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The Construction Practitioner's Perception of Integrated Project Delivery (IPD) Principles

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Abstract

The construction industry is an important sector in the economies of nations and plays a key role in socio-economic growth of Zambia. Construction projects in Zambia struggle to meet owner's performance expectations. Increased cost-effectiveness and reduced waste in Architecture, Engineering and Construction (AEC) projects requires an examination of alternative delivery methods. Integrated Project Delivery (IPD) has been used on some projects since 2007, revealing great advantages and outcomes exceeding owner's expectation. IPD is a proven solution for a poorly structured construction industry, characterized by wastage, late-delivered projects, over budget, and at a significant human cost. Yet, the exposition, understanding and application of IPD mechanism in Zambia remains absent in the construction project management, specifically in the construction practitioner's human skills. The purpose of this paper was to measure the view of Zambian construction practitioners on IPD principles. The investigation used a quantitative method through a questionnaire survey targeting construction practitioners in the Zambian construction industry. The finding revealed that 87.4% of respondents agreed with statements emanating from the IPD main contract while 12.6% either disagreed or were unsure, 69.8% were in agreement with IPD catalysts while 29.2% of respondents were unsure on the usefulness of the suggested tools to deliver project more effectively, and finally 97.9% of respondents perceived that the adoption and application of IPD principles in the Zambian construction industry would help deliver efficient projects in Zambia. Hence the need to familiarize construction practitioners with IPD contractual principles.

Keywords: Integrated Project Delivery, Collaboration, Delivery method, Zambia Construction Industry

1. Introduction

The majority of population in Sub-Saharan Africa has little or no access to safe drinking water, adequate housing, health and education services (Zawdie & Langford, 2000). The persistence of this problem is directly related to the lack of adequate infrastructure, and the prevalence of low indigenous construction capacity in the region. The construction industry contributes 19 percent of the national gross domestic product (GDP) while growing, year-on-year, faster than the already rapidly expanding Zambian economy (Zambia Green Jobs Program, 2012). Zambia construction Industry (ZCI) plays an integral part in the development of the economy and has been one of the important catalysts for growth in recent years (Mukelabai, 2016). However, ZCI face a certain number of problems. Among these problems, can be identified the defects of contractors on site, poor execution and insufficient supervision of consultants (NCC, 2006); and limited technical and managerial skills of construction practitioners (The Parliament, 2015). These problems can be directly linked to the type of contract agreements generally used.

These contract provisions are responsible of owner's dissatisfaction, time and cost overruns, poor quality, lengthy and costly litigation, and disruption of relations between the contracting parties to a project. To mitigate these problems for sustainable development, a wide range of initiatives in the construction sector can be explored. Hence the need for an innovative form of collaborative and flexible delivery method like the Integrated project delivery (IPD).

The Integrated Projects Delivery (IPD) seems to be a solution for future construction project in terms of efficiency and the new collaborative structure that it offers (University of Minnesota, 2012). In 2016 according to Deloitte Africa's construction industry report, most African countries spent a lot of money in construction related matter, and in 2017 an economic growth of over 5 percent in the construction industry was expected (Deloitte, 2016). This expectation was based on a number of observations that occurred or were likely to occur in 2017. From this trend, the Deloitte (2017) report, asserted that collaborative project delivery methods will become more popular in the following years as the days of traditional delivery method domination might be winding down in the world.

Integrated Projects Delivery is a project delivery approach that integrates people, systems, business, structures and practices into a process that collaboratively harness the talents and insights of all participants to reduce waste and optimize efficiency through all phases of design, fabrication and construction (Cook, 2007). IPD offers a different approach to any other delivery method in the construction industry. Leading proponents of IPD claim that it can potentially achieve superior results over other procurement models. The required commitment from all parties and team members is to see the project succeed and the contractual relationships that bind the parties requires a team culture based on risk-sharing, joint decision making and trust, like no other.

This study analyzes the perception of Zambian construction practitioner's perception of IPD principles. By analyzing the perception of IPD principles for the ZCI, a new contractual structure and management formula can be put in place in ZCI to attain change in the procurement strategies in order to deliver projects efficiently. The results of this study will also help Zambia construction practitioners consider the option offered by the IPD when selecting a delivery method for their projects. These considerations are related to a realistic budget, a timetable that includes a reasonable performance period, a reactive and quality design process, a risk assessment with risk allocation for the appropriate parties and recognition of the level of expertise within the organization of the parties (Rawlins, 2015).

2. Literature Review

2.1 Introduction

The reviewed literature shows that past studies were primarily focused on the comparison of Integrated Project Delivery (IPD) and the traditional delivery method which is commonly used in Zambia, the need for change in the construction industry and the level of collaboration when using the team work approach (Keith, 2010; O'Connor, 2009). Others scholars focused on the efficiency, cost saving, risk management and the respect of schedule that can produce the use of IPD approach (Hanks, 2015; AGCA, et al., 2010). Some reported the success of real-world construction projects that have used the IPD in its pure form in order to understand the mechanism (El-adaway, 2010; Markku & Cheng, 2016; Cohen, 2010; University of Minnesota, 2012). Their conclusions were based on the opinions of direct participants to the IPD construction project.

2.2 Dominating Contractual Arrangement in the Construction Industry

Navigant Consulting Inc. (2017) a specialized, global professional services firm, defines the traditional construction industry contractual arrangement as being the design-build (DB) model and its variants. The traditional delivery method is structured on the basis that, the design professionals enter into a separate contract with the owner, who in turn separately contracts the general contractor, who, in turn, contracts separately with the various trade contractors, suppliers and vendors. At the beginning of the project, the contractor is forced, to document designs which took years to be completed and to discover error and omission in a very short time, sometimes during the implementation of the project. Knowing that, the contractor bid and manage the project aggressively, the designer attempt to defensively over-design and transfer design risk to the contractor through specifications, requiring extensive verification, coordination, and contract interpretation clauses. Finger pointing behavior, claims, disputes and litigation characterize this kind of projects and according to Ashcraft (2010) none of this is in the owner's best interest. The Construction Management Association of America (CMAA) in its 2012 report gave the overview of delivery methods in today's world construction marketplace, the frequency of each of the delivery methods is approximately as follow Figure 1:

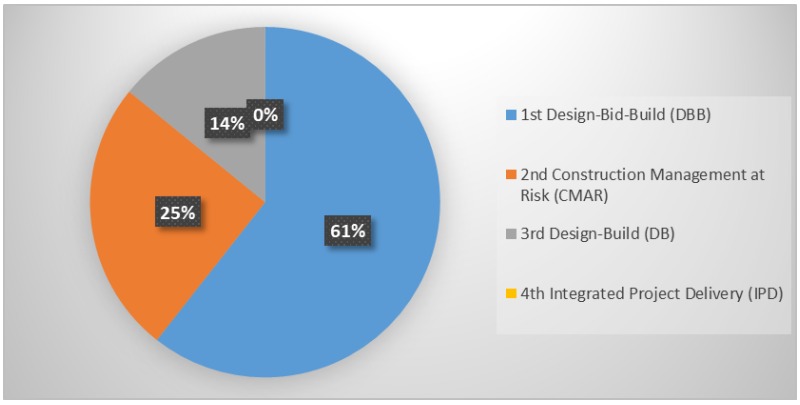

Figure 1: Current distribution of delivery method in the construction market (CMAA, 2012)

With the following breakdown:

- Design-Bid-Build (DBB) 60%
- Construction Management at Risk (CMAR) 25%
- Design-Build (DB) 14%
- Integrated Project Delivery (IPD)<1%

As shown in the above breakdown, the traditional contractual arrangement is leading the construction industry. However, the validation of IPD as reported by Gregory's (2011) is to be considered possibly as the most exciting novelty for the design and construction industry for years, with the potential for major savings and efficiencies like not experienced with traditional delivery methods but still needs an overall industry unanimity.

2.3 IPD and Traditional Delivery Method Contrast

Stakeholders Relationship

Each type of delivery method results in different events and requires different types of relationship between parties involved in the contract. Effective relationship management can mean the difference between a problematic contract and a smoothly run one. A study on management practices and procurement methods in 15 major European infrastructure projects showed that the hard aspects of project management such as risk analysis, and cost control, were generally better managed than external and internal relationships (Hertogh, et al., 2008). The strong fragmentation of the construction industry and the conflicting relationship favored by the traditional delivery method between key stakeholders is blocking the successful completion of projects. Relationship management remains one of the key issues to be solved in order to successfully complete project.

Table 1 illustrates the differences between traditional delivery method and IPD approach with regard to team approach, process, risks, compensation, communication, and agreement etc. in order to understand the relationship structure of both and more important to compare them.

Table 1: Traditional framework verses IPD philosophy (McGraw, 2008)

Integrated Project Delivery		Traditional Project Delivery
Learning, continual improvement, engaging with reality	Culture	Blame, finger pointing, exploiting loopholes, individual reward maximization, risk averse
Systems thinking; Optimize the whole; encourage, foster & support multi-lateral open sharing & collaboration	Thinking	Command & control; encourage unilateral effort; Break project into constituent parts; Optimize parts (especially "my bit")
Outside-in: act on the system to improve it for customers (helped by those working in it).	Management Ethos	Top-down: Manage the contract, manage the program, manage budgets, manage people
Integrated with work; based on data	Decisions	Separated from work
Related to purpose, capability & variation	Measures	Budget output, activity, standards, productivity
Based on demand, value & flow; open, collaborative & integrated team of key players formed at the outset & added to as the stakeholder group grows	Organization Design	Functional specialization; fragmented silo based, strongly hierarchical, controlled; constructors not generally added until late in process
Concurrent & multi-level; high trust & respect	Process	Linear, distinct, siloed (over-the-wall);
Shared openly & early	Knowledge & Expertise	Gathered "just-as-needed", hoarded in silos

Integrated Project Delivery		Traditional Project Delivery
Collectively managed, appropriately shared	Risk	Individually managed, transferred as much as possible
Team success tied to project success; value-based	& Reward Compensation	Individually pursued; min effort for max return; (usually) first-cost based
Digitally based, virtual; Building Information Modelling (3, 4 & 5D); Short-term planning e.g. Last Planner	Communication Technology	Paper-based, 2 dimensional; analog;
What matters to them? – Understanding Their human & technical concerns.	Attitude to Customers	Contractual

Team approach, process, risks, compensation, communication, agreement etc. constitute a set of elements that establish the basis upon which key stakeholders' relationship rely on. The table above establish clearly the difference between the two different contractual arrangement and the benefit and innovation brought in by IPD to the current construction industry philosophy.

Productivity and Project Components

Productivity levels is decreasing in the construction industry compared to other industries and have even declined over time all over the word (O'Connor, 2009). In the same vein, the United State Department of Commerce, Bureau of Labor Statistics, reports that among all major industries, construction is the only one to have actually experienced a decline in productivity since 1964 (McGraw, 2008) Figure 2.

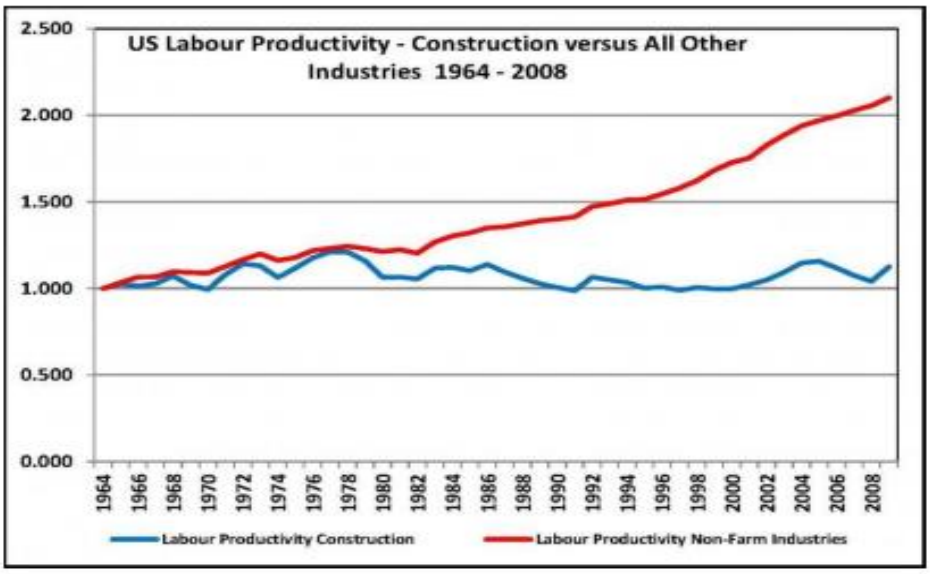

Figure 2: Labor productivity in construction and non-farm industries (McGraw, 2008)

As shown in Figure 2 the same report concludes by showing that while the average productivity has more than doubled since 1964, it has actually decreased in the construction sector. According to O'Connor (2009), a number of workplace forces contribute to waste and low productivity in the construction industry, such as poor contracting practices, unequal risk allocation and inappropriate delivery approaches. Even projects that are perceived as successful often have many similar problems. Knight (2008) reveals some of them in his report, where he stated that this disastrous project involves several change orders, hundreds of interpretation requests of contract documents, conflicts during construction, and overtime. Add to these, additional financial claims due to errors, omissions, unforeseen and unexpected conditions, delays caused by poor and untimely communication during the design or construction phases (Knight, 2008).

To deal with the problem described above and deliver efficient projects, Wilson (2014) illustrates how IPD generally devotes more time and energy to make decisions at the beginning of the project, when the ability to impact the project positively is higher. This approach can enhance the outcomes of projects, because IPD include making changes on the road, when the impact on cost, quality and time is negligible. Thus, in the traditional method they make changes during the implementation process when the pressure becomes high and the changes costly Figure 3.

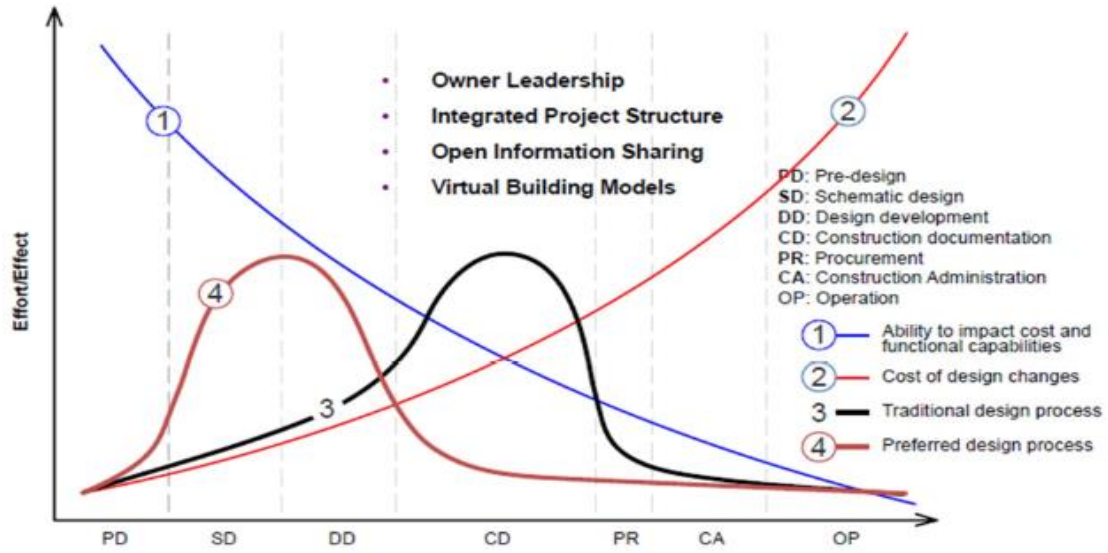

Figure 3: Impact of changes as project progresses (Wilson, 2014)

As shown in the above Figure 3 the major part of the work is done at the beginning of the project when using the IPD (4), and when using the traditional delivery method (3) the effort is concentrated during the construction documentation process.

The first IPD project was motivated by the realization that escalating costs, missed completion dates, and projects wrought with claims was not the best way to meet owner 's needs (Keith, 2010). Hence the need of a clear definition of projects stakeholders and most important the time of their involvement. Figure 4 compares the time the definition of project features and participants (what, who, how) occur when using the two structures.

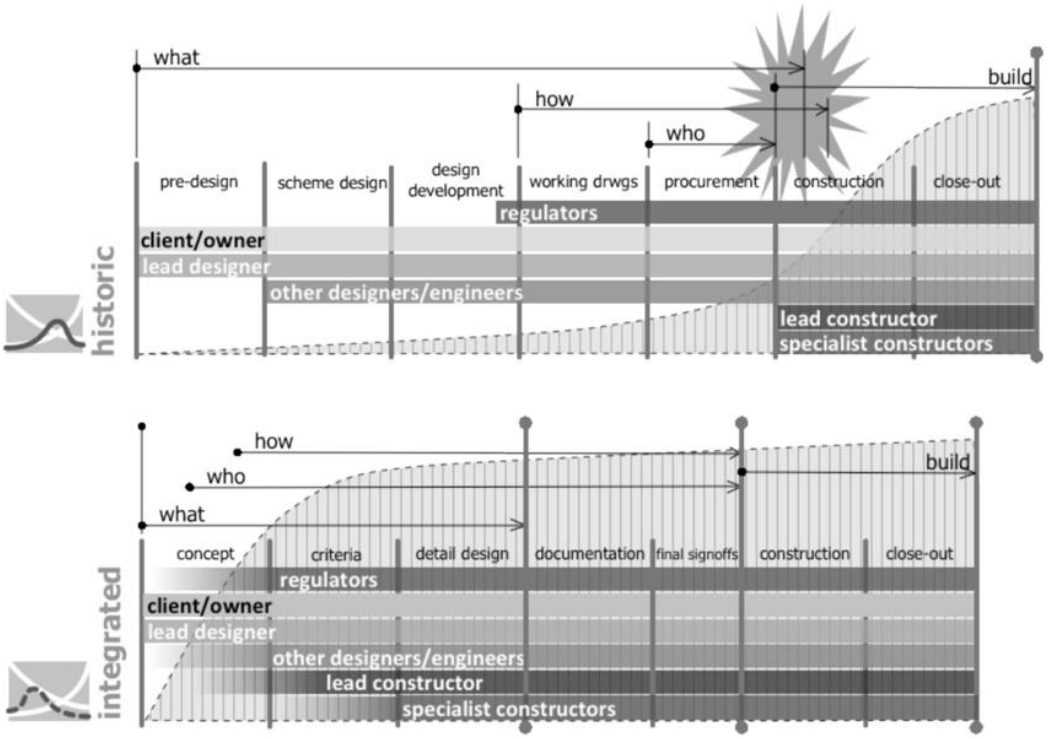

Figure 4: Comparison of historic and integrated project delivery timelines (Eckblad, et al., 2007)

As shown in Figure 1.4 the IPD timeline is shorter than the traditional delivery method. It also shows how IPD helps define very early in the process key stakeholders, their attributions, project goals and the project constructability. By the time the building process begins in the integrated structure, everything has been fully defined and all parties know exactly the "what" and the "how" whereas with the traditional method there is an inevitable crash that occurs at the beginning of the construction process because some elements of the project have not yet been defined.

3 Materials and Method

This study used the quantitative approach through a survey questionnaire as instrument. As Lee (2006) mentioned in his report, questionnaires are beneficial for assessing state of mind, concepts, and penchants about theories as well as attitudes towards the applicability of a new knowledge, skills, and approaches required in a given area. Other researcher like Singleton (2010), University of Minnesota (2012), and Hassan (2013) used this method in their studies on IPD. The investigation concerned consultants, contactors and regulators because of their capability to drive change in the ZCI. Questionnaires were addressed to them in form of a closed-ended questionnaire as recommended by Stehr-Green et al., (2003).

This research considered a 5-point Likert scale with anchor points of agreement (Strongly Agree; Agree; Unsure; Disagree; Strongly Disagree). The study also used purposive expert sampling because of the need of opinions and appraisal of respondents with a high degree of understanding about the study area. It was described by Stake (1995) as a group of various sampling techniques that rely on the judgment of the researcher when it comes to selecting the units (e.g., people, cases/organizations, events, etc.) that are to be studied. Kothari (2004) claim for a use of purposive sampling when the universe happens to be small and a known characteristic of it is to be studied intensively. The behavior of the selected small group is analyzed and the accurate result are or can be applied to a larger group for generalization.

The number of population being unknown, Smith (2010) formula was used, to ensure the correctness of the sample size considering the fact that the size of the population was unknown. According to Smith (2010):

$$\text{Necessary Sample Size} = (\text{Z-score})^2 * (\text{StdDev})^2 / (\text{margin of error})^2 \quad \text{Equation 1}$$

Equation where:

Z-score: Correspond to the confidence level - The most common confidence intervals are 90%= 1.645 confident, 95%= 1.96 confident, and 99%= 2.326 confident.

Std Dev: Standard deviation - Smith (2010) advice to take 0.5 as the safest decision, because it is the most tolerant number and ensures that the sample is sufficient.

Margin of error: we used of +/- 10%

With 90% confidence level, 0.5 standard deviation, and a margin of error of +/- 10%.

$$\text{Necessary Sample Size} = [(1.645)^2 \times 0.5(0.5)] / (0.1)^2$$
$$= (2.706 \times 0.25) / 0.01$$
$$= 0.6765 / 0.01$$
$$= 67.65$$
$$= 68 \text{ respondents were needed}$$

Following from this, 73 adequate respondents for data collection were identified. A total of 73 questionnaires were distributed. 48 (66%) of questionnaires were received and the remaining 25(34%) were not received. Finally quantitative data from survey results were examined by the use of a software namely statistical packages for social science (SPSS) for frequency and descriptive analysis.

When assessing the validity and reliability of data collected, a certain number of sources of evidence are supposed to be considered in order to produce data which are reliable, verifiable and most important useful for the body of knowledge. However, a comprehensive source of confirmation being extensive, this study used only sources of evidence which appeared important to justify findings. Face validity was used in the initial stage of the development of the survey and content validity was used afterward to make the results of the survey more valid and reliable as advice by Marshall & Rossman (1989).

4 Results and Discussion

4.1 Basic Principles of IPD

For the purpose of this study, the principles outlined in Table 2 were considered as imperative for projects using IPD. Among the described fundamental principles, only the contractual requirements and IPD catalysts were analyzed. These principles constitute the foundation of the IPD contract published in various professional institutions documents on IPD such as AIA (2007), AGCA et al., (2010) and Lean Construction Industry, (2016).

Cook (2007) divide these principles in three categories, which are contractual, behavioral and IPD catalysts:

i. Contractual Principles (These are written into agreements)
ii. Behavioral Principles (These are necessary for project optimization but are ultimately choice-based)
iii. Catalysts for IP (These can be greatly beneficial for optimizing project results).

Behavioral principles were left out because of their qualitative nature and the lack of appropriate tools to measure them.

Table 2: Fundamental principles of IPD selected for this study

Contractual principles (These are written into agreements)	Catalysts for IPD (These can be greatly beneficial for optimizing project results)
1. Shared risk and reward 2. Liability waivers ("no sue" clause) 3. Fiscal transparency 4. Early Involvement of key participants 5. Jointly developed project goals 6. Collaborative decision-making	7. Multi-party agreement 8. Building information modeling (BIM) 9. Co-location of team

These nine basic principles were considered fundamental because they are binding and not just aspirational and based on intent to interact openly and collaboratively. These nine principles amend the basic traditional contract form and liability relationships. They generate incentives and a structure of consequences arising from the application or ignorance of practices and principles of collaboration. The described nine basic principles appear among others principles in The American Institute of Architect (AIA), the Associated General Contractors of America (AGCA) and Lean documents on the IPD, but are the ones to be often repetitive in various documents.

4.2 Contractual Principles

The first category assessed was the IPD contractual principles. 87.4% of respondents agreed with statements coming from the IPD main contract. The remaining 12.6% either disagreed or were unsure. Table 3 and 4 gives more details.

Table 3: Contractual Principles Frequencies

Keys	**Responses**	
	frequency	**Percent**
strongly agree	280	36.5%
agree	391	50.9%
unsure	45	5.9%
disagree	16	2.1%
strongly disagree	36	4.7%
Total	768	100.0%

Table 4: Contractual Principles Descriptive Statistics

Contractual Principles	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Having key participants bound together as equals.	48	1	4	1.35	.601	.361
Contractually defined relationship between key participants.	48	1	2	1.67	.476	.227
Tying fiscal risk and reward encourages “best for project” behavior.	48	1	3	1.56	.580	.336
Liability waivers between key participants.	48	1	5	2.52	1.130	1.276
The existence of a "no sue" clause between key participants.	48	1	5	3.35	1.495	2.234
The agreement to use only alternative dispute resolution.	48	1	5	3.23	1.387	1.925
Fiscal transparency between key participants.	48	1	5	1.77	.722	.521
The existence of a clause on open book environment in the contract.	48	1	3	1.58	.577	.333
Early involvement allows greater understanding of the project features.	48	1	2	1.52	.505	.255
Requiring all participants essential to project success to be at the table early.	48	1	2	1.48	.505	.255
Greater team investment to achieve all desired project goals.	48	1	2	1.65	.483	.234
Intensified design prior to construction.	48	1	2	1.54	.504	.254
Jointly defining project goals increases the chance of them being achieved.	48	1	3	1.67	.519	.270
Jointly defining performance criteria.	48	1	3	1.73	.574	.329
Requiring participants to work together leverages pools of expertise.	48	1	3	1.69	.512	.262
Requiring participants to work together on the decisions making process.	48	1	2	1.71	.459	.211
Valid N (listwise)	48					

The respondents perceived IPD contractual principles as being fundamental measures to enhance the quality of construction projects delivered. The vast majority of respondents agreed with the statements concerning:

- Key participants bound together as equals,
- Shared financial risk and reward based on project outcome,
- Fiscal transparency between key participants,
- Early involvement of key participants,
- Jointly developed project target criteria, and
- Collaborative decision-making

This proved the understanding of the importance of collaboration and joint decision-making process to deliver quality construction projects. With a mean varying between strongly agree (1) and agree (2) the interpretation is that, the above-described contractual principles got an approval from respondents that can be also observed from a low standard deviation score and a z score not reaching (2).

Contractual principles that lead to confusion concern, liability waivers between key participants which include the presence of a "no sue" clause in the contract and the use of only alternative dispute resolutions to solve problem between contracting parties. This can be observed in the tables 1.4 detailing the descriptive quality of the analyzed data. As observed all statements relating to a "no sue" close were the only ones that attracted answers going from strongly agree (1) to strongly disagree (5). Which explains in some way a higher mean score of close to (3), meaning the variation of answers were mostly spread between respondents who were insure and those that strongly disagree to the "no sue" concept. With a standard deviation of (1.495) and mean close to 3 on this section it can easily be concluded that 95% of the respondents where more on the questioning (unsure) concerning the use of a "no sue" clause in a contract. A “no sue” clause is always perceived as an act of irresponsibility because, as Prince (2014) arguied in his presentation on the integrated principles of construction management, change of behavior become inevitable when parties start experiencing loss of money. Price's argument shows that contracting parties are tempted to act more irresponsibly when there is no risk of litigation. This theory is anchored on the theory of rational behavior under risk and uncertainty, which consider that there is no zero risk in any given project. No matter the amount of trust or collaboration between parties it’s not advisable to rely on others good will in a business transaction. Hence the importance of adopting a responsible behavior when undertaking a project. The perception of respondents on the presence of a "no sue" clause in a contract corroborate with the general observation of other researchers like University of Minnesota (2012); AIA (2010); Cheng (2012); Cohen (2010) and Burcin, et al., (2010) who realized in their research that nobody accepted to include a "no sue" clause in the IPD contract. On the other hand, these researchers noted that instead of having a "no sue" clause, parties agreed to prioritize, but on a contractual basis alternative dispute resolution approach before engaging the court. This is in contradiction with our results which shows a refusal to have an agreed process to follow before engaging the courts.

4.3 IPD Catalysts

For IPD catalysts the analysis of results shows that 69.8% were in agreement and the remaining 29.2% of respondents were unsure on the usefulness of the suggested tools to deliver project more efficiently. Table 5 and 6 give more details.

Table 5: catalysts for IPD Frequencies

Keys	Responses	
	frequency	Percent
strongly agree	53	27.6%
agree	81	42.2%
unsure	56	29.2%
disagree	2	1.0%
strongly disagree	0	0.0%
Total	192	100.0%

Table 6: IPD Catalysts Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Having key participants bound together as equals.	48	1	4	1.35	.601	.361
Co-location of project participants	48	1	3	1.62	.531	.282
Working in the same room	48	1	4	1.90	.751	.563
The use of BIM can help gain more time	48	1	3	2.31	.803	.645
The use of (Building Information Modeling) BIM	48	1	3	2.31	.803	.645
Valid N (listwise)	48					

Catalysts for IPD concern the use of tools and practice that can be greatly beneficial for optimizing project results. Apart from some fundamental principles such us co-location of team, IPD catalyst are essentially based on technological element such us the use of Building Information Modeling (BIM). Respondents perceived IPD catalysts as being crucial measures to improve the quality of construction projects delivered. The vast majority of respondents approved the statements concerning:

- Multi-party agreement; and
- Co-location of team.

With a mean score less than (2.5) the interpretation is that answers varying from strongly agree to ensure. A z-score of 1 indicated that all the variables where one standard deviation from the mean and consequently, can be considered as an expression of an approval of the IPD catalysts. This corroborates with the AIA (2010) and Cheng (2012) where the response was significantly positive concerning securing a big room and merge different key participants to work together and keep track of the project features. However, a close attention was paid to the negative and neutral responses on catalysts for IPD concerning fundamentally the use of BIM. This can be explained by the lack of familiarity with BIM in the Zambian construction industry (ZCI). BIM is considered to be one of the most promising recent developments in the architecture, engineering, and construction (AEC) industry. Given its ability to provide an accurate virtual model of a building in digitally constructed structure it is considered inevitable for a construction industry and world that is embracing technology. The hesitation of respondents should not be considered as a temptation for rejection of a tool that is described to be inevitable for the future and valuable for construction projects. This hesitation can be justified by several raisons highlighted by other researchers such as Ruya, et al. (2018) who studied challenges of building information modelling implementation in Africa a case of Nigerian construction industry and revealed that, lack of information on BIM, lack of investment in technology from construction firms and the absence of education in educational and professional body was one of the major delay to the application and adoption of IPD in Nigeria. Looking at the results of the survey and comparing them to Cohen's (2010) investigation on IPD, it can be concluded that there is a tendency to minimize the importance of interoperability when it comes to technological tools. Finally, the University of Minnesota (2012) study revealed that lack of software interoperability can greatly influence the schedule in a negative way and when well used, can help identify system clashes during design and provide significant cost savings to projects.

4.4 Adoption of IPD in ZCI

Finally, the research assessed the general point of view of respondents on the usefulness of all the principles, practices and techniques suggested by the IPD in the survey. The questions related to the ability of IPD principles to help deliver project more efficiently in ZCI if they were to be observed by construction practitioners. As shown in table 5 97.9% of respondents perceived that the adoption and application of IPD principles in ZCI would help deliver project within the expected time, with respect to the cost and with the required quality.

Table 7: Ability of IPD to deliver project efficiently in ZCI Frequencies

Keys	Responses	
	Number	Percent
strongly agree	64	66.7%
agree	30	31.2%
unsure	2	2.1%
disagree	0	0%
strongly disagree	0	0%
Total	96	100.0%

The general point of view of respondents concerning the totality of contractual principles, and IPD catalysts was significantly positive. The respondents where highly supportive of the IPD approach as a method that can help deliver project successfully in ZCI. The results of this report corroborate with the results of the survey conducted by (Change & Allison, 2016) where the distribution of responses was weighted heavily toward the most positive answers in support of IPD approach. To express the encouraging experience that these respondents had, the likelihood to use IPD and to recommending IPD as a delivery methodology to others was also significantly positive. Working on challenges that may hinder the adoption of IPD in Zambia could be of great benefit. Resistance to change has been of late one of major challenges faced by the construction industry in general. An agreement to adopt a new delivery method does not automatically imply a change in behavior. IPD is relatively a new way of undertaking construction project, hence issues relating to legal matters, financial matters, technological and cultural matters have to thoroughly be worked on to facilitate an efficient and most important a real-life adoption and application of IPD in Zambia. As it can be observed in the results, only legal, financial and technological issue were a draw back to the complete adoption of IPD principles.

5 Summary, Conclusion and Recommendations

5.1 Conclusions

This research proposed to investigate Zambian construction practitioner's opinions on IPD principles and the impact they can have on their projects. As a starting point this paper produced beneficial information on the current state of the construction industry all over the world including the particular challenges faced by ZCI, in order to establish and contextualize the background of the study. The results of the study show that a significant number of respondents felt that the adoption and application of IPD principles in Zambia, would help meet the owner's expectations in terms of time, cost and quality. Findings also translated an overwhelming desire to collaborate in a new and different structure than the one proposed by the traditional delivery method. Yes, there is more room to learn, and IPD method needs more and various backgrounds analysis for its implementation in different countries, and particularly in Zambia. Empowerment of decision makers in the construction sector through a certain number of anticipatory measures to deal with limitations of IPD implementation would make IPD structure adequate and appropriate for ZCI.

5.2 Recommendations

Based on the study's findings, it is recommended that Zambia's construction sector begin a structured transition toward adopting Integrated Project Delivery (IPD) principles. This should include targeted capacity-building initiatives, development of supportive policy and contractual frameworks, and sensitization of key decision makers to the proven benefits of IPD. Given the strong industry appetite for enhanced collaboration and improved project outcomes, piloting IPD on selected public and private projects would provide practical insights, reduce implementation barriers, and help tailor the model to Zambia's unique construction environment.

Declaration of Competing Interests

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Ethical considerations

The article followed all ethical standards appropriate for this kind of research.

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