

Leveraging Historical Project Data To Uncover At-Risk Projects

Using Advanced Data Mining and Analytics

Team Presentation



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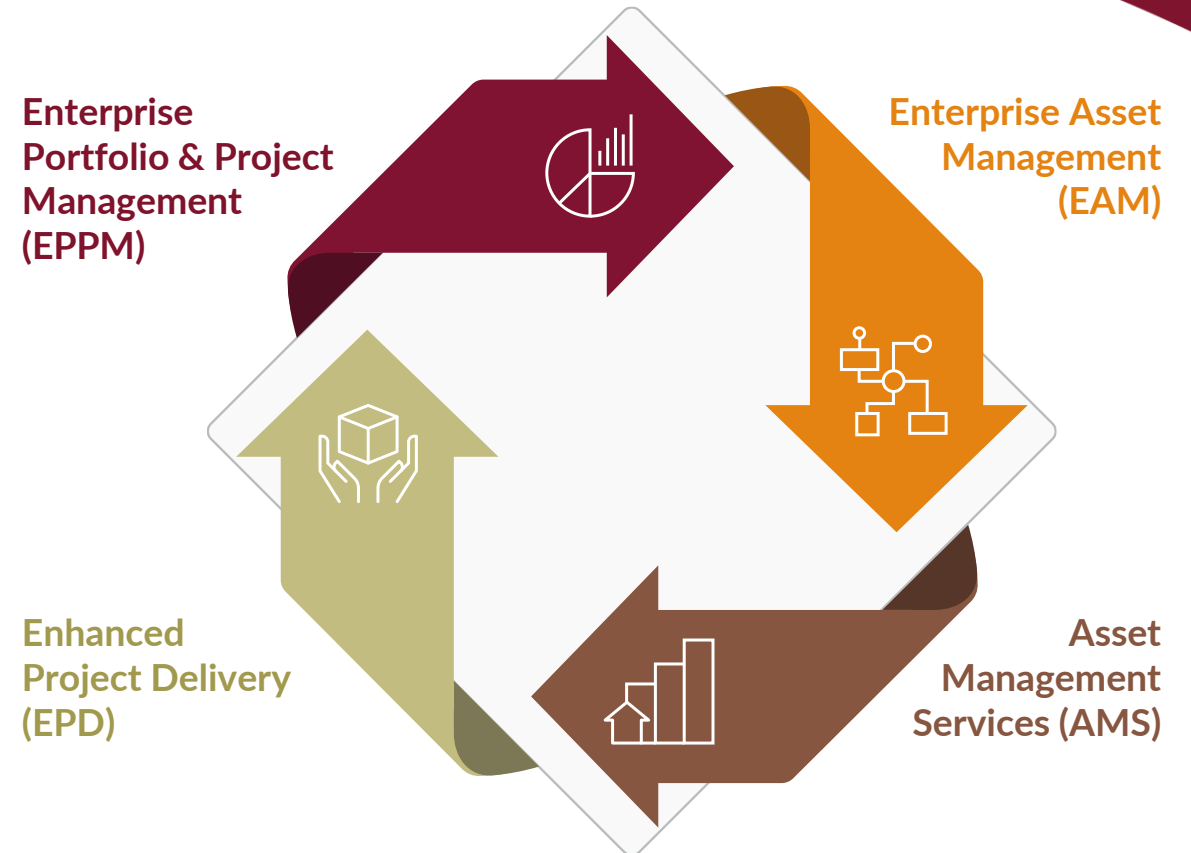
Overview

Asset Lifecycle Management: Who We Are

FTI Consulting's **Asset Lifecycle Management** (ALM) team offers an unparalleled breadth of services focused on improving the lifecycle value for critical capital assets.

In addition to **partnering with our clients to transform their approach to ALM**, we regularly fulfill project and operations management roles for clients around the world, leveraging the strength of FTI Consulting's best **practices and technology**.

Our services and tools improve every aspect of the asset management lifecycle – **shortening time to value and increasing capital efficiency**.



Data Intelligence

Our DI solutions offer scalable statistical analytic solutions combined with data management and business intelligence infrastructure.

Capabilities

Services

Value



Data & Analytics Maturity Assessment

Conduct data quality analysis, maturity review and gap assessment of existing data infrastructure

Move ahead of the curve with improved data management, business intelligence and analytics capabilities



Master Data Management

Assess existing capabilities: update or develop governance policies, management processes and data solutions to meet an organization's MDM goals

Transform inefficient and inconsistent business processes with integrated digital solutions



Business Intelligence

Design scalable interactive dashboards and data visualizations to optimize information consumption and visual analytic capabilities

Reduce reporting time to value with automated dashboards with increased insights and minimized manual inputs



Statistical Analytics

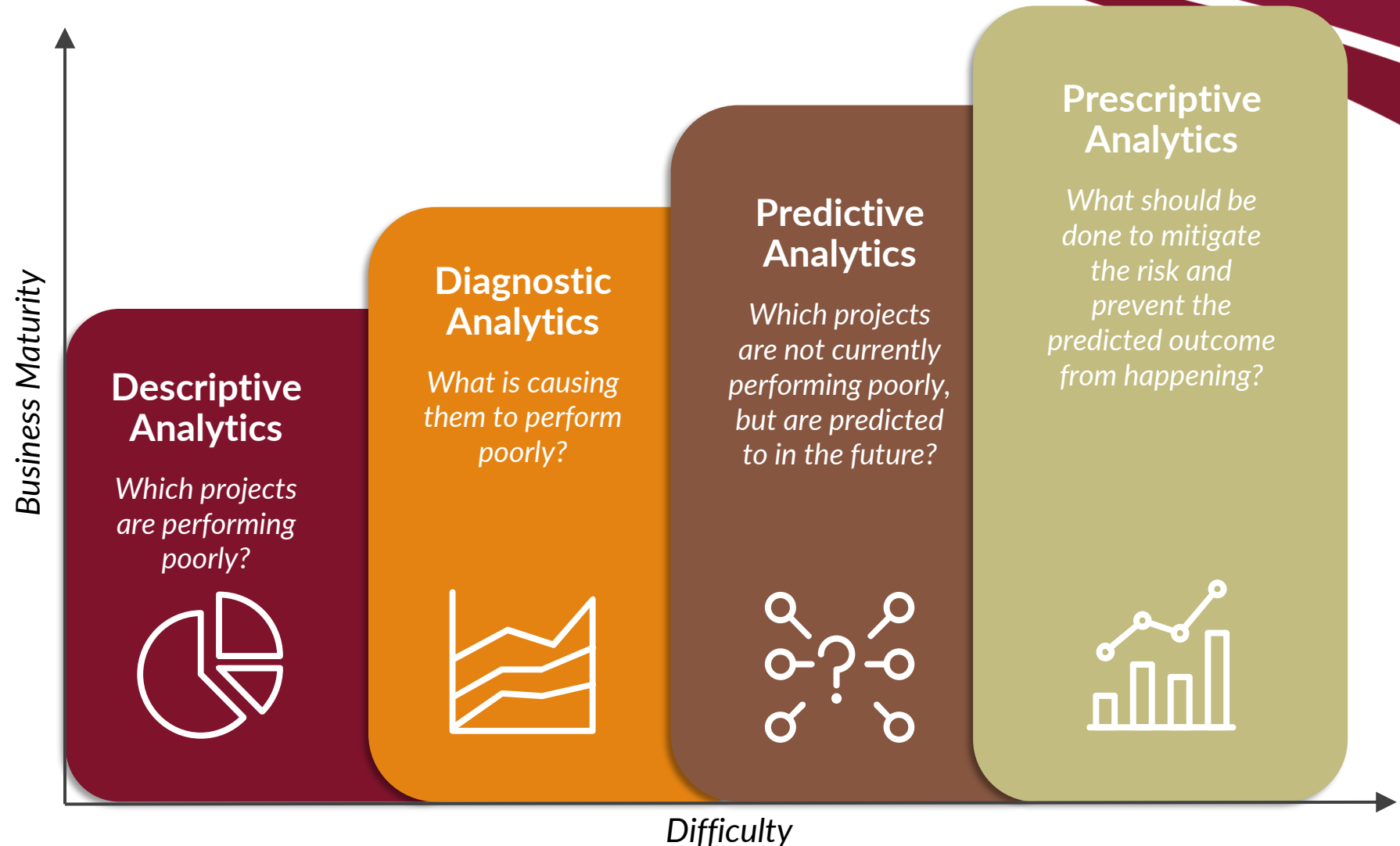
Design and develop diagnostic, descriptive, or predictive analytical solutions to answer those critical business questions

Produce timely, accurate, transparent and actionable information to promote accelerated decision making

Data Intelligence

Levels of Analytics Maturity

Our analytical solutions apply visualization, analysis and modeling techniques to your existing data to identify and quantify the trends in your business and projects, which cannot be understood otherwise.



The Need for Advanced Analytics

Background

Client:

- A Global EPC Company

Situation

- Cost management and risk management systems were in use, with a significant amount of historical data generated and stored
- A business intelligence platform with a large number of descriptive (reactive) reports and dashboards were available
- Limited return on investment made in data management, business intelligence and analytics, and want to advance their data analytics capabilities

Problem:

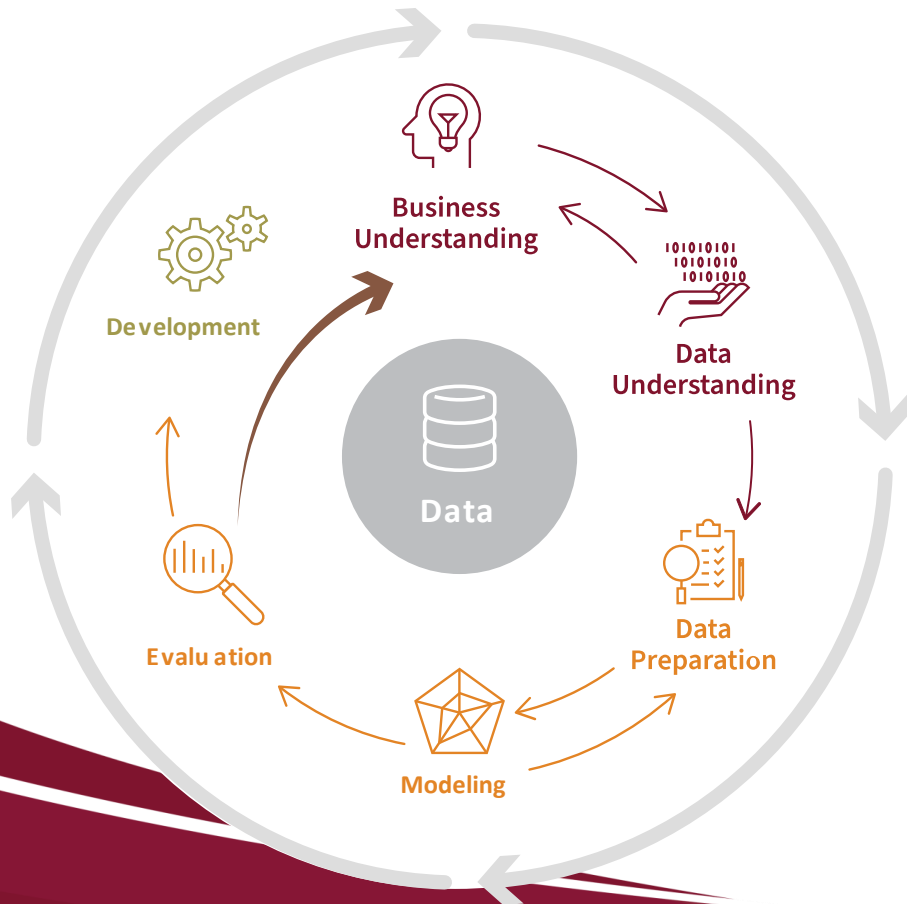
- Dissatisfaction among users (PMs, PCs etc) due to large number of reports that were not fit for purpose.
- Reports and dashboards did not provide true value to Leadership as lacked ability to identify 'At Risk Projects'
- Historical project data was not organized and do not support in a manner to support access and use in benchmarking analysis



Innovative Analytics Approach

Methodology

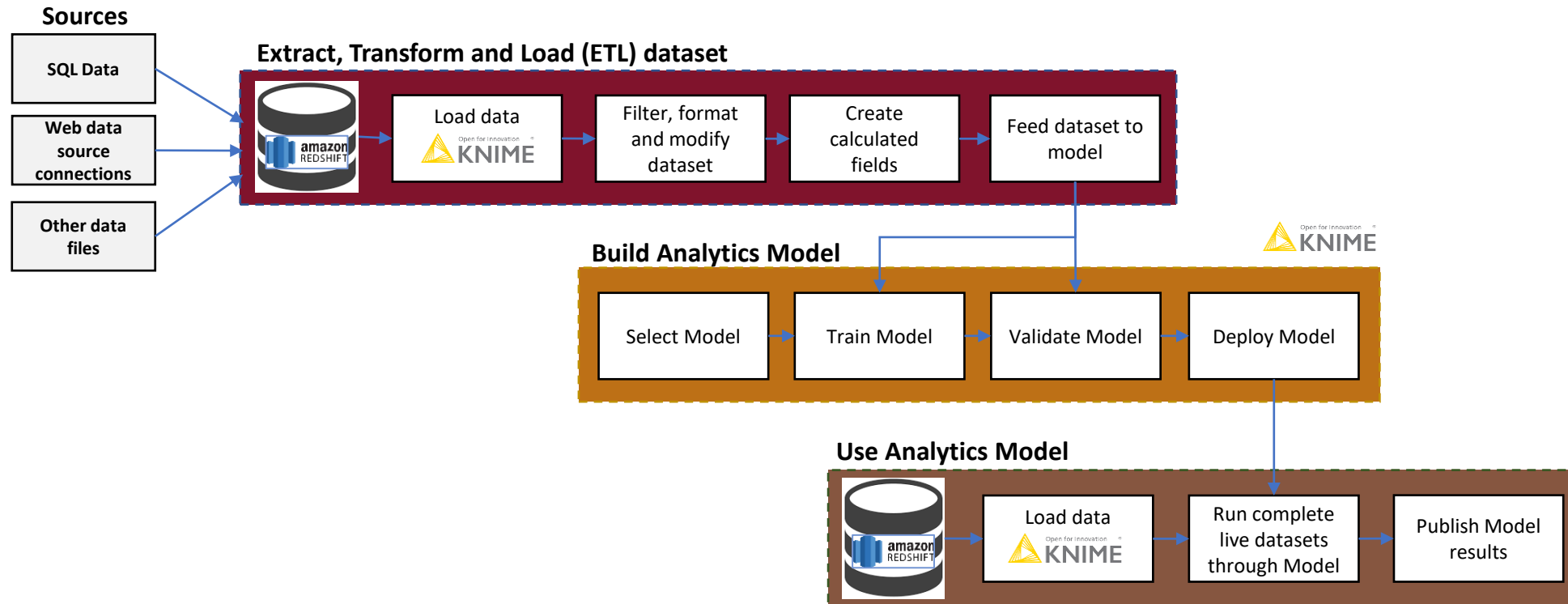
FTI utilized **Cross-Industry Standard Process for Data Mining (CRISP-DM)**, the recognized industry standard for managing and executing data analytics and data mining projects, to conduct the data quality review, analysis and development of findings.



- **Business Understanding & Data Understanding:**
Document findings and conclusions based on business and data understanding.
- **Data Preparation, Modeling & Evaluation:**
Evaluate the outputs to understand if desired outcomes were achieved, and hat gaps may exist.
- **Confirmation & Iteration:**
Review results with business leaders and confirm alignment in next steps. Iterate the process as necessary with the goal of improving the reliability and accuracy of the analytics.
- **Deployment:**
Publish the analytical dashboards and solutions for use within operations.

Innovative Approach

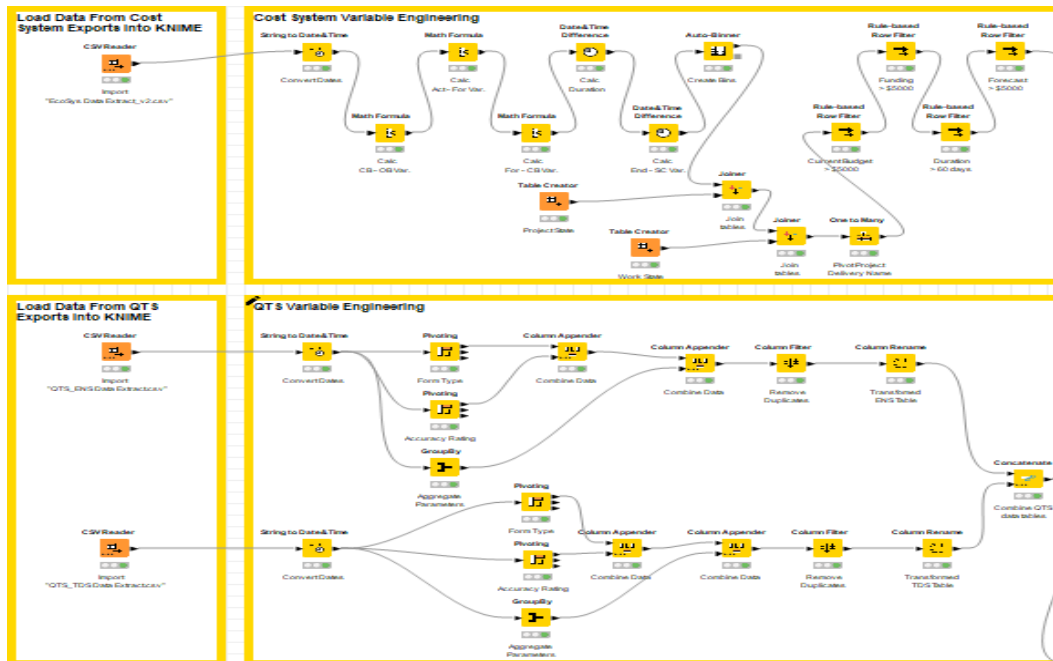
Below approach demonstrates the flow of data from the data warehouse (i.e. source), all the way through to the business intelligence outputs (i.e. dashboards).



KNIME analytics workflow

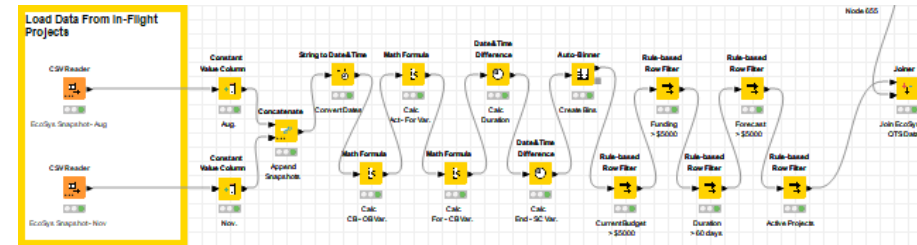
Below KNIME analytics workflow is used to training and testing the model with closed/completed projects data, and use the trained model on In-flight projects

Training & Testing dataset

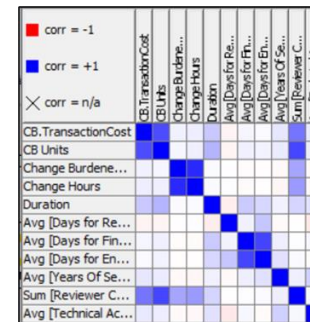


Capital Project cost and quality data was leveraged for this modeling application...

Production dataset

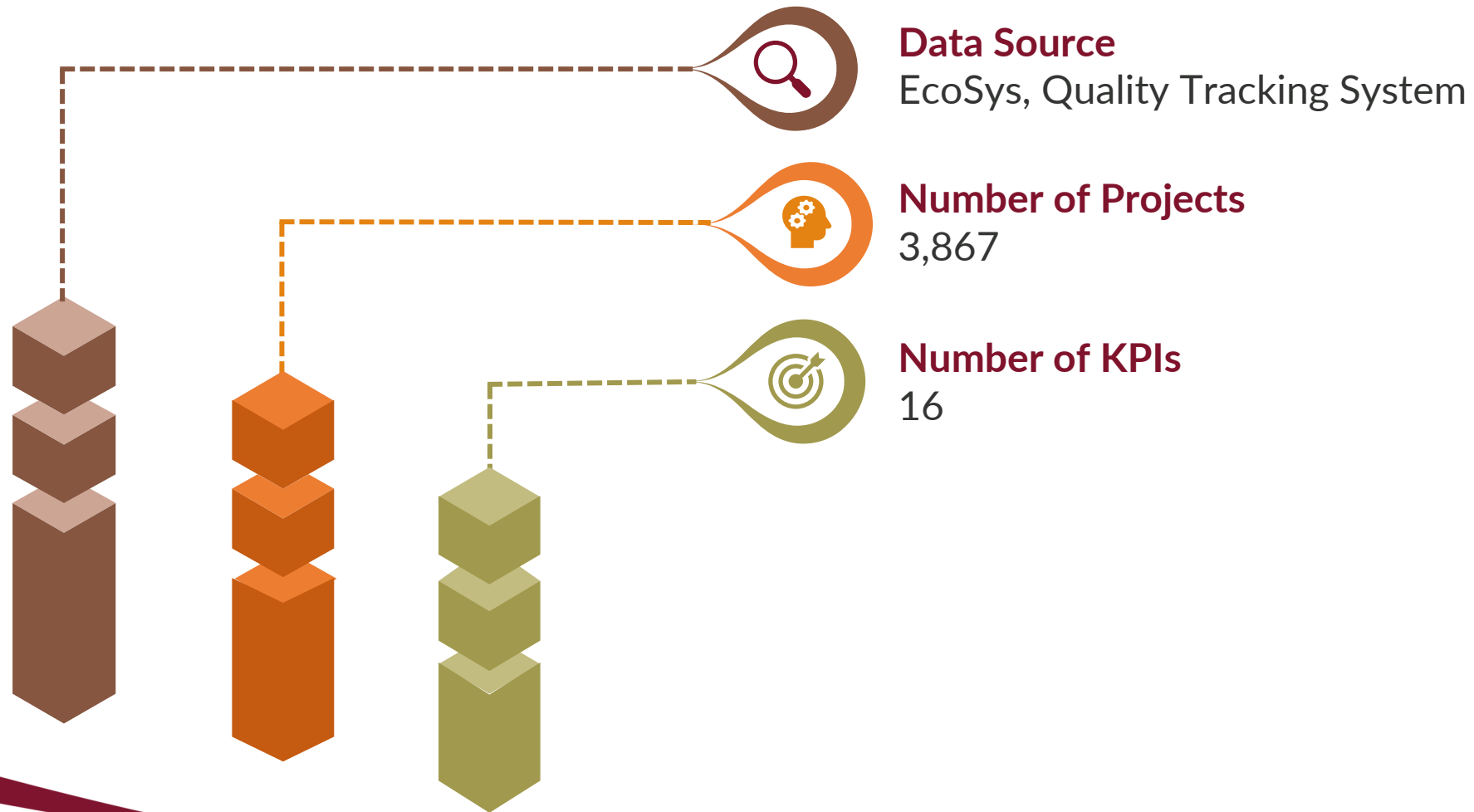


Testing results were analyzed to identify modifications



Row ID	D prediction_Forecast
R ²	0.974
mean absolute error	29,272.382
mean squared error	4,638,605,790.115
root mean squared error	68,107.311
mean signed difference	-0
mean absolute percentage error	0.439

Data Inputs & KPIs



Key Performance Indicators

Ranges for At-Risk profiles

KPIs were created to evaluate the data and ranges were established to identify the risk profile of each (red being most risk).

KPI	GREEN	YELLOW	RED
Cost Burn Rate	0.76	Between	0.58
Hour Burn Rate	0.63	Between	0.50
Project Finish Delay	-74	Between	-294
Non-Billable Cost Variance	-\$6,120	Between	-\$10,182
Spending % (\$)	110%	Between	158%
Spending % (hours)	126%	Between	188%
Funding %	53%	Between	44%
Commitment Spend %	85%	Between	92%

KPI	GREEN	YELLOW	RED
CB - FCST Var. (\$)	-\$17,080	Between	-\$30,956
CB - FCST Var. % by CB (\$)	-11%	Between	-32%
CB - FCST Var. (hours)	0	Between	-389
CB - FCST Var. % by CB (hours)	-22%	Between	-54%
Avg Days Response per Review	2.5	Between	4.1
Avg Reviewer Years Service	9.7	Between	7.4
Avg Reviewers per Review	1.3	Between	1.1
Avg Tech Accuracy Rating	3.7	Between	2.9

Results

Key Benefits

Our Innovative Analytics Solution resulted in three key benefit

01. Identifying At-Risk Projects

Identified 5 categories of At-Risk projects summing to **\$40M Cost Overrun** according to performance to date, evaluation of KPIs, project characteristics, relative performance and other trends.

02. Proactive Reporting Tools

Developed dashboards in Power BI to support the analysis and visualization of the results, enabling project/portfolio managers to **proactively identify projects at-risk**.

03. Dynamic KPIs for Benchmarking

Identified most **influencing KPIs** with dynamic data range based on past completed project data.



01. Identifying At-Risk Projects

Projects were grouped into 5 Categories

Categories



Data / Process Issues

Projects identified to **have potential data issues, updating process issues, significantly large overruns (i.e., > 30%), or other issues** that need to get investigated further before useful analysis can be completed.



Evident At Risk

Projects identified to be At-Risk **according to cost overruns / performance to date**. This group of projects has overruns of at least 10% and are likely known to be problematic based on this performance.



Potential At Risk

Projects identified to be At-Risk **according to the evaluation of the KPIs, project characteristics, relative performance or other trends** identified within the data.

Tier 1

Higher Likelihood of final Project performance to exceed budget

Tier 2

Middle Likelihood of final Project performance to exceed budget

Tier 3

Higher Likelihood of final Project performance to exceed budget

01. Identifying At-Risk Projects

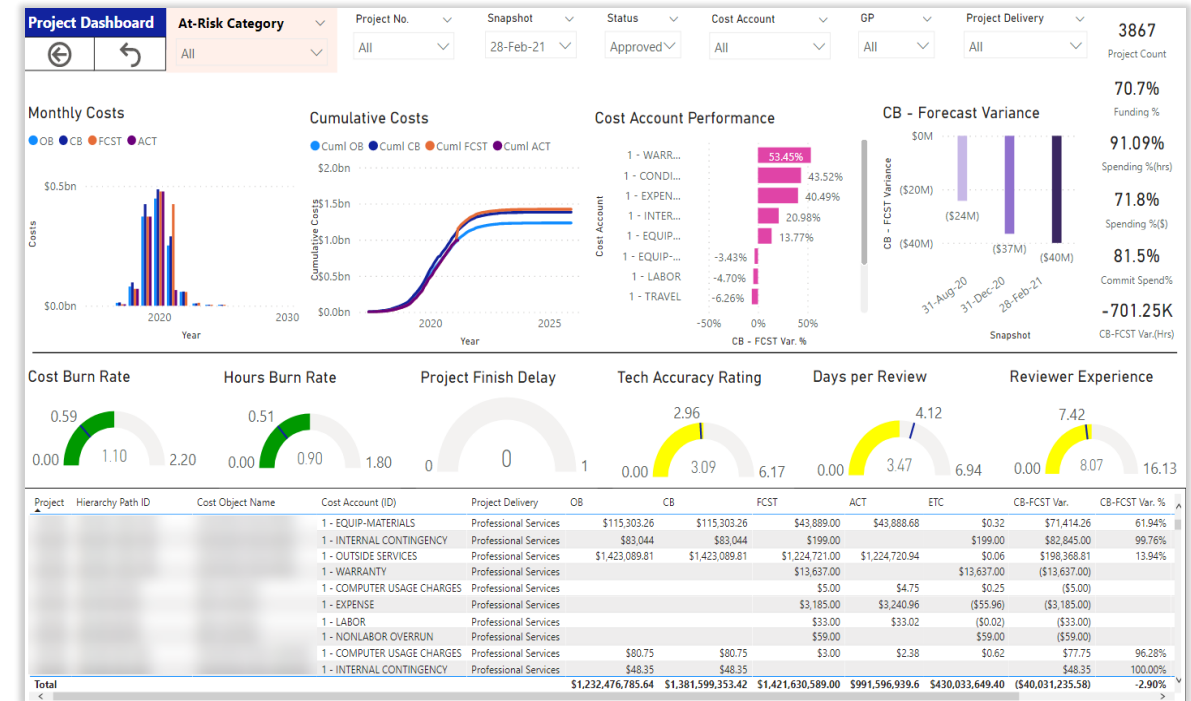
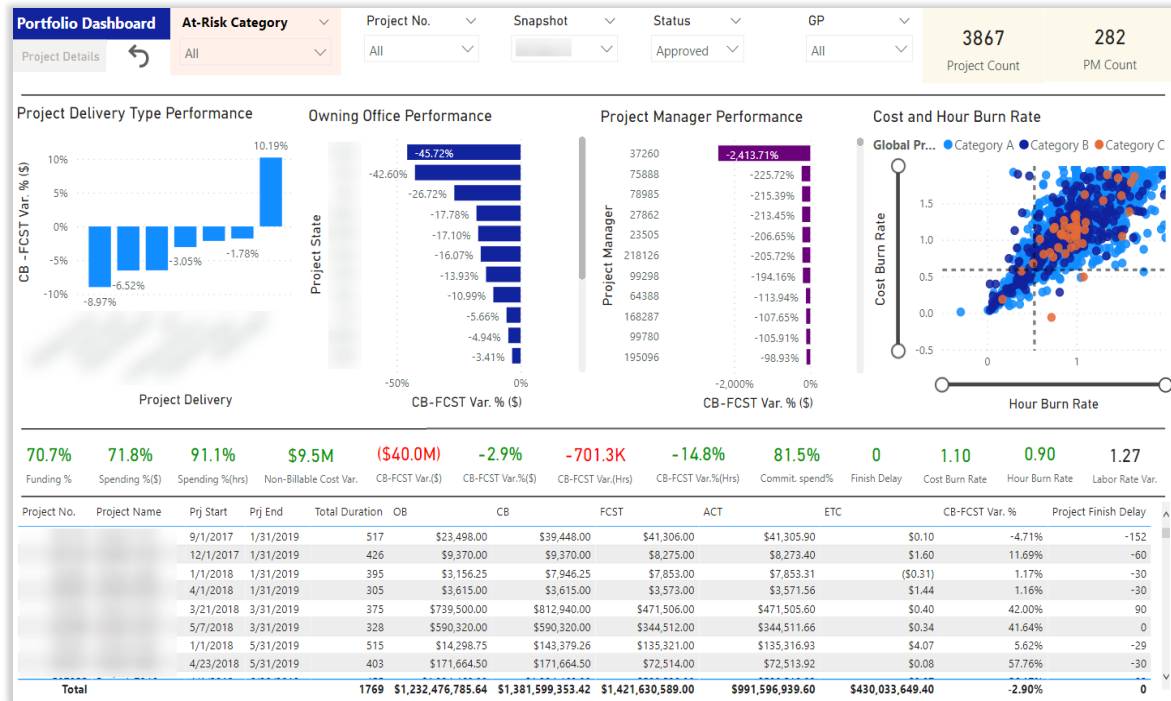
Overall Performance results of Categories

A sample of 10 Projects have been selected from this group.

AT-RISK CATEGORY	PROJECT COUNT	OVERRUN (\$)	OVERRUN (%)
Data / Process Issues	206	\$20.8M	119.3%
Evident At Risk	155	\$35.0M	23.2%
Potential At Risk - Tier 1	20	\$12.9M	137.3%
Potential At Risk - Tier 2	20	\$2.8M	80.0%
Potential At Risk - Tier 3	69	\$4.8M	39.9%
Subtotal	470	\$76.4M	39.4%
Other	3397	\$(36.3)M	(3.1)%
Total	3867	\$40.0M	2.9%

02. Proactive Reporting

Developed dashboards in Power BI to support the analysis and visualization of the results



03.Dynamic KPIs

Top 5 Influencing KPIs

KPI	HYPOTHESIS
CB - FCST Variance (hours)	Labor hours are largely under-estimated within the Current Budget, leading to the Forecasted hours eventually exceeding the budget - especially seen for projects that have long durations. Labor Cost Accounts are a significant contributor to overruns.
CB - FCST Variance % by CB (hours)	Similar scenario to above.
Cost Burn Rate	Actual Costs are being expending at a much quicker rate than expected in the time phased Current Budget, indicating a risk of eventual overrun. This issue is compounded when Projects fail to extend their time phased Current Budgets into the future when needed.
Hour Burn Rate	Actual Hours are being expending at a much quicker rate than expected in the time phased Current Budget, indicating a risk of eventual overrun. This issue is compounded when Projects fail to extend their time phased Current Budgets when needed.
Funding %	Projects with a lower percentage of funding are translating into being At Risk and / or experiencing overruns. This may be an indicator of projects failing to receive the appropriate funding for necessary pre-planning and execution strategy development.

Key Takeaways

From our Innovative Analytics Solution



Better visibility into At-Risk projects can help **uncover current loss-making projects** and **help prevent future revenue loss** for an organization.



Dynamic KPI risk thresholds defined using **organization specific project performance goals** will yield better alignment and confidence in decision making.



Analyzing on-going project performance against benchmarks established from **past completed projects** can help an organization better understand opportunities for improvement that maximize success.

Q & A

Thank You

FTI Consulting: At a Glance

FTI is an independent global business advisory firm dedicated to helping organizations manage change, mitigate risk and resolve disputes.

Who We Are

6,400+

Employees
Worldwide

9/100

Advisor to 96 of
the world's top
100 law firms

8/10

Advisor to 8 of the
world's Top 10 bank
holding companies

\$4.9B

Market Cap(1)

55/100

55 of Fortune Global
100 corporations
are clients

Forbes

2020 America's Best
Management
Consulting Firms

86

Cities

29

Countries

64+

SMD

Our Five Segments

- Corporate Finance
- Forensic & Litigation Consulting
- **Asset Lifecycle Management**
- Strategic Communications
- Economic Consulting
- Technology

Industry Experience

- Chemicals & Industrials
- Aerospace & Defense
- Agriculture
- Automotive
- Construction
- Energy, Power & Products (EPP)
- Environmental
- Financial Institutions
- Healthcare & Life Sciences
- Hospitality, Gaming & Leisure
- Insurance
- Mining
- Public Sector & Government Contracts
- Real Estate
- Retail & Consumer Products
- Telecom, Media & Technology
- Transportation

1. Number of total shares outstanding as of July 29, 2021, times the closing share price as of July 29, 2021.