Implementing an Integrated Project Delivery approach for infrastructure projects during the early planning phase – A Peruvian case

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Infrastructure Projects
Background Infrastructure

**Peru:**
+ 30 million people

- + 25% Do not have access to drinkable water
- + $58 000 million investment needed in Transportation

This research aims to investigate the implementation of an integrated project delivery (IPD) approach for a Peruvian infrastructure project with operation and maintenance as part of the scope.
Background Infrastructure

Major Issues

- Management system not suitable for integration
- Need procedures that look for integration
- Absence of planning and evaluation of the feasibility of execution (Engineering – Construction – O&M)
- Lack of alignment mechanisms.

We need to integrate
Team: Traditional Approach

WHAT
- Pre-design
- Schematic Design
- Detailed design
- Working drawing
- Winning
- Construction
- Close

WHO
- Public agencies
- General Contractor
- Other SC
- Client
- Designer
- Other designers / consultants

HOW

PPP Bid
Get additional **business opportunities** for the companies of our group \(\rightarrow\) **Stability**

Combine knowledge to perform any work **delivering the greatest value** to the client.
Team Alignment: IPD Approach

Economic growth → Complex projects → Need to change how we do things
Service Level

COMPETENCY FACTOR

FC = X% Investment Value + Y% Operation Value

Develop of a competitive solution (Competence factor) that meets service levels

Classical Public Project

Develop the budget based on a defined solution

Integrated Approach (IPD)

Public Project: PPP

Value Engineering Incidence

Price Incidence
Study Objectives

Identify current Lean, BIM, and IPD level of implementation

Analyze perception of participants regarding IPD practices

Propose further improvements based on best practices
Study Participants

14 Project Manager
1 Designer
2 Construction Manager
1 Technical Manager
2 Field Engineer
3 Technical Office Engineer
1 Human Resources

• Period:
  3 months (May – Jul)

• Participants:
  Professionals infrastructure division

• Total number of participants:
  30

Answered: 26
Skipped: 04

Case Study:
Rail Line Expansion
Current State
~ 60% of participants are not familiar with IPD concept or just know a little bit about it

Training plays a crucial role on the implementation of IPD through all the divisions
Juntos mejorando la calidad de vida de miles de peruanos

MINISTERIO DE TRANSPORTES Y COMUNICACIONES Y LÍNEA 1 FIRMAN IMPORTANTE ACUERDO

COMPRA DE 20 TRENES Y 39 COCHES PERMITIRÁ AUMENTAR LA CAPACIDAD DEL SISTEMA

In the 2019 transportaremos, en una hora, la misma cantidad de clientes que la capacidad del aforo del Estudio Nacional.

AVANCE PROGRESIVO

HOY INICIO 2018 FINES 2018 FINES 2019

CAPACIDAD INSTALADA

24 TRENES +4 TRENES +4 TRENES +4 TRENES

FRECUENCIA EN HORA PUNTA EN DÍA LABORABLE

6 MIN 5 MIN 3 MIN 3 MIN

CLIENTES TRANSPORTADOS POR HORA CORRESPONDIENDO AMBOS SENTIDOS

20 MIL 24 MIL 40 MIL 48 MIL

OBRAS COMPLEMENTARIAS. Iniciarán en agosto 2016 y culminarán a finales del 2018

1. Electric system improvement
2. Train stations expansion
3. Garage units expansion
4. Second Access to the train stations

Budget: US$ 123,564,043.00
Schedule: 28/07/2016 - 06/12/2018
Current State

Level of Complexity

Case study: Unique in its kind in Peru

Complexity can:
- Challenge (encourage or discourage)
- Motivate
Teams need to improve:

“We’re still doing PUSH”
Start designing our production system

Cost → Risk management

Accountability & Trust → Real commitments

Communication → Efficient (Quality, quantity, time)
Team Perception
Participants Perception

**IPD as a delivery method:**
- Adds value
- Why are we not using it?

**Decision making:**
- Ideas/information sharing
- Empowerment

**Team work:**
- Collaboration
- High morale

- I can make big changes
- No one is more important than others
- My job benefits the team
- Team shows consideration with new members
- We work better as a team
- We share risk & reward
- It is a different way of doing things
- It helps to improve communication
- It helps to create trust
- I can speak up about anything
- I am an essential part of the team
- We do better things by sharing ideas
- The team wants to hear my voice
- I feel empowered
- It is a different way of doing things
- We share risk & reward
Team Alignment

Factors to Choose Key Partners

- Cost
- Technical Proposal
- Design
- Expertise

Not only COST driven
We’re still not choosing Technical proposal → Cost consequences due risk impact
$9 million under risk needs creative people
CBA for choosing advantages of working with each partner
Implementation of IPD Principles
## Target Cost

### TARGET COST PROPOSAL

<table>
<thead>
<tr>
<th>COST</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Cost</td>
<td>83,683,123</td>
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<tr>
<td>Engineering</td>
<td>2,840,958</td>
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<tr>
<td>Indirect Cost</td>
<td>14,094,116</td>
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<tr>
<td>Insurance, WC</td>
<td>1,255,890</td>
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<tr>
<td>RISK</td>
<td>A% TC 9,434,873</td>
</tr>
<tr>
<td>Overhead OP</td>
<td>B% TC 6,114,059</td>
</tr>
<tr>
<td><strong>PROFIT</strong></td>
<td>C% TC 6,114,059</td>
</tr>
<tr>
<td><strong>TOTAL COST:</strong></td>
<td>123,537,078</td>
</tr>
<tr>
<td><strong>TARGET COST:</strong></td>
<td>117,423,019</td>
</tr>
</tbody>
</table>

**Pain/Gain Sharing**

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Shared Governance

Core Group: Integrated Management Committee (IMC)

Decisions are made in consensus
Shared Governance

**BUSINESS MODEL**
- Critical variable identification
- Strategies to win
- Contract management and risks
- Integrated decision-making process
- Financial analysis

**ENGINEERING**
- Conceptualization
- First estimation
- Contractual analysis
- Alternatives
- Best solution identification
- Constructability
- Contractual analysis
- Best estimation

**OPERATION**
- Iteration of decisions
- Operational Security
- Financial analysis

**CONSTRUCTION**
- Iteration of decisions
- Operational Security
- Financial analysis
More people are getting involved in early phases.
Decision-Making Process

Parties Involvement in Decision-Making Process

More people involved in decision-making
Essential Principles for Integration

Lean requires:

Respect

Survival is more important than working conditions
Conclusions

Current State

Survival culture

Early involvement of different parties

Target Value: Iterative process, stimulate creativity

IPD Principles

Develop a culture

Strengthen use of tools such as: A3, CBA…

Focus on delivering greater value: Life-cycle

Further Improvements

Change of mindset:

Respect for people

Multidisciplinary team working together through all phases of the project

Work on commercial strategies to sustain IPD:

Risk & Reward management
In the spirit of continuous improvement, we would like to remind you to complete this session’s survey in the Congress app! We look forward to receiving your feedback.

Thanks for making it possible:

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Santiago Ruiz
Alonso Medina

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Case-Study Project

Final users feedback

Goal:
Getting final users feedback & Delivering greater value

Focus should be greater in Design phase

10% Didn’t use feedback