

# Case Study

## Business Intelligence & Augmented Analytics

**Smarten Case Study: Augmented Analytics Solution for Large Indian Construction and Infrastructure Company**



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### The Client

The Client is a prominent Indian construction and infrastructure company providing services in numerous sectors, including highway, rail, mining, energy, irrigation, and water supply. Known for their expertise in managing large-scale and complex projects, the Client has played a significant role in enhancing the India infrastructure and has achieved robust growth and financial stability. The Client is currently managing sixty two (62) projects and employs more than 5000 employees in numerous market sectors across India.

### The Objective

The Client is focused on improving data literacy across the organization, and wishes to incorporate analytics across the organization, including at the site level, so team members can understand the costs of each element, improve cash flow and improve overall business performance. The Client wishes to expand the use of analytics across all departments including Finance, Accounting, HR, Administration, Planning and Monitoring, Plant and Machinery, Procurement, Techno Commercial and Environmental Health and Safety (EHS).

The key objective is to consolidate data from disparate data sources and create a data repository to increase transparency at organizational levels, target and measure key performance indicators (KPIs) and their effectiveness to measure performance, to justify budget allocations, and to formulate growth strategies.

### Challenges

- **Data Fragmentation:** Client data is divided across disparate databases with varying schemas and departments, making it difficult to integrate into a single platform for analysis.
- **User-Specific Analysis:** Each department requires customized reports and analyses based on specific data access permissions and requirements, posing a challenge in delivering uniform reports while catering to individual needs.
- **Data Quality Issues:** Inconsistent data entry practices and varying data quality across departments can lead to inaccurate analysis.
- **Scalability:** As the volume of data grows, maintaining the performance and responsiveness of the dashboards becomes increasingly challenging.

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- **Change Management:** Implementing new tools and processes for dashboard creation and data analysis may be hampered by resistance from employees accustomed to existing systems.
- **Real-Time Data Updates:** Ensuring that dashboards are updated in real-time with the latest financial data can be technically challenging.
- **Integrate All User Bases:** Dashboards and report access permissions must be tailored according to the plant and department of each user.
- **Non-Interactive Built-in Reporting:** The existing solution has built-in reporting, but reports are not interactive, leading to a continuous end user need for new reports. This time-consuming and expensive process slows decision-making and creates inefficiencies.
- **Reports with Unsecured Data:** Excel-based reports are non-interactive and pose security risks due to unsecured data handling. The increased time spent on report generation and potential data breaches affected data integrity and security.

## The Solution

The Smarten team developed and presented Smarten analytics using Client data to demonstrate features and functionalities that will address pain points

and technical needs. The team configured Smarten to connect with various data sources, ensuring data integrity and quality through a unified data repository. Customizable dashboards were created for different departments, facilitating user-specific analysis while maintaining standardized reporting. Real-time data pipelines were implemented to keep dashboards updated with the latest information, enhancing decision-making.

Advanced visualization tools were used to create interactive visualizations of key metrics and KPIs, improving stakeholders' ability to analyze data. The Client staff received self-service analytics training to enable independent data analysis and report generation and accelerate decision-making processes. The dashboards incorporated compliance to monitor and report key regulatory metrics, ensuring adherence to standards.

Specific dashboards were developed for accurate and timely revenue tracking, ensuring that management had access to current and precise revenue data for better strategic decision-making.

The data infrastructure was scaled to efficiently handle increasing data volumes and maintain optimal dashboard performance. Risk management dashboards were developed to highlight potential financial risks and provide insight into debt levels and other indicators. A comprehensive change

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management program was implemented, including training sessions and ongoing support, to ensure smooth adoption of the new system and to maximize the utility of the dashboard features. The solution enabled a smooth transition from time-consuming Excel-based reports to secure interactive dashboards with Smarten enhanced data security and integrity, while making reports more interactive and easier to generate.

By centralizing data management, the Client was able to ensure accuracy and consistency, and achieve regulatory compliance by accurately tracking and reporting key metrics, and empowering users with self-service analytics to accelerate decision-making.

- **Data Integrity and Quality:** Centralize data management to ensure accuracy and consistency across the organization.
- **Executive-Level Snapshot View:** Provide high-level summaries with the ability to drill down to site or project-level details.
- **Corporate-Level KPIs and Monitoring:** Establish key performance indicators (KPIs) and monitoring mechanisms at the organizational level.
- **Site-Level Operational Reports and KPIs:** Develop site-specific reports and KPIs to track operational performance and progress.

- **Cash Flow Management:** Monitor and understand cash flows at both the organizational and project levels for effective financial planning.
- **Indirect Cost Monitoring:** Identify and track indirect costs and their implications on overall project and corporate financial health.
- **Project Performance Analysis:** Analyze project performance, understand reasons for performance variations, and implement corrective actions for non-performance.
- **Dynamic Cost Analysis for Bidding:** Track and analyze fluctuating costs to enable more effective and competitive bidding strategies.
- **Fixed Assets Management:** Monitor and manage fixed assets to optimize utilization and reduce costs.
- **Human Resources Management:** Integrate HR data for insights into workforce allocation, recruitment, attrition, and employee performance.
- **Legal Compliance:** Consolidate legal data and compliance-related information into a centralized system that enables real-time tracking of regulatory obligations, contract statuses, and legal risks.
- **Department-Specific Insights:** Provide tailored analytics and insights specific to the needs and objectives of each department.

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### Technology & Platform

<b>Server</b>	: Intel(R) Xeon(R) Silver 4314 CPU @ 2.40GHz – 2.39GHz (2 Processors)
<b>Spark Cluster</b>	: Establish cluster environment to support 1500+ users and to leverage multiple hardware servers for high performance and rapid response times. Smarten application connects with Spark Cluster (with 4 worker nodes) and utilizes Spark Cluster for data processing
<b>Operating System</b>	: Windows Server 2019
<b>Applications</b>	: MS Office
<b>Back-End (Database)</b>	: SAP HANA, MySQL

#### Key Analytical Objects Implemented:

##### 1. HR & Admin:

- **Attrition:** Provides an overview of the total number of employees working versus those who have resigned.

- **Recruitment:** Covers the entire recruitment process with all statistics used to monitor recruitment processes and recruiter performance.
- **Manpower Ratio:** Compares budgeted versus actual revenue along with budgeted salary cost and actual revenue cost-to-revenue ratio.
- **Mess:** Tracks per plate expenditure in each project.
- **Salary (Budgeted):** Provides an overview of budgeted versus actual salary along with variance.
- **Salary (Non-Budgeted):** Compares total actual versus non-budgeted cost per person (average).
- **Travel Expense:** Tracks per person travel expenses when deployed to a site and whether it aligns with the norms assigned to a grade.

##### 2. Finance & Account:

- **Debtor Aging:** Tracks amounts to be received from vendors.
- **Creditor Aging:** Tracks amounts to be paid to vendors.
- **Cash Flow Analysis:** Provides overall cash flow at the company, vertical, and plant levels, including inflow, outflow, and net flow.
- **GR/IR Live:** Monitors Goods Receipt and Invoice Receipt.

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- **Vendor Advance Outstanding:** Tracks advances given to vendors.
- **Cash Balance:** Shows vertical and project-specific cash balances.
- **Cash Expense:** Tracks vertical and project-specific cash expenses.
- **Employee Outstanding Status:** Provides data on outstanding amounts by employee status.

### 3. Planning & Monitoring:

- **DPR Pending:** Tracks project-specific pending Daily Progress Reports.
- **DPR Revenue Timeline:** Tracks DPR revenue with a time series.
- **WIP Dashboard:** Monitors work in progress in each vertical and project.
- **DPR Budget Vs Actual:** Compares DPR budget versus actual across all aspects of the company.
- **Pending Order Book:** Tracks the order book of the company, including pipelined projects and estimated closing dates.

### 4. Plant & Machinery:

- **Availability vs. Utilization:** Compares the availability of equipment versus its utilization.
- **Breakdown Maintenance:** Provides an overview of the frequency of equipment breakdowns.
- **Scheduled Maintenance:** Tracks scheduled maintenance of equipment to avoid breakdowns.
- **Non-Utilized Equipment:** Identifies equipment that is idle in the plant.
- **Equipment Cost:** Tracks maintenance expenditure for each piece of equipment.
- **Fuel Consumption (Overall):** Includes fuel consumption of DG and vehicles.
- **Plant Production Quantity Trend:** Tracks overall production plant along with budget versus actual quantity and percentages.

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### 5. Procurement:

- **Business Share:** Analyzes the distribution of business across verticals, projects, vendors, material groups, materials, and purchase groups.
- **Tender vs. Actual:** Compares tender versus actual costing for bulk and energy materials.
- **Material Ageing:** Categorizes fast-moving, slow-moving, and non-moving stocks as per the system and other considerations.

### 6. EHS:

- **Module Task Status:** Tracks the status of tasks assigned by the EHS department.
- **Incident Statistics:** Monitors incidents in projects, including root causes and their frequency and severity rates.

### 7. Techno & Commercial:

- **Vendor Closure:** Summarizes vendor closure for each department.

- **Entry Sheet Timeline:** Tracks project and HO daily bucket counts for entry made, also showing delayed contributions.
- **Royalty:** Tracks company and vendor royalty amounts with liabilities.
- **Subcon Stock and WIP:** Compares subcontractor stock amounts and work-in-progress amounts.

## The Smarten Team Role

The Smarten team played a crucial role in delivering comprehensive support throughout the project life cycle.

- **Analytics Development:** Crafting robust analytical solutions tailored to specific business needs.
- **Template Enhancement:** Improving and customizing templates for enhanced usability and efficiency.
- **Dataset Creation:** Designing and constructing datasets to support accurate and insightful analysis.
- **Dashboard Development:** Creating intuitive dashboards that provide actionable insights at a glance.

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- **KPI Definition:** Establishing key performance indicators (KPIs) aligned with strategic goals.
- **Data Structure Assessment:** Evaluating and optimizing data structures for improved performance and scalability.
- **Metadata Design:** Structuring metadata frameworks to enhance data organization and accessibility.
- **User Acceptance Testing (UAT):** Conducting thorough UAT to ensure solutions meet user requirements and expectations.
- **Ongoing Technical Support:** Providing continuous technical assistance to adapt to evolving client needs and challenges.
- **User Access Permission:** Creating multiple user accounts with access permissions based on their plant and department conditions.
- **Training and Support:** Providing adequate training and ongoing support to users to maximize the utility of the dashboards.

### Conclusion

The Client required augmented analytics and reporting capabilities integrated within their existing systems to understand and analyze performance across various departments and projects for better resource allocation and strategic planning.

By implementing Smarten, the Client created a foundation for improved data literacy, and achieved a consolidated view of their data, enhanced decision-making processes, and ensured regulatory compliance through comprehensive and interactive dashboards. This data integration facilitated accurate tracking of KPIs, improved data transparency, and empowered stakeholders with self-service analytics, ultimately supporting the Client objectives for growth and operational efficiency.



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SMTNR1032CS-CaseStudy - Smarten Case Study: Augmented Analytics Solution for Large Indian Construction and Infrastructure Company - Version1.0 - Published 2024

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