

A DEEPER LOOK INTO THE PERCEPTION AND DISPOSITION TO INTEGRATED PROJECT DELIVERY (IPD) IN COLOMBIA

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ABSTRACT

Integrated Project Delivery (IPD) has been utilized as an alternative project delivery method by encouraging team collaboration, sharing risks/rewards, and more importantly, requiring trust and transparency amongst all stakeholders for projects in the United States. In Colombia, a traditional approach for delivery of projects is typically utilized under a Design/Bid/Build model with limited collaboration. This paper describes the analysis conducted to evaluate potential barriers of implementation of IPD concepts as a delivery method for construction projects in Colombia. The analysis conducted includes research of perceived cultural, financial, legal and technological barriers to stimulate the adoption of collaborative delivery models. It includes a survey and interviews with different stakeholders and industry members (developers, designers, construction managers and general contractors) to understand the benefits and shortcomings when engaging with collaborative methods. Survey results were evaluated by using correlational coefficient models to gauge dependencies among all factors identified as potential inhibitors of IPD. Detailed analyses of the findings as well as future steps for a successful implementation of IPD in Latin America, focused in the Colombian case study are discussed.

KEYWORDS

Integrated project delivery (IPD), Colombia, South America, implementation barriers, collaboration, project management, trust, transparency, design/bid/build

INTRODUCTION

With the coming of age of innovative delivery methods, an in depth analysis of the potential barriers of implementation of Integrated Project Delivery (IPD) concepts as

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a successful methods for delivering projects in South America needs to be analyzed. It can be easily pointed out, that in the Colombian market constructability processes, contract administration and project management are closely linked to fear of change and lack of innovation, obstructing significant and necessary advancements on the development of this industry. One of the main reasons for the reduced implementation, is the lack of knowledge about new methods, poor communication about the risk/rewards of each option, and ultimately little existence of transparency and trust amongst the different stakeholders, where individual goals triumph instead of group goals.

LITERATURE REVIEW

Construction (Project) Management originates as the industry response to the problems of complexity and productivity that the construction industry was experiencing a few years back. In the 1960's in the United States began to shape the idea of establishing the concept of Construction Management as a solution to the inefficiency and capacity problems for large projects originated by the traditional "Design-Bid-Build" Model. Later came the model of "Design-Build" consisting in awarding the design and construction processes to a single entity, giving security improvements for the client on costs and time objectives. Simultaneously to this model, in Australia began the use of "Project Alliancing"⁵ (Sakal, 2005) through collaboration, team work and group goals, looking forward to the project development. This approach showed excellent results in each one of the projects where it was implemented, launching the solution and arriving to the United States where it was called Integrated Project Delivery or IPD.

The American Institute of Architects (A.I.A.) defines IPD⁶ (AIA, 2007) as a focus of Project execution integrating people, systems, business structure and practices inside a process that collaboratively takes advantage of talents and ideas of all the involved, reducing waste and increasing the efficiency through the design, fabrication and construction stages. This methodology not only claims to improve cost and time results, but also foster individual work of all involved parts, where the traditional idea of searching an individual goal is left behind and it is replaced with objectives and guidelines focused in a common goal, the project profit and the value creation for the involved stakeholders. A.I.A. proposes as key principles: trust and mutual respect, shared risk and reward, collaborative innovation and decision making, early involvement of the key participants, early definition of the goals, intensified planning, open communication, organization and leadership and multiparty agreements.⁷ (Kent and Becerik-Gerber, 2010)

IPD is closely linked with project information sharing and its availability for any of the team members. At this point technology plays a primary role assisting

⁵ Project Alliancing: A Relational Contracting Mechanism for Dynamic Projects. *Lean Construction Journal* 2005, vol 2, p 70. (2005). Sakal, Matthew W.

⁶ Definition presented in *Integrated Project Delivery: A Guide, Version 1* (2007). The American Institute of Architects.

⁷ Understanding Construction Industry Experience and Attitudes toward Integrated Project Delivery. *Journal of Construction Engineering and Management*, Vol. 136, No. 8, pp. 815-825. (2010). Kent and Becerik-Gerber.

inefficient and intelligent means of communication. Building Information Modeling (BIM) is one of the main components required when executing an IPD project to ensure the Team can visualize the project early on and through detail model coordination.

Results obtained with IPD reflect significant progress for the industry, with estimated savings of 30%⁸ (UKOGC, 2007) of construction cost by promoting stakeholders team work and profit. For project owners, IPD not only allows them to play a vital role participating and contributing with their ideas and opinions in the execution stages but also significant savings in costs and times. For contractors, having an integrated execution process allows them to build a project out of alternative studies to the client satisfaction creating and innovating by the use of the latest technologies and improving financial results, understanding from the beginning each stakeholder expectation, accomplishing and sometimes overcoming their needs. For designers, it means reduction of unnecessary work and information availability, having the opportunity to learn side by side with contractors performing quality job without the necessity of revisions, leaving behind problems of misinterpretations or incomplete information.

HYPOTHESES

To evaluate the main implementation barriers of IPD in Colombia, we developed an array of hypotheses to gain a better understanding of the limitations of such novel approach and its potential implementation.

- *Old School Mentality*: Fear of change, where management models stay away from innovation with little interest to new tendencies. Passive thought that considers that what has been working for several years still works today.
- *Transparency*: One sided contracts, with no transparency and equality on the distributed risk. Contracts with preferences and inconsistencies that favor a few and seek individual profit instead of group profit.
- *Silo Approach*: Professional specialization with sectorized tasks and procedures segregating construction processes. Lack of team work thinking, searching for individual goals prevailing over group goals. Unsupportive culture where the progress and learning are not shared or transmitted to others.
- *Limit the End Goal*: Restrictions in resource allocation for work execution and developing of new ideas. Buildings and projects developed in the limit where is only achieved the minimum required for obtain profits and decrease the expenses. Lack of economic and knowledge resources to implement new technologies as Building Information Modeling.
- *Commitments*: Absence of control over project deadlines, lacking stakeholders' commitment.

⁸ Achieving excellence in construction procurement guide, Vol. 5 at pag.6 (2007). The United Kingdom's Office of Government Commerce (UKOGC). www.ogc.gov.uk

RESEARCH METHODOLOGY

SURVEY

A survey was completed to analyze the hypothesis presented above, and gain a grass root understanding of the potential limitations of this undertaking. The survey was targeted to key individuals and groups of stakeholders having an impact in the Colombian construction industry. The study was composed of fifty-two (52) questions divided into four main categories. Categories applicable for this survey were: 1. General/Introduction, 2. IPD Specific Questions., 3. Building Information Modeling (BIM) and 4. Lean (Last Planner) questions. The intent was to not only question respondents about IPD knowledge but also to gauge their understanding of their forward thinking mechanism for innovative topics such as BIM and Lean. The survey was sent to a total of 139 participants, representing: Clients/Owners (8 responses), Constructors (26 responses), Designers/Consultants/Architects (9responses), and Project Managers (5 responses) for a total of 48 respondents (35% response rate).

RESULTS

As a follow up to the survey, interviews were conducted with four (4) key participants to gain a better in depth understanding of their answers. The results are presented next to challenge the hypotheses presented previously. An in-depth numeric as well as statistics analysis was conducted to the responses received. Results were classified by group or sector to which each respondent belonged, and the most significant and relevant questions were chosen to be consolidated in graphs as presented below.

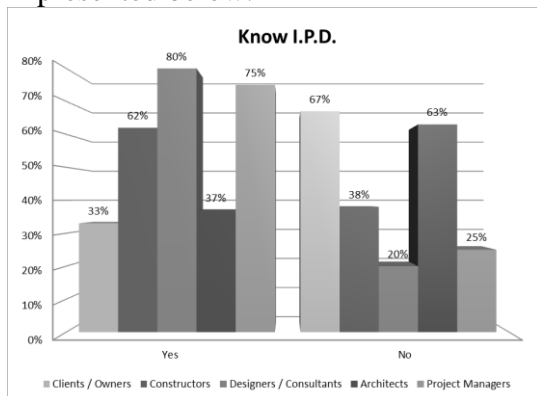


Figure 1: Number of Respondents Knowing IPD by Sectors

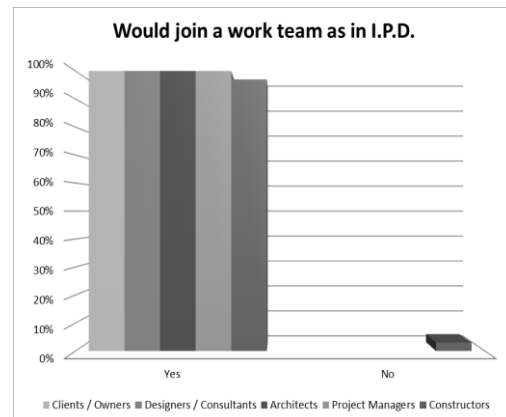


Figure 2: Number of Respondents that would join a Work Team as in IPD

One of the main concepts proposed by IPD is the creation of a team composed of the general contractor, designer and client/owner. The readiness of the companies for this idea is vital for its possible implementation. A 98% (Figure 2) of the participants would be interested in joining a team like this.

There are countless problems in the different stages of the execution of a construction project. In early stages of coordination it is crucial to set main goals and objectives. The obvious first question was to inquire the group about their beliefs on

the main causes for not meeting established design milestones in a project. The responses obtained (Figure 3) are as follows, and suggest an interesting trend around lack of communication and poor commitments (not meeting deadlines) as the biggest obstacle.

In the Colombian construction industry, project management and delivery occurs in a traditional way, not focusing on innovation and development. It can be easily stated, that during the last few years the majority of the construction processes has unfortunately not evolved at all. For this reason, we wanted to understand this barrier and limitation to outline an innovative process (Figure 4).

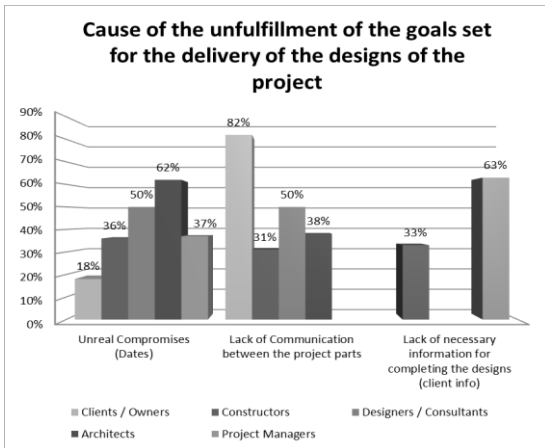


Figure 3: Causes of not Meeting Goals for Project's Design Delivery Milestones

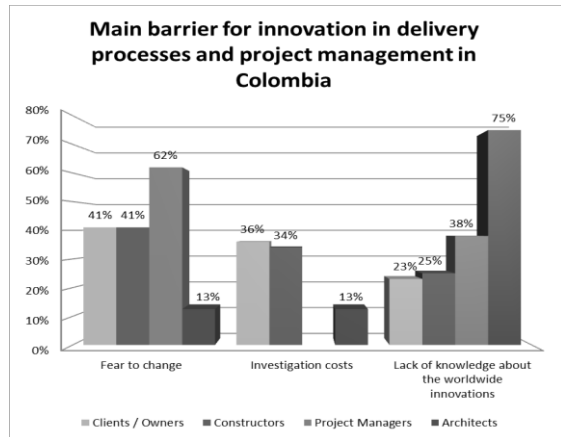


Figure 4: Main Barriers for Innovation in Delivery Processes and Project Management in Colombia

Another concept presented by IPD is the Multi-party agreements. It was important to understand the type of stakeholders that would be willing to take part and execute projects following this approach. Based in this question (Figure 5) it was found that the majority of stakeholders (83%) would sign it. This is an overwhelming majority. The main reason for the balance of the respondents (17%) to not join a multi-party agreement are factors such as fear, lack of knowledge, distrust or simply disinterest on IPD.

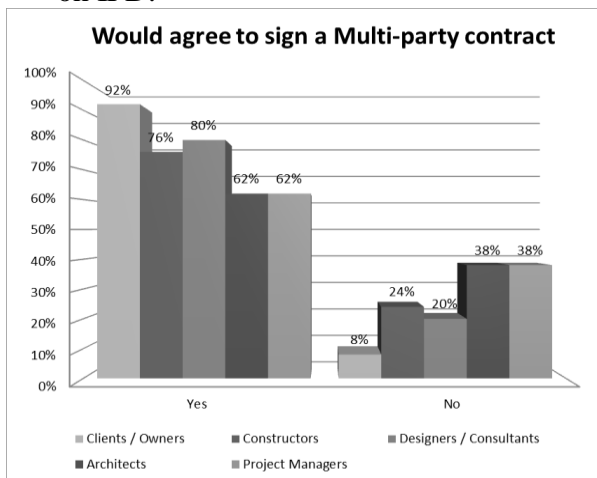


Figure 5: Number of Respondents that would

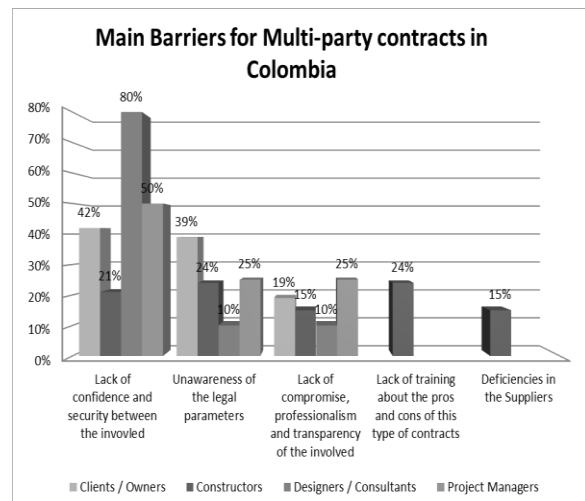


Figure 6: Main Barriers for Multi-party

Sign a Multi-party Contract

Contracts in Colombia

Based on the answer presented before, we wanted to dig deeper and understand the main barriers to implement an IPD method (Figure 6). Interesting answers obtained are presented below, reinforcing the point that lack of confidence (trust) is the main barrier of implementation.

In most cases, contractors work and their early involvement in integrated teamwork are undervalued, producing problems of non-fulfilment and overruns. 93% of the respondents answered positively, representing the big interest of the industry for this to happen.

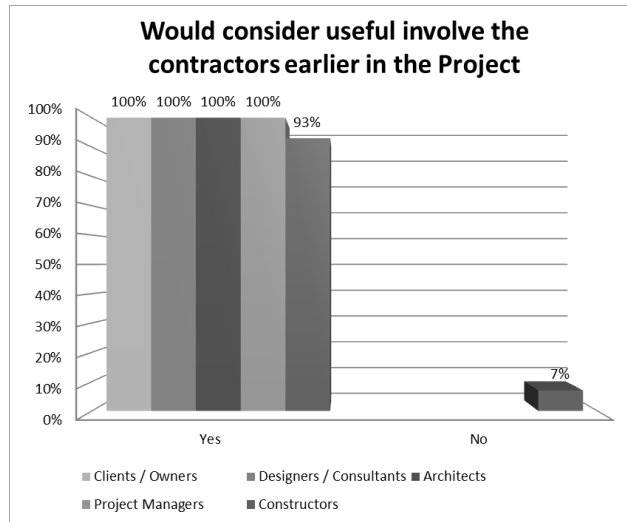


Figure 7: Number of Respondents that would consider Useful to involve Contractors Earlier in the Project

Some tools and concepts implemented in IPD have gained more acceptance and recognition than the doctrine itself. This is the case of Building Information Modeling and Lean Construction – Last Planner. This situation can be evidenced due the efforts of companies for evolve and innovate inside a very conservative industry, searching for a better planning, organization and quality between the stakeholders. A high percentage (66%) know BIM, and standing out the respondents from big (>200 employees) and medium (between 51 and 200 employees) companies (Figure 8).

One of the main worries and likewise interest of the industry is to obtain more efficient results using more ordered mechanisms and more completed planning, recognizing activities and objectives that are pretended to achieve, reducing the uncertainty and imprecision in each stage of the project. With this in mind arise the need to know the level of knowledge about methodologies as Lean Construction – Last Planner; 64% of the respondents did know the concept (Figure 9), being very similar than the results for BIM. These results suggest that the concepts of BIM and Lean are more popular than IPD and multiparty contacts.

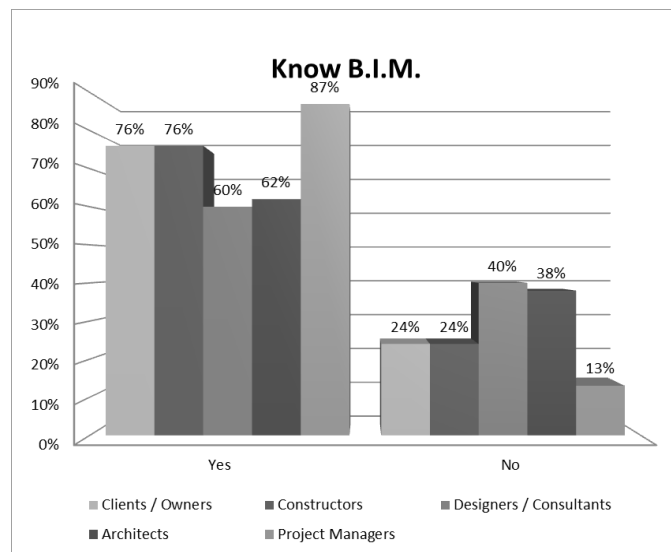


Figure 8: Number of Respondents that Know BIM

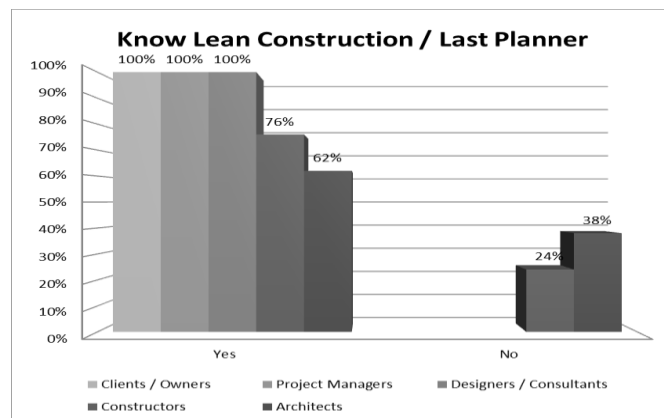


Figure 9: Number of Respondents that Know Lean Construction

RESULTS ANALYSIS

Fear to change was considered one of the main barriers for IPD implementation in Colombia. Results denied this hypothesis and ratified the interest of a great majority of the stakeholders for the progress and development of the construction industry. Every respondent is aware of the pitfalls and problems of the industry and agreed in the need of mechanism that can guarantee more effective results.

The hypothesis of poor valuation of the transparency in contracts, methodologies and administrative processes is confirmed. There are groups very interested in the transparency and equality in contracts. Is important to mention that there are still stakeholders opposing the open and transparent methodologies, considering it as unnecessary or dangerous. The constant fear and distrust between the involved parties minimizes the spirit of these ideas resulting in mechanisms of “hyper control” that obstruct a dynamic and efficient work.

Precarious communication between the key stakeholders of the Project makes the process of delivery a simple task of great complexity. According to the results the thought about team work exists but only inside each company. Thinking of a holistic approach with team that works between different companies becomes less attractive.

The group objectives of the companies engaged on a project such as satisfaction of the client, decrease in overruns, reduce the waste of materials and minimize delays, become secondary to economic remuneration and personal growth. The lack of organization and deficient planning are the principal cause of the most harmful problems for the correct execution of projects.

In the Colombian construction industry there is an environment where initial costs and low budget mentality prevail over the quality of the work. The hope is to maximize the profits with lowest possible investment affecting quality and generating risks. It is uncommon to allocate company resources to study and adopt new methodologies and technology because of the intangible results. The use of new technologies such as BIM, Last Planner, etc. is very limited. The required technological advancement and infrastructure tools exist and are available, but the proper training interest from the companies to invest on this upfront cost, is almost impossible to obtain.

The lack of compromise between stakeholders is evident and the ultimate goal of greater profits as the sole source of success it is an element that has nothing to do with the final result of other key parameters of the project. Quality and client satisfaction are not even considered as measures of success.

Concepts as the Big Room, multi-party agreements, shared profits, etc. as proposed by the IPD (Constructor, Designer and Client), present a good reception from the stakeholders. Results show that the 70% of the respondents would work with the method or consider its implementation appropriate. This encourages the implementation of IPD in emerging markets as the Colombian promising a lot of benefits for the industry.

A follow up statistical analysis using correlations intended to quantify and identify possible relationships between some specific questions of the surveys was conducted.

First it was sought to identify whether there is any relationship between knowledge and familiarity of the concept of Integrated Project Delivery (IPD) with the perception that there are more effective ways to design/build a project where all interdisciplinary teams work together from the early stages of the project. Based on responses from surveys and statistical analysis in STATA, it can be concluded that General Contractors and Developers have a negative correlation towards this two issues. However, for designers, there is a high correlation between understanding the concept of IPD and the perception that there are better ways to execute the project.

As far as open book approach and sharing of budget information, we found that general contractors have very low dependence between the willingness to report in detail all the costs to the project team, and willingness to work on a project in which the budget is set by the team at the initial stages of the project. This indicates that although builders are possibly willing to report their costs, they would be unwilling to work with a fixed budget since early stages.

Regarding multi-party contracts, we analyzed the dependence that each of the companies was willing to sign a multiparty contract with the possibility of distributing the project profit according to the performance of each of the parties involved. The statistical results show that General Contractors and Construction Managers have a high correlation between these two variables, indicating that these actors consider that the multiparty contract can promote or contribute to the

transparency required for each party to accept to put all the project utility in the same bag and distribute it based on performance and participation of each of the parties involved. However, designers and developers have a very low or any correlation on this issue, which may indicate ignorance about what a multi-party contract is, or that they simply do not agree with this methodology.

Finally, it was found that constructors, project managers, and developers have a high dependency or correlation between familiarity or knowledge of the concepts of BIM and Lean - Last Planner, while designers presented a zero correlation with these concepts. This means that designers are not familiar at all with concepts such as BIM and Lean.

CONCLUSIONS & RECOMMENDATIONS

Construction industry in emergent markets tends to be very traditional, but that does not mean that they are not ready to adapt and change. The willingness of the companies to develop and engage with new tendencies is one of the principal advantages to bring forth and adopt new ideas that have given excellent results abroad. It is necessary to recognize the usefulness of creating clusters in early stages among stakeholders. All innovation and change awakes rejection, but in this particular case and based on the analysis of the survey, there is definitely interest to engage this novel approach. The need to transform the industry is evident.

The main objectives and goals in order to succeed, need to be focus on aligning the industry towards a transparent, integrated and inclusive approach that seeks to minimize the overruns, waste and break the silos down. It is key to develop this approach, to link education with industry, where mutual collaboration is achieved, generating development and progress. IPD can be implemented in Colombia. Physical, economical and cognitive resources for the development of this methodology and its correct implementation inside the local companies are available.

The main barriers defined and established with this study are the lack of knowledge and information about the topic representing an easy obstacle by opening the doors to continue the study, investigation and promotion of this field, along with people and companies training on this approach. Asymmetry between designers and contractors is evident, demanding to focus around an inclusive industry future, recognizing each group perception of the value that one and another can add to the project in pro of the optimization of the project execution and reinforce the permanent communication bridges between the main involved from the beginning to the end of the project. There is no need to fear to change the way of thinking towards a new way of doing things in a different and more efficient way, and becomes a vital necessity to be able to apply all the theoretical knowledge in real results in the practice.

There are many activities to follow, label IPD under a Spanish name that bear the concepts of integrated work that it promotes. It will be necessary to stimulate local companies to study IPD implementation, using practical cases from other countries, the benefits of an implementation of the IPD and compare the results with a Project developed with a traditional construction method. Apply to a national study Project, the concept of a team or society formed by the owner, constructor and designer, documenting possible problems and advantages of this methodology.

Promote the use of new technologies and methodologies as Lean Construction, BIM, Big Room, Multi-party agreements, etc. being trained about these and applying them into case studies that evidence the results obtained with each one. Design and standardize multi-party agreements of easy use and implementation from the contractual basis of each country. Study a particular case where the contractors be involved in early stages of the Project and compare the results in terms of costs and times with a case where the contractors are involved belatedly. Do a practical exercise of a Big Room where constructors, designers and clients are invited, simulating a fictitious Project that have to develop during certain period of time inside this space and where fundamental decisions are made for each of the stages of the execution of the Project, and finally distribute the fictitious profits according to the performance of each group; document the results and the participants opinions. Assuming that early adopters will be the private sector, and once it has shown its benefits mimic in the public sector.

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