Being smart with your construction programmes and projects
Enhancing construction resource efficiencies and utilisation

KPMG in India aids project owners, contractors, and project management consultants with improvements that are quantifiable in construction resource productivity and utilisation, leading to reduced wastages and costs, improved project timelines and budget performance.

This is achieved through a combination of extensive know-how of enhancing construction site management performance, digital sensors and intelligent dashboards for real time monitoring and generating insights.

This value proposition targets a substantial portion of project cost and can result in tangible cost and time savings.

Construction resources, namely labour, materials and equipment, are prone to waste and inefficiencies, driven largely by the lack of effective mechanisms to accurately estimate the right quantum of resource deployment, and to effectively track productivity and utilisation metrics. What results in many cases, are ineffective processes.

KPMG’s smart methodologies create a new experience for our clients by digitally connecting the three ‘M’s for building any asset: man, material, and machinery.

We leverage new age technologies such as Internet of Things (IoT) coupled with its tested work methods and practical construction site knowledge to create a digital platform.

Using sensor based technology, we identify sources of waste and process inefficiencies in resource usage (3-M) during project execution and unlock hidden opportunities for improvement.

Expected benefits

This KPMG value proposition can address up to 80 per cent of construction cost, and yield substantive benefits.

Typical project cost distribution

<table>
<thead>
<tr>
<th>Category</th>
<th>Cost Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>10 - 15%</td>
</tr>
<tr>
<td>Manpower/Labour</td>
<td>40 - 50%</td>
</tr>
<tr>
<td>Material</td>
<td>10 - 15%</td>
</tr>
<tr>
<td>Plant &amp; Machinery</td>
<td>5 - 15%</td>
</tr>
<tr>
<td>Other costs</td>
<td>10 - 15%</td>
</tr>
</tbody>
</table>

Potential benefits

<table>
<thead>
<tr>
<th>Category</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manpower</td>
<td>Efficiency improvement</td>
</tr>
<tr>
<td>P&amp; M</td>
<td>Utilisation and availability improvement</td>
</tr>
<tr>
<td>Material</td>
<td>Pilferage reduction</td>
</tr>
</tbody>
</table>

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Overall architecture

Tracking and plugging leaks across the value chain – Sample applications

**Project Office**
- Safety
  - On time
- Quality
  - On cost

**Learning repository**
- Remote access to site; man, material, & P&M
- Real time data availability for effective and quick decision-making
- Targeted reviews
- Evidence records

**Cloud server**
- Secured data – Documents
- Timely storage, easy access of documents anywhere and anytime
- Integration of information from different areas and provide analysis via dashboards

**Wired site**
- Timely record of asset management and productivity of the asset

**Planning and procurement**
- Planning with real time performance
- Integrated supply chain

**Plant and machinery**
- Real time utilisation analysis of all assets
- Insights about equipment, safety and quality

**Skilled labour**
- Equipped with wearable to monitor efficiency
- Unauthorised zone movement

**Supply chain and logistics**
- Accurate and timely tracking of the material in transit with use of RFID, GPS

**Progress**
- Progress capture using QR code and pictures
- Feed in to BIM

**Supply chain and logistics**
- Supply replenishment
- Inventory management (by use of RFID technology and sensors)

**Labour**
- Unauthorised zone movements
- Present/absent at workplace
- Labour location on a map (zone-wise) and count
- Planned vs actual hours spent
- Utilisation and efficiency
- Safety metrics

**Material**
- Material tracking location
- Vehicle tracking & turnaround & transit time for deliveries
- Material ageing
- Real time reconciliation
- Stock availability
- Compliances to GR/GI requirements post material receipt/issue

**Plant and machinery**
- Machine location and count
- Machine availability
- Machine utilisation
- Machine productivity/output
- Maintenance alerts
- Fuel consumption
- Safety metrics

Tracking KPIs that can lead to better outcomes
Sample use case for monitoring welders in a large project

Total welding required: Two lakh IND (inch. dia.)

<table>
<thead>
<tr>
<th>Project challenges</th>
<th>Impact factors:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower welding output</td>
<td>Front unavailability</td>
</tr>
</tbody>
</table>

Before IoT implementation
Low productivity of 10-12 IND per welder/day

After IoT implementation
>18 IND per welder/day

IoT architecture implemented

**Wearable device:**
To track the location and movement of workmen

**Welding torch node:**
To track current measurement

**Wall-mounted beacons:**
For Geo fencing

**Gateway:**
Communicate between the wearable device & cloud

**Data collected every 5-10 min**

Benefits achieved

- 72% improvement in labour efficiency
- 95% improvement in crew utilisation
- 25% improvement in welder output
- 25 Days of early completion opportunity

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