RESEARCH REPORT

Owners' Perceived Barriers to Adoption of IPD in Canada

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IPDA
INTEGRATED PROJECT DELIVERY ALLIANCE

THE UNIVERSITY OF BRITISH COLUMBIA

BIM TOPICS LAB

Authors

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EXECUTIVE SUMMARY

Integrated Project Delivery (IPD) is a project delivery method which aligns the project team members and provides an effective collaboration mechanism to enable them to achieve overall project goals efficiently.

While IPD is emerging as a viable delivery model in the industry, with success stories from Canada and around the world (as documented in previous research including "IPD: Performance, Expectations, and Future Use"[2] and "Motivation and Means"[3]), some Canadian owners are hesitant to give it a try.

This report presents the research findings of a study investigating those owners' perceived barriers to adoption of IPD as a delivery model on their construction projects. The reasons are complex but can largely be distilled down to a set of six perceived barriers (Figure 1). The order of barriers is not reflective of their importance.

Figure 1: Categories of perceived barriers to owner adoption of IPD

What is IPD?

According to the American Institute of Architects, Integrated Project Delivery (IPD) is a project delivery method that integrates people, systems, business structures and practices into a process that collaboratively harnesses the talents and insights of all participants to reduce waste and optimize efficiency through all phases of design, fabrication and construction.[1]

"Real" versus "Perceived" Barriers

Owners and teams are successfully delivering projects in Canada using IPD. Barriers to IPD can therefore be "real" (those that actually have to be overcome through investment, regulation or some other structural change) or "perceived" as a result of a lack of information, experience, authority and so on. It is clear from the research, that the barriers identified are not universal to all organizations, their relative importance is highly variable and, indeed, some may not be "barriers" at all.

Research methodology "in a nutshell"

Three owner forums with over 50 Canadian construction owners and owner representatives from the public and private sectors took place across three Canadian provinces and cities - Vancouver, BC, Calgary, Alberta and Toronto, Ontario.

The research team collected more than 30 hours of recording data from the three owner forums. Specifically, we identified the perceived barriers, the specific characteristics of IPD that cause those barriers, and the related drawbacks or impacts resulting from those barriers.

1: Resistance to Change

Resistance to change and "fear of the unknown' are prevailing attitudes at many owner organizations. IPD is a new procurement model that is being introduced into an industry that views almost all innovation as risky and tends to discount (or ignore entirely) the long-term value of that innovation. The reasons for the construction industry's resistance to change are well-documented and are not unique to Canada. According to the World Economic Forum, they can be attributed to various internal and external challenges: the persistent fragmentation of the industry, inadequate collaboration with suppliers and contractors, the difficulties in recruiting a talented workforce, and insufficient knowledge transfer from project to project, to name a few.[4]

2: Cultural Misalignment

The collaborative culture required for IPD is not aligned with the traditional protectionist "command and control" mindset of many owners. There is also significant industry inertia and a 'lowest bid' mentality that is difficult to dislodge. Additionally, there is resistance throughout the construction industry to provide financial transparency and "open book" project management, believing that such transparency could make an organization more vulnerable.

3: Lack of Clarity in the IPD Contract Model

The CCDC 30 standard form of contract for IPD in Canada is still new and has yet to be tested legally. Some owners believed that provisions relating to construction administration (including indemnity, bonding and insurance) require refinement. These aspects are particularly relevant to the Canadian context and not readily adaptable from international IPD contract models. There is also a need for more contractual measures for accountability and assurance of the project outcome's quality. They also stressed the lack of enough measures for the off-boarding process of low performing partners and the need for clarifying its related obligations.

4: Resistance to Greater Involvement in Project Management

The fact that IPD generally requires greater owner involvement and more human resources up front leads many owners to believe that IPD is more expensive with the extra costs being incurred at the preliminary stages. Unwillingness to invest early means that, for example, the project does not benefit from the Validation phase – a critical step in an IPD project when the team establishes cost, scope and schedule certainty (see side bar).

5: Lack of Familiarity and Trust in the New Process

Many owners lack the tools, resources and expertise (in particular, risk mitigation methods) to be confident that the IPD process will lead to success. There is a perception that there is still only a small pool of Architecture, Engineering and Construction (AEC) firms with IPD experience leading some public owners to wonder about how to conduct a fair, open and transparent team selection process. Lack of familiarity with lean planning methods, the need for lean tools and the necessity (and cost) for providing IPD training to the project team was also noted.

6: Structural Misalignment at Owner Organizations

Many owner organizations operate within highly siloed departmental structures which can make internal collaboration and cross-functional decision-making (e.g. between legal, finance, risk management, etc.) very difficult. Different departments can have competing interests which can impact the hiring process for an IPD project team, cause a lack of flexibility in cash flow management and even affect overall project approvals.

Resources to assist owners get on board with IPD

1. Case Studies of completed IPD projects in Canada.
2. An easy-to-use "quick-start" guide.
3. Technical resources for building the business case for IPD.
4. An orientation guide and onboarding toolkit for legal advisers and in-house counsel.
5. A suite of easily customizable template documents.

Owner education "on the fly"

At the end of each of the three owner forums that were convened for this research study, IPDA hosted a presentation and panel discussion on IPD for participants (Below Vancouver, bottom Toronto).

The perceived barriers identified in this research are complex, inter-related and multi-layered and their relative importance can vary widely between different owner organizations. They can influence individual, organizational and industry-level perspectives. Given this complexity, many owners identified the need for additional resources, education and tools to support the transition to this more collaborative way of executing construction projects (see sidebar).

In particular, training and educational sessions for a novice IPD team early in the project process can help them to collaborate effectively while increasing their overall awareness of the IPD model. Such sessions also help to build confidence within the owner organizations. Training sessions can be delivered through a variety of media and tailored for different members of the owner's internal project team, including procurement, legal, finance, HR and project management. Supporting owners through their first IPD project by providing access to facilitators and team coaches will help to ensure that all the onboarded members share the same level of understanding. Conferences, boot camps and regional "Communities of Practice"[5] are also valuable to ensure continued learning and knowledge sharing.

Owner organizations need internal IPD champions who can help to advocate for IPD adoption, particularly at a senior level who can reach across different departments. These individuals may need specialized support in the form of in-depth training and a community of practice. An IPD credentialing system, like the Lean Green Belt program, may encourage participation.

Finally, public policymakers can help to drive adoption of IPD through the creation of incentives and policies for the market to adopt IPD. These measures will be helpful to encourage construction stakeholders and companies to help lead this change.

IPD Primer

Integrated Project Delivery (IPD) is "a contractually based approach, which creates an environment that enhances collaboration, innovation, and value. IPD is characterized by early involvement of team members, shared risk and reward based on project outcome, joint project management, liability reduction among IPD team members, and joint validation of project goals."

IPD implemented together with Lean Construction practices and Building Information Modeling (BIM), is seen as one of the most promising means for the improvement of productivity and project performance within the construction industry. IPD has shown to improve owners' satisfaction, provide higher cost and schedule predictability, improve cost, quality and schedule performance, reduce project changes and enhance communication among the project team. Although the implementation of IPD has been successful in the US and Canada, the rate of adoption of IPD within Canada has been uneven.

1 RESEARCH METHODOLOGY

This research aims to better understand building owners' challenges with IPD adoption in the Canadian context, and to identify the perceived barriers and critical factors that influence IPD adoption by Canadian building owners.

The study was informed by three focus group "forums" held in three different Canadian provinces: Ontario, British Columbia and Alberta. In 2019, these three provinces accounted for over 70% of Canada's construction GDP ($138.2 billion)[6].

Owner Participation

A total of 53 representatives from different owner organizations participated in the study. They were executive or senior management level decision makers from government agencies, public organizations and private development companies who were responsible for procurement, purchasing, operations, capital investment, project management, infrastructure development, manufacturing and logistics, and commissioning of mid to large commercial, institutional and multi-family residential projects.

To ensure perspectives were gathered from individuals with a wide range of experience with IPD, some participants were invited who had no prior involvement with IPD but were interested in the topic. Invitations were also extended to owners who had their first IPD project underway as well as owners who had completed at least one IPD project. Participants were identified with the assistance of the IPDA and regional industry stakeholders. The forums were held in Toronto (October 2019), Vancouver (November 2019) and Calgary (February 2020). Attendance and group configuration at the three forums are summarized in Figure 2.

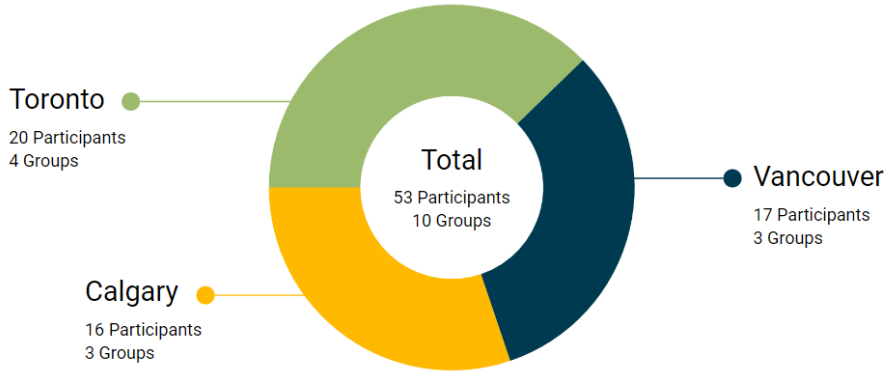


Figure 2: Breakdown of participants and groups at the three forums

Data Collection

Each of the three forums followed the same format and agenda. The overall process for data collection at each forum consisted of five significant steps, as shown in Figure 3. All the sessions were audiotaped, and the participants were asked to provide as much information as possible.

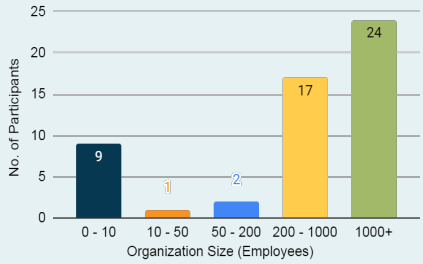
Figure 3: Process for data collection at the three owner forums

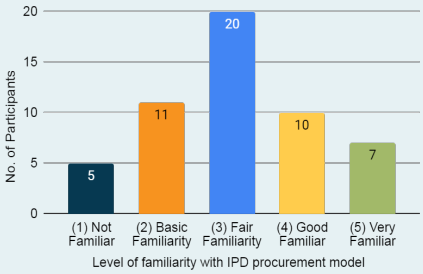
Group Distribution

Before attending the forum, all the participants completed a survey in which they provided information about their organization, their level of familiarity with the IPD delivery model and information on any completed IPD projects. This data was used to organize the participants into discussion groups of 4 or 5 people. The objective was for each group to have participants from different types of organizations who would each bring different perspectives about IPD to the table.

Out of 53 participants, 31 (58%) worked in the public sector, and 22 (42%) were from the private sector. The participants split by organization size and level of familiarity with IPD (on a self-reported scale of 1 to 5) are shown in Figure 4.

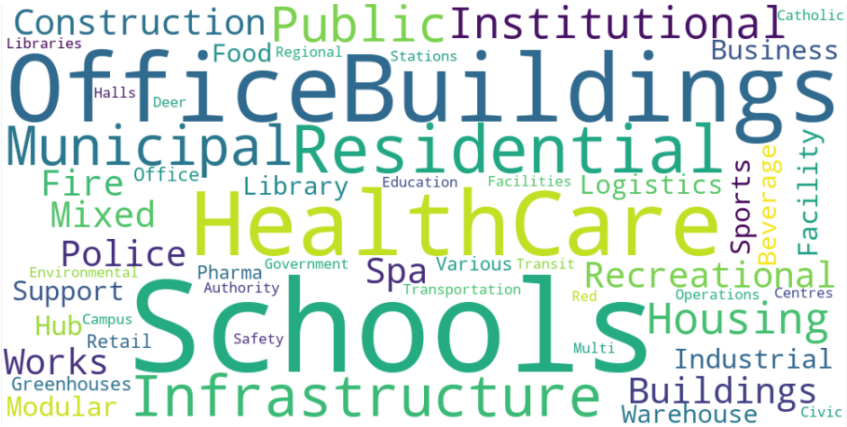
Figure 4: Distribution of participants by organization size (below) and level of familiarity with IPD (bottom)





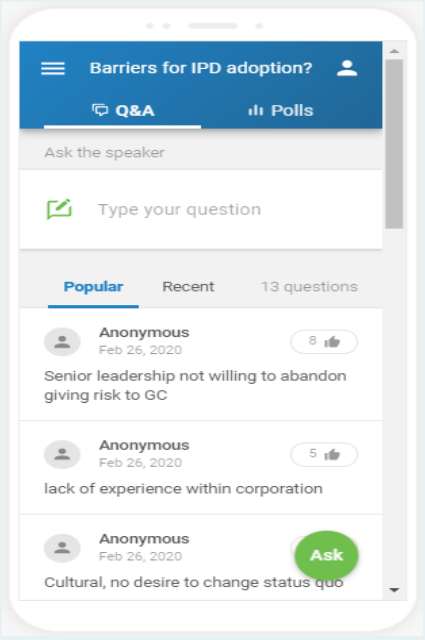
Survey respondents were also asked about the type of projects that their organization primarily undertakes. Figure 5 shows a word cloud of the major categories of projects to provide a general idea about the participants' backgrounds.

Figure 5: Project specializations of the participant's organization



Live Online Survey

As a "warm-up" at the beginning of each forum, all the participants were asked to use a live online survey tool to identify the barriers that they believe might hinder the adoption of IPD. The participants were able to submit multiple entries and could make their submissions anonymously. Everyone could see the results projected on the screen as they were being posted and could "upvote" different submitted barriers by others, as shown in Figure 6. The participants were given about 10 minutes to complete this task.



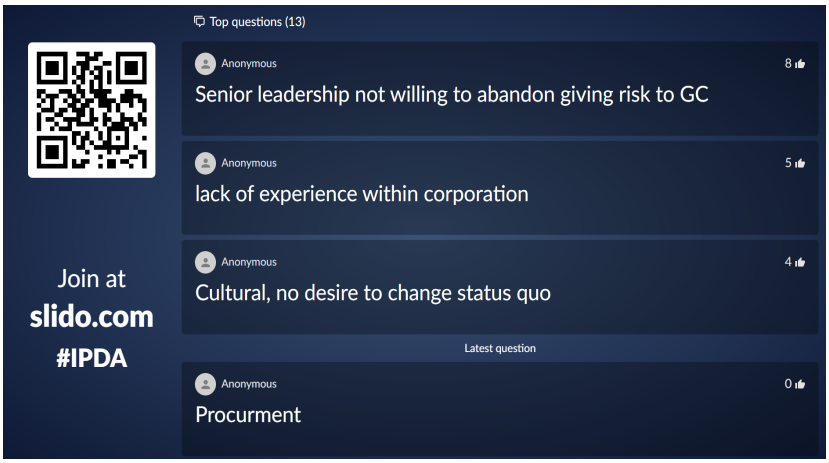


Figure 6: (above and right) Participants submitting barriers and voting for other submissions using their phone or laptops

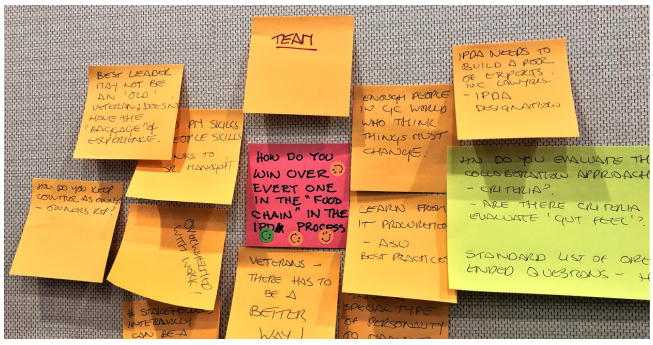
Figure 7: Focus group discussion with research team members

Focus Group Discussions

The focus group discussions were conducted in two 90 minutes sessions. In the first session, the top two barriers, as voted by the participants, were used as the theme for discussion by all groups (Figure 7). In the second session, each group was given a choice to select a preferred topic for further discussion - either a topic of their choosing or from the list of upvoted topics from the live online survey.

A research team member moderated each focus group discussion. Each group logged their inputs about a barrier to IPD on sticky notes, which they then collectively organized into categories of "barriers to IPD." The group then ranked the categories of barriers in terms of significance and severity. A sample snapshot of sticky notes grouping and prioritization completed by the participants is shown in Figure 8.

Figure 8: Sticky notes grouping and prioritization by participants in a group - the smiley stickers on the notes show the ranking of the issue, as suggested by the participants.



Report Outs

Following the focus group sessions, a member from each group outlined the critical topics of discussion at their table to the participants from other groups. The participants could ask clarification questions and garner insights from other participants (Figure 9).

Figure 9: Report out session after a focus group discussion in Toronto

Data Analysis

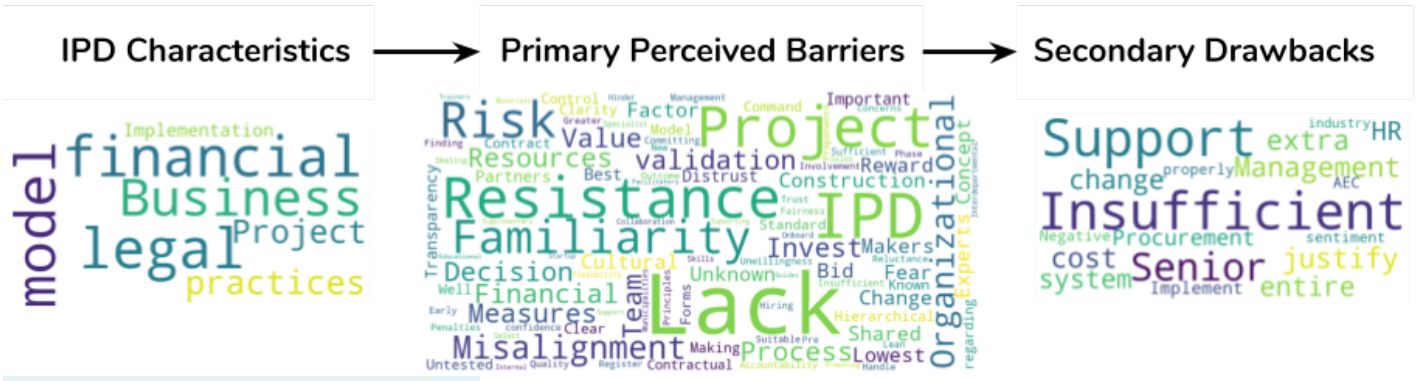
The research team collected more than 30 hours of recording data from the three focus group forums. Following a high-level review of the data, a contextual analysis was performed to organize the highly complex data and gather insights about knowledge of IPD among participant groups.

The specific circumstances in an organization (or in the industry in general) that lead to challenges with adopting IPD were determined by identifying the perceived barriers, resolving the specific characteristics of IPD that cause those barriers and uncovering any linked drawbacks resulting from those barriers. In this regard, the following fundamental questions were used for analyzing a barrier:

1. ***Which aspects of IPD, if implemented, can be mainly linked to the identified barrier?*** Investigating this question helped to uncover the deep conflicts between IPD and conventional industry practice.
2. ***Which secondary drawbacks and consequences can be attributed to the identified barrier?*** The distinction between the primary perceived barriers and the secondary drawbacks can sometimes be challenging, given that many barriers are multi-layered and difficult to define, as discussed below. However, this distinction helped the solution-finding process to be more productive.

The conceptual approach utilized in this research is shown in Figure 10 which offers a systematic picture of the highly interconnected subject matter. It also shows that this analysis distinguishes between the “Primary Perceived Barriers” and the “Secondary Drawbacks.”

Figure 10: Research Analysis Approach



Key IDP Characteristics

In this study, the adoption of IPD is assumed to be a combination of:

- **New business practices:** IPD demands greater engagement, collaboration and commitment of the owner to the IPD team, which must be sustained throughout the project.
- **New financial models**: Contractual agreement among the project team members to share risk and reward that builds trust through transparency.
- **New joint project implementation approach:** Integration of all project participants in a transparent decision-making process. Additionally, the adoption of Lean principles to achieve higher levels of productivity and accountability.

The primary barriers to IPD adoption identified in this research mostly exist because of the current circumstances, cultural norms and established perceptions in the Canadian industry. These barriers may eventually be resolved if those circumstances, norms and perceptions change.

Owners and teams are successfully delivering projects in Canada using IPD. The word "perceived" was therefore chosen as a "modifier" to this research topic to suggest that some of the barriers identified might not be necessarily "real", but the fact that the owners perceive them as actual drawbacks justifies their relevance.

The main objective of this research was to identify the primary perceived barriers to IPD and their connections to the characteristics of IPD. However, the "Secondary Drawbacks" that usually emerge as a consequence of the primary perceived barriers have also been included. The reason for this approach is that the focus group participants tended to state the drawbacks to IPD without necessarily being able to define the underlying barriers, particularly those with limited experience with IPD. In other words, the research approach considered the drawbacks as "symptoms," which could then be organized in a way to diagnose the underlying perceived barrier.

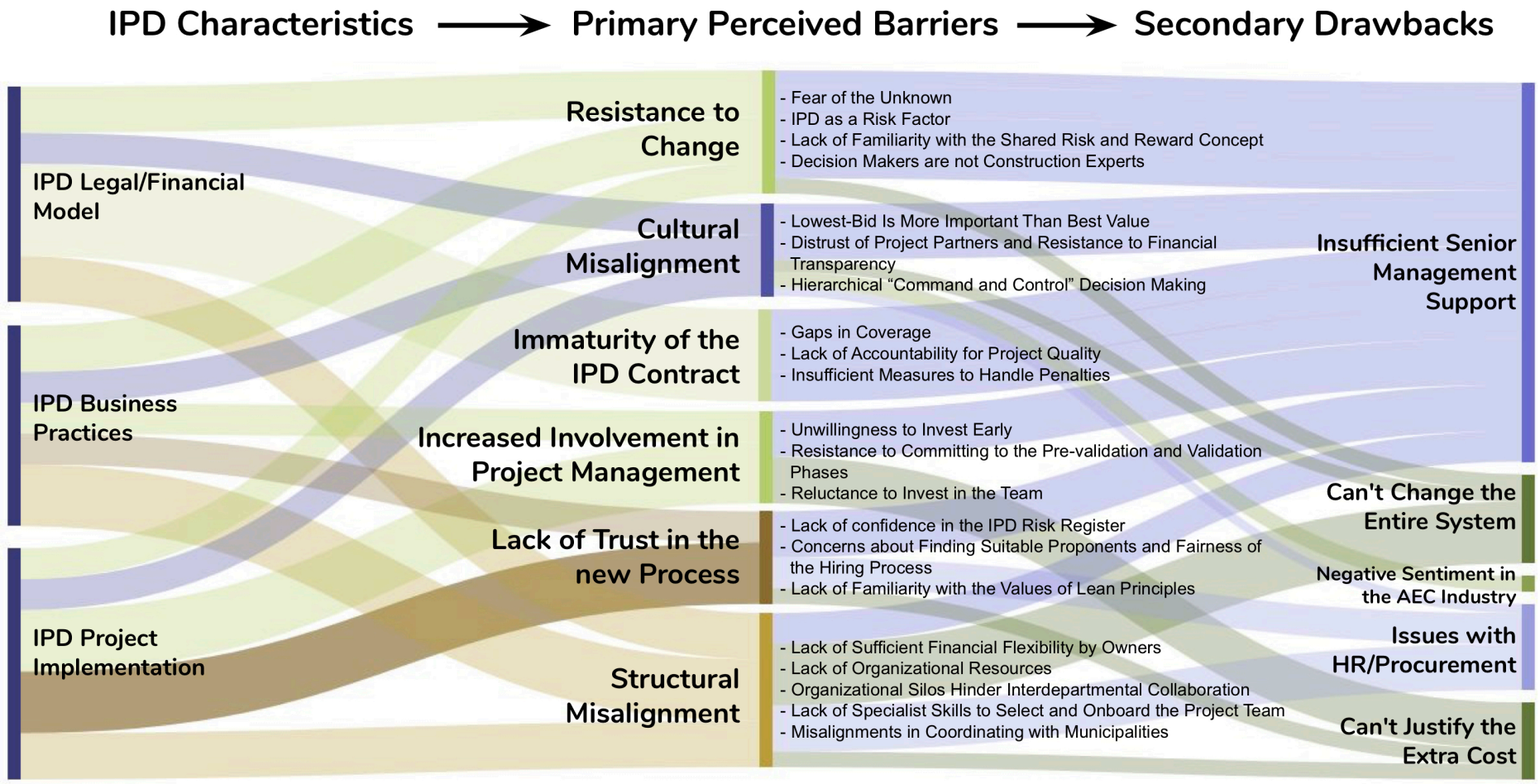
Before describing the primary perceived barriers and the secondary drawbacks in more detail, it is important to have a common understanding of the key IPD characteristics and the extent to which they impact project scopes (see sidebar). These novel characteristics require the AEC industry and, potentially, the supply chain that supports it, to rethink their business practices and relationships. This reconsideration can be challenging given the fragmented nature of the industry, the tendency to "short-term thinking" that results from being highly project-driven and the industry's long-standing resistance to change.

2 BARRIERS TO IPD ADOPTION

Analysis of the outputs from the three forums revealed six different categories of owners' perceived barriers to IPD adoption in Canada.

Figure 11: Contextual relationships among IPD characteristics, primary perceived barriers, and secondary drawbacks

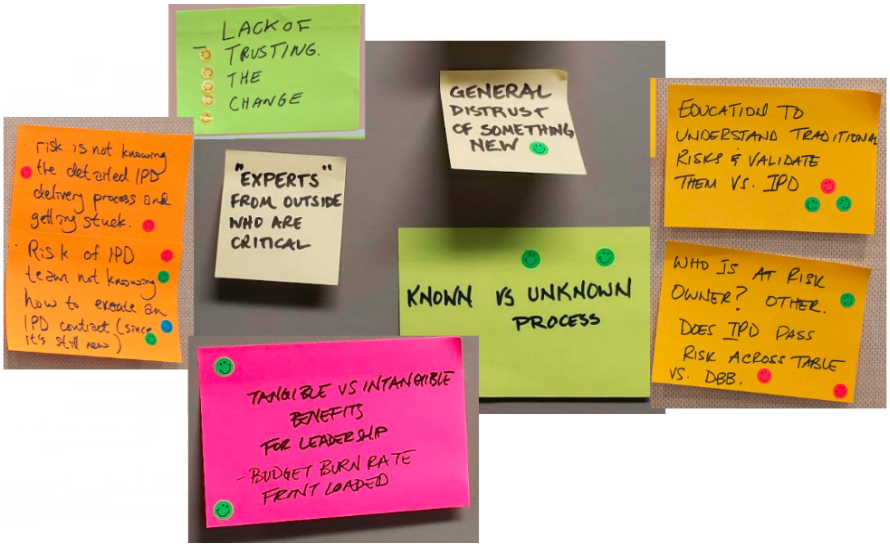
The order of barriers is not reflective of their importance. Figure 11 illustrates the complexity of the topics and their level of interconnectivity.



1. Resistance to Change

This category of perceived barrier encompasses the negative sentiment that commonly prevails in the construction industry regarding the adoption of any new innovation. Figure 12 gives an overview of the collective feedback regarding this category of perceived barriers by the owners.

Figure 12: Overview of the notes collected regarding the resistance to change within the AEC industry.



Fear of the Unknown

IPD is a new delivery model to most owners and builders in Canada (the first Canadian IPD project finished in 2015). It comes with a new set of concepts for how to conduct business practices, set up financial models and implement the project. For many owners and the AEC industry, these concepts may be or appear to be fundamentally different from customary practices. The lack of enough knowledge and fluency with the different aspects seems to be significant across the country and is rooted in fear of the unknown.

This concern is amplified by the perception that the application of IPD requires the development and implementation of a new risk management model, contractual relationships, and decision-making processes. The changes may potentially occur at the same time and maybe tricky for owner organizations to handle.

Figure 13: Notes collected regarding resistance in engaging with an innovation

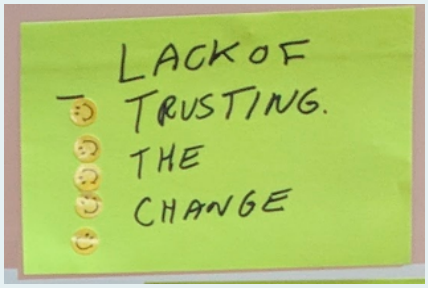
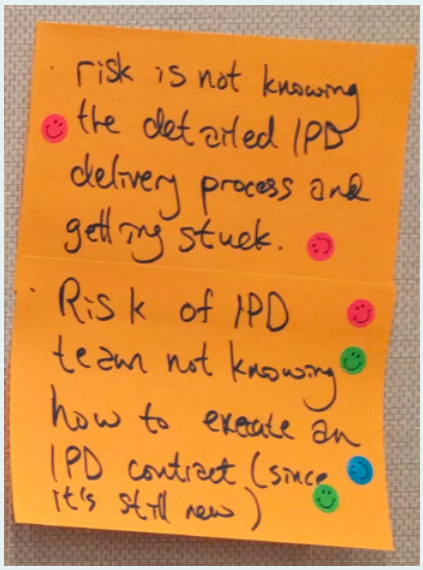


Figure 14: Note collected regarding considering IPD as a risk factor



Without information about how onerous these shifts in business practice are to achieve and the scale and likelihood of benefits being realized by successful projects, there can be resistance to investing in the necessary changes - particularly from senior management. This fact was repeatedly mentioned by focus group participants, as shown in the notes below (Figure 13).

IPD as a Risk Factor

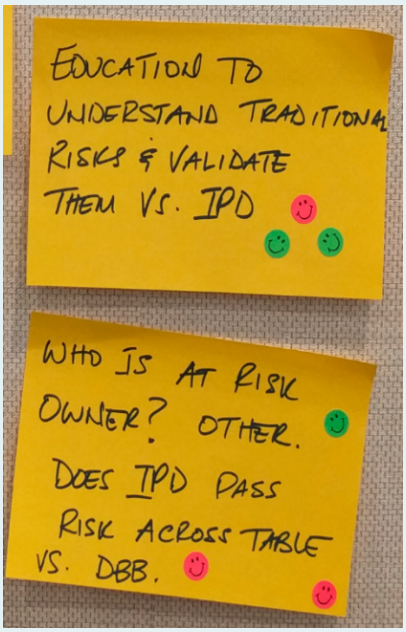
A lack of familiarity with the new procurement and contract models that underpin IPD compounded by a deep-rooted "fear of the unknown" described above can influence risk management approaches in owner organizations. The traditional risk management approach is mainly to off-load or download risk wherever possible. By comparison, risk in IPD is identified and documented in the "risk register," and the team collectively agrees on the allocations under the principle of shared risk and reward. The risk register is used in an IPD project to identify, quantity, and mitigate risks proactively across the project.

Many owners did not understand how exactly IPD deals with risk. Those that had some idea made it clear that the IPD risk management approach goes against the traditional approach to the extent that IPD itself is sometimes identified as a risk factor. (Figure 14).

"One of the questions I have is the time component of the risk. When are the risks being identified or potentially realized, and how does IPD shift that? As an owner, if I'm doing traditional design-bid-build, I'm going all the way up until my bidding process, and all of a sudden, something repeats twice in budget or something of that nature, and that is when I realize the risk.

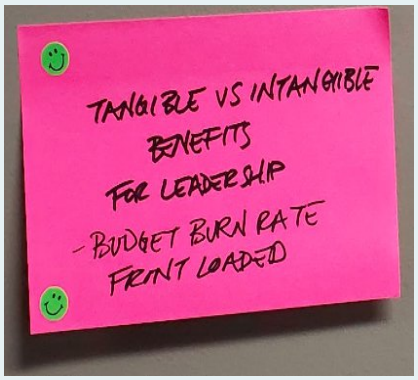
In IPD, are we realizing those potential risks earlier and are we then better able to manage those risks? Consequently, does that also require additional funding and budgeting upfront to be able to go through that process? As this will change my whole budgeting structure and cost flow curves."
- Public owner

Figure 15: Notes collected regarding lack of awareness about IPD dealings with risk.



"Referring to the idea that you are outsourcing and transferring the risk [in the conventional construction, there is] a lack of overarching awareness or understanding of what the model is and how risk is shared between the parties."
- Owner Representative

Figure 16: Note collected regarding IPD benefits being intangible to decision-makers



Lack of Familiarity with the Shared Risk and Reward Concept

The shared risk and reward mechanism that is a cornerstone of the IPD contract is new to many Canadian owner organizations. Limited understanding of IPD principles, the financial "mechanics," legal aspects and risk management implications is a crucial challenge for many owners. The organizations where the legal and financial decisions are made by those not directly involved with the project or familiar with the construction process, especially face this issue.

The fact that the shared risk and reward mechanism in IPD is contractually guaranteed is a radical departure from the traditional legal and financial models that are familiar to most owner organizations. Focus group participants who were new to IPD and had limited experience with the legal and financial procedures in IPD voiced concerns about the shared risk and reward approach. In particular, how is IPD implemented, when costs become known, when costs are incurred, how risk management works in IPD and what the levers for control might be (Figure 15).

The concept of "profit pool" that is used in IPD to formalize the shared risk and reward arrangement is also a new concept for both owners and AEC firms. It is not only difficult for some organizations to incorporate this concept into their current organizational systems; some owners might not have appropriate or enough benchmarks for understanding reasonable ranges for each involved party's prospective profit.

Decision-makers are not Construction Experts

In many owner organizations, budgetary decisions are frequently made by non-construction experts on capital management committees, who are not directly involved with the project and who may not appreciate the advantages of implementing IPD. Focus group participants who are IPD advocates within their organizations stated that they lack the means to effectively communicate the benefits and value of IPD to those who do not have construction management expertise (Figure 16).

"C-suite and senior management are not necessarily the technical people; they do not see the day to day of a project; they only see the result.

"IPD seems to be focused a lot on the process, and everybody has a nice time doing a project and the fact that [in] most projects people don't have a nice time, that kind of benefit is not something that's seen at the senior level.

What they only see is, were you on time and budget? or whatever the kind of key criteria is. [...] so as a result, owners are not necessarily incentivized to be tech-forward, like all of these new systems aren't necessarily something that is key to the way that businesses run."

- Group Summary Report Out

The presence of a technical and cultural disconnect between the decision-makers and the project team in an owner organization is not uncommon. Decision-makers are not acquainted with the realities of conventional construction management. They, therefore, do not appreciate the values and benefits of IPD and the positive effects it could have on their organization's resources and internal processes.

Key Takeaways

Many owner organizations and AEC companies do not have a sophisticated approach to managing innovation. They tend to perceive it as a risk factor, which leads to considering innovation as additional ad hoc "expenses" that are often wrapped into the project budgets, rather than proactively investing in R&D as a core business strategy.

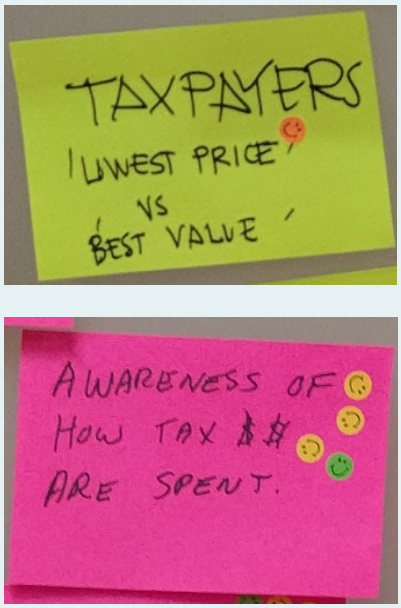
IPD is a new procurement model that requires fundamental changes in the way projects are conducted. The negative sentiments towards anything new that pervade the construction industry mean that there is the inevitable resistance to adoption driven by fear of the unknown and lack of ability or authority to adopt operational practices to accommodate it. Resistance to change also fosters a lack of willingness to learn about IPD fundamentals and benefits, which result in the adoption of IPD itself being viewed as a risk.

2. Cultural Misalignment

This category of perceived barrier relates to the established mindsets and cultural norms that persist in the real estate development and construction industries broadly and that have an impact on IPD adoption. Figure 17 gives an overview of the collective feedback regarding this category of perceived barriers by the owners.

Figure 17: Overview of the notes collected regarding cultural misalignments in the AEC industry.

Figure 18: Notes collected regarding concerns about accountability when the lowest bid is not pursued.



"They [taxpayers] never think of anything over time, and the taxpayer will only tolerate the lowest budget for procurement" - **Public Owner**

Lowest-Bid versus Best Value

The principle that the "lowest bid always triumphs" is still a firmly held doctrine in many owner organizations. While some owners are shifting to life-cycle costing and total cost of ownership based approaches to their procurement models, the belief that the lowest bid equals "best value" has been difficult to dislodge. This belief is especially common for public owners who need to be responsive to the taxpayers regarding their construction expenses (Figure 18).

"Even though we have had success with our IPD projects, I still keep getting asked: 'Why is it not the lowest bid? How can this possibly be in the public's best interest, if it's not the lowest-bid?' I get this from the senior management, legal, procurement, everyone. It's ubiquitous!

I find it frustrating when I'm standing in front of the senior management, and I'm talking about the successes of a project, and they tell me: well, but it wasn't the lowest bid. How are you sure that you're getting value out of it?"
- Public Owner

However, IPD is predicated upon aligning the project with the owner's business goals to define and then deliver optimal value, which has the owner's and project participant's satisfaction as a goal for the project outcome. However, the IPD philosophy of a project process delivering a "win-win" to all parties appears to be difficult for some to grasp - given the adversarial nature of traditional construction and the deep-rooted mistrust between project team members (discussed further in the next section).

IPD advocates in the focus group discussions described how they struggled with defining, articulating and justifying the expected advantages of IPD. The culture of "lowest-bid equals best value" is so profoundly ingrained throughout Canada's construction industry that it can be challenging to develop a convincing argument for doing something different. However, many owners spoke of low-bid projects that ended up costing more[7]. The lowest-bid mentality drives down margins, which pushes bidders to try and make profits back through change orders which can potentially result in quality and performance problems on the project.

IPD is explicitly designed to address this situation by involving contractors in the design phase and by introducing an incentive mechanism through which cost savings are shared among participants. However, some of the focus group participants pointed out that despite being unhappy with the lowest-bid culture, there were construction companies that had geared their business strategy to bid low. These companies would make their profits through changes and be resistant to an "open book" approach (see the next section). Others mentioned that they were unclear about how using IPD could improve project predictability to the contractors and thereby shift the mindset of needing change orders to be profitable or were unconvinced that it could.

"CM guys …. don't care as long as [they are] making their profit. And I saw that profit model and the cost model, and I'm like how transparent are those costs? Because you're creeping into your profit or reintroducing your profit, you lower your targeted costs. It either increases or decreases - so how are you looking at the actual overall cost?"
- Public Owner

Distrust of Project Partners and Resistance to Financial Transparency

The principle of shared risk and reward, and the associated profit pool structure, is predicated upon financial transparency between all the parties to the IPD agreement - or, in other words, an "open book" approach to project cost management. This approach requires all parties to communicate how they calculate their costs and profits.

Experienced owners who participated in this research agreed that in the traditional construction industry, ingrained distrust between all project team members has existed across the board for a long time, and it is challenging to dislodge.

This distrust leads to a limited understanding of the need for financial transparency. In some cases, it also leads to unreserved skepticism about financial transparency. In entirety, this distrust can make the IPD cost control process challenging - especially during the Validation phase when developing the project target budget - and can ultimately compromise the effective implementation of IPD. That such negative sentiments towards financial transparency exist is unsurprising given the prevailing lowest bid culture, which drives down profits and adds stress to the market.

Making the switch from a traditional "risk off-loading" mentality to the shared risk philosophy promoted in IPD is predicated upon a certain level of trust between the project partners, which historically has been lacking (Figure 19). The amount contingencies or "padding" built into the budget are generally an indicator of the level of trust between a contractor and owner. Such a contingency mindset limits the acceptance of a shared risk and reward approach.

Figure 19: Note collected regarding distrust among project partners

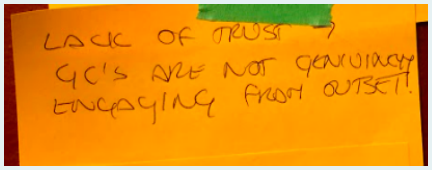
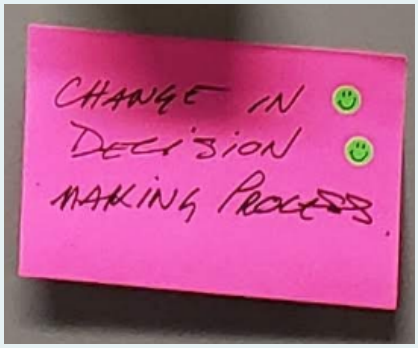
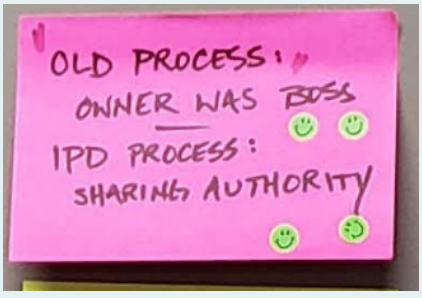
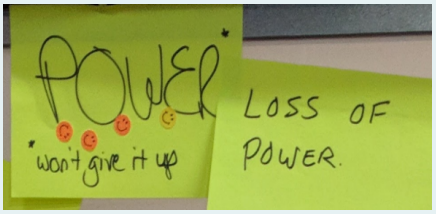


Figure 20: Notes collected regarding hierarchical decision making and power mindset







Hierarchical "Command and Control" Decision-making

Sharing the decision-making power with other IPD team members requires a significant philosophical shift, given the overwhelming desire in many owner organizations to retain control of all aspects of the project. This barrier was mentioned in the focus group sessions several times (see Figure 20).

Traditional project delivery processes are predicated upon highly defined decision-making hierarchies and chains of command, which is also referred to as a "command-and-control approach to management." By contrast, an IPD project is managed through a collaborative decision-making framework where the power to make decisions is shared. Building a culture of trust around a shared risk and reward system without falling back to old behaviours is difficult for many owners.

"[In our case] the government issues the cash. We hire the architects [and] the consultants, and we meet with them occasionally. We tell them what they want [to carry out the project]. They run away. They come back, and they say, how about this [concept] and we correct a little bit or give them some input, and in the end, we've got a project.

So that is what's known [our process], and our superintendent has done a lot of that. So, buying into an unknown process whereby we sit down and meet with everybody [and say] let us all collaborate and everybody's opinion matters. That is a massive cultural shift. It ties into the collaboration and the release of authority. It's changing everything." **– Public Owner Representative**

Key Takeaways

IPD focuses on fostering trust and goodwill in an industry where these values have been eroded over a long time. IPD clashes with traditional protectionist "command and control" mindsets. The cultural misalignment that IPD is facing starts with the mindset of industry individuals and goes up to the entire industry culture.

These include the mindset of:

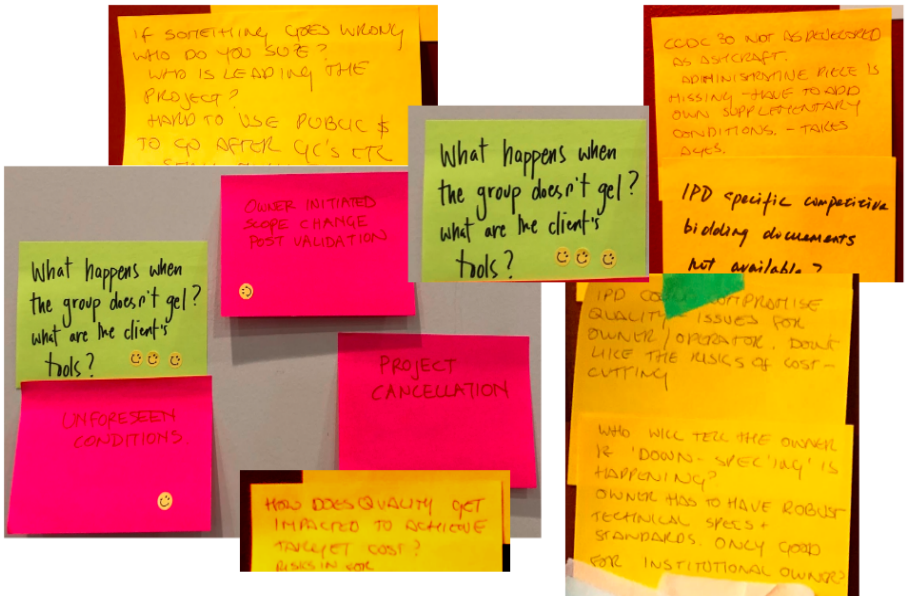
- considering the lowest bid as the best reasonable value that the project can achieve.
- controlling the entire decision-making process and not sharing the decision power with others is the best way to achieve the desired outcome.
- financial transparency could harm an organization and make it vulnerable, especially when bidding as low as possible and making the most of the profit through change orders become the typical business model.

Some owners and AEC firms agree that the current system is broken. However, there appears to be insufficient incentive to share many essential aspects of their business and financial processes because the benefits of IPD are not apparent. Another reason is that change appears to be very hard to make, given that it implies systemic change across many organizations at the same time. The result is considerable industry inertia that limits engagement with IPD.

3. Immaturity of the IPD Contract Model

This category contains barriers that are related to the shortcoming of available IPD contract models to owners and AEC firms. It should be noted that some of the issues described below might only be a barrier to public owners since they had the highest participation rate in this study. However, the fact that most early adopters of IPD in Canada are public organizations adds weight to these findings. Furthermore, the standard form of IPD agreement in Canada - CCDC 30 - was only introduced in 2018. Figure 21 gives an overview of the collective feedback regarding this category of perceived barriers by the owners.

Figure 21: Overview of the notes collected regarding the immaturity of the IPD contract model



"It's so onerous getting approvals [and] having feedback from the municipality. The [IPD] team can come up with a design that they think is agreeable, but then the municipality may not approve it, [and] they may have feedback. So that lack of timely information is a big challenge." **- Private Owner**

"Comparing different contract models from the owner's perspective, I have a relatively good idea of CCDC 2 and its risks to me, but I don't know what it would be like in CCDC 30." ***– Owner without IPD experience***

"Using a CCDC - if you're just going to do that - doesn't make sense because our supplementals will be so thick. That's why we don't [do CCDC]."
- Public Owner

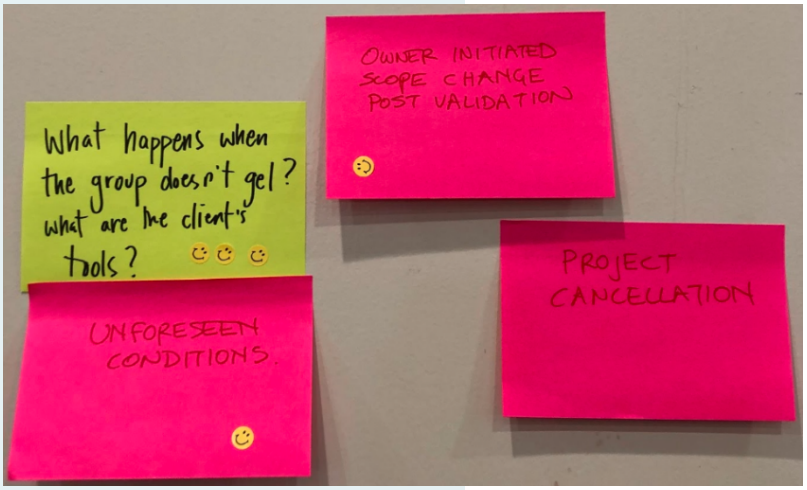
Gaps in Coverage

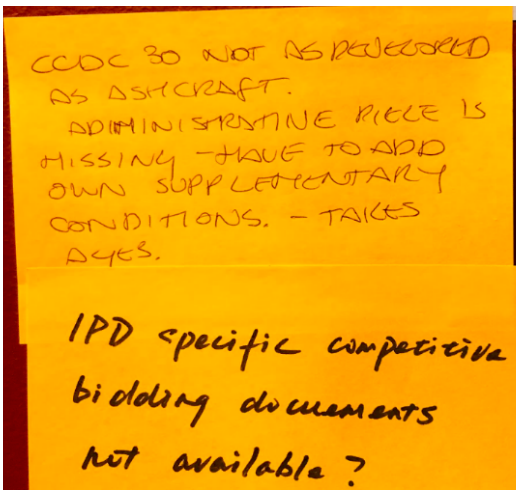
Operating procedures within many owner organizations, especially public owners, dictate that only standard Canadian forms of contract can be used on their projects. Although CCDC 30 is now available, it is still considered unknown and untested.

Some owners with experience implementing the CCDC 30 contract indicated that it has some gaps compared to other IPD contracts, especially around construction administration (e.g. dealing with shop drawings). Other potential gaps or "unknowns" with CCDC 30 include strategies for what happens in case of project cancellations and an explanation for how insurance requirements vary from other contract models (Figure 22). In this regard, measures to manage unforeseen conditions that can lead to project cancellation or change of the project scope are missing. These unforeseen conditions can vary from political and economic changes to natural events.

As a result, owners who agree to try IPD need to develop their supplementary general conditions that can be expensive and time-consuming (Figure 22). Sometimes starting to draft a new contract from scratch for an IPD project might be a preferable option to some owners.

Figure 22: Notes collected on the unforeseen circumstances (below) and Canadian IPD contract model (right)





"So, what we did is that we used the CCDC 30 model, but the CCDC 30 model is not as developed as the Ashcraft model, because they [in CCDC 30] talked about the concept of the model, but they did not go into the detail of that. Like say, for example, when a shop drawing is coming, the administrative pieces are missing in CCDC 30 [to deal with that], so what we did is that we had to add a bunch of supplementary conditions. So, the contract took us about six months to establish supplementary conditions. […]

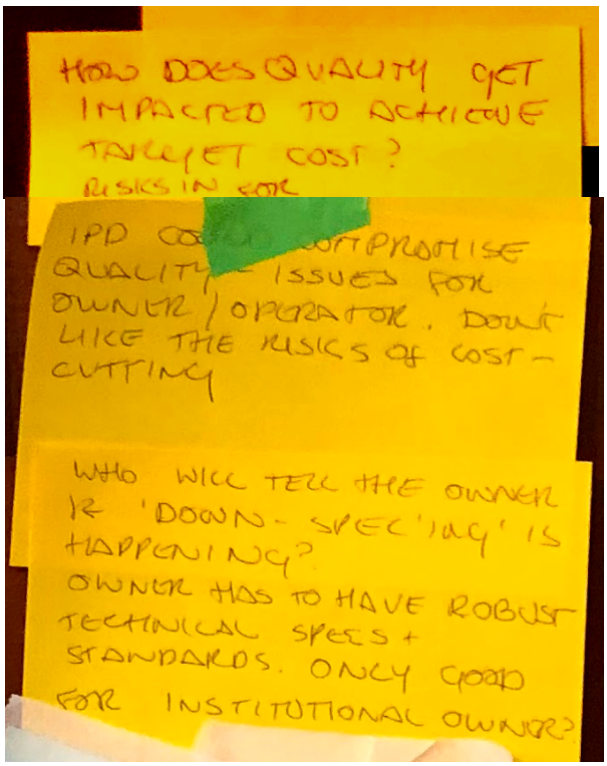
Any project that we do as a public sector, indemnity, bonding, insurance, these are very standard languages that we need to use for any form of contract. Whereas there are some contradictions from the base fundamental contract - especially the bonding piece- so we had to work with our legal [department], and it took a quite long time for [us] to get the buy-in from procurement and legal, and to get that contract out for the entire [IPD] team... So, the entire team, including the trades, the legal, etc. need to vet that document, and their comment needs to be looked into. So, all these things happened and took quite a bit of time." **- Public Owner with IPD experience**

Lack of Accountability for Project Quality

It was mentioned several times by focus group participants that there is a limited understanding of how an IPD contract addresses quality assurance and quality control (QA/QC). At the same time, many of the participating owners acknowledged that describing what they mean by the "best value" or "quality" for the project can be challenging. Consequently, concerns about delivering the project at the planned target cost without the quality being compromised (i.e. through "down-spec-ing") were raised. Furthermore, some owners noted that it could be challenging to know if and when the down-spec-ing of products and systems is happening.

These concerns may be most prevalent among owners who do not maintain their technical specifications and standards. Additionally, owners who do not have internal mechanisms to control the quality of the project outcome also face this issue. Furthermore, owners who have historically taken a "hands-off" approach to their project delivery processes cannot fully appreciate the role they can (and should) have in an IPD project (Figure 23). These concerns contribute to the general negative sentiment of believing that the budget control mechanisms in IPD compromises the project quality.

Figure 23: Notes collected regarding accountability issues in CCDC 30



"The belief is that under IPD, the contractor always looks for the cheapest solution to come in under budget, so they use lower quality materials, so then you end up with lower quality in the overall project."
- Owner

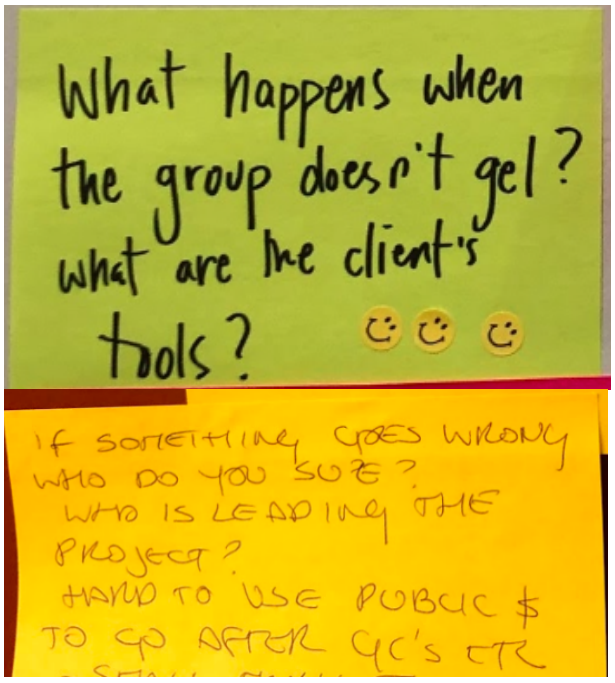
Concerns about QA/QC represent a significant hurdle to IPD adoption, and the question is how responsibilities can be made clear contractually and what would be the consequences in case the expected quality is not delivered.

Insufficient Measures to Handle Penalties

The participating owners in this research stated that the off-boarding process is not well covered by CCDC 30. Lean practices and IPD processes provide tools for progress monitoring and issue resolution. However, the focus group participants stated that a precise contractual mechanism that is tailored to the Canadian industry is necessary (and is insufficiently described in CCDC 30) to deal with potential worst-case scenarios.

Many owners found that the legal processes and implications of removing the non-performing individuals or companies from an IPD project unclear. According to the owners, this ambiguity can serve as a deterrent to hiring a potential team member if there is no clear path to firing them if things go wrong. It also potentially limits their choice for replacing team members in a small or hot market, where finding alternatives is challenging (Figure 24).

Figure 24: Note collected regarding CCDC 30 shortcoming about handling penalties



Key Takeaways

Developing a bespoke contract model from scratch is time-consuming and expensive. However, due to the novelty of CCDC 30, the perception of the participating owners was that there are still areas that need to be covered carefully by this contract model, particularly areas related to:

- Construction administration, including indemnity, bonding, insurance
- Dealing with unforeseen conditions that lead to project cancellation or change of scope
- Accountability and assurance of the project outcome's quality
- Off-boarding process and clarifying the related obligations

4. Increased Involvement in Project Management

This category comprises barriers that are related to the resistance and unwillingness of owners to invest in the additional staff time and resources necessary to support an IPD project. Figure 25 gives an overview of the collective feedback regarding this category of perceived barriers by the owners.

Figure 25: Overview of the notes collected regarding the resistance to greater involvement in the project management process

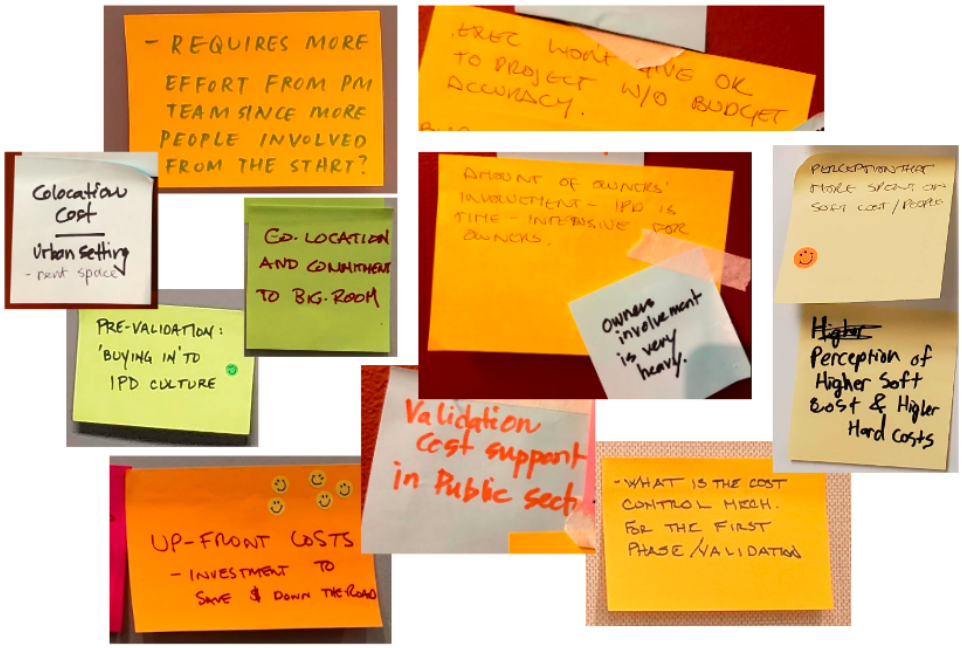
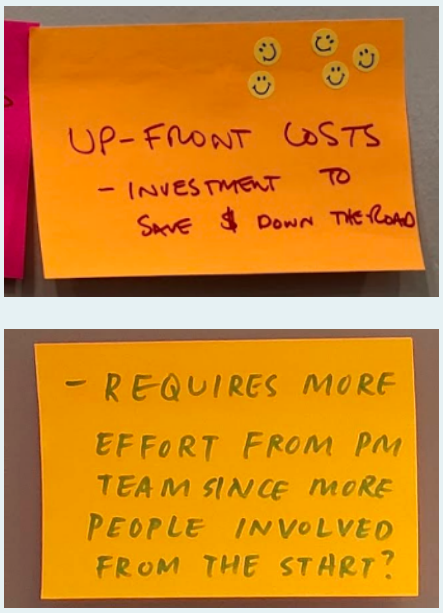


Figure 26: Notes collected regarding early expenses in IPD



Apprehension About Investing Early

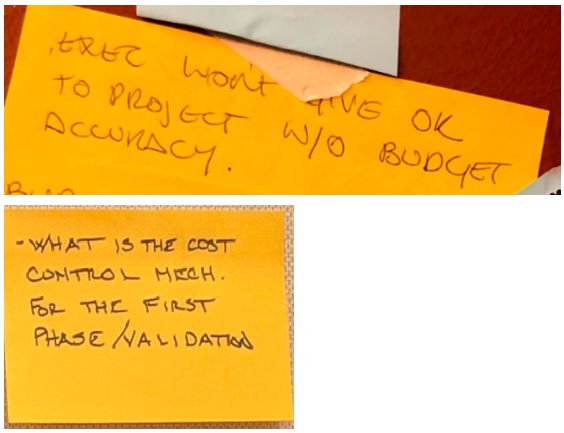
Fostering a highly collaborative team early in the project process requires different project workflows and dynamics. There are new and distinct project phases in IPD - such as Pre-validation and Validation - that are explicitly designed to develop and test possible project outcomes against the owner's business-case objectives. From a financial perspective, this early engagement necessitates the front-loading of costs, which can be challenging for owners. Some of the owners in the focus groups with IPD experience highlighted this fact as a critical barrier and talked about the perception of increased costs associated with IPD[8] (Figure 26).

"There's an upfront cost in this [IPD] process. … There's a capital investment and […] equipment […] and the presumably escalated sort of staffing costs and things like that, you know. There's a lot of upfront costs that need to be understood and accepted before we could even go down this road. And we have to be able to demonstrate that this upfront cost is an investment to save a lot of money down the road."
- Owner

The hiring process in IPD was described as a challenge by many owners. The early onboarding of team members was uncommon for many owners, and they struggled with its mechanics. This point was highlighted explicitly regarding bringing key trades onboard during the Validation phase when, traditionally, they would be required to go out to tender based on an "issued for construction" package.

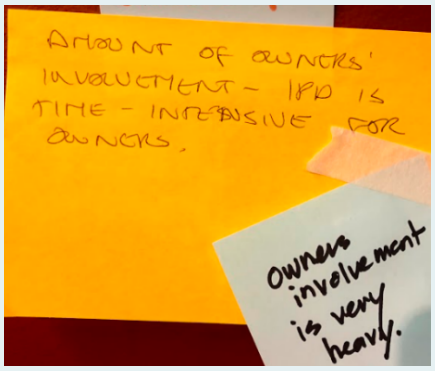
The goal in the Validation phase is to identify a target project budget and create an agreement among the project participants through an IPD contract to commit to that specific target budget. However, this initial financial commitment process conflicts with the traditional approach dictated by lenders, financial institutions and government agencies (public entities), who typically require a high degree of budget detail before they approve funding for the entire project budget. This level of detail will not be achieved in the Validation phase and was one of the concerning points noted by the participating owners in this research (Figure 27).

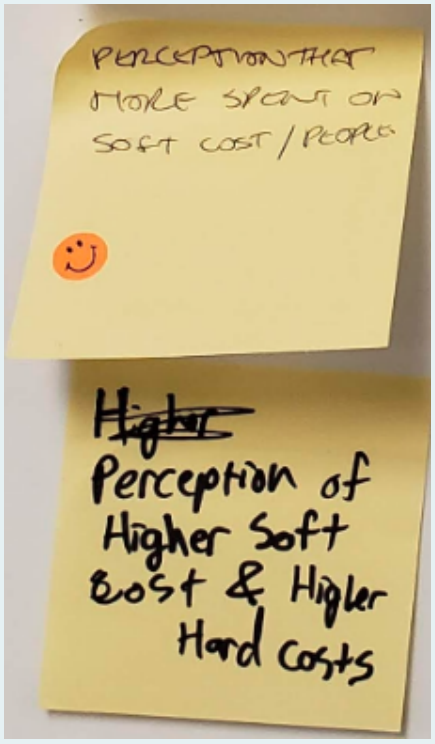
Figure 27: Notes collected regarding concerns related to financial commitments before an accurate budget is finalized



It should be noted that an essential objective of the Validation phase is to create cost certainty by identifying potential design options without finalizing the design details. Since this process is highly integrative, the identified design options and related cost estimations are highly reliable. However, in the traditional project delivery, the designs and associated costs might be very detailed, but the fact that they lack a collaborative input adds to their unreliability. This conventional budgeting approach is one of the primary reasons for cost overruns in construction projects.

Figure 28: Notes collected regarding committing to the additional IPD phases





Resistance to Pre-validation and Validation Phases

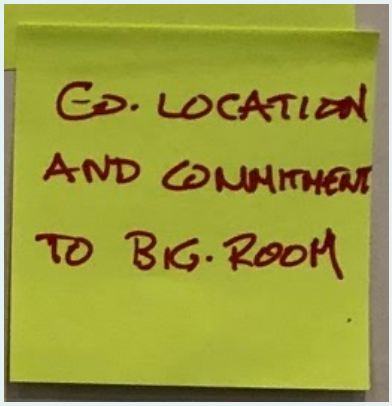
Pre-validation and Validation are steps taken in an IPD project to ensure successful project execution. However, these steps are out of sync with expectations and budgets in traditional project delivery processes. In the focus groups, some of the owners shared their concerns with getting buy-in from senior decision-makers or funders related to the additional cost and time commitment for these phases (Figure 28).

Reluctance to Invest in the Team

An essential characteristic of IPD that warrants consideration is related to the investment necessary to establish, maintain and sustain a productive and meaningful team throughout the project. Starting with the team selection process (which is usually more involved than a conventional RFP or bidding process), fostering a capable team that operates with a high degree of trust requires the long-term commitment - and, at times, strong leadership skills - from the owner. While owners in the focus groups talked a great deal about the costs associated with maintaining the team, the time and skills required are also a concern.

"There's a fear of IPD being very time-heavy for owners; like way more than it is right now [in the conventional project delivery]. So, if you're in the process of delivering 40 or 50 projects a year, how do you then spend enough time on this particular one [with IPD]?"
– Group Summary Report Out

Figure 29: Notes collected regarding the owner's long-term commitment to the process



"Our big room was massive initially, and we brought in everyone involved. The owner doesn't charge their time into it, but everybody else does. We started to learn, well, this big room is costing us thousands of dollars."
- Owner with IPD experience

An essential piece in IPD implementation is the co-location of the project team members, where they physically gather for commonly 1 or 2 days a week and collaboratively address different project issues. There was a wide range of opinions in the focus groups as to how much time project team members and owners needed to spend in the big room. Nevertheless, the costs for co-location of the project team during the Validation phase (such as rental of large meeting rooms and equipment) and interpreting its perceived benefits is also a challenge for many owners (Figure 29).

Key Takeaways

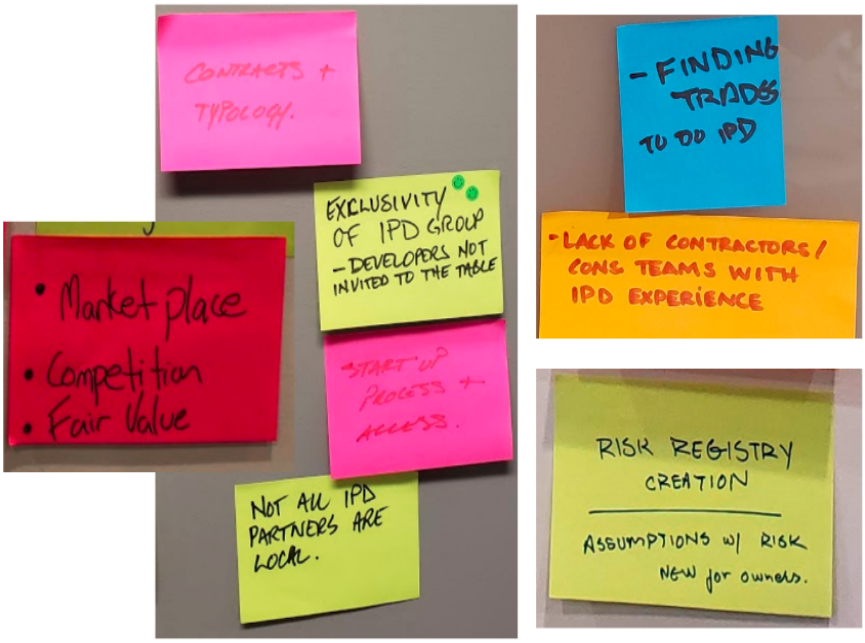
A successful IPD implementation requires proper resource allocation by the owners, i.e., the owner needs to be engaged and committed to the process. However, there is a perception that IPD costs more in terms of soft costs and that those costs are cripplingly front-end loaded. IPD also demands more involvement from owners. In this regard, the implementation of IPD faces specific barriers related to an accurate understanding of the costs and time requirements:

- There is a lack of understanding of how to allocate and manage project cash flow to allow for up-front costs to bring the team on early and adequately plan the project.
- Owners struggle to find the necessary skills and resources to support intensive early engagement as required during Pre-validation and Validation phase
- Owners do not appreciate the value of a highly capable project team and do not have the skills, resources or willingness necessary to maintain the team throughout the project.

5. Lack of Familiarity and Trust in the New Process

The barriers presented in this category are primarily related to the implementation process of IPD. The common thread in many conversations was the lack of first-hand IPD experience among owners. They were somewhat familiar with the concept of IPD and wanted to give it a try but could not find current and reliable empirical examples to help them build required confidence in the process. Figure 30 gives an overview of the collective feedback regarding this category of perceived barriers by the owners.

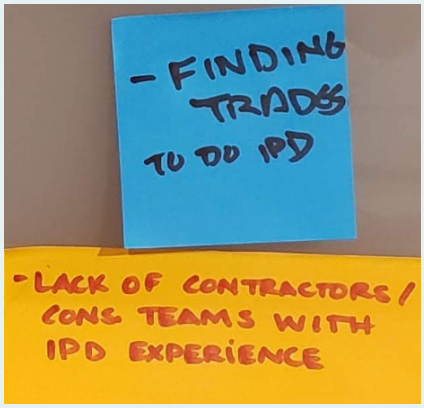
Figure 30: Overview of the notes collected regarding lack of familiarity and trust in the new IPD process

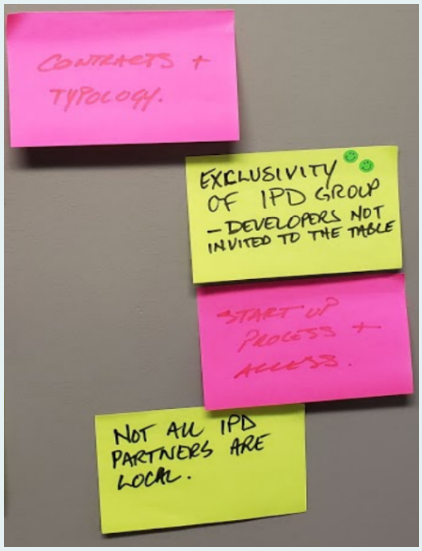


Lack of confidence in the IPD Risk Register

A risk register is a vital tool used in IPD to identify, quantify, and mitigate risks proactively across the project phases. However, some owners with experience of using the risk register pointed out that decisions made during the Validation phase and target value design process were not always correctly or accurately reflected in the risk register (Figure 31 above - bottom right corner). This disparity can lead to a lack of confidence in the process.

Figure 31: Notes collected regarding market readiness and the fairness of the hiring process





"How do you evaluate that collaborative approach? In traditional RFP, you are not evaluating that, but it's a big component of IPD. So how do you put some criteria around that? Is that objective, or how much of it is subjective?" **- Owner**

The focus group participants also noted that developing an understanding of the assumptions for every risk in the register was time-consuming and challenging, especially when dealing with team members who were new to IPD as there was a good deal of education required before and during the process.

Concerns about Finding Suitable Proponents and Fairness of the Hiring Process

Since IPD is still new to the Canadian market, the pool of experienced companies is small. Prior IPD experience is generally not considered essential in IPD hiring assessment process templates. However, the selection criteria for project team members used by most owner organizations are still usually heavily weighted towards prior experience and historical performance. Inevitably, this leads to concerns about whether the owner will be able to assemble a qualified team and, if so, whether they will get the best value for money (Figure 31).

Indeed, many of the metrics used to evaluate proponents in traditional projects are often not compatible with IPD, given the emphasis on soft skills and teamwork. Owners need to put new processes in place that will require sophisticated HR and recruiting expertise that may not be available. Some owners in the focus groups were doubtful that they would have the skills and procedures necessary to find proponents that will become a 'good fit' for the IPD team.

Lack of prior experience with IPD means that project team members may require training and investment in new tools. Unlike other industries, investment in innovation (be it for technologies or processes) is not seen as a source of competitive advantage by most AEC companies. The costs of education and training are usually borne by the project, often leading to additional costs for the owners who, unsurprisingly, may be unconvinced of the returns at the start of the IPD project. Furthermore, owners with limited knowledge of IPD feel compelled to recruit team members with a collaborative mindset (who have prior experience of IPD AND have all worked together before) who can support the shared risk and reward environment. Such a team is tough to assemble, particularly in a hot market.

Figure 32: Note collected on market readiness and the fairness of the hiring process

"There is a concern about just the general market maturity and the fact that there are still very few builders who are familiar with IPD. How do you get a fair, open, and transparent bid process?
How do you get an accurate read on the market, and where are all the trade contractors, support teams, and consultants as well who will be able to put a fair bit in understanding into what they're supposed to be doing?" **- Owner**

"It's all about fairness and transparency. How many people are we excluding [from the procurement process]? How many down the food chain have been excluded for lack of experience?" **– Owner**

"So, we've implemented lean, and IPD is … the extension [of it] because obviously, it's the lean way of running projects. However, for us, we need to be more competitive versus traditional construction. So, for us, it's really about reducing the cost using lean so we can be competitive" **- Owner**

Additionally, the lack of enough companies with IPD experience brought into question the prequalification methods for an IPD project and whether they are compatible with public procurement process requirements to be fair, open and transparent. Public owners in the focus groups pointed out potential conflicts between the goals, timing and criteria of IPD hiring processes, and the requirements to go to public tender. This conflict is particularly relevant for hiring trade contracting services, where the lowest bidder who is usually selected may not fit well into the IPD process (Figure 32).

The perceived lack of fairness in the IPD hiring process due to the small pool of experienced companies and the qualitative nature of the evaluation has been raised as a significant issue by some public construction and trade councils. They fear it might not promote fair, open and transparent procurement practices and question the value provided to taxpayers. There is also a lack of clarity related to how unionized environments work within an IPD model. Construction councils, unions and similar industry advocates have a significant voice in the marketplace and can sway industry perceptions and sentiment. They need to be sufficiently familiar with the value proposition for and mechanics of IPD.

Lack of Familiarity with the Values of Lean Principles

If IPD is seen as a framework for high-performing collaborative project implementation, then lean planning methods provide the tools and processes to implement the project. Several owners in the focus groups were unfamiliar with lean tools (such as the Last Planner System, Pull Planning, and Set-Based Design) and how it can add value to a project delivery process. Consequently, the relationship between lean and IPD was not clear to many owners. Furthermore, those with experience in lean project delivery felt that it was difficult to explain in the abstract, which is why those who are unfamiliar with lean techniques tend to distrust the process and be skeptical that the anticipated benefits can be realized. The best way (and some felt the only way) to witness the benefits of lean project delivery was first-hand, either by doing a project or visiting a project in progress - "seeing is believing."

"RFIs and SI become a mechanism for the consultants that I've hired to watch out for my interests and to document what was agreed upon when substitutions were made.
So, one of the proposed benefits of IPD is reduced RFIs, great from an administrative point of view for lesser paperwork, but I'd rather have a track record of every design omission or every design decision that was made as an owner, rather than not." **- Owner**

It should be noted that some participating owners with IPD experience also mentioned that lean practices - in their opinion - could lead to some insufficient documentation in comparison to traditional project implementation, as stated below.

Key Takeaways

IPD implementation is heavily dependent on the skills, expertise, enthusiasm and trust of the project team, which, if not functioning well due to poor team dynamics resulting from a flawed hiring process, potentially compromises the project outcomes. Owners are not sufficiently familiar with what it takes to recruit and manage an IPD team and, as a result, fail to understand the value of the cost and time involved.

The most significant barriers identified are:

- Owners lack the tools, resources and expertise (in particular, risk mitigation methods) to be confident that the IPD process is being conducted properly.
- With a small pool of experienced IPD AEC firms in the market, there is concern that the team selection process may not be fair, open and transparent, or offer the best value.
- Lack of familiarity with lean thinking and lean tools and the relationship between lean and IPD means that some owners are skeptical that the IPD project outcomes will be any better than if they followed a conventional process.

6. Structural Misalignments at Owner Organizations

The barriers in this category are related to the lack of adequate organizational structure and mechanisms within the owner organizations to adopt and implement the IPD delivery model successfully. Figure 33 gives an overview of the collective feedback regarding this category of perceived barriers by the owners.

Figure 33: Overview of the notes collected regarding the structural misalignment at owner organizations

"In a public sector we're fiscally funded so we have to go for money. In the past, we have been required to have a concept design ready two years before we even did any procurement. So, you have a cash flow that isn't matching the IPD requirements. How do you sell that?" **- Public Owner**

"In my experience, where I'm currently working, we would not have the resources to take on a project with an IPD delivery model." **- Owner**

Lack of Sufficient Financial Flexibility of Owners

Onboarding all significant decision-makers as early as possible in an IPD project leads to front-end loading and potential increases in project soft costs. This shift requires a cash flow and financial administration processes that are different from normal operations in many owner organizations. A lack of flexibility within an owner organization's financial system is a critical barrier in IPD adoption.

"If I'm going to do an IPD project and I have like ten people on my whole team, you're going to have to put two people on that one IPD project, and other eight people have to deal with the rest of the projects" **– Owner**

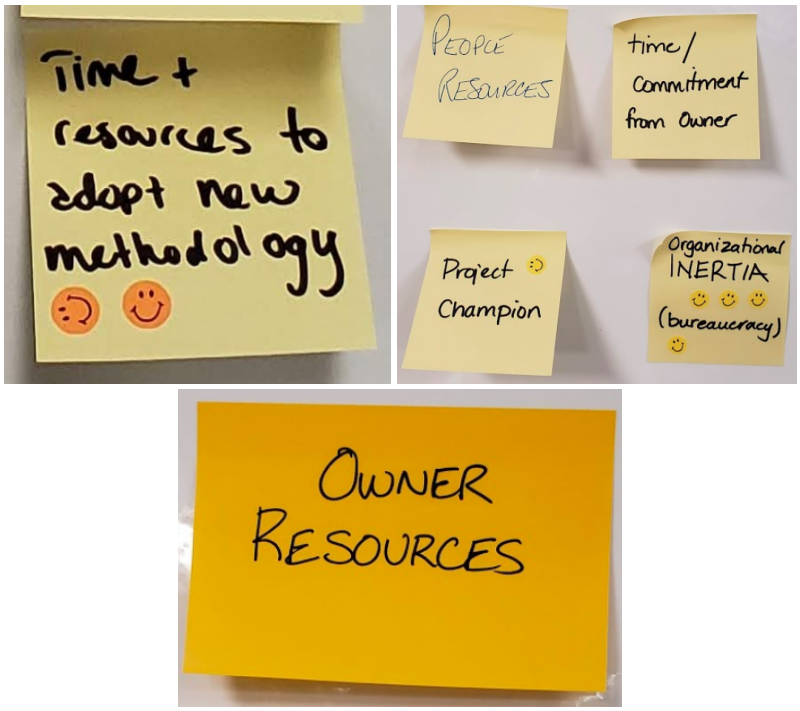
Lack of Organizational Resources

The lack of organizational resources is a significant reason for owner organizations not being able to engage early and commit fully to an IPD project. As noted in *"Barrier 4: Resistance to Greater Involvement in Project Management Owners",* there is a general belief that IPD demands a much higher investment of time by the owner, which makes it difficult to justify. In particular, the research participants noted that the purchasing and project management departments in many organizations are under-resourced and overstretched, with project managers working on multiple - sometimes dozens of - projects at the same time.

This lack of internal resources creates organizational inertia, which can only be addressed by a fundamental change in how the organization is structured and resourced (Figure 34).

"We can't get six people in a room ... to agree on anything in my experience. I don't say that we don't like each other. It's just that we protect our silos, and we protect our subject matter expertise. The lawyers certainly aren't running to collective risk, that's for sure." **- Public owner**

Figure 34: Notes collected regarding lack of internal resources to assign to an IPD project



"We have a very, very strict code of conduct like everything is fighting collectivity against the sharing of risk, the identification of risk. It's all like keep to your silos, right? We had to get extensive permission just to participate in this forum." **- Public owner**

Organizational Silos Hinder Interdepartmental Collaboration

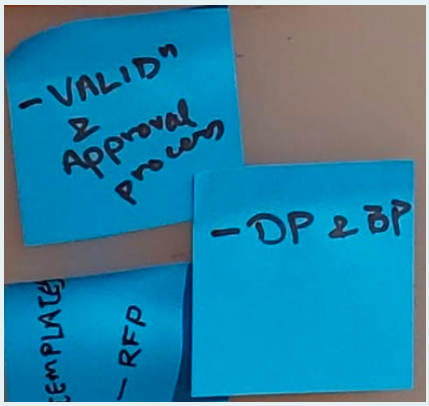
IPD requires different internal departments of an owner organization to collaborate closely with each other with full transparency and trust throughout the project. Setting up, procuring and managing an IPD project requires involvement from legal, purchasing, financial and HR at a minimum. However, many owner organizations are siloed with different and sometimes competing expertise and interests, which makes inter-departmental teamwork difficult.

Organizational silos limit access to decision-makers and can make communicating the benefits of IPD difficult. Owners noted they tend to down-play the advantages of IPD for fear of overpromising the benefits of IPD to the senior management and under-delivering results.

Lack of Specialist Skills to Select and Onboard the Project Team

IPD relies on a cohesive and highly functioning team, leading to concerns among owners about the expertise necessary to go to the market, qualify, evaluate, and select the team members. This process may require specialist procurement and HR skills that are outside the capabilities of their organization. Specific issues included the lack of ability to go to tender without having a confirmed project budget and fear of giving away control of the team hiring process by allowing other project partners to recruit the rest of the team. Many owners felt that their organization was not structurally aligned or did not have the flexibility to pursue this approach.

Figure 35: Notes collected regarding regulatory approval processes



"My biggest risk is integrating the IPD process with the municipal process of how validation and approvals go hand in hand so that the work that's validated is aligned with what we get approved. It's about bridging that gap between the approval process and the validation process." **- Private Owner**

"It's so onerous getting approvals [and] having feedback from the municipality. The [IPD] team can come up with a design that they think is agreeable, but then the municipality may not approve it, [and] they may have feedback. So that lack of timely information is a big challenge." **- Private Owner**

Increased Coordination with Municipalities

The timing and requirements of permit submissions and the nature of the regulatory process can conflict with the IPD process (Figure 35). According to the many of the private owners, the regulatory processes are not usually compatible with IPD. For example, the public consultation process and development / building permit approvals are often misaligned with the Validation phase in IPD. This may result in making design decisions that must be revised later, issues in estimating and problems committing to a reliable project budget in that phase. Municipal processes can take a long time and there are inefficiencies with keeping the team on board in the meantime.

To address this barrier, focus group participants suggested that a targeted education for regulators about IPD, how it works, and the impacts of the regulatory process on the project process might help.

Key Takeaways

Many established owner organizations have departmental silos making internal collaboration difficult, which can cause barriers in IPD implementation. These barriers are mainly related to:

- A lack of flexibility in cash flow management and project financing approvals.
- Competing interests and goals between different departments that do not usually collaborate.
- The internal capacity to manage the hiring process for an IPD project team.
- Misalignments with the regulatory and permitting process.

3 CONCLUSIONS AND LESSONS LEARNED

This study to identify the perceived barriers to owner adoption of IPD is based on outputs gathered from three owner forums with over 50 construction owners and owner representatives from the public and private sectors across three Canadian provinces and cities.

The results of this research reveal six categories of owners' perceived barriers to IPD adoption: (1) resistance to change, (2) cultural misalignment, (3) Immaturity of the IPD contract model, (4) increased involvement in project management, (5) lack of familiarity and trust in the new process and (6) structural misalignments at owner organizations.

Recognizing that there are owners and teams successfully delivering projects in Canada using IPD, the types of barriers are described as "perceived" because some of the barriers identified might not be necessarily "real" but are thrown up because disruption to "business as usual" usually brings some discomfort - as a result of a lack of information, experience, authority and so on. It is important to understand the nature of these barriers and their relative importance and, indeed, whether they are in fact a "barrier" at all but rather a symptom of the construction industry's considerable inertia and well-known challenges with shedding old paradigms.

Certainly, it is evident that the perceived barriers to IPD identified in this research are complex and multi-layered. Many were found to have individual, organizational and industry-level dimensions that were frequently intertwined. Resolutions for some could even lead to additional drawbacks and obstacles down the road.

Therefore, it is important to stress that the categorization of the identified barriers should be seen as highly nuanced rather than clearly delineated. Thus, descriptions of some of the barriers may reference barriers from a different category. This overlap is intentional and serves the purpose of communicating the complexity of the subject matter.

Many of the participating owners mentioned the need for additional resources, tools, and resources to support the transition towards more collaborative project delivery models. Owners seeking to adopt IPD want clear language presented in easily accessible formats on how IPD delivers the best value on construction projects to help them convey the benefits to senior decision-makers who are usually not familiar with the construction process. The value of IPD should also be documented from the standpoint of return on investment, design innovations, quality and operations and maintenance savings.

Specifically, the owners recommended the following guides that they felt would help facilitate the adoption of IPD:

1. Case studies of completed IPD projects in Canada.
2. An easy-to-use “quick-start” guide
3. Technical resources for building the business case for IPD
4. An orientation guide and onboarding toolkit for legal advisers and in-house counsel
5. A suite of easily customizable template documents

In addition, it was also clear that training and educational sessions, particularly during the early stages of a project, would help to prepare the IPD team for a highly collaborative project process and increase their overall awareness of the IPD model. Such sessions would also help to build confidence within the owner organizations. Training sessions can be delivered through a variety of media and tailored for different members of the owner’s internal project team, including procurement, legal, finance, HR and project management.

Supporting owners through their first IPD project with access to facilitators and team coaches after the start of an IPD project will help to ensure that all the onboarded members share the same level of understanding. Conferences, boot camps and regional “Communities of Practice”[9] are also valuable to ensure continued learning and knowledge sharing.

It was also clear that owner organizations need internal IPD champions who can help to push the adoption of IPD. These champions may be from any level in the organization, such as project level, internal team level, management level and executive level, although the best case would be to have a champion at the senior level who can reach across different departments. These individuals may need specialized support in the form of in-depth training and access to a community of practice. An IPD credentialing system, like the Lean Green Belt program, may encourage participation. Additionally, public policymakers should prioritize the creation of incentives and policies for the market to adopt IPD. These measures will be helpful to encourage construction stakeholders and companies to advocate for change.

Although these findings may suggest that owner adoption of IPD in Canada faces an uphill struggle, it is worth noting that that participants at all three forums were strongly supportive of the principles of IPD. Furthermore, the participants were curious to learn more about IPD and genuinely engaged in enthusiastic discussions and exchanges of ideas. As testament to the appetite of forum participants to know more about IPD, after a morning of focus group discussion, attendees at each session stayed for a presentation on IPD provided by IPDA and a panel discussion with experienced Canadian owners and practitioners. The current swell of interest in IPD suggests that now is a good time for IPD advocates to deliver the education and outreach programming described in this study to owners and key industry stakeholders.

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5 Note that the CCA Lean Construction Institute has recently launched regional communities of practice (CoPs) and set up CoP leaders across the country. For more information, visit www.lcicanada.ca/communities/current-communities-practice.

6 Statistics Canada. Table 36-10-0400-01 Gross domestic product (GDP) at basic prices, by industry, provinces and territories, percentage share and Table 36-10-0434-01 Gross domestic product (GDP) at basic prices, by industry, monthly (x 1,000,000).

7 Although beyond the scope of this project, it is worth noting that several recent research studies have pointed to the lack of robust project performance data for construction projects in Canada. Other jurisdictions such as the UK, Australia and New Zealand have been tracking and aggregating industry KPIs (such as % of projects delivered on time, on budget, client satisfaction, etc.) to benchmark performance. For example, the VRCA's "Measuring Up: Key Performance Indicators for BC's Construction Industry", 2018. Available at: www.constructionfoundation.ca/wp-content/uploads/2019/05/Construction-Industry-KPI-report-FINAL.pdf

8 It should be noted that this statement is subjective and reflects the perception of some of the participating owners in this research, which is in contrast with much of the recent research on IPD. For more information see for instance:

- IPDA (2016). "MOTIVATION AND MEANS: HOW AND WHY LEAN AND IPD LEAD TO SUCCESS" Available online at www.ipda.ca/research-performance/case-studies/motivation-and-means-how-and-why-lean-and-ipd-lead-to-success_ , Last accessed May 2020

- BC Housing (2019). “Strategies for Collaborative Construction - Integrated Project Delivery Case Studies” Available online at www.bchousing.org/research-centre/library/building-science-reports/strategies-collaborative-construction , Last accessed May 2020

9 Note that the CCA Lean Construction Institute has recently launched regional communities of practice (CoPs) and set up CoP leaders across the country. www.lcicanada.ca/communities/current-communities-practice.