

Integrated project delivery in the Nigerian construction sector: an unexplored approach from the stakeholders' perspective

Integrated
project
delivery

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Abstract

Purpose – Over the past years, high waste and inefficiencies in the construction industry may have contributed to many projects failing to meet clients' expectations. Among the new project delivery mechanisms to tackle this problem is integrated project delivery (IPD). IPD has been proved as a mechanism that increases stakeholders' collaboration at the early stage and delivers the highest value-for-money projects. In Nigeria, research regarding practitioners in the application of IPD in construction delivery is scarce. Thus, this study aims to investigate the level of awareness, issues hindering the implementation of IPD and proffer solutions to promote the use of IPD in project delivery.

Design/methodology/approach – Qualitative research was adopted. Twenty virtual interviews via Zoom and Whatsapp Videos were used to collect data from the selected participants and analysed via a thematic method. This is because of the unexplored dimension of the issues.

Findings – Results show that practitioners are aware of IPD but lax in the application. The emerged issues hindering the adoption and implementation of IPD were grouped into technological, legal, financial and cultural in Nigeria's context.

Research limitations/implications – This study is restricted to the relevance and hindrances facing the usage of IPD in the Nigerian built environment. The study proffers solutions to promote the use of IPD in the built environment via a qualitative approach.

Practical implications – This paper will contribute towards stirring Nigeria's stakeholders to create an enabling environment within the industry via IPD friendly policies and promote the use of IPD on construction projects.

Originality/value – This paper is one of the few papers that attempted to uncover issues that hinder the use of IPD on construction projects in Nigeria via a qualitative approach.

Keywords Construction sector, Integrated project, Nigeria, Project delivery, Stakeholders

Paper type Research paper

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1. Introduction

The construction sector is one of the largest sectors and delivers the construction facilities for economic development. Some scholars called the construction industry “physical infrastructure sector” and the engine room of an economy (Ebekozien, 2020a). The growth of this sector is germane. It forms a vital part of our lives and generates wealth and sustains the well-being of humanity. It is one of the critical pillars of an economy (Weber and Alfen, 2016; Ebekozien *et al.*, 2019). Globally, the construction industry is worth above \$10tn yearly. But the sector is faced with high waste and inefficiencies across the world. Majority of the developing countries are possibly the worse; Nigeria was not excluded. In the UK, the gross value added decreased from 8.9% in 2007 to 6.7% in 2011, respectively (Piroozfar *et al.*, 2019). Lichtig (2006) and Kahvandi *et al.* (2017) affirmed that the sector is becoming complex, and the application of unsuitable functions may have contributed to the high waste and loss of resources.

It is necessary to search for novel approaches to mitigate the high waste and incompetence associated with construction projects, especially in developing countries. Kent and Becerik-Gerber (2010) opined that enhancing construction project implementation is pertinent to successful project delivery. It can be achieved through the integration approach. One of the outcomes is high value-for-money (VFM) for the clients. Choi *et al.* (2019) affirmed that team integration is one of the forces that can drive project stakeholders to achieve a successful project outcome for the client. One of the newest approaches is integrated project delivery (IPD). Choi *et al.* (2019) avowed that construction project delivery methods could influence the platform of stakeholders’ integration and a construction project outcome. This approach alters the traditional responsibilities and connections of major project teams. In the opinion of Hanna (2016) and Govender *et al.* (2018), apart from IPD increasing early collaboration within the stakeholders, the approach intends to mitigate high waste and offer the peak VFM projects to clients. The authors postulated that IPD is a possible answer to several encumbrances hindering fruitful project delivery in the construction industry. Well, this is not without some challenges in attempting to transform to the tipping point. This new mechanism is receiving attention across the globe, including some developing countries such as Malaysia, Ghana and South Africa, but not much has been done in Nigeria’s context. Apart from the paper’s findings stirring policymakers to strive towards feasible policy solutions that promote IPD, filling this gap will form a significant theoretical contribution to the existing literature in Nigeria’s context.

Kahvandi *et al.* (2017) asserted that IPD provides a platform for improving variables such as time and cost and promoting efficient communications among the project team, resulting in win-win fields for all the parties. In the USA, some construction projects were contracted and executed through the IPD (American Institute of Architects AIA, 2012; Piroozfar *et al.*, 2019). The latter authors affirmed that the UK Government had authorised building information modelling (BIM) Level 2 for public construction projects. But the American Institute of Architects (AIA) emphasised that BIM can perform better if implemented within IPD. Elghaish *et al.* (2021) corroborated that the BIM and IPD target is to achieve the utmost collaboration among project stakeholders. Further studies could be conducted to evaluate the potential improvement, not within the scope of this paper. The IPD is a new trend. The UK construction sector has made several moves to improve collaboration among stakeholders and reward high-performance teams via promoting partnering and cooperation.

In Nigeria, few studies (Dada, 2012a, b; Akpan *et al.*, 2014; Zuofa and Ochieng, 2016; Onungwa *et al.*, 2017) have worked in related direction but not regarding awareness, hindrances confronting the adoption and implementation and proffering solutions to improve the usage of IPD in Nigeria from the stakeholders’ perspective. Onungwa *et al.* (2017) focused on BIM as a tool to manage construction projects in Nigeria. Akpan *et al.* (2014) focused on the implementation of constructability in project delivery, while the focus of this paper is on IPD. Dada (2012a) evaluated the main difference between the traditional and integrated

procurement methods and developed a model to predict the procurement method. Globally, many developed economies have recorded remarkable positive and progressive implementation of IPD principles in their construction practices. This necessitates an investigation into the level of its awareness and the underlying issues hindering the adoption and implementation in the Nigerian construction industry. Thus, this paper attempts to investigate issues hindering the implementation of IPD and proffer solutions to promote the use of IPD in project delivery through exploratory interviews with senior practitioners in the Nigerian construction industry. And findings from this paper could be adopted by construction stakeholders in developing nations with similar challenges. The study's objectives are:

- (1) To evaluate the level of awareness on IPD usage in construction projects by Nigeria's practitioners.
- (2) To investigate the issues hindering the implementation of IPD principles in the Nigerian construction industry.
- (3) To proffer feasible solutions that will mitigate hindrances and promote IPD usage in construction project delivery systems (PDS) in Nigeria.

2. Theoretical background

2.1 *Integrated project delivery (IPD) in the construction industry*

The construction industry is a key sector of any national economy. The industry is one of the major drivers of economic growth, especially in developing nations (Ebekozi, 2020a), because other sectors of the economy hinge on its products and services directly or indirectly. It is a sector that is key to industrialisation and urbanisation (Osuiugbo and Ojelabi, 2020; Ebekozi and Aigbavboa, 2021). Also, it improves the nations' overall GDP. McKinsey Global Institute (2017) reported that the sector spends about US\$10tn on construction-related goods and services yearly. It is equivalent to about 13% of GDP and makes the industry one of the largest in the global economy. Over the past years, this novel sector has experienced high waste and inefficiencies and may have contributed to many projects failing to meet clients' expectations. Among the new project delivery mechanisms to tackle this problem is the IPD (AIA, 2014).

The history of IPD is dated back to the 1940s, when the "design-bid-build approach" was frequently utilised in the USA for a long duration (Viana *et al.*, 2020; Pishdad-Bozorgi and Srivastava, 2018). The design-bid-build method involves an isolating procedure, directly via one construction contractor, client and design team, developing the project from inception to completion (Hamzeh *et al.*, 2019). There were issues associated with the approach, though partially resolved via the construction management method that was introduced in 1960 (Hamzeh *et al.*, 2019). Improving client's VFM via projects performance, stakeholders' integration among project teams is supreme to achieve fruitful construction project performance via project alliancing (Choi *et al.*, 2019). It is also known as IPD. The authors affirmed that IPD had gotten attention from the construction sector and research institutions, including academia, because of the high degree of stakeholder integration it delivers from the inception to completion.

This new mechanism (IPD) has been proved to increase early collaboration and relationships of key stakeholders (Hanna, 2016) and demands explicit principles for usage. AIA (2014) identified clear aim definition, collaboration, integration (stakeholders and systems), combined ownership, reverence, confidence, openness, harmless location, shared risk within the stakeholders and reward and good digital platform along the seven stages. Hanks (2015) ranked early and clear aim definition as the most important, while Azhar *et al.* (2014) and Fischer *et al.* (2017) ranked confidence as the essential one. Some of these principles

may enhance the transformation move and eliminate encumbrances impeding successful project performance, such as the early collaboration and risk-sharing among the teams.

Many scholars, including [Hanna \(2016\)](#), opined that IPD is one of the latest PDS and alters major stakeholders' usual conventions and relationships. [Collins and Parrish \(2014\)](#) asserted that some of the benefits of IPD could emerge in the first stage, also known as the conceptualisation phase. [Hanna \(2016\)](#) and [Fischer et al. \(2017\)](#) acknowledged the early collaborations as a contributing influence on the VIF to clients. [Lee et al. \(2013\)](#) found that IPD attention improves projects and achieves efficiency from inception to completion. It is made possible via the digital technology that the IPD has created a platform and all stakeholders well informed of decision-making. The use of 3D via digitalisation minimises significant changes that may have occurred during construction. Also, constructability, reworks and wastages are mitigated ([Dossick et al., 2013](#)). It led to a 2–10% construction cost reduction for a single project and up to 30% for a series of projects ([Achieving Excellence in Construction, 2003](#)). In summary, quality improvement, time and cost reduction, early collaboration and risk-sharing among the stakeholders are the benefits of construction projects that adopted the IPD mechanism ([Choi et al., 2019](#); [Piroozfal et al., 2019](#); [Ling et al., 2020](#)). Others are accountability and transparency, trust within the teams, precision estimates because of digital technique, better outcomes and productivity of the project.

2.2 IPD application in construction projects

The engagement of IPD in the construction industry has increased, especially in many developed countries, because of the high rate of success and benefits recorded to date ([AIA, 2014](#); [Hanna, 2016](#); [Elghaish et al., 2021](#)). This section briefly reviews some terms associated with IPD implementation in construction projects.

2.2.1 IPD integrated contracts. This type of contract allows for an integrated alliance between the client, design team and other key stakeholders to the project. This approach has reduced unsatisfactory performance, mitigated lawsuits and minimised unnecessary costs ([Fischer et al., 2017](#); [Alves and Shah, 2018](#)). This alliance defines the major roles, such as schedules, structures, procedures and design drawings. It has five major structural elements. This includes shared risk and gains based on project output, joint project control, minimised liability exposure, mutually developed and proven targets ([Fischer et al., 2017](#); [Viana et al., 2020](#)).

2.2.2 Process. In the IPD method, there are seven stages in the construction project, logical identified as conceptualisation, standards design, comprehensive design, execution documents, agency final buyout, construction, and finally, closeout stage ([Fischer et al., 2017](#); [Viana et al., 2020](#)). At the first stage (conceptualisation), all major stakeholders such as the client, design team, other consultants and construction contractor are affiliated in a common agreement to generate the project planning and range of work for the contract ([Hall et al., 2014](#)). At the second stage, all key parties from the conceptualisation stage are active, and other added to the team, called trade builders ([AIA, 2014](#)). During the third stage, all key stakeholders remain, and no addition ([Viana et al., 2020](#)). In the fourth, documents for financing the project, procurement approach, permits, etc., and materials (designs and specifications) list are generated. Most of the time, the fifth stage runs concurrently with the second, third and fourth stages because of the integrated approach. In the sixth stage, the project execution starts, and modifications and errors are drastically reduced because of the mechanism played out in some projects in the USA. Finally, the seventh stage is the closeout stage and is known as the stage where as-constructed drawings, residence and completion of notices documents are released ([AIA, 2014](#)).

2.2.3 Information and modelling. [Kalach et al. \(2018\)](#) asserted that for executing the IPD approach, some important modelling tools with precise digital knowledge, early partnership and automation competencies are pertinent. The mode could be used for one or more of the

following, “modelling of design intent; multidisciplinary performance analysis; building geometry data; merged with construction site data; delivery of as constructed facility model; 4D visualization; virtual prototyping; transparent, interoperable, and reliable data transfer with third-party applications; automated propagation of changes and integrity checking, and computer-aided manufacturing and assembly” (Reginato and Said, 2018). The BIM comes in here to play the role of the support tool to achieve these objectives via coordination and integration process (Kalach *et al.*, 2018).

2.2.4 Team. The practitioners mix their strengths to develop a better level of team output by using partnership and trust (Laurent and Leicht, 2019). Trust and partnership are the major constructs in the IPD teams, where the obligation to attain common objectives and outputs with mutual responsibility is pertinent. In accordance with this, Baiden *et al.* (2006) developed a team integration matrix, and each level has been illustrated in Table 1 as modified.

2.3 Hindrances facing IPD principles in the construction industry

The IPD mechanism is not without hindrances (Ebrahimi and Dowlatabadi, 2018), especially in developing countries. It may have contributed to the reasons for the low usage in many developing countries, including Nigeria. Ghassemi and Becerik-Gerber (2011) identified cultural and financial issues as possible encumbrances to implementing the IPD. Kent and Becerik-Gerber (2010) identified liability regarding identity, rights about owner and inter-operational challenge with integrated software as a possible hindrance to the implementation. While insurances and liabilities were identified by Rached *et al.* (2014). Regarding hindrances, literature is absent in Nigeria’s context. It again strengthened and justified the reason for this study. The same scenario of literature paucity in the implementation, apart from few studies (Dada, 2012a, b; Akpan *et al.*, 2014; Zuofa and Ochieng, 2016; Onungwa *et al.*, 2017) but not regarding awareness, hindrances confronting the adoption and implementation and proffering solutions to improve the usage of IPD in Nigeria as previously reported in Section 1.

3. Research method

The study adopted qualitative research. Because of the unexplored dimension of the issue, it provides an acceptable approach in exploring and allows intricacy of a sizable scale of

Dimensions	Full integration	Partial integration	No integration
Team focus and aims	Mutual focus and goal, performing towards mutual aims	Individual aims, still in line with the aims	Individual aims
Operation with no restriction	No individualism, performing towards mutual aims	Perform as individuals, support collaboration	Alignment and affiliation to individual organisations
Unlimited information sharing	Project information is available to all stakeholders	Information access only through team sections	Information only to the practitioner responsible
Team creation (single)	A single team performing in a common office	Individual performance. However in common office	Individual location and operation
Opportunities and respect	Equal treatment for the members involved in all phases	Member competence recognition, however, only in the field of expertise	Contributions only allow to the member specific field
“No blame” culture	Mutual responsibility for issue solving and outcomes	Single responsibility, however, help others to resolve issues	Individual responsibility for every issue and error made

Source(s): Modified from Baiden *et al.* (2006)

Table 1.
Team integration accomplishment

participants (Garcia and Gluesing, 2013). A virtual qualitative research method via Zoom and Whatsapp Videos was employed to collect data from 20 selected interviewees (public clients, consultants and construction firms). The breakdown of the 20 virtual interviews were 8 construction firms (P1–P8), 8 consultant experts (P9–P16) and 4 public clients (P17–P20), as presented in Table 2. They are all knowledgeable regarding IPD and its possible impact on construction project delivery. A thematic approach was adopted to analyse the collated data. It was steered by the semi-structured questions in line with Ebekozien (2020a, b). The cover letter and semi-structured questions are presented in Appendix. The cities covered were Abuja, Lagos, Benin City and Owerri. The virtual interviews were conducted via Zoom and Whatsapp Videos because of the pandemic regulation guidelines. Table 2 shows the interviewees’ number of employees (where applicable), rank, location and years of work experience. Lagos and Abuja are top on the list of commercial hubs and high construction ongoing projects in Nigeria. The study’s methodology adopted is satisfactory. This present methodology is like a study conducted by Jadidoleslami *et al.* (2019), where an interview approach was adopted to collate data that developed a framework to facilitate constructability via focusing on the IPD approach. This research adopted both purposive

ID	Company	Location	Number of employees	Years of experience	Participant rank
P1	Construction firm (Large)	Abuja	350	26	Management staff (Site operations)
P2	Construction firm (Large)	Lagos	330	29	Management staff (CEO and operational manager)
P3	Construction firm (Large)	Owerri	185	32	Site inspection officer
P4	Construction firm (Large)	Benin city	200	30	Project manager
P5	Construction firm (Medium)	Abuja	70	32	Project coordinating manager
P6	Construction firm (Medium)	Lagos	60	34	Operational manager
P7	Construction firm (Medium)	Owerri	50	27	Site manager
P8	Construction firm (Medium)	Benin city	45	29	Project Manager/CEO
P9	Architectural firm	Abuja	8	29	Director, design unit
P10	Civil engineering firm	Abuja	7	23	Partner (Structural Section)
P11	Architectural firm	Lagos	8	29	Senior partner
P12	Quantity surveying firm	Lagos	7	35	Chief principal partner
P13	Architectural firm	Owerri	4	32	Senior principal partner
P14	Civil engineering firm	Owerri	5	24	Senior partner, Structural eng. Firm
P15	Architectural firm	Benin city	5	30	Director, Arch. Firm
P16	Quantity surveying firm	Benin city	5	34	Principal manager, QS firm
P17	Govt. agency	Abuja	–	28	Chief maintenance engineer
P18	Govt. agency	Lagos	–	27	Director, works Section
P19	Govt. agency	Owerri	–	28	Deputy director, housing dept
P20	Govt. agency	Benin city	–	24	Director, maintenance unit

Table 2. Summary of participants’ description

and snowball sampling techniques. The former technique chose the prime interviewees, followed by the latter to obtain acceptable representation (Teddle and Tashakkori, 2010). Regarding the choice of the construction firms, four large and four medium firms were contacted. The 20 interviews took an average of 60 min.

Invitation letters were sent to the interviewees. Between early May 2021 and July 2021, 20 virtual interviews were conducted, and saturation was achieved. It was established when “new data” insights from the exploration were no longer forthcoming from the participants (Braun and Clarke, 2019). Though the interviewees’ identities were hidden, information from Table 2 reflects that they were experienced about IPS and the Nigerian construction sector. Examples are P2, P5 and P7. They have no less than 25 years of experience in the field and construction administration. Also, P8 is a Project Manager and double as the Chief Executive Officer of a fast-growing medium construction company. The participants were informed regarding the objectives and agreed to be part of it without coercion concerning moral issues. In developing the codes, the researchers utilised thematic analysis. The collated data were manually analysed, and results were described in themes. In the first phase, the 20 transcripts were read several times among the researchers who double as the coders to capture the participants’ opinions regarding the phenomenon. It is in accordance with Ebekozi *et al.* (2021a) that employed the same method to generate the initial coding scheme for their research. The researchers adopted two phases (first and second cycle coding phases). It is in accordance with Ebekozi *et al.* (2021a). Saldana (2015) affirmed that the first coding is known as open coding. The second phase encompasses utilising the sub-themes from the open coding to re-read the collated documents accurately and explore the concepts. The investigators adopted the thematic approach to study the familiar patterns. Three themes emerged from the categories. The study’s research objectives played a significant role in developing the themes from the sub-themes (categories) that emerged from the codes. The researchers adopted researcher reflexivity, member checking and triangulation as the validity methods of the collected data (Creswell *et al.*, 2018; Ebekozi *et al.*, 2021a). In summary, the study used emotion, in vivo, narrative and themeing coding techniques in the data coding process (Corbin and Strauss, 2015). It was conducted manually. In total, 201 codes were generated. The codes were re-categorised and grouped into nine categories. Three themes emerged from the nine categories. They are level of awareness concerning IPD usage, hindrances facing the implementation of IPD in Nigeria and feasible solutions to mitigate hindrances and promote IPD. With the assistance of data triangulation techniques, a threat to the results was mitigated (Tajeddini and Mueller, 2009).

4. Results and discussion

In Nigeria, the application of IPD principles in construction delivery is yet to receive in-depth research as revealed in the reviewed literature and may have contributed to the high waste and inefficiencies in the industry. It is because early stakeholders’ integration is germane to achieving fruitful construction project performance and higher VFM to clients. Also, this approach can enhance risk-sharing, transparency, trust within the stakeholders, precision estimates, among others, as revealed. Thus, the following sections present the three main themes:

4.1 Theme one: level of awareness concerning IPD usage

This section presents the participants’ perspective concerning the level of awareness on IPD application by construction practitioners in Nigerian construction projects delivery. Findings show that IPD principles will stimulate sustainability, risk-sharing management, technology integration (i.e. BIM), construction efficiency (i.e. lean construction) and enhance early

collaboration within the construction stakeholders. One of the outcomes of this action is the successful completion of construction projects and high VFM to the clients. Findings show a high degree of awareness of IPD within the construction practitioners, including the client's representatives. It may be because the clients' representatives are construction professionals from their academic backgrounds. But only four participants (P1, P6, P8 and P17) are familiar with the principles. It is one of the germane points as generated from the analysed data. They are the ones that have a better knowledge from that place. Findings show that 20% of the engaged participants are knowledgeable regarding the IPD principles and agree that the usage is still shallow within the Nigerian construction industry. It indicates that the Nigerian construction stakeholders are not satisfied with IPD usage in the construction PDS.

Participant P6 says, "... many of my colleagues are familiar with building information modelling (BIM) than IPD and sometimes mix them up in terms of application during the conversation. Basic awareness regarding the difference between BIM and IPD and how the IPD principles operate is required..." Findings agree with [Govender et al. \(2018\)](#) but disagree with [Bygballe et al. \(2015\)](#). [Govender et al. \(2018\)](#) found that only a few respondents were familiar with the principles when construction practitioners in one of the developing countries (South Africa) were engaged. It indicates that lack of awareness is likely a challenge in many developing nations, including South Africa and Nigeria. The authors encouraged stakeholders to explore the possibility of slowly adopting a more integrated approach, such as design-build on projects. It may enhance and promote the integration of design and construction. [Bygballe et al. \(2015\)](#) found that in five case studies of IPD projects in the USA and Norway (developed countries), the construction projects depend on the recognised contracts entered in line with the IPD and structures to rouse partnership between the team members and to improve problem-solving scenarios. One of the reasons this was successful is because the stakeholders were knowledgeable concerning IPD and understood the concepts and applications. This is where the majority of the developed countries such as the UK and developing countries such as Nigeria stand different regarding IPD level of awareness and knowledgeability.

Findings indicate that awareness and usage concerning IPD principles are higher in advanced countries than in developing countries like Nigeria. One of the concepts is that IPD expedites the growth of trust and individual relationships between the stakeholders. Participant P9 says, "... as a consultant and most likely will lead the design team, I'm aware of IPD and the potential benefits of implementing IPD principles from the start of the engagement, but there are some challenges because the industry is not made up of one professional. Have we evaluated others regarding the basic understanding and technological advancement that is required to adopt this approach? This is the question..." Findings corroborate the lack of information (practice and academic) regarding IPD and may have contributed to the paucity of literature in Nigeria's context. This result leads the paper to the second theme.

4.2 Theme two: hindrances facing the implementation of IPD in Nigeria

Investigating the possible hindrances to adopting and implementing the IPD concept that has mitigated waste and inefficiencies in many developed countries' construction sectors, yet not in operation in Nigeria's construction sector cannot be over-emphasised. This section offers the interviewees the platform to explore the possible hindrances from their perspective. Findings across the board show that hindrances are facing the implementation of IPD in Nigeria. The emerged hindrances were categorised into four major groups as follows cultural issues, financial issues, technological issues and legal issues, respectively, as summarised in [Table 3](#). Classifying the issues into four main groups in Nigeria's construction sector context is one of the germane findings from this study. In terms of cultural issues, findings identify the unwillingness to apply a different approach by many construction companies, especially

Categorisation	Financial issues	Technological issues	Legal issues
Cultural issues			
Unwillingness to apply a different approach by many construction companies	Inability to structure how to share the rewards and risk	Lack of necessary skills and knowledge to implement the software	Lack of trust in industry partners
Building owner does not see the advantages	Lack of coordination and training	Lack of appropriate technology	Procurement method constraints/limitations
Lack of available information about the process	Weak background structure	Licensing and liability concerns	Lack of appropriate insurance
General lack of industry support	The problem in compensation selection	Lack of availability of appropriate software	Inability to manage risk allocation
	High cost of software		

Table 3.
Emerged major IPD hindrances implementation in Nigeria

the indigenous firms, as the major issue that emerged. Other issues are property owners who do not see the benefits (P5, P10, P13, P5 and P18), inadequate information about the procedure (P2, P3, P4, P7, P12 and P20) and a general lack of industry support (majority). Participant P7 says, “... *Many in my category believes that the IPD concept is for academic exercise. It is because there is inadequate information about the benefits and the various professional institutes including the local chapter of the building contractors’ association have not helped matter. You do not expect me to delve into a new concept without in-depth knowledge ...*” Results agree with [Govender et al. \(2018\)](#) and it was discovered that the above issues that emerged were ranked within first to fifth, within the mean score range of 4.04–3.60, apart from “unwillingness to apply a different approach by many construction companies” that agrees with [Viana et al. \(2020\)](#). Many construction firms in developing nations mainly implement the traditional delivery system and find it challenging to align with change.

For the financial issues, problems in the compensation selection (P8, P13, P16 and P20), weak background structure (P5 and P9), inadequate coordination and training (P11, P14 and P17), high cost of software (P1 and P17) and inability to structure how to share the rewards and risk (majority) emerged as the major issues associated with the financial issues. Findings agree with [Ghassemi and Becerik-Gerber \(2011\)](#) and [Rached et al. \(2014\)](#). [Ghassemi and Becerik-Gerber \(2011\)](#) discovered that the inability to choose the reward and incentive was identified as one of the financial challenges. [Rached et al. \(2014\)](#) found that the absence of coordination and training could be considered part of the financial issues that hindered IPD implementation. Note, this is pronounced with developing nations than developing countries. Participant P8 says, “... *there is a need for vast knowledge regarding the IPD principles when it comes to compensation and risk-sharing. This is one area that many practitioners need to learn before delving into the adoption and execution of the IPD concept ...*”

For the technological issues, lack of appropriate technology (majority), lack of necessary skills and knowledge to implement the software (majority), licensing and liability concerns (P1, P6, P8, P17, P19 and P20) and lack of availability of appropriate software (majority) emerged as the hindrances associated with technological issues that may have hindered the implementation of IPD in Nigeria’s construction industry. Findings agree with [Ghassemi and Becerik-Gerber \(2011\)](#) and [Govender et al. \(2018\)](#). [Ghassemi and Becerik-Gerber \(2011\)](#) found that it may be difficult for some sub-contractors to develop their software for their work. It is of concern to many because the sub-contractor is one of the stakeholders to determine the project’s success. Regarding challenges associated with legal issues, lack of trust in industry partners (P3, P5, P9 and P15), procurement method constraints (P4 and P17), inability to manage risk allocation (majority) and lack of appropriate insurance (majority) emerged as the

possible hindrances to the implementation of IPD from the perspective of the stakeholders engaged. Results agree with [Rached et al. \(2014\)](#), and it was discovered that insurances and liabilities and inability to manage risks allocation are challenges facing IPD adoption and execution.

4.3 Theme three: feasible solutions to mitigate hindrances and promote IPD usage

There is much literature regarding suggestions to mitigate the challenges confronted with the adoption and implementation of IPD in the construction industry, but evidence shows paucity from Nigeria’s stakeholders’ perspective. It is one of the implications the paper will fill. Therefore, this section allows the interviewees the opportunity to proffer feasible solutions to mitigate hindrances and promote IPD usage in the Nigerian construction industry. The possible solutions that emerged were grouped to address the issues as identified and categorised in the previous theme. This includes cultural, financial, technological and legal solutions, respectively, in Nigeria’s context and may apply to other developing countries to improve their IPD concept as presented in [Table 4](#). Regarding cultural solutions, training and retraining systems for the stakeholders and strong commitment to sustainable project delivery via integration from project stakeholders emerged as the major possible solution. This intensive training system should include intensive learning and individual behavioural changes. Results agree with [Fischer et al. \(2017\)](#) and discovered that an intensive training system would demystify the approach. Also, clearly defined goals and priorities of all stakeholders (P10, P5 and P18) and stakeholders should identify with the ideology behind the concept (IPD) (P2, P14 and P19) emerged as part of feasible solutions.

For the financial solutions, create accountabilities, expectations, roles and responsibilities for the stakeholders (P4, P9, P14 and P20), teamwork to increase mutual compensation and incentives (P15 and P19) and sharing of targets, profits and costs among the stakeholders (P4 and P7) emerged as the major solutions associated with the financial solutions. Results agree with [Rached et al. \(2014\)](#). The authors discovered that teamwork allows sharing of targets, profits and costs, and this approach assists to over likely financial challenges from the project when properly applied. For the technological solutions, most of the participants suggest integrated software to integrate people and systems via BIM software. It may become an issue for new users because many lack BIM background, resulting in “Cobra Effect.” The “Cobra Effect” is a concept used to describe a scenario to proffer a solution but ends up creating more problems. Thus, P3 suggests BIM training courses for freshers and non-freshers to increase the popularity of the software. Results agree with [Rached et al. \(2014\)](#). The authors discovered that integrated software with an early training programme for new users on BIM mitigates technology-related issues. Regarding solutions to mitigate legal related

Table 4. Emerged feasible solutions to mitigate hindrances and promote IPD usage in Nigeria

Categorisation			
Cultural solutions	Financial solutions	Technological solutions	Legal solutions
Training and retraining system for the stakeholders	Teamwork to increase mutual compensation and incentives	Proposed integrated software	Select contract with a multi-party agreement
Clearly defined goals and priorities of all stakeholders Stakeholders should identify with the ideology behind the concept (IPD)	Sharing of targets, profits and costs among the stakeholders Create accountabilities, expectations, roles and responsibilities for the stakeholders	Boost BIM training courses	

issues, most of the participants suggest selecting a multi-party agreement. Findings agree with [Rached *et al.* \(2014\)](#), and this will alleviate the chances to develop a lawsuit among the stakeholders. The outcome will increase coordination and contractual delivery.

5. Study's benefits and implication

This study's benefits include the feasible solutions from the field and approaches to inspire and stir the adoption and execution of IPD in Nigeria's construction sector have far-reaching advantages to the stakeholders, the government and the economy in general. Besides the economic benefits of the IPD to the construction sector, such as efficient risk management, effective cost predictability, construction efficiency (lean construction), early partnership, high-performance design (construction sustainability) and enhancing productivity, the utilisation of IPD can improve technology integration and enhance high VFM to clients on construction projects delivery within time, cost and quality high performance. Regarding the theoretical implication, this is one of the few studies, if any, in Nigeria's context, that examined the level of awareness of IPD to the construction industry, investigated the issues facing the implementation of IPD and proffered possible solutions from experts in the field on the ways to mitigate these encumbrances and promote the use of IPD in the industry. It validates the remarkable silence of IPD and the Nigerian construction industry apart from [Dada \(2012a, b\)](#) but did not cover the subject matter. Findings and discussion from this study have filled the existing theoretical gap in this paper. Also, the four categorised major IPD hindrances (cultural, financial, technological and legal issues) and emerging feasible solutions to mitigate hindrances and promote IPD usage in Nigeria are components of the theoretical contributions to the body of knowledge. This study's results will support and offer an understanding of the benefits of IPD. It will stir more awareness of the concept and the application of the principles to the stakeholders in the construction industry. It will facilitate major parties to develop a healthy environment for the adoption and execution of IPD in the industry. As earlier stated, the adoption and implementation of IPD in the sector can enhance technology integration and high VIM to clients' projects. Other developing countries with similar challenges may modify suggested measures and adapt them to develop their construction sector. The study is envisioned to stir up parties concerning awareness, hindrances and proffering solutions to enhance and promote the use of IPD on construction PDS.

6. Conclusion and recommendations

Evidence from the study shows that there are hindrances in adopting and implementing IPD, and most Nigerian construction practitioners engaged are aware of IPD. Still only a few are knowledgeable concerning IPD principles and the concept. The poor enforcement and implementation of the IPD in the construction PDS may have contributed to the high waste and inefficiencies in Nigeria's construction sector. It has contributed to the backwardness of the sector in terms of technology. The use of IPD is technology integration-driven. IPD mechanism would have assisted in mitigating the high waste and reducing the inefficiencies leading to cost and time overruns. Besides mitigating high waste, the application and integrated knowledge can reduce construction waste and time via accurate cost predictability and lean construction, improve project quality and early collaboration and improve the high-performance design. Amongst the solutions, the government needs to facilitate a friendly environment and support construction companies via feasible and all-inclusive policies to adopt this technological development from the pre-construction arrangement. Early collaboration and teamwork of the stakeholders are pertinent from the conceptualisation phase to the completion phase of the project delivery. It would enhance and promote the

coordination between construction and pre-construction phases to facilitate more straightforward constructability implementation via integration against the “traditional method” that encouraged individualism as presented in Table 1 (fourth column where there is no integration). The paper recommends training and re-training systems for the stakeholders to enhance teamwork and increase mutual compensation and sharing of targets and responsibilities. It would enhance the transformational move towards IPD and deliver the highest VFM construction projects to clients in conjunction with other delivery methods with similar attributes like the IPD principles.

Thus, the results in this paper regarding the hindrances faced by IPD implementation may be evaluated in the future with other developing nations with similar construction industry characteristics as part of the areas for future research. Therefore, this paper can conclude to aid the academicians, policymakers and other stakeholders in the developing nation’s industry, especially in Nigeria, about how IPD usage can deliver construction projects to the highest VFM to clients construction projects delivery well adopted and implemented. One of the limitations of this paper is the methodology (qualitative research design) used, yet did not affect the strength of the results. Future studies should consider adopting a sequential exploratory mixed method. It allows generalisability (Creswell *et al.*, 2018; Ebekozen *et al.*, 2021b). The authors recognised that this type of research design enhances scholars to authenticate the results from the oral data. It will enlarge the coverage and empirical findings of future studies. Also, concerning future research, the study can examine the critical difference between BIM and IPD as applicable in the construction industry. From a practice point, the items and variables that emerged from the virtual interviews can be further validated via a quantitative approach in other developing countries with similar characteristics concerning IPD status, economic, political and culture.

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Further reading

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Appendix Virtual interview questions

Dear Participant,

Request for Virtual Interview

Following the recent innovations in the construction industry, the integrated project delivery (IPD) to tackle high waste and inefficiencies in the industry, this study plans to investigate issues hindering the implementation of IPD principles and proffer solutions to promote the use of IPD in project delivery. It has become germane because the Nigerian construction practitioners in applying IPD principles in construction delivery are yet to receive in-depth studies. Therefore, this research is titled: **Integrated Project Delivery in the Nigerian Construction Sector: An Unexplored Approach from the Stakeholders Perspective**. Specifically, the researchers will achieve the aim via the following objectives:

- (1) To evaluate the level of awareness on integrated project delivery (IPD) usage in construction project delivery systems (PDS) by Nigeria's practitioners.
- (2) To investigate the underlying issues hindering the implementation of IPD principles in the Nigerian construction industry.
- (3) To proffer feasible solutions that will mitigate hindrances and promote IPD usage in construction PDS in Nigeria.

Please note, questions for the virtual interview are going to be within the paper's stated objectives. Responses provided by you will be collated and analysed together with that of other interviewees. It will make up the findings, and all information provided will be handled with the greatest secrecy.

Hence, your valuable time and other input in answering the questions and contributions will be highly cherished.

Kind regards,

Yours faithfully,

(Research Coordinator)

Basic questions for the participants

- (1) Please, for record purposes, what is the name of this organisation?
- (2) Please, what is your position in your organisation, and how long have you been working?
- (3) Please, are you knowledgeable regarding integrated project delivery (IPD) concerning the construction sector?
- (4) If yes to question 3, in general terms, from your perception, how can you describe the state of IPD in the Nigerian construction projects?
- (5) Please, can you evaluate the level of awareness on IPD usage in the construction project delivery system by Nigeria's practitioners?
- (6) As a stakeholder in the construction sector, are you satisfied with the level of IPD usage in the construction project delivery system (PDS) by Nigeria's practitioners?
- (7) What are the IPD principles regarding PDS?
- (8) From your perception, do you think IPD usage can enhance the construction project delivery system in Nigerian construction projects?
- (9) Please, from your experience, can you identify the underlying issues hindering the adoption and implementation of IPD principles in the Nigerian construction industry?
- (10) What do you think the government can do as a regulatory entity to mitigate these hindrances?
- (11) What are the feasible policies to support and create the enabling environment to build a more resilient construction sector via IPD principles that can be used to promote IPD usage in construction PDS in Nigeria?

- (12) Do you think IPD is achievable in Nigerian construction projects?
(13) If yes, how can this be achieved?

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