

OVERCOMING “BUT WE’RE DIFFERENT”: AN IPD IMPLEMENTATION IN THE MIDDLE EAST

Samuel Korb¹, Eran Haronian², Rafael Sacks³, Pedro Judez⁴, and Ory Shaked⁵

ABSTRACT

What are the key success factors and barriers that can be expected when implementing Integrated Project Delivery (IPD) for the first time in a traditional construction culture? We present an in-depth case study of the “Saxum” project under construction in Abu Ghosh, Israel, the first implementation of IPD in this traditional construction culture. The goal is to glean insight into the dynamics that support and/or subvert the required paradigm shift. The researchers interviewed the key participants, visited the site and reviewed source material from this and other IPD projects.

Despite cultural and historical factors that were expected to prevent or weaken implementation of a collaborative approach like IPD, the key participants built the project according to the IPD framework. The insistence of the overseas project owner's representative that IPD be employed, coupled with the openness of the local partners to work differently, were found to be critical success factors. The participants' mindset and their behavior changed fundamentally with respect to their traditional roles, as did the character of the project (which was measured on a multi-factor sliding scale from “traditional” to “pure IPD”).

Prior to this successful implementation, the opinion of local practitioners on IPD could be summed up as: “Nice in theory, but not applicable in our adversarial construction business culture.” Yet this project has shown that given the right combination of agents, it is not only feasible but also rewarding to adopt.

While there are multiple accounts of IPD implementations, we focus here on viewing the case study through the lens of change management with an analysis of the local cultural barriers that were overcome.

¹ PhD Student, Virtual Construction Lab, Faculty of Civil and Env. Eng., Technion – Israel Institute of Technology, Haifa 32000, Israel, +972-4-829-2245, shmuel.korb@technion.ac.il

² MSc Student, Virtual Construction Lab, Faculty of Civil and Env. Eng., Technion – Israel Institute of Technology, Haifa 32000, Israel, +972-4-829-2245, haronian.e@gmail.com

³ Assoc. Prof., Virtual Construction Lab, Faculty of Civil and Env. Eng., Technion – Israel Institute of Technology, Haifa 32000, Israel, +972-4-829-2245, cvsacks@technion.ac.il

⁴ Ind. Eng. and Master of Adv. Studies, PhD Candidate, Dept. of Eng. Presentation, Universitat Politècnica de Catalunya - BarcelonaTECH (UPC), Spain, +34-679-848-109, pedro.judez@upc.edu

⁵ CEO, C² Construction Consulting, Ltd., +972-544-235-422, ory@ccece.co.il

INTRODUCTION

“This was a difficult project, and without the collaborative approach, I have no doubt that we would have ended up in court over some of the problems that came up. But because we had the IPD framework, we managed to work things out internally, since everyone was committed to finishing the project, not just to their own personal financial interests.” - *Project Manager, Saxum Center*

In 1994, a worldwide Christian institution decided to realize the vision of its founder and build a center in Israel (Saxum Foundation 2014). After years of searching, in 2007 a 15,000 m² plot was acquired in Abu Ghosh, a town not far from Jerusalem, and the development of the initial design was begun.

A European engineer with years of experience in the construction industry was hired as the Owner’s Representative (OR) for the project in 2010. The complex will consist of 7,700 m², distributed in three main zones: a Conference Center, for spiritual retreats, workshops and conferences, with 50 guest rooms, two chapels, and common areas, dining room and classrooms; a Hospitality Center for training in professional hostelry skills; and a Multimedia Resource Center, where pilgrims will have access to information for their sojourn in the Holy Land, offering also training courses for tour guides and travel operators (Saxum Foundation 2014). The contract budget for the construction of the building was US\$17 million (without landscaping, design costs, taxes or equipment).

The OR had previous good experiences using transparent agreements, although none as collaborative as IPD. From these experiences, he realized that collaborative approaches were essential in creating win-win relationships between owners and contractors, as opposed to the traditional situation in which the two parties are contractually opposed from day one. Thus the OR decided that he would introduce Integrated Project Delivery (IPD) (AIA 2012) into the project.

There was only one problem: no one in the country had ever implemented IPD in a construction project before. Although the approach is taught in construction management courses at the Technion and had been presented at an industry conference in 2010, no building had ever been built in Israel using a collaborative contract such as partnering, alliancing or IPD. Yet ultimately the OR prevailed. The project was successfully delivered, while using IPD principles. Since this was the first IPD implementation in a country, we seek to explain the dynamics at work so that future IPD practitioners who wish to break into new markets can learn from the experiences (both positive and negative) of Saxum.

MANAGING CHANGE

Though IPD is technically a method of contractual agreements among the parties in a construction project, at root, it seeks to drive new ways of working for the professionals involved in the project. Thus the process of implementing IPD can draw on knowledge about the field of Organization Behavior, specifically the domain of Change Management.

Change Management researchers seek to understand the mechanisms and phenomena at work when an organization and the individuals within it undergo a shift in their work processes and mindsets. One of the pioneers in the field was Lewin (1952), who proposed the “Unfreeze, Change, Refreeze” model of change. Kotter (1996) built upon this, outlining

eight stages that organizations go through when undergoing change: establishing a sense of urgency, creating the guiding coalition, developing a vision and strategy, communicating the change vision, empowering broad-based action, generating short-term wins, consolidating gains and producing more change, and anchoring new approaches in the culture.

An underlying assumption of “Organizational Change Management” approaches (Todnem By 2005) is that there is an existing organization with prevailing “ways things are done around here” that is changed. Yet in construction, each project is an ad-hoc collection of companies joined together for the extent of the particular project. Thus a better-suited model may be the ADKAR model (Hiatt 2006), which focuses on the level of the individual. Which phases does each person go through as they experience change?

Awareness – an initial understanding that the change is on the horizon

Desire – identifying “what’s in it for me” and becomes a change supporter

Knowledge – “how” to make the change, typically through formal learning

Ability – the ability to work in the new way, typically gained through hands-on experience with the new methods

Reinforcement – the new patterns of behavior are reinforced by the new work environment

Like many deeper changes, the transition to IPD entails not just changing behavior but changing the more deeply-held beliefs they have about their behavior and the organization: their paradigms (Barker 1993). AEC professionals implementing IPD must learn to see other project participants not as opponents to be overcome – an example of a zero-sum approach (Emiliani 2008) – but rather as colleagues to cooperate with in order to attain mutual success for the project and each of the participants. This is “non-zero-sum” thinking: for each party to succeed, it need not be at the expense of another.

EXPECTED DIFFICULTIES

When the OR approached the Israeli construction market with his desire to use IPD, he was met with skepticism about the applicability of the approach to the local culture and construction sub-culture, since the mainstay of Israeli construction remains the traditional Design-Bid-Build method. According to the Hofstede’s Cultural Dimensions Theory (2001), Israeli culture is marked by very low power distance and high uncertainty avoidance. Israel’s history as a melting pot of immigrants has left its legacy in the low-context nature of the culture. These elements help to explain the fricative nature of Israeli discourse. Short tempers and shorter fuses are not considered amenable to the collaborative approach that IPD requires. Israeli construction companies are staffed by people who come from various ethnic backgrounds, in which smaller companies (subcontractors) are typically homogenous in their ethnic makeup (Priven and Sacks 2015). Given the complex political history of the country, this means there is even more of a tendency to keep inter-company relations at arm’s (and contract’s) length. Rached et al. (2014) explored the openness of construction professionals in the region to IPD, and found that many of those surveyed indicated that IPD would likely conflict with the local construction culture.

Another difficulty is that which confronts any implementation of IPD regardless of underlying regional cultures: the natural tendency to slide back into well-known behaviors. Though collaboration has the potential to reward all participating parties, as game theory explains, individual actors may be tempted to “defect” and attempt to exploit the collaboration in pursuit of their own particular agendas. As the success of the “tit for tat” strategy has shown (Axelrod and Hamilton 1981), this is a fool’s errand, but for people and organizations used to maximizing their own short-term payoff, it will no-doubt beckon. Each member of the collaboration has to navigate a network of different considerations and competing priorities: their interests as a member of the project (and commitments to that project, to which they have committed their reputation and good name), their own personal interests regardless of the project, their prior interactions and relationships with the other parties, as well as their expectations of future relationships and contracts with the other parties.

THE TEAM AND THE CONDITIONS

In that context, the OR set about assembling the team that would bring Saxum and IPD to life in Israel. The first partner to come on board was the Architect. Though initially skeptical about IPD, the OR’s drive and commitment to the method brought him around. The OR also brought in a local professional construction Project Manager (PM) after numerous interviews and much additional explanation of the IPD approach. The OR, the Architect, and the PM then sought the right contractor. Though they met with some major contractors, the response was lukewarm. Ultimately they found a General Contractor (GC) who agreed to work under the conditions IPD requires: transparency, target cost, share bonus and penalties, preconstruction services, fixed fee, etc.

Before signing the contract, it was necessary to explain IPD to the lawyers of each partner. A baseline document helped; ConsensusDOCS 300 was selected and adapted to suit the Israeli legal system. Finally, an ‘IPD-like’ agreement was signed with the following stipulations: the direct costs “as built” of the project would be paid back-to-back to invoices and team salaries throughout the construction phase; at project completion, the total Real Cost (RC) of the budget would be measured up against the Target Cost (TC). If $RC > TC$, then there is “Pain Sharing”: the owner and GC cover the additional expenses in an 80-20 ratio, with the GC’s contribution capped at one third of his fee.

In the opposite scenario where $RC < TC$, there is “Gain Sharing”. The savings below the TC are distributed as follows:

- 20% to the GC
- 10% to the Architect
- 10% to the PM
- 60% to the owner

The Target Cost was developed by the OR in collaboration with the owner and other construction professionals and colleagues. The proposed construction budget was created during the pre-construction design phase. The design team created a construction budget to determine if it could be brought within the TC. Through successive iterations of design and cost estimation refinement informed by the GC’s input as to constructability and

preferred construction methods, the construction budget achieved the desired level. Once that happened, construction began immediately with the existing team without the need to go through a bidding process.

The project was overseen by the “Collaborative Project Delivery” (CPD) team, composed of the OR, the PM, the Architect, and the GC. The CPD was responsible for all of the major decisions about the project; in the case that the CPD was not in consensus about a particular issue, it was put to a vote. The Architect and GC each had one vote while the OR and PM shared a vote. At the same time, the OR retained a veto over decisions that were deemed unacceptable. The day-to-day management of the project was in the hands of the Project Execution Team (PET), composed of the site engineer (representative of the GC), site inspector (representative of the PM), an architect from the studio of the Project Architect, and the OR.

SELECTED PROJECT EXPERIENCES

While the project was eventually considered a success, along the way there were inevitable ups and downs. This section describes three vignettes that illustrate such situations.

THE AIR CONDITIONING SYSTEM

The project was initially designed with a radiant heating and cooling system based on a proprietary technology to be supplied from abroad. However, the supplier went bankrupt, which meant the system would not be delivered to the project. The team scrambled, eventually deciding on a conventional ducted HVAC system. However, since construction had already begun, all the new ducts had to be routed around existing systems, and openings had to be created in existing poured concrete walls and precast hollow-core flooring planks (including the engineering complications the latter entails).

Had the project been conventionally structured, a change of this magnitude so late in the process could have led to infighting and recriminations. But instead of going head-to-head, the team members worked shoulder-to-shoulder in order to persevere. The members of the CPD accepted responsibility for jointly managing the process, and the influence that comes with it. But with that responsibility came their participation in the risks of the project, like the bankruptcy of a key supplier. This incident was a test of the strength of the commitment of the parties to the project and to the collaborative approach, and they passed with flying colors. Their response to the unexpected development was focused on solving the problem at hand for the project, and not exploiting the mishap as an opportunity to redress grievances with other parties to the agreement.

THE BIM MODEL

The OR proposed that the project be designed using Building Information Modeling (BIM). However, the designers were used to designing in 2D, and it was decided that instead of designing in BIM, an external company would be hired to take the output of the designers (2D engineering drawings) and convert them into the 3D model in BIM, where clash detection could be performed, with the clashes reported back to the designers. However, this added an additional layer of complexity to the management of the design process, with the outcome being that the process was much less efficient than it could have been.

A second BIM model was developed internally by the site engineer to support production organization. This was useful, but stopped when the person left the project. The use of BIM is highly recommended for IPD projects (Sacks et al. 2010), and the inefficiencies encountered in Saxum are testament to the opportunities that were missed.

USE OF PROJECT MANAGER HUMAN RESOURCES BY THE CONTRACTOR

Once construction began, the CPD realized that additional resources needed to be devoted to the management of this phase. Rather than bring in new people, two members of the PM's team, the site inspector and design coordinator, would take on additional roles as the site engineer and production assistant, respectively. They remained employees of the PM, but were paid an additional amount from the construction budget, taking instructions from the GC. "In a regular project, having people from the PM team work for the GC would be an unheard of conflict of interest, but thanks to the collaborative effort, we made it work," commented the PM. The shared commitment to complete the project on time and within the target cost (coupled with the financial transparency) allowed the team to consider a unorthodox solution. In order to resolve the inspector's potential conflict of interest, an outside quality assurance firm was hired.

RESULTS OF THE PROJECT

As of this writing, the project is still a few months away from completion, but the end is within sight and the OR is very satisfied. The quality of the product is very high, which is one of the most important aspects for the customer, and is the major factor driving their satisfaction. As for cost, even with the setbacks, changes in personnel, and unexpected developments, the project will come in at or slightly below the target cost. While this means that there may be little or no "gain sharing," this also means the owner will be paying more or less the price they were expecting. In terms of schedule, the project is about four months behind the initial predictions. Despite the delay, the owner is satisfied, since their priority was to achieve a high level of quality at a reasonable cost.

The owner's lawyer reports that, unlike typical projects in which participants are in frequent contact throughout to clarify the requirements of the contract, in the Saxum project he hasn't really heard from the partners since the contract was signed. There have been no legal claims among the parties despite the many unexpected problems.

The Saxum project did not exploit all of the commonly recognized opportunities of IPD and apparently the project could have been delivered for less money, yet it did manage to maintain the core principles of IPD and achieve a successful outcome. Table 1 portrays the authors' assessment of the project's position within the range from "traditional" to "full IPD" for a number of different factors, based on the factors described by the AIA (2012).

DISCUSSION

What lessons can be abstracted from Saxum that are relevant to other IPD pioneers in new countries or regions? Specifically, what are the important points which lead to the success of the project, and what were the difficulties that were encountered along the way?

Table 1: Saxum on the scale from “Traditional” to “IPD”: tabular explanation

Subject	1: Traditional	Saxum	5: IPD Vision
Contract	2-sided, costs and work content	3: Used ConsensDOCS, but Architect has separate contract	Multi-party, relational contract
Design Process	By Architect, prior to bidding	4: GC involved, but no Big Room	Collaborative, with GC integrally involved. Use of “Big Room”
Pain/Gain Sharing	Set prices for set work content	3: GC, Architect, Proj Manager share gain. GC shares pain	After agreeing on TC, all parties share gain and pain
BIM	Used primarily for design	2: Only partially used for construction	Used as tool for collaboration, during design and construction
Cooperation	Sporadic, and only as it befits local optimization	4: CPD cooperates fully. Subcontractors less so.	Ongoing, to jointly pursue project-level optimization
Decision Making	Divided, each party decides in area of speciality	5: CPD responsible for major decisions	Core team jointly decides, together with owner
Subcontractor Selection	By GC, mostly by lowest cost	5: Chose subcontractors based on prior experience, by CPD	By CPD, by reliability and quality of subcontractor
GC Selection	DBB: Lowest-cost GC bid, after design complete	4: Chosen ahead of time based on quality	First choose team members (including GC), then design together

Interviews with the key site personnel showed the relevance of the ADKAR model of change discussed above. The IPD contract provided the basis for gaining the Awareness and Knowledge, and the Gain/Pain Sharing mechanisms helped align their interests and contribute to their Desire to work collaboratively. Each occasion in which the team cooperatively resolved an issue that would under other contractual terms lead to confrontation, such as the need to replace the HVAC system, provided positive reinforcement.

KEY SUCCESS FACTORS OF THE IPD IMPLEMENTATION

The **personalities of the individuals** involved in the project has been identified as the key success factor, both by project participants and in the analysis of the authors. Each participant had to have enough openness to be willing to try working in a new way, one that differed from their years of experience. They are what Rogers called “early adopters” (Rogers 2003).

Each of the individuals on the CPD had key personality traits that enabled success. The OR was the driving factor who brought IPD to a new country. Interestingly, and perhaps crucially, despite his commitment to IPD, he had no prior experience in the local construction industry. It may be that as a foreigner and cultural “outsider” he was granted more leniency to stray from cultural and business norms, at least enough to make his case. Despite being told that local conditions were different from those he was familiar with, he decided that they were not different enough such that IPD would be unviable. And of course, as the representative of the owner (who is paying for the project), he retained the privilege to place demands on the suppliers, including the use of IPD. By submitting

himself to the collaborative approach, the OR released some of his control over the project; decisions about the project would be made jointly by the CPD. Though he retained a veto over the CPD's decisions, but he was disinclined to use it so as not to negatively impact the collaborative spirit. In practice, the veto was never used, even though there were some decisions in which he was in the minority.

Owner of overseas projects tend to be risk-averse, preferring a "fixed price" contract arrangement. Here the opposite was true: the pain/gain sharing mechanisms meant that the owner had no idea ahead of time what the final price would be; there was no "guaranteed maximum". This may actually be a more realistic worldview on the OR's part. The "security" and "control" supposedly offered by fixed-price traditional contracting models are to a large extent self-delusion; the owner will ultimately bear the brunt of inefficiencies and cost overruns. In IPD there are incentives for the bad news to come out much earlier, even during the design phase, rather than having problems simmering "behind the scenes" until they become too big to hide (more typical of an environment in which information hoarding is incentivized; fixed price contracts are a prime example). One underlying assumption for owners adopting IPD is an understanding that the bid price of a traditional contract is not really going to be the actual price.

The personalities of the other team members were also crucial to the outcome of the project. The PM was hand-picked by an authority familiar with both IPD and the players in the domestic market as someone with an academic background who was open to new methods. Rather than being a turn-off, the OR's description of IPD was one of the main reasons the PM joined; this was an opportunity to gain experience with an innovative method. The Architect demonstrated enough openness to go forward with IPD (even though he was not contractually bound to do so, since his engagement to work on the project had begun even before the OR arrived). The GC was willing (unlike most of the contractors that were approached) to use IPD, including all the changes it would entail in the way he was used to working: transparent accounting, shared decision-making responsibility with the other members of the CPD, and participation in the pain sharing mechanism.

Another key success factor was the **pre-existing relationships** among some of the parties prior to beginning work on the IPD project. The Architect had previously worked with both the GC and the owner. The GC requested (and was granted) permission to employ subcontractors he had worked with in the past, rather than going with the lowest bid for each trade, in order to reduce the number of "surprises". When participants have worked together in the past (and had positive experiences doing so), they will be more willing to commit to a collaborative venture. This is due to the **trust** they have for one another, which is the underlying element of this success factor. Without trust, even the most detailed IPD contract in the world cannot force the team members to cooperate and work as partners. Personal acquaintance and "good chemistry" between the stakeholders are a must.

BARRIERS TO IPD IMPLEMENTATION

Despite the eventual success of the project, there were items that could have been improved upon along the way. In Lean terms, by engaging in *hansei* (reflection) upon the negative

aspects of the implementation, it is possible to improve upon them in future journeys down this path.

It is interesting to refer back to the “barriers” that the OR was told to expect when he decided to bring IPD to Israel. Ultimately the culture proved to be a non-issue; the lively and brash style that marks Israeli interpersonal communication may actually be a boon to a collaborative approach, since it is through discussion that a team can create the best solutions to the problems they face. The team members were able to adapt to new collaborative modes of working. For example, the site inspector related how, despite his initial gut reaction was to default to a confrontational, offensive position, in time he learned to consider the site engineer a partner.

At the same time, the temptation to slip back into established patterns of behavior was ever-present, and there were examples of “local optimization” at the expense of the project. One case in which this happened was early in the project during the earthworks to prepare the site. The subcontractor who excavated the foundations of the building submitted an invoice that didn’t align with the expectations of the team. The GC wanted to pay the bill as written, whereas the PM (who releases the money) objected. This almost led to a conflict that could have threatened the continuation of the IPD. Luckily the sides calmed down enough to work together to address the situation as partners (they disputed the invoice). Even though an IPD agreement has been signed, constant effort must be made in continually developing relationships and learning new ways of working.

The project struggled with the best way to involve subcontractors in the collaborative efforts, like many other implementations of IPD. Despite the OR, Architect, GC, and PM participating in the CPD and a collaborative approach, from the point of view of the subcontractors (who actually performed the vast majority of the work in constructing the building), there was no major difference in Saxum; their contracts and compensation were not far from the norms they were used to. Had there been a more effective way to get them on board as part of the collaborative effort (or some critical subset of the prime trades), the project outcome could have been even more successful.

CONCLUSION

A Jewish architect and GC, a Christian OR, a Muslim site engineer and a mixed Jewish-Muslim workforce met in an Israeli-Arab town in the Jerusalem foothills to build a project using a new method of contractual relationships – though this sounds like the beginning of a bad joke, the Saxum project moves closer to successful (quality, schedule, budget) completion with each passing day, and with it, the first building to have been built using IPD in the country (and perhaps the region). If IPD can work here, as the project has proven, then it can likely work anywhere (to a greater or lesser degree). This includes other projects domestically, other projects in the region, and even other parts of the world where the culture is thought to be less than conducive to collaborative approaches. Yes, the project owner was a non-profit organization whose primary interest in the project was not making money. But like any owner, they still had the same project goals of cost, quality, and reasonable lead time. The IPD approach is not based on expectation of ethical behavior arising from altruistic motivation, but on the right alignment of the common interest of all of the stakeholders to get the right money for their work.

The main challenges for a would-be IPD pioneer are thus:

Finding the right principal people for the project, i.e. professional and open-minded;

Inculcating the values of IPD;

Educating a team to exploit the opportunity provided by the collaboration to remove waste and gain values, primarily through the use of Lean Construction and BIM.

ACKNOWLEDGMENTS

The authors thank the participants in the Saxum project for their time and insights.

REFERENCES

- AIA. (2012). "IPD Case Studies." School of Architecture - University of Minnesota.
- Axelrod, R., and Hamilton, W. (1981). "The evolution of cooperation." *Science*, 211(4489), 1390–1396.
- Barker, J. A. (1993). *Paradigms: the business of discovering the future*. HarperBusiness, New York, NY.
- Emiliani, M. L. (2008). "The Equally Important 'Respect for People' Principle." *Real Lean: The Keys to Sustaining Lean Management (Volume Three)*, M. L. Emiliani, ed., The CLBM, LLC, Wethersfield, Conn., USA.
- Hiatt, J. (2006). *ADKAR: a model for change in business, government, and our community*. Prosci Learning Center Publications, Loveland, Colorado.
- Hofstede, G. (2001). *Culture's consequences: comparing values, behaviors, institutions, and organizations across nations*. Sage Publ, Thousand Oaks, Calif.
- Kotter, J. P. (1996). *Leading change*. Harvard Business School Press, Boston, Mass.
- Lewin, K. (1952). "Group decision and social change." *Readings in Social Psychology*, Henry Holt, New York.
- Priven, V., and Sacks, R. (2015). "Effects of the Last Planner System on Social Networks among Construction Trade Crews." *Journal of Construction Engineering and Management*, 141(6), 04015006.
- Rached, F., Hraoui, Y., Karam, A., and Hamzeh, F. (2014). "Implementation of IPD in the Middle East and its Challenges." *22nd Annual Conference of the International Group for Lean Construction*, B. T. Kalsaas, L. Koskela, and T. A. Saurin, eds., Oslo, Norway, 293–304.
- Rogers, E. M. (2003). *Diffusion of innovations*. Free Press, New York.
- Sacks, R., Koskela, L., Dave, B. A., and Owen, R. (2010). "Interaction of Lean and Building Information Modeling in Construction." *Journal of Construction Engineering and Management*, 136, 968–980.
- Saxum Foundation. (2014). "A project in the Holy Land." *Saxum*, <<https://www.saxum.org/>> (Apr. 11, 2016).
- Todnem By, R. (2005). "Organisational change management: A critical review." *Journal of Change Management*, 5(4), 369–380.