

IMPLEMENTATION OF IPD IN THE MIDDLE EAST AND ITS CHALLENGES

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ABSTRACT

The traditional delivery approach in construction has proven to contain many flaws which have become more apparent with the increasing level of project complexity. Integrated Project Delivery (IPD) was therefore initiated as a response to the deficiencies encountered in the traditional approach. Although it is being increasingly adopted in the United States and other parts of the world, its application in the Middle East has not commenced yet. Despite the numerous advantages this new method provides, no sign of IPD implementation can be detected in the region today. After taking a close look at various published works and conducting field surveys, the paper analyses the cultural aspects found in the Middle East which inhibit the application of IPD. We hope that the findings of this study will be used as a foundation for possible future studies that will encourage the construction industry in the Middle East to adapt IPD or other collaborative delivery methods.

KEYWORDS

Traditional delivery approach, IPD, Middle East, FIDIC, cultural aspects.

INTRODUCTION

Integrated Project Delivery (IPD) is an emerging project delivery method aiming at minimizing waste in construction leading to optimal or sub-optimal improvements in schedule, cost, and quality (Matthews and Howell, 2011; Singleton and Hamzeh, 2011). For instance, all team members including the owner, architect, consultants, constructor, subcontractors and suppliers understand the value of collaboration and are committed to working as a team in the best interests of the project (AIACC, 2007). In addition pains and gains are shared between team members (Matthews and Howell, 2011). However IPD projects should overcome some cultural, financial, legal and technological barriers in order to achieve wider adoption by the construction industry (Ghassemi and Becerik-Gerber, 2011).

In the Middle East, where construction is expected to be booming for the next twenty years and where more than US\$1 trillion are to be spent on construction projects by 2030 (Kirk et al. 2013), the governing delivery approach is the traditional one. The latter differs in principles such as teamwork, early collaboration, trust, solid sharing agreements, value-based driven projects, and many other metrics that lead to a successful project (AIACC, 2007).

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Regarding contractual procedures, the Fédération Internationale Des Ingénieurs-Conseils (FIDIC) family of contracts for traditional project delivery approaches has been widely used since the 1970s in the Middle East. FIDIC Red, explaining the traditional design-bid-build delivery procedure, tends to be the most commonly used of the FIDIC contracts in the region (Webster, 2009). However FIDIC contracts seem to present some inconveniences. For instance, they are transactional and rigid when compared to IPD's relational-type contracts (Matthews and Howell, 2011). Moreover they do not provide collaboration tools that enhance teamwork in traditional delivery methods (Wilkinson, 2012). The contractor is lowly involved in decisions related to design and construction techniques (Watson, 2001). Finally, the presence of some biased clauses in favour of the employer in the FIDIC contracts can have serious consequences on the contractor (Matter 2001, Aljarosha 2008).

Therefore IPD and its relational type contract form an alternative that overcomes the obstacles encountered in the traditional approach. However in the Middle East, there are some particular barriers other than the ones mentioned previously that hamper the implementation of IPD. Since no extensive research was done on this perspective, the paper will focus on the Middle Eastern cultural aspects, presenting themselves as the most pronounced limitation. For instance, with respect to other cultural clusters, the Middle Eastern one scored low on relevant cultural dimensions such as future orientation, uncertainty avoidance and team orientation (Javidan et al. 2006). Another important cultural dimension that Littrell and Bertsch (2012) found was that the Middle Eastern society finds difficulty in changing its habits and does not readily accept the idea of change. In the aim of encouraging the use of collaborative project delivery approaches in the Middle East, the paper addresses first the advantages and barriers of IPD in general. Then it focuses on the delivery approach as well as the contract applied in the Middle East and its resulting problems. Finally the paper discusses the specific Middle Eastern cultural barriers that could hinder the implementation of IPD in the region.

METHODOLOGY:

In the aim of comparing the traditional delivery method with the integrated one, as well as presenting the barriers inhibiting IPD's implementation in the Middle East, the authors relied on extensive analysis based on various published works and conducted research. In an effort to shed light on the cultural aspects and construction management preferences in the Middle East, a survey in the form of an interview is conducted with 30 professionals working in the industry within the region. The countries from which the participants were chosen are the United Arab Emirates, Qatar, and Lebanon. The first two have respectively the second and third highest GDP in the Middle East (United Nations, 2012) and are to host two major international events in the upcoming years, Expo 2020 and FIFA World Cup Qatar 2022. The distributions of these participants regarding the nature of the company to which they belong as well as their overall experience are shown in Figure 1. Many surveyed professionals have experience in more than one field. For instance, they have worked as engineering consultants in some projects and as client representatives in other projects. In addition to the three countries in the Middle East listed above, the participants have worked in construction in the following countries: Algeria, Bahrain, Canada, Egypt, Iraq, Jordan, Kuwait, Libya Oman, Saudi Arabia, Syria, the United

States and the United Kingdom. More than 85% of the projects they were involved in were delivered using the traditional approach; therefore the participants are well experienced with the Red Book of FIDIC entitled “Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer”.

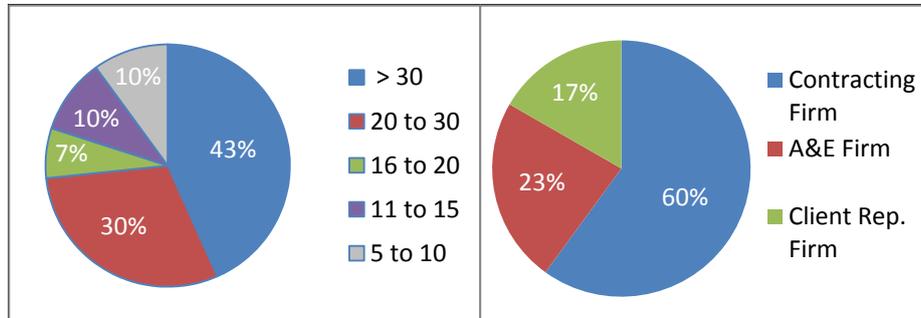


Figure 1: Distribution of the participants according to their overall years of experience (left) and the nature of the firm to which they belong at present (right)

ADVANTAGES OF IPD

By definition, IPD is a project delivery approach that integrates people, systems, business structures and practices into an innovative process that collaboratively harnesses the talents and insights of all participants to reduce waste and optimize efficiency through all phases of design, fabrication and construction (AIACC, 2007). The main features of this approach are listed below:

Early collaboration: IPD encourages early contribution of knowledge and experience and requires proactive involvement of key participants (AIACC, 2007). This means that the delivery’s quality is enhanced when the owner, architect, contractor, subcontractors, consultants and suppliers join their expertise early on during the project life cycle as shown in Table 1. Moreover, insight from each participant is valued in a culture that promotes and drives innovation and outstanding performance (AIACC, 2007). Hence the team members, linked together through a multi-party agreement, shall discuss and innovatively solve cross-functional issues related to design and construction. This occurs before execution starts, which minimizes potential future waste and enhances quality of construction.

Table 1: Involvement of all parties at all stages of a project life cycle in IPD (adopted from Kent and Becerik-Gerber, 2010)

	Preliminary design (%)	Early design (%)	Design development (%)	Construction (%)	Closeout (%)	Facility management (%)
Owner	94.3	85.8	84.9	82.1	72.6	71.7
Architect	92.3	89.4	92.3	82.7	67.3	15.4
Engineers	71.0	86.9	91.6	85.0	60.7	19.6
General Contractor	46.7	69.2	82.2	89.7	76.6	23.4
Subcontractors	17.1	41.9	72.4	89.5	67.6	22.6
Manufacturers/suppliers	11.8	41.2	74.5	87.3	48.0	23.5
Specialty consultants	43.1	69.9	83.3	79.4	46.1	28.4

The Last Planner System: The IPD's effective production control system comes from the idea of the Last Planner which was developed as a production planning and control system to assist projects in smoothing variability in construction work flow, developing planning foresight, and reducing uncertainty in construction operations (Hamzeh et al. 2009). In other words, the Last Planner encourages a proactive behavior, whereby errors and wastes are distinguished and eliminated from the beginning.

Painshare/gainshare agreement leading to elimination of adversarial relationships: Since a considerable part of the hard work is done at the start, the teamwork should be fairly acknowledged by the owner and gratefully appreciated. Therefore the trades are compensated for their work based upon a formula that rewards them in accordance with their participation on the project (Winstanley, 2011). The teams' risks and benefits being shared, there is no need for holding back information from one another as all try to add value to the customer, which softens adversarial relationships. Hence, a notion of "All for one and one for all" is promoted where a trade's strength and advantages cover another's weaknesses for the greater good of the final product.

Integrated Leadership: In IPD, leadership can be passed on from one person to another since it is "dynamic" in nature (Winstanley, 2011). All suggestions are listened to and main decisions are made through general consensus. Therefore, the optimization of design and construction is further enhanced due to the empowerment of the team members and their contributing ideas.

Collaboration Software: A Building Information Model (BIM) is a digital representation of physical and functional characteristics of a facility (AIACC, 2007). It is used in IPD as a tool to facilitate the transfer of information and knowledge from one trade to the other and therefore forming a foundation for well conducted cooperation and communication. Hence, the probability of having a passed on, misunderstood information is reduced and the actions which it engenders are eliminated from the equation before they create potential waste or damages.

BARRIERS FOR IMPLEMENTING IPD:

Despite the emergence of IPD as a comparably advantageous project delivery approach, literature on this topic presents numerous obstacles.

Cultural: The main cultural issue is inertia, resisting change (Ghassemi and Becerik-Gerber, 2011). Many companies are well accustomed with their management system to a point where they prefer not to change it. Moreover success of an IPD project relies on trust between all the different stakeholders. If not well prepared to adopt this new method, they must be willing to receive training to be able to implement IPD in their project (Ghassemi and Becerik-Gerber, 2011).

Financial: It is the challenge of selecting compensation and incentive structures commensurate to the unique characteristics of the project and its participants (Cohen, 2010). Therefore a very elaborate study should be done prior to signing the multiparty contract to determine the risks that each party will take in the project. This will guarantee a fair distribution of the shared savings and profits. If the incentive program was not properly considered, it might significantly reduce the morale of the teams involved, hence affect their productivity.

Legal: One of the main legal issues concerns applying IPD in the public sector. The law convention in the public sector is to select the lowest bidder. However IPD imposes value-driven selection criteria and this cannot ensure the lowest bidder. Actually IPD's value selection criteria can only be achieved through a public law designated for design-build delivery (Ghassemi and Becerik-Gerber, 2011). This solution is not as collaborative as IPD. In fact not all team members in the project are collaborating from the early phases and the authority is not evenly distributed. It is generally given to the owner through the contractor.

Technological: BIM integrates all the trades and design aspects in 3D and helps clarify the scope of work and the construction method to be used. However the use of BIM might cause problems when small entities like subcontractors do not have enough expertise with such a technology, thus struggling to coordinate with the rest of the parties (Ghassemi and Becerik-Gerber, 2011). This barrier can be overcome by training the nominated subcontractors to the use of BIM prior to the start of the project.

TRADITIONAL PROJECT DELIVERY IN THE MIDDLE EAST:

The Middle East is to experience unprecedented levels of construction projects in the next two decades (Kirk et al. 2013). While practices of project delivery approaches have evolved with time as more sophisticated projects are taking place, the theoretical principles behind these approaches remain the same. The governing project delivery approach in the region is still the traditional one, whereby a contractor constructs the works in accordance with a design package provided by the architecture and engineering consultant to the employer. The latter differs from IPD in principles such as teamwork and early collaboration, trust, solid sharing agreements, value-based driven projects, and many other metrics that ultimately lead to a successful project as shown on Table 2 (AIACC, 2007).

Regarding contractual procedures, the Fédération Internationale Des Ingénieurs-Conseils (FIDIC) family of contracts for traditional project delivery approaches has been widely used since the 1970s in the Middle East (Webster, 2009). The Red Book of FIDIC 1999, entitled "Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer", tends to be the most commonly used of the FIDIC contracts in the region (Webster, 2009). This book explains in great details the exact procedure to be followed by all parties to deliver a project using the traditional delivery approach. Although clear and thorough, this contract seems to present some inconveniences. For instance, it is transactional and rigid when compared to other relational-type contracts (Matthews and Howell, 2011). It does not provide collaboration tools that enhance teamwork in traditional delivery methods (Wilkinson, 2012). Consequently entities work independently from each other and seek to locally optimize their own work without taking a look at the system as a whole. Furthermore the contractor is lowly involved in decisions related to design and construction techniques (Watson, 2001). As a result, issues and clarifications related to design and construction are more likely to appear and be notified during execution, contrarily to IPD, where the contractor and designer discuss together such issues at an earlier stage. Finally, the presence of some biased clauses in favor of the employer in the FIDIC contracts can have serious consequences on the contractor (Matter 2001, Aljarosha 2008). This would cause the contractor to bear more risks than he is

capable of, increase contingency in the cost estimate and possibly submit a bid much higher than the expectations of the client. Therefore IPD and its relational type contract form an alternative that could fill the gaps of the traditional approach that is widely used in the Middle East.

Table 2: Traditional Project Delivery vs IPD (adopted from AIACC, 2007)

Traditional Project Delivery		Integrated Project Delivery
Fragmented, assembled on “just-as-needed” or “minimum-necessary” basis, strongly hierarchical, controlled	Teams	An integrated team entity composed of key project stakeholders, assembled early in the process, open, collaborative
Linear, distinct, segregated; knowledge gathered “just-as-needed”; information hoarded; silos of knowledge and expertise	Process	Concurrent and multi-level; early contributions of knowledge and expertise; information openly shared; stakeholder trust and respect
Individually managed, transferred to the greatest extent possible	Risk	Collectively managed, appropriately shared
Individually pursued; minimum effort for maximum return; (usually) first-cost based	Compensation/Reward	Team success tied to project success; value-based
Paper-based, 2-dimensional; analog	Communications/Technology	Digitally based, virtual; Building Information Modeling (3,4 and 5D)
Encourage unilateral effort; allocate and transfer risk; no sharing	Agreements	Encourage and support multi-lateral open sharing and collaboration; risk sharing

MIDDLE EASTERN CULTURAL ASPECTS:

In an attempt to provide a sound basis for conceptualizing worldwide leadership differences, the Global Leadership and Organizational Behavior Effectiveness (GLOBE) research program assesses cultural attributes and culturally endorsed leadership theories on ten culture clusters. The results concerning the Middle Eastern cluster that are of interest to us are featured in the Table 3.

Table 3: Results of the Middle Eastern cluster for different cultural dimensions (adopted from Javidan et al. 2006)

Cultural Dimensions	Score
Future Orientation	Low
In-Group Collectivism	High
Uncertainty Avoidance	Low
Participative	Low
Team Oriented	Low
Self-Protective	High

From the table above it is noticed that the Middle Eastern cluster scored low in the following attributes: uncertainty avoidance, future orientation, team-oriented and participative. These cultural dimensions are reported to contribute to outstanding leadership according to the authors and are defined as follows:

Uncertainty Avoidance: the extent to which a society, organization, or group relies on social norms, rules, and procedures to alleviate unpredictability of future events.

Future Orientation: the extent to which individuals engage in future oriented behaviors such as delaying gratification, planning, and investing in the future.

Team-Oriented: a leadership dimension that emphasizes effective team building and implementation of a common purpose or goal among team members.

Participative: A leadership dimension that reflects the degree to which managers involve others in making and implementing decisions (Javidan et al. 2006).

These cultural dimensions are fundamental qualities required for the success of an IPD project. In fact, the main principles of IPD is to eliminate waste through early collaboration and trust between all team members, risk sharing, assessment of all design and construction alternatives, and application of the Last Planner System. In other words, being proactive as well as working together in one team are necessities to successfully apply IPD and other collaborative delivery methods.

The other two cultural dimensions on which the Middle Eastern cluster scored high are reported to have an impact in impeding outstanding leadership and are defined as follows:

In-Group Collectivism: the degree to which individuals express (and should express) pride, loyalty, and cohesiveness in their organizations or families.

Self-Protective: the degree to which individuals ensure the safety and security of the individual. It is self-centered and face saving in its approach (Javidan et al. 2006).

In-group collectivism is an important social attribute as it reflects the individual's pride and loyalty to his organization. That being said, excessive pride might affect the person's impartiality and objective point of view. Likewise, a self protective behavior might cause an individual to over think what is best for him/her and neglect what is best for the others. Thus these cultural attributes would also form barriers to implement collaborative delivery methods.

Finally, although resistance to change is a natural human trait, it is also one that can be avoided through targeted implementation and well-conceived incentives and encouragements (OECD, 2009). However the way to avoid uncertainty and risk in the Middle East is usually dealt with by implementing strict rules, policies, and regulations which consequently leads an individual to become change averse (Littrell and Bertsch, 2012). This specific trait might as well pose itself as a barrier to switch from the traditional delivery approach to IPD.

SURVEY RESULTS AND ANALYSIS:

RATING IPD PRINCIPLES:

In the first part of the survey, a list of randomly distributed project metrics indirectly referring to either IPD or the traditional project delivery practices was presented to the participants. They were asked to rate each item from 1 (not effective) to 5 (very effective) according to how much in their opinion this item would lead to a successful project. The results are shown in tables 4 and 5.

The average being equal to 3, we notice that all scores obtained on metrics describing IPD principles are above the average. Although many of these metrics seem utopian to the participants, especially if considered to be applied in the region, the high grades reflect some harmony with collaborative delivery principles, leading to some hope in the possibility of implementing these latter in the Middle East. For instance, while most of the applicants agree that sharing the cost on the project and distributing profit based upon a fair formula would have a positive impact on the project, they believe it is impractical and difficult to be applied in the region.

The highest scores are obtained on the following principles: collaboration in design and construction, work in the same office, root cause analysis, 3D and 4D modeling, permanent communication and sharing risks. It is interesting to note that the participants are in favor of collaborating with the contracting and subcontracting teams before the beginning of construction. This early collaboration occurs very rarely in a traditionally delivered project supported by the FIDIC Red Book. Thus the high grade obtained for “collaboration in the design phase” reflects the positive impact of the contractor and eventually the subcontractor on the early phases of a project. As mentioned previously in the paper, early collaboration and proactive behavior considerably help in reducing variations and errors that might occur in execution.

Table 4: Rating of IPD principles

Metrics	Average rate (/5)
Collaboration between Owner, A&E, Contractor, and Subcontractor in pre-design	3.11
Collaboration between Owner, A&E, Contractor, and Subcontractor in design	4.15
Collaboration between Owner, A&E, Contractor, and Subcontractor construction	4.52
Include experienced foremen and other heads of labors in weekly progress meetings	3.30
Having the owner, A&E, contractor, and other team members (supplier, subcontractor...) working together in the same office for all the duration of the project	4.15
Find the root cause of an error after being committed and take preventive actions	4.78

Table 5: Rating of the traditional delivery approach and IPD principles

Metrics	IPD principles vs Traditional method principles	Average rate (/5)
Technology	3D or 4D modeling combining specialties in one file	4.37
	Simple 2D drawings relative to each specialty alone	3.04
Design	Set-based design	3.52
	Point-based design	3.01
Communication	Encourage permanent communication with different parties in the aim of revealing unnoticed problems and sharing general risks	4.56
	Withhold relevant knowledge and information from other parties to benefit later from this advantage	2.44(all parties) 2.89(contractors)
Payment	The collaborating team members agree to share the cost on the project and to distribute their profit based upon a formula that rewards them in accordance with their participation on the project	3.00
	Having each party involved in the project (mostly A&E) being paid an amount equal to a certain percentage of the total cost of the project	2.30
Decision making	Suggestions in a functional team are listened to and main decisions are made through general consensus	3.63
	All decisions are made in a hierarchical way by a team leader and carried on downstream neglecting suggestions of the downstream members of the team	2.15

FIDIC (RED BOOK):

In the second part of the survey, participants are presented with different statements/ideas and are asked to which level they think the FIDIC Red Book encourages these. The results are shown in the figures below (SD: Strongly disagree, D: disagree, N: Neutral, A: Agree, SA: Strongly agree):

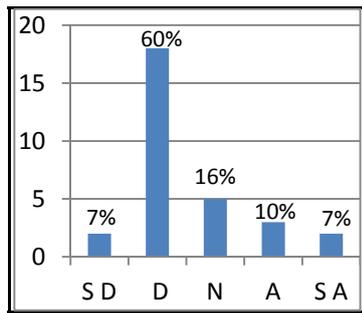


Figure 2: Collaboration between the different parties (left)

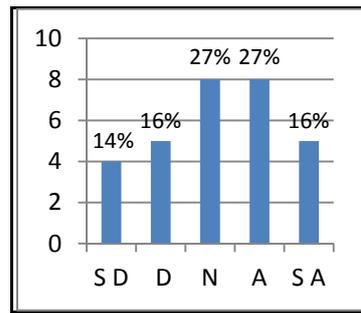


Figure 3: Adversarial relationship between the different parties (right)

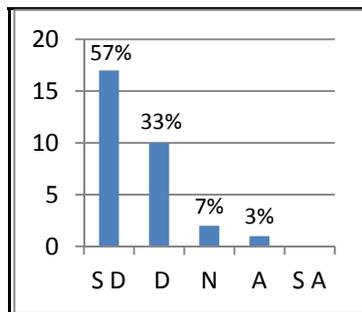


Figure 4: Involvement of contractor and subcontractor in pre-design and design (left)

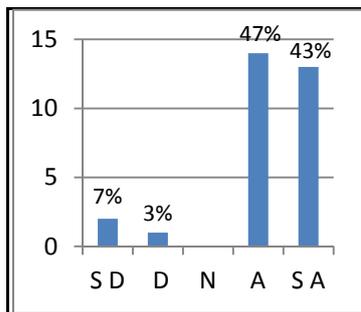


Figure 5: Authority given to the owner through the engineer (right)

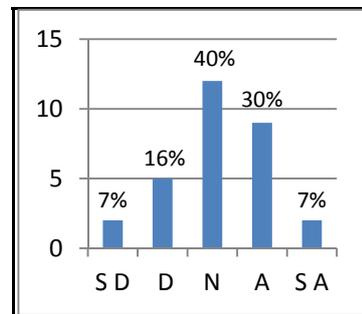


Figure 6: Solves problems without resorting to arbitration and courts (left)

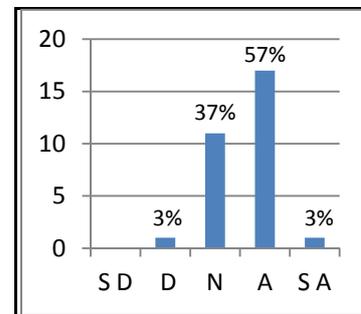


Figure 7: Contract organization and text are practical and user-friendly (right)

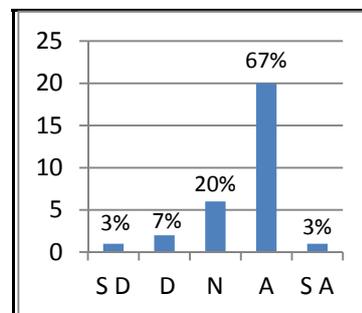


Figure 8: Flexible and easily changeable to adapt to the country's legal aspects (left)

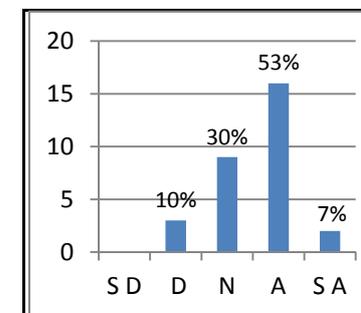


Figure 9: Favors a claim conscious behavior on behalf of the contractor (right)

The results of the figures above reveal the following: 67% of the participants disagree that the Red Book of FIDIC promotes collaboration between the different parties during all phases of the project (Figure 2), 90% disagree that it involves the contractor and subcontractor in the pre-design and design phases (Figure 4) and agree that it gives the authority to the owner through the engineer (Figure 5), and 60% agree that it favors a claim conscious behavior on behalf of the contractor (Figure 9).

While collaboration between the parties in the early phases of the project can considerably help in the success of a project, it is not encouraged in the FIDIC contract according to two thirds of the participants. They also believe FIDIC is giving the authority to the owner. This last will lead the contractor to bear more risks which might oblige him to increase his contingencies and become claim-conscious in order to protect his position. In this case, the consulting engineer hired by the client and the client himself become more and more suspicious of the contractor's actions, which might deteriorate the relationship between one another.

The participants have different views on whether FIDIC solves problems without resorting to courts (Figure 6) and whether it promotes adversarial relationship (Figure 3). For instance, while 37% agree that it solves problems without resorting to courts, 23% refuse this idea and 40% are neutral. The participants think that this issue depends most importantly on the degree to which the contractor and the client themselves are contentedly willing to solve their problems without using arbitration. Finally 60% of the interviewees agree that FIDIC is user-friendly (Figure 7) and that it is easily changeable to adapt to the country's laws (Figure 8). In fact its flexibility allows clients to easily alter some issues in the particular conditions of the contract to make it compliant with the laws of the country or with their own advantage.

When asked about their opinion concerning FIDIC (Figure 10), a majority of 64% of the participants say they are satisfied with the contract while only 3% are dissatisfied and 33% are impartial. In addition, when asked if they would switch from FIDIC to other contracts that provide more collaborative delivery methods (Figure 11), 60% are in favor while 37% are hesitant and state that it depends on whether the whole construction industry in the Middle East is changing the set of contracts used.

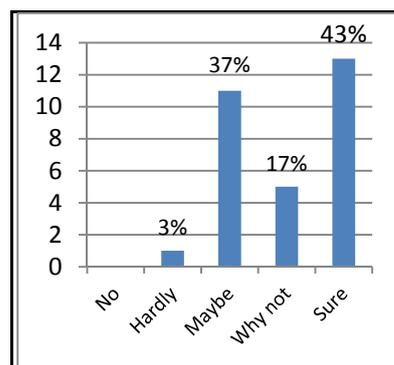
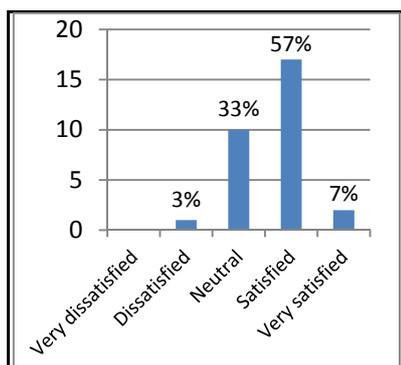


Figure 10: Level of satisfaction with FIDIC (left)

Figure 11: Willingness to switch to more collaborative contracts (right)

In fact, when conducting the interviews with the participants, it was noticed from the early beginning that most of them, especially the ones working in the gulf region, mentioned that the virgin FIDIC Red Book is not as used as the modified version of

FIDIC in the Middle East. As explained earlier, the modified Red Book is prepared by the owner and given to the contractor. The owner partly or completely changes the particular conditions of the contract to make it more suitable to the country's laws. However what most of the participants made clear is that the owner changes the power distribution in the contract as well, whereby the capacities of the contractor are reduced and so the risks he should bear are increased. The reason behind the usage of such contract is probably lack of trust from the owner. Therefore we asked participants in the gulf region about their level of satisfaction with the modified FIDIC. The results are shown in Figure 12. It is worth noting that 59% of the participants are dissatisfied with this type of contract, 23% are neutral and only 18% are satisfied. While the modified FIDIC restrains the contractor's capabilities and increases risk on the contractor, the unmodified FIDIC contract is regarded as reasonable and fair in its risk distribution. This explains the 64% satisfaction with the unmodified Red Book.

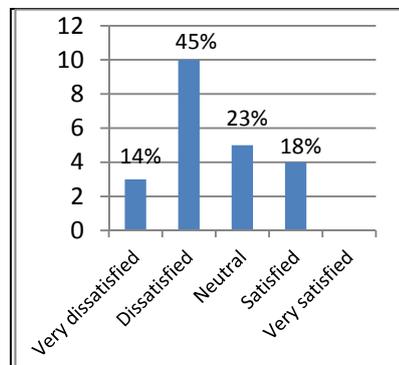


Figure 12: Level of satisfaction with the modified FIDIC Red Book contract

CONCLUSIONS

Unlike the traditional delivery approach supported by the FIDIC Red Book, IPD and its relational type contracts promote a more collaborative delivery approach that yield to more successful projects. Experienced professionals working in the construction industry in the Middle East generally agreed as well that IPD principles are more likely to achieve better results than the traditional method. Mainly, in order to reduce variations in the construction phase, they believe collaboration between the owner, designer and contractor is a must in the design phase. This early collaboration hardly ever happens in the traditional approach. To apply IPD in the region, some cultural barriers specific to the Middle East need to be taken into consideration. Teamwork, change, future orientation and most importantly trust and transparency need to be increasingly present between all project parties to facilitate the implementation of collaborative delivery approaches.

The authors hope that this assessment of the cultural and developmental readiness of the construction industry in the Middle East forms a basis for future adoption of IPD practices and encourages more collaborative forms of FIDIC contracts. However, for a company to benefit from IPD's advantages, it should be able and willing to undergo radical changes at the organizational, methodical and commercial levels. While the first two require hard work in terms of intensive training and habituation,

the last one is the most challenging since it requires the adoption of new legal and economical ways of doing business.

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