Integrated Project Delivery A focus on integrated project delivery, the enablers for this process, and the challenges and barriers to IPD within an Irish context.

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Abstract

Integrated project delivery is a relatively new collaborative procurement route for delivery of construction projects. Building Information Modelling works hand in glove with this process by offering a means for deep integration among construction professionals. There is growing realisation among clients and construction professionals that design, construction and facilities management will function much better in a multidisciplinary environment. Although there is enthusiasm for this new process in many quarters, highlighted by case studies on successful project outcomes for projects throughout the world, there are still barriers to IPD & BIM implementation.

This paper explores the concept of integrated project delivery, focussing on what the enablers for this process are, along with the challenges and barriers standing in the path of future uptake. There is a particular focus on the Irish context which forms the backdrop for this study.

A qualitative methodology is utilised, using semi structured interviews with selected professionals within the Irish construction industry. This is reinforced by an extensive literature review of world literature dealing with this area.

This research has highlighted the main barriers to IPD uptake as cultural conservatism within the Irish Construction Industry, the need for education and upskilling in BIM technologies and the need for greater involvement by the Irish government in promoting the use of this new process

Keywords: Integrated Project Delivery, Building Information Modelling, Collaboration
1.0 Introduction

There is general consensus within the Irish Construction Industry that we are experiencing unprecedented times in terms of economic and technological change. Unfortunately, much of this change surrounds the collapse in economic activity, rising unemployment and basically trying to survive in an ever more challenging environment. When presented with the potential benefits of Building Information Modelling (BIM), many stakeholders in our industry acknowledge the importance of its potential, however are more inclined to adopt a “wait and see” approach before becoming fully engaged with the process.

Within a global context, the uptake of BIM, and associated technologies is increasing with pace. The UK government have stipulated that public works contracts in that jurisdiction must include BIM by 2016, and this requirement is assisting in developing awareness among construction professionals on this side of the Irish Sea. Indeed many large Irish based contractors are involved in contracts in both jurisdictions, and will experience this new provision first hand. BIM is a new way of working in AEC industry along with associated technologies. BIM involves much more than implementing new software packages, a misconceived perception that exists in certain quarters. Figure 1 illustrates how BIM can ultimately decrease pressure on the construction process.

*Figure 1* (Eastman, Teicholz, Sacks, & Liston, 2011)
BIM is a different way of thinking about construction that requires a move away from traditional workflow, with all parties including: architects, surveyors, engineers and contractors sharing and effectively working on a common information pool. The ultimate goal of BIM implementation is to facilitate IPD (Integrated project delivery).

Integrated project delivery (IPD), is a collaborative alliance of professionals, systems, business structures and practices into a process that harnesses the talents and insights of all participants, to optimise project results, increase value to the client, reduce waste, and maximise efficiency through all phases of design, fabrication, and construction (AIA, 2007). IPD may only be an aspirational concept in Ireland at present; however the successful development of BIM to level 3 and above has the potential to make this aspiration a reality.

The overall aim of this paper is to research the changes required to the construction process as it currently exists in Ireland, and to investigate the issues, concerns and possible impediments to the evolution of this process within an Irish context. An in-depth literature review is included in this research which highlights problem areas such as legal issues, attitudes, costs and technological deficiencies.

2.0 Literature Review

2.1 Integrated Project Delivery – Background

There is a growing realisation among construction professionals that design must take place in a multidisciplinary environment (Arayici, Coates, Koskela, Kagioglou, McCall, & O'Reilly, 2014). “The AEC industry has realised the value that can be generated through collaboration and integration….the results of these ongoing efforts are integrated project delivery, building information modelling and lean (Pishdad-Bozorgi, Hamzanlui-Moghaddam, & Karasulu, 2013, p. 1)”. It is felt that owners can predict more efficient and cost effective design with the adoption of BIM, and also more cost effective construction and facilities management as a result (Arayici, Coates, Koskela, Kagioglou, McCall, & O'Reilly, 2014). The nature of the construction industry has always included elements of risk and uncertainty which are not as prevalent in other industries. Project management in construction can be described as “effective uncertainty management, clarifying what can be done, deciding what is to be done, and ensuring that it gets done (Atkinson, Cawford, & Ward, 2006, p. 688)”. The emerging view of current practice on many construction projects worldwide from inception to handover is that inadequate risk management and failure to
address basic sources of uncertainty are common (Atkinson, Cawford, & Ward, 2006). Construction projects are generally complex, with the volume of on-site activity adding to this complexity. Hence the management of project complexities must be a priority for clients and design teams alike (Baccarini, 1996). This is reinforced by (Williams, 1999) who observes that construction project complexities are increasing with shorter programmes. “Managers of today’s capital projects are under pressure to complete complex projects under conditions of uncertainty in less time, without sacrifice to cost and quality and without leaving customers and users dissatisfied (Laufer, Denker, & Shenhar, 1996, p. 189)”. The idea of better collaboration in construction to achieve stronger outputs is not a new concept, and this is highlighted by (Laufer, Denker, & Shenhar, 1996) when they observe “Simultaneous management can be summed up in one breath: by planning systematically, making early adequate decisions, involving all parties concerned early, leading them as a team, operating first rate communications, using simple procedures, executing the projects phases early and in parallel, monitoring project performance and the environment, and judiciously adapting the projects execution to arising contingencies – one can execute challenging projects with excellence and speed (Laufer, Denker, & Shenhar, 1996, p. 198)”. This sets the stage for the evolution of a more collaborative integrated approach to construction projects. (Winter & Szczepanek, 2008) have found that many industry surveys continue to note familiar problem areas of quality, missed deadlines and budget overruns, they also highlight a more strategic approach being adopted in project management and a strong emphasis on the value and benefits that projects and programmes contribute to organisations. This evolution has crystallised in the form of integrated project delivery.

2.2 Integrated Project Delivery – Process

The American Institute of Architects have developed a set of guidelines for integrated project delivery, firstly defining the process as “a project delivery approach that integrates people, systems, business structures and practices into a process that collaboratively harnesses the talents and insights of all participants to optimise project results, increase value to the owner, reduce waste, and maximise efficiency through all phases of design, fabrication and construction (AIA, 2007, p. 1). IPD is also defined by the Lean Construction Institute in the UK as “a delivery system that seeks to align interests, objectives and practices, even in a
single business through a team based approach (LCI, 2013)”. There is further elaboration on this process by (Eastman, Teicholz, Sacks, & Liston, 2011) who describe IPD as a relatively new procurement method that is becoming more popular as the use of BIM technologies increase, and as the AEC/FM industry learns how to operate this technology with integrated teams. Figure 2 below illustrates an interesting contrast between IPD and traditional project delivery.

![Figure 2](image)

This illustrates the early involvement of contractors and subcontractors in the overall process. There are many approaches to IPD as industry experiments with this process, however all have commonalities such as effective collaboration between owners, designers, and contractors (Eastman, Teicholz, Sacks, & Liston, 2011). “The key concept is that the construction team work together using the best collaborative tools, at their disposal to ensure that the project will meet owner requirements at significantly reduced time and cost (Eastman, Teicholz, Sacks, & Liston, 2011, p. 9)”. The American Institute of Architects has formulated nine key principles of IPD as follows:

1. Mutual respect and trust.
2. Mutual benefit and reward.
3. Collaborative innovation and decision making
4. Early involvement of key participants
5. Early goal definition  
6. Intensified planning  
7. Open communication  
8. Appropriate technology  
9. Organisation and leadership  

(AIA, 2007)

These principles reflect the ethos and fundamentals of integrated project delivery and illustrate the requirement for open minded integrated teams in order to embrace these principles.

2.3 Integrated Project Delivery – Barriers

BIM should not be seen purely in technical terms but rather a catalyst for a deeper process. Contractual changes are vital in order to facilitate this process to its full potential (Hannele, Reijo, & Tarja, 2012). The Irish construction industry has traditionally followed similar trends to the UK, due to proximity, similar legal system and historical ties, however the BIM concept in this country, and indeed the IPD process has been slow to achieve market share. (McCauley, Hore, West, & Kehily, 2013) find that BIM, as a process,” is having a profound effect worldwide on the construction industry, even leading to new forms of procurement, such as, Integrated Project Delivery (IPD)”. Although slow to take off in Ireland to-date, BIM is becoming extremely relevant. There may be underlying reasons for the slow uptake of BIM in Ireland. The country has witnessed an economic meltdown in its construction industry between 2006 and 2014, with recovery only at an early stage, and with limited resources available, clients are slow to take chances with the unknown (Henstridge, 2011). It is argued that while the Irish government produced a new suite of public works contracts in 2007 with the aim of achieving greater cost certainty, there is little evidence that this has been achieved, and that the introduction of a mandatory requirement for building information modelling and IPD would increase the probabilities of achieving that goal (McCauley, Hore, West, & Kehily, 2013). It is argued that Ireland must follow the lead given by US and UK in this area or face being left behind and unable to compete on foreign markets. The uptake of IPD effectively demands significant alterations to the way construction companies operate at nearly every level within the construction process, and this not only necessitates new learning and computer software, but also a reinvention of the workflow as it stands, training of staff,
The Irish Construction Industry is currently at a crossroads with reduced fees for construction professionals as a result of aggressive competition in all areas, and yet increased responsibilities and higher client expectations. There is a need to replace traditional cumbersome working practices with a process that performs more efficiently, provides more valuable information and, most importantly, delivers on greater cost certainty (McAuley, Hore, & Deeney, 2013). Clients will respond to cost certainty positives, however they must be made aware of risk sharing and risk management, and buy into the partnering and collaborative nature of integrated project delivery. Clients will have to embrace target value design, an effective management technique originating in manufacturing industries which has benefits for the construction industry. (Zimina, Ballard, & Pasquire, 2012). “The involvement of the project team in establishing target values will increase the likelihood of project success in achieving those set values because of the team’s buy-in to those goals and their increased sense of ownership (Pishdad-Bozorgi, Hamzanlui-Moghaddam, & Karasulu, 2013, p. 7)

Integrated project delivery requires a different contractual relationship between stakeholders to facilitate this process. To achieve a successful project outcome, a commercial framework of risk allocation and associated compensation must be agreed, requiring improved alignment of parties commercial interests with a collaborative approach adapted (Mathews & Howell, 2005). The traditional forms of construction contract used in Ireland have tended to encourage an adversarial approach by key professionals who are conversant with every detail, and in some cases enter a contract on a new project with claims in mind from the start. Architects, Engineers, Quantity Surveyors, Contractors and other construction professionals have deeply embedded work practices and traditional delineations of responsibility and liability. Each professional is confident that they have optimised their work practices in the method they assemble information within their brief, and the use of their existing technology whether it is good or bad. Project delivery methods and contractual relationships have evolved over a considerable time, and have ultimately created an environment where integrated project delivery may struggle to gain a foothold (McAuley, Hore, & Deeney, 2013). “Maximising value and minimising waste is difficult when the contractual structure inhibits coordination, stifles cooperation and innovation, and rewards individual contractors for both reserving good ideas and optimising their performance at the expense of others (Mathews & Howell, 2005, p. 46)” . “A multiple contract structure does not contribute to an
IPD culture (CMAA, 2009). Hence the adoption of appropriate contracts is necessary to facilitate the non-adversarial running of these projects. These contracts must give explicit recognition to the commercial relationship between parties, ensure that responsibilities and benefits are apportioned fairly and transparently with mechanisms for delivery that focus on trust and relationship, and include team based incentives or reward mechanisms, placing value on successful outcome rather than individual performance (Colledge, 2005).

2.4 BIM & IPD – Enablement & Adoption in Ireland

Many Government Departments, Semi-State Bodies and Agencies acknowledge the requirement for BIM in Ireland, they understand its merits and advantages and, yet, they appear reluctant to include it on future publicly-funded projects. Many believe that BIM will not be mandated in this country for many years. It is felt that Government would need to see, first hand, the true benefits of BIM before supporting any proposal from BIM Lobbyists. This could be provided in the form of a pilot project, co-undertaken with industry professionals, vendors, providers and education officials on a new-build public school or something similar in nature, so that the true benefits of BIM become well established and recognized throughout all Government Departments. The conventional and historic responses from those in Government advisors must be superseded by a decisive, simple and well-thought-out strategy for change in the way information is managed in construction. Historic structures, supply chain issues, the adversarial nature of the AEC industry, barriers and drivers have been illustrated above, however now is the time to actually achieve something positive within the Irish construction industry (McAuley, Hore, & Deeney, 2013).

There is a need for a change in policies, views, opinions and one-dimensional beliefs for the common good of the construction industry and all its associated professions. There is a need for BIM recognition and familiarity of brand at a regional level as this could spark a faster uptake of the technology in many firms and companies throughout Ireland. Another recommendation must be in the method of BIM education and training. Third level colleges are ideally placed to offer a comprehensive suite of modules for all levels of BIM user, from BIM basics to advanced BIM, with the additional provision of on-site support, when and where needed, and again, regional familiarity of brand is essential to this success.

Government will need regular reporting and consultation in the area of BIM if a future BIM mandate were to happen on all publicly-funded projects. Government representatives will also require BIM training and support in order to achieve maximum BIM efficiency (McAuley, Hore, & Deeney, 2013). The role of the Irish Government will be critical if the
implementation of BIM is to become a reality and must play a major driver in this process, as well as, review current BIM initiatives and barriers within internationally public sector procurement (McCauley, Hore, West, & Kehily, 2013)

2.5 Case Study Review – Sutter Medical Centre Castro Valley (SMCCV)

The Sutter Medical Centre in Castro Valley is a $320 million hospital development in California, regarded as ground-breaking in its utilisation of a 11 party Integrated Form of Agreement (IFOA). Important innovations on the project included visualisation tools to create transparency and establish common goals for the team. The integrated team worked in a highly collaborative environment including the state permitting agency which facilitated the development of strategies and work methods to implement a Phased Plan Review (PPR). The IFOA facilitates one form of Integrated Project Delivery utilising the organisation approach, the organisation including the owner, architect, key technical consultants and the main contractor, pursuing the goal of lean ideals, with high level communication techniques to deliver the project.

The lean project delivery system on this project differs fundamentally from a traditional system with regards: 1. Organisation defined above, who have early involvement. 2. The Operating System which refers to the way the work is managed. This contrasts with traditional approaches by focussing on workflow, making it stable, predictable and coordinated. 3. Commercial terms for binding key stakeholders, which develops a structure to allocate risks and compensation in order to align the party’s interests with a collaborative approach. The project used a Phased Plan Review process which imposes challenging requirements on all concerned, where everyone involved must submit their deliverables in a timely fashion, and work in a coordinated and collaborative manner.

There are interesting statistics emanating from this project which are strongly supportive of IPD. (Alarcon, Christian, & Tommelein, 2011) observe that commentators speculate that the project would have had a seven year programme if constructed under traditional process while the programme on this project was five years using IPD. The core group on the project included Sutter Care (Owner), Eden Medical Centre (Owner), DPR (Main Contractor), Capital Engineering (Mechanical), Devenney (Architectural design) and McClenahan (Plumbing specialist). This core group met every two weeks to ensure risk management was
optimised. A more extensive group including designers, builders and specialty consultants met every two weeks to resolve any strategic issues affecting the project in its entirety.

All construction projects have elements of uncertainty, and trying to manage uncertainty is a key goal for any project management team (Koskela, 1992), and managing variability is equivalent to increasing predictability which is fundamental to good project management. One of the key goals on this project was to reduce uncertainty, in turn reducing risk on budgets and programmes. (Alarcon, Christian, & Tommelein, 2011) observe that the project was driven by key goals

1. Structural design completion by 31/12/08
2. Project cost not exceeding $320,000,000
3. Hospital shall open fully complete and ready for business by 1/1/13
4. Healthcare delivery innovations (design/technological)
5. Environmental stewardship

A common understanding was developed as a result of focusing on the goals outlined above, which were clear and quantifiable and used in the decision making process.

When risk identification techniques were initially implemented, it became apparent that the Office of State-wide Health Planning and Development (OSHPD) could play a crucial role on many of the possibilities of delay and hence were integrated into the project team, an innovative approach again emphasising collaboration. This aided the project team in the production of a potential risk list of items that could impact project performance in a significant manner. Items such as late owner changes and decisions, incomplete information and coordination could be successfully managed. The list formed a basis for honest conversations among team members to achieve results, such as incorporating flexibility in design. A unique approach involved delay of design start by 8 months to finalise issues. The project team highlights this as a key area in reducing the impact of changes in the project. Design development workflow involved the entire team utilising constructive debate to complete design, increasing certainty and minimising risk. Where traditional approaches tend to create cycles of rework and miscommunication, this IPD process advances the design
process by recognition of all dependencies and establishment of milestones, demanding a deeper awareness of interdependencies to ensure minimal rework. Every step in the design process must be analysed to fully understand what is being produced and its effect on what other specialists are producing. On this project the design planning process commenced with acknowledging key design decisions which if changed later would have the greatest effect on quantity of rework, leading to a non-traditional sequence of design decisions defining design-deliverable milestones. This process was supported by building information modelling, utilising 3d models for visualisations during the decision making process.

Traditional design process normally follows a linear route from schematic stage to full construction drawings involving large cycles of rework. This is in stark contrast to the IPD process on this project. A "big room" space was equipped and utilised to ensure collaboration at a high level, with changes applied to the BIM model in real time. The BIM model was used for two main strategic purposes: 1. Design for fabrication and 2. Development of an integrated 3d working model. It was found that the utilisation of BIM collaboration technologies were major enablers of intense collaboration. On this project they facilitated the ability to build directly from the model, providing cost and time savings and allowing a degree of prefabrication.

This case study provides a detailed insight into the workings of an IPD project on the ground from both an organisational and contractual viewpoint. The fact that the project could be completed two years earlier than expected by not using traditional procedures is in itself a major endorsement of this new process. This type of development, by its nature is complex with many risk areas, and IPD offered an effective means of overcoming traditional problem areas. The case study deals with the project after the main contractor was selected and further study on main contractor selection would generate interesting debate.
3.0 Research Methods

The literature review above has carried out a review of worldwide literature and perspectives on integrated project delivery and building information modelling. The case study has provided an insight into best practice at work on a specific project. However, the majority of literature on this topic is outside the Irish context, hence it is important to gather primary data from professionals within an Irish context. This topic could provide the basis for an extensive research project, however, within the constraints of this paper, I have decided to use semi-structured interviews with four participants who have knowledge of integrated project delivery in this country.

The research design utilised in this paper is qualitative and is structured in a step by step approach. This is illustrated in Figure 3, and forms the blueprint for analysis to follow. The main research gathering technique used involves semi-structured interviews.

Figure 6. Methodology Steps

Figure 3
Step 1: The research topic covers Integrated Project Delivery, What are the enablers to IPD? And what are the challenges and barriers to IPD.

Step 2: A detailed literature review based on current literature surrounding this topic, and exposes gaps in this literature necessitating the pursuit of this research endeavour.

Step 3: The selection of key participants, who are adequately experienced in the phenomenon in question is paramount to a successful outcome (Moustakos, 1994). He holds that there are no set rules in the selection process, or the numbers involved. However the sample size must be adequate to provide credible findings and substantive evidence essential to resolving the research question.

In this study the researcher has identified a number of key participants whose experience and views, along with literature review will form the basis of this research. This study addresses the research question by interviewing different participants, who have different perspectives on the topic, and who inform the process based on their own experiences. As this study wants to gather experiences from different perspectives in a relatively short period of time, the number of participants is quite small for a study of this nature. However the author feels that the number in question was adequate to rationalise findings on this issue and as such get to the essence of the collected experiences. The number of participants from each perspective is illustrated in table 1.

Table 1. Participant Numbers

<table>
<thead>
<tr>
<th>Participants</th>
<th>Numbers selected for interview.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIF</td>
<td>1</td>
</tr>
<tr>
<td>Main Contractor</td>
<td>1</td>
</tr>
<tr>
<td>Specialist Sub-Contractor in Mechanical &amp; Electrical</td>
<td>1</td>
</tr>
<tr>
<td>Lecturer &amp; Academic</td>
<td>1</td>
</tr>
</tbody>
</table>

Step 4. (Van Manen, 1997) advises that all research should be based in “a sense of the pedagogic good” (Van Manen, 1997, p. 6). The main ethical concerns on this study concern: consent, confidentiality, voluntary participation, access to data, validation of data, and
reciprocity. This was addressed by briefing all participants prior to any interviews taking place, with all of the ethical issues explored. They were all given the opportunity to remain anonymous if required, which all participants declined. The information in question was not of a sensitive nature, and there were no confidentiality concerns among participants.

Step 5. The interviews were designed with a semi structured approach adopted. (Gillham, 2000) advises that interviews are more than a conversation; they must be formal, have a research agenda, and are subject to some form of control. He argues that they are appropriate where a relatively select number of individuals are involved, and are accessible to be interviewed. Gillham (2000) discusses the advantages of interviews in that they are effective in collecting expert opinion, and that information produced can be rich in quality and vividness. However they are time consuming to administer, as there are a relatively large number of participants to interview, the interviews are designed to be short and to the point. The questions were designed with this in mind and are included in Appendix C.

Step 6: The interviews were organised with an agreed schedule detailing times and dates for each interview. They were conducted in November 2014, with the main points from each interview transcribed by hand as a record of proceedings. Moustakas (1994) describes the interviewing process as rigorous, and (Creswell, 2007) advises that the nature of these interviews must be in-depth.

Step 7: Moustakas (1994) describes how to develop composite textural and structural description which reveal essences. Creswell (2007) advises on the importance of identifying significant statements that explain the experience of the phenomenon and draw out key themes to produce rich descriptions. “The understanding of meaningful concrete relations implicit in the original description of experience in the context of a particular situation is the primary target of phenomological knowledge” (Moustakos, 1994, p. 14). The foundation for analysis carried out in this research is based on Giorgi’s five point approach to data analysis cited in Moustakas (1994):

1. Read the entire description of the learning situation straight through to get a sense of the whole.
2. Develop a series of meaning units or constituents.
3. Eliminate redundancies – elaborate the meaning of constituents.
4. Reflection – researcher comes up with the essence of the situation.
5. Synthesises and integrates the insights achieved into a consistent description of the structure of learning.

This approach lays out a “road map” for analysing the large quantity of data gathered during the interview process. Using this process, the data arising from interviews is transcribed, which allows the interviewer an opportunity to become familiar with the material. The individual interviews are then condensed by concentrating on the significant statements and removing irrelevant content. Experiences are then compared and contrasted to allow common themes to emerge. The combination and linking of the various experiences of participants highlight the more significant elements in relation to the research topic. Synthesis of meanings and essences as described by Moustakas (1994) essentially refers to a process which interprets collected data, and involves the composition of an encompassing description of the essence of the phenomenon from the individual descriptions. These essences have been organised in the form of overriding themes, which are referred to throughout this study and are as follows:

- Theme 1 – The industry challenges, barriers and opportunities
- Theme 2 – Business value of BIM and IPD
- Theme 3 – How BIM and IPD supports collaboration
- Theme 4 – How BIM and IPD can be enabled
- Theme 5 – The way forward for BIM and IPD adoption in Ireland

This data analysis section documents the findings gathered during the interview process under major themes. It provides the platform for interpretation and analysis of the data collected. The interviews were semi structured in nature, with a prepared

4.0 Data Analysis

4.1 Participants

My semi structured interviews involved professionals who have experience of both BIM and IPD within an Irish Construction Industry context. They are as follows:
John Curtin (JC), Director, PJ Hegartys & Sons Ltd – John Curtin has been involved with Hegartys on the Intel Software Plant in Co Kildare, where BIM technologies and IPD (to a limited extent) is being used.

Sean Downey (SD), Director, Construction Industry Federation – Sean Downey is a director with CIF with responsibility for specialist contractors. His involvement in the Irish construction industry covers a wide range of different projects.

David Byrne (DB), Engineer, Mercury Engineering Ltd. – David Byrne is conversant with IPD contracts being used in Intel Software Plant and has experience with BIM technologies.

Dermot Kehily (DK), Lecturer / PhD Student, Dublin Institute of Technology. - Dermot Kehily is a currently a lecturer on quantity surveying modules in DIT. He has extensive experience of lifecycle costing and is currently completing a PhD in this area. He also has an extensive knowledge of BIM technologies.

The participants are involved in different sectors of the Irish construction industry. Pj Hegartys & Sons Ltd is a large Irish main contractor with an annual turnover of €125m employing over 220 direct employees. Mercury Engineering Group is one of Ireland’s largest specialist mechanical and electrical contractors. The Construction Industry Federation is the national and regional representative body for the Irish Construction Industry. In many cases they are recognised by government as the voice of the construction industry. Dublin Institute of Technology is a third level higher education provider with a history covering 125 years. Representatives from these organisations gave their views on a number of themes. I have correlated their responses to draw conclusions and recommendations going forward.

4.2 The industry challenges, barriers and opportunities for BIM & IPD

DK feels that culture within the Irish construction industry will have to change from an adversarial tradition to one of collaboration and shared resources. He has found that Irish construction professionals are protectionist and are reluctant to leave their “silou” approach. DK acknowledges that there is a large potential for companies who adopt BIM on their contracts, however he feels that there is no point on companies going on a “solo run”, there needs to be buy-in across the industry for IPD to progress as a legitimate alternative to current processes. Dk advises that the lack of suitable forms of contract in this country is a barrier to progression in this area.
DB is currently working on a bespoke IPD contractual arrangement in Intel. He advises that it works well in Intel due to the nature of construction work there where programme is more important than budget. A barrier for him is the level of detail contained in the BIM model for IPD to work effectively. He finds that while professionals try to collaborate in an integrated manner, in some cases their “heart is not in it”. However in Intel they have a “BIM Cave” which does facilitate integration and collaboration.

JC advises that Hegartys have an in-house professional with responsibility for BIM throughout the company. They have experience of BIM technologies on both Dublin Airport Terminal 2 and Intel. He feels that the IPD model in Intel is a hybrid version of the concept with an integrated approach on a bespoke contract. He is supportive of the “Bim Cave” which he feels is way forward. JC observes that BIM is being utilised on many projects but without the necessary integration that is required for a true IPD process.

SD feels that there is greater awareness of BIM in the Irish Construction Industry in general; however he feels that the Irish Government must take note of the actions of their counterparts in the UK and make BIM mandatory on public works. He sees culture and conservatism within the Irish construction industry as the main barriers with this regard.

4.3 Business value of BIM & IPD

JC notes that these processes are in their infancy in Ireland at present, and from his company’s point of view it is very difficult to value until they have completed a number of projects using this system so comparisons can be made with similar projects completed under traditional routes. He is confident that value for money will be achieved; however it’s impossible to put a sum against it at this time.

DB observes that from a mechanical and electrical viewpoint, IPD will offer great value to the construction process due to the reduction in rework and rfi’s due to clashes on site being eliminated. He finds in Intel that this is not obvious on the surface as modular items being used in many cases are more expensive than traditional methods.

DK feels that IPD will push our industry away from lowest cost selection which has resulted in below cost tendering in Ireland since 2007 which will result in a better quality product. He feels that the whole life cycle of the building will be considered. Main contractors will not be under the same cost pressure and more inclined to focus their attention on quality and programme.
SD observes that the CIF needs to sell the value of IPD within our industry, and that currently clients are unconvinced about the value aspects of this process.

4.4 How BIM & IPD support collaboration

DK advises that collaboration and IPD/BIM go hand in glove together. He feels that without true integrated approach that there is little benefit to be gained. He advises that any attempt to move away from our claims culture in the industry can only contribute in the long run to the quality of the product.

JC has found that the “BIM cave” on the Intel project is a fine example of collaboration in the field. He feels that collaboration will work well on large projects, however on small projects it may not work as well.

DB has found that his experiences of IPD in operation does increase collaboration on projects which is alien to projects on a traditional route. He says there is no way you can work in a silo when involved in this form of arrangement.

SD observes that there is little doubt that IPD/BIM stimulates collaboration at a deep level. Again he feels that this presents the biggest challenge to IPD being embraced by Irish construction professionals.

4.5 How can BIM & IPD be enabled.

SD is adamant that the Irish government must take the lead here by making BIM mandatory on public works contracts, however there is little evidence of appetite for this among government agencies at present. He also feels that if BIM is pushed at third level education institutes, students will go into the workplace with these skills.

JC feels that this must be client driven, with key professionals advising clients on the benefits of this approach. He also thinks that the Irish Government Departments have to show more enthusiasm for this approach. He also feels that construction professional need to upskill on new BIM software’s

JD advises that the benefits for mechanical and electrical contractors are clear, especially in the area of clash detection. He feels that the benefits of this approach being used in UK and USA will filter back to Ireland and help to change attitudes.
DK feels that BIM/IPD must be client driven starting with the largest construction client, the Irish government. He feels that education must make a contribution, not only to BIM, but also by looking at the lifecycle of the building and facilities management.

4.6 The way forward for BIM and IPD in Ireland

DK finds that culture within the Irish construction industry has to adapt to this new approach, leaving the silos behind and embracing a new way of managing the construction of projects. He feels that education is the key, and has no doubt that graduates from all construction courses will help to make this cultural change happen.

JC observes that we will monitor progress in the UK closely, and as many of our contractors are now involved on projects in the UK, their experiences will help to change attitudes. He feels that it will be adopted more readily on large contracts.

SD reiterates his comments on government involvement. He predicts that when the economy improves over time, there is a better chance of convincing government departments to experiment with procurement routes for certain job types. He feels that this will be the catalyst for adoption of collaborative approaches to getting work done.

DB observes that facilities management is becoming more sophisticated in Ireland, and facility managers will push for handover BIM models with intelligence and ultimately equipped with dashboard installations.

5.0 Conclusion & Recommendations

When we examine the responses from participants to this study, there are many commonalities in the content recorded. These responses are the basis for my conclusions on where the future lies for IPD and BIM in the Irish Construction Industry, and what recommendations can assist this development.

Cultural Barriers

All participants highlight cultural barriers among Irish construction professionals as a major obstacle to implementation of IPD / BIM. The solution to this problem is education for new professionals entering the arena, and advising existing professionals on the merits of IPD by using case studies from successful projects in UK, USA and worldwide. The literature review
has highlighted that this is a worldwide obstacle; however some jurisdictions are more progressive on overcoming this problem

Contracts

The fact that our standard forms of contract do not facilitate the use of IPD arrangements is a cause for concern. One of the few IPD projects in Ireland is using a bespoke contract based on a form from USA. The solution to this obstacle is to either amend existing forms of contract or formulate a new form of contract to address this problem.

Education

All participants felt that education on IPD and BIM was the key to more widespread use. This would involve upskilling on BIM technologies, but also enlightenment on how the IPD process operates.

Government Involvement

All participants were in agreement that IPD must be client driven, with the Irish government taking the lead by making the use of BIM on public works contracts a mandatory requirement. It is acknowledged that economic depression in the industry has not provided the best platform for embracing these new technologies

Value

It is generally accepted that money is a great motivator, and when clients / owners become aware of the financial rewards which arise from using integrated project delivery, there will be more of an appetite in our industry to embrace this procurement route.

The items listed above are the headline issues arising from this research paper. There is considerable optimism in the Irish Construction industry as we emerge from the most severe economic depression since the foundation of the state. As buildings become more complex and environmental and lifecycle issues become more important, there is little doubt that IPD will emerge as a cost effective and quality enhancing process for getting work done.
6.0 Future Study

Due to the limitations of this research paper, a relatively small sample of Irish construction professionals were interviewed. This topic warrants a more extensive research study on culture and attitudes relating to BIM and integrated project delivery going forward.
References


