Reimagining Construction: Integrated Project Delivery *

"We cannot solve our problems with the same thinking we used when we created them."
- Albert Einstein

In its legal structure, the contractual supply chain enabling any piece of construction or infrastructure is little different from that which supports most of the other manufactured things of the world.

It is a networked system of bilateral contracts. Party A agrees to deliver an output of his labour or material to Party B, who receives that as input for her own deliverable to Party C in the next contract between them. Repeat this in coordinated fashion as often as necessary, and the resulting output is the manufactured item for the end user.

It is an arrangement which has been perfected since at least the 18th century. The law of contract has evolved in lock step to maintain the system and protect its integrity. Its underlying precepts include the specialization of tasks, performed by people silo'd in relative isolation from one another except those in contractual proximity. The primary objective of each is to maximize the return from their bargain with the other. The whole, even if discernible, is of immediate concern only to those at the top. The button maker may know little, and care less, whether his buttons are destined for a gown or a frock.

As a system, it has been astonishingly effective. It is responsible for virtually everything we buy and use, from pencils to Boeings, as well as our buildings, roads and bridges. There are differences, however, between the creation of our manufactured goods and our physical infrastructure.

That these differences are worth pondering is a matter of statistics, as well as experience. While the productivity of non-construction manufacturing has grown steadily in the generation or more in which this has been measured, productivity in the construction industry has remained stagnant at best. Many surveys, conducted around the world and covering the range of construction activity, reveal a persistent and dismal record of cost overruns, schedule delays, conflict and waste. This is despite advances in technology and project management capability, and contracts of ever-increasing sophistication. Alongside these, a claims culture has also become embedded in construction, supported by its own cottage industry of specialists whose energy is devoted not to building anything but instead adjusting contested entitlements, usually after the fact.

Useful clues about the solutions to these problems can be discerned by examining what distinguishes the construction process, as well as the characteristics of the contractual supply chain that supports it. In fundamental ways, that networked system of bilateral contracts underlying traditional construction project delivery is incapable of consistently and efficiently meeting the parties' expectations despite our best efforts at scope definition, risk allocation, dispute resolution, and all the rest of the patchwork effort in making it work. This is true whether the delivery method is design-bid-build, design-build, CM, or any variant of these.

To critically examine the construction process and its supply chain is to unearth the rationale for integrated project delivery (IPD) as well as the underlying principles governing it. It is difficult to understand IPD fully without closely examining construction as a unique manufacturing method, including its contractual supply chain and the value propositions that pervade it.

The Manufacturer and the Construction Owner

Creating a new manufactured product typically involves a dynamic prototyping phase, during which the manufacturer is able to perfect his conceptual design in collaboration with anticipated component suppliers as well as stakeholders. The creation of the prototype, often over numerous iterations, can be done relatively cheaply and at little risk. Design changes are expected and encouraged.

The collaboration is not merely to perfect the prototype but also to confirm that the manufacturer was being realistic in his assessment of the need for the product in the first place. The prototyping phase provides the manufacturer with an opportunity for sober reflection before making the heavy investment in a decision to proceed. Some prototypes never make it into production precisely because of this.

The goal of the prototyping phase is high certainty about the product's design and its functionality, its materials and the dimensions of its components, its method of manufacture and so on, as well as the costs of manufacture. It is evident that the system of bilateral contracts which constitutes the manufacturer's supply chain is well suited to this process, particularly given the transactional nature of the relationships between each of the parties in the chain. Price, quality and timing of delivery have all been predetermined. All that remains is to perform and pay.

The construction process shares few of these attributes, although oddly we pretend that it does in the contractual supply chain enabling it.

There is no opportunity to prototype a building. The building *is* the prototype. There is simply no escaping that *this* one project, on *this* site, designed and constructed by *this* team with *its* capabilities and culture, during *this* timeframe and in *this* economic and regulatory environment, is the owner's one chance to get it right.

The construction owner's decision to proceed is not made in a vacuum - but it is made early and upon information which is necessarily incomplete. Cost estimates, perhaps a feasibility study and a preliminary design only go so far. Add to this the measure of indeterminacy which pervades the process generally and cannot be eliminated. The causes are many and varied, including imperfect designs, unforeseen site conditions, owner-directed variations, contractor failures of performance, force majeure events, and all the rest. To state the obvious: construction is a dynamic activity and change is a virtual certainty.

Through this lens, the owner's decision to proceed is a more or less-informed act of faith. On occasion, that faith is spiced with a bad case of optimism bias, buttressed by influences such as political agendas, monument-building and the like, rather than a proper business case made upon hard, real-world data. High profile megaproject failures such as Mirabel, The Chunnel, Muskrat Falls and Berlin Brandenburg Airport come to mind, but these are only the more notorious examples.

Once made, the decision to proceed precipitates the familiar series of bilateral contracts involving the owner and the design and construction parties which, in their totality, map out into one of the usual, well known models. It is a crystalline structure; in their quest for an elusive certainty, each of the pairs of parties employs fixed prices (commonly), invariant schedules and detailed scopes of allocated work, all backed up by the usual threats such as liquidated damages, liability provisions and indemnities. But the problems of incomplete information and the near certainty of change remain, minimized as they often are among the group at large amid some optimism biases of their own.

So there we have it, two networked systems of bilateral contracts, the manufacturer's and the construction owner's, looking very similar but with this crucial difference: for the parties to construction, what remains is not simply to perform and pay. It is also to *relate*, over time and circumstance.

Most construction contracts attempt to deal with this through the use of change mechanisms. It is worth noting, however, that it is the imperfect operation of those same change mechanisms that lies at the root of most of the problems in construction. Why is this?

Recall the primary objective of each party to each contract: to maximize the return from their contracted bargain. This is intrinsic to the value proposition each brought to the bilateral transaction at the outset. A change event brings with it the need to renegotiate that value proposition, but now in very different circumstances wherein the parties are significantly committed and mutually dependent, there may be uncertainty about responsibility for the change event and opacity about its financial impact, and the parties now have a history.

In any event, it is this value proposition between the parties that is both staunchly defended by each of them and assiduously protected by the law of contract which holds their bargain sacred. It is, however, the value proposition of a silo. The law of bilateral contractual relations is exquisitely indifferent: it will readily enforce the silo-keeper's claim to payment for storing the farmer's grain, even as doing so bankrupts the farm.

Integrating Project Delivery

IPD is a model that attempts to ameliorate the difficulties mentioned above by recognizing the relational characteristics of construction in an intentional, comprehensive and radical way.

We now have in Canada a standard IPD contract, being the CCDC 30 - 2018 form. What follows is a summary of the key driving principles of IPD, each of which are accommodated by CCDC 30 either expressly or by necessary implication. Capitalized terms below bear the same meanings as defined in CCDC 30:

1. Eliminate the silos.

CCDC 30 is a multi-party contract having at least three parties (Owner, Contractor, Consultant). It contemplates Other IPD Parties at time of contracting, as well as Added

Parties who may join later. In practice, it is not unusual to have 15, 20 or more parties all signatory to the same contract.

2. Focus *first* on the team, *then* on the project.

As at the date the CCDC 30 is entered into, there is no project. There is, at best, an Owner's conception, probably a working budget, some idea of a project duration, perhaps a site.

CCDC 30 begins by establishing the IPD Team. From within that group, it prescribes a Senior Management Team, Project Management Team (PMT), and Project Implementation Teams. Default provisions addressing the roles, responsibilities and governance of these teams are set out. As with any CCDC form, these are capable of revision to suit using supplementary conditions.

3. Emulate, as far as practicable, the elements of a prototyping process.

CCDC 30 prescribes the all-important Validation Phase as the first step towards a viable project. Undertaken by the PMT, validation is the detailed, comprehensive assessment of all aspects of the proposed project, done in close collaboration among the owner and the design and construction parties including key trades and suppliers. The objective of validation is to verify a proper business case for the project, which means maximal clarity about cost on an elemental cost basis, project budget and cash flow, scope and task allocation, anticipated risks, contingencies required, and so on.

Validation serves three other purposes: (1) it provides the team with the opportunity to gel with one another as a smoothly functioning group; (2) it allows for the identification and replacement of any participants who are incapable or unwilling to work in the highly collaborative manner necessary; and (3) it affords the owner the opportunity to delay its go/no go decision until the Last Responsible Moment (a principle of Lean construction), to make that decision in circumstances wherein it has far more reliable information available to it than otherwise, and in which lurking optimism biases among the team have likely been identified.

4. Trust but verify.

CCDC 30 is the only contract within the CCDC suite that uses the term "trust". Each member of the IPD Team is obliged, among other things, to "establish and maintain an atmosphere of mutual trust, respect and tolerance".

There is nothing Pollyannaish about this. While the IPD model places extraordinary emphasis upon mutual trust, openness and transparency, including transparency in financial matters, CCDC 30 backs that, among other ways, with record retention requirements and audit rights, including the audit of profit expectations of the members of the Design/Construction Team.

5. Collaborate. *Really* collaborate.

There is heavy emphasis throughout CCDC 30 upon open, continuous collaboration among the IPD Parties, starting with the Validation Phase and continuing through the Design/Procurement, Construction, and Warranty Phases of the project. As examples, the IPD Team is expected to co- locate in physical proximity in a Big Room, it is expected to establish and maintain a culture involving the exchange of mutually reliable promises, and most decisions are required to be made unanimously (with mechanisms to prevent deadlock).

Intensive collaboration optimizes the use of a number of tools for enhanced project performance including BIM, Target Value Design, the use of Lean construction techniques to enable continuous learning and drive out waste, pull planning, and so on. An IPD project involves ongoing project monitoring and control, in real time and involving everyone, with the objective of anticipating possible change events, making the adjustments necessary, and avoiding surprise.

6. Be ethically aligned about the money.

For the Owner, this means the obligation to pay the Design/Construction Team at least its Reimbursable Costs (which excludes profit) in any event of project outcome.

For the Design/Construction Team, this means recognizing profit for what it actually is: money exposed to risk of potential loss if performance expectations are not met - in other words, their investment in the project's success. During the Validation Phase, the IPD Parties identify and agree upon the profit expectations of each member of the Design/Construction Team, which is then set aside in a combined Risk Pool. The Risk Pool is subject to increase upon predetermined events, and is subject to depletion depending upon the performance of the Design/Construction Team as a whole. It is paid by the Owner and distributed upon directive of the PMT in accordance with percentages previously agreed upon during validation.

7. Make it safe to succeed.

Because the maximization of each party's return from a bilateral bargain is no longer relevant in IPD, CCDC 30 provides for the express waiver by the IPD Team of claims against one another. This intentionally leaves the members of the Design/Construction Team with only one place to look to receive their return: the Risk Pool.

There are a small number of necessary exceptions, such as payment obligations, wilful defaults, and insured claims. But the overriding principle remains: the financial consequences for deficient performance are visited upon all of the members of the Design/Construction Team collectively, in accordance with the percentage allocations of each in the Risk Pool.

This has the salutary effect of focusing the parties precisely where they need to be: upon their collective success in achieving the project objectives that they had all agreed upon in advance. It also establishes an atmosphere of psychological safety and redirects the

parties away from the usual self- protective, finger pointing mode which is endemic in traditional delivery towards innovation and problem solving for the good of the project as a whole.

Conclusion

IPD is a new paradigm, seeking to solve the pervasive problems of construction project delivery in a fundamentally different way. Studies to date comparing the performance of IPD projects against traditional methods are highly encouraging. It carries great promise for those prepared to think differently, and should be seriously considered.

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