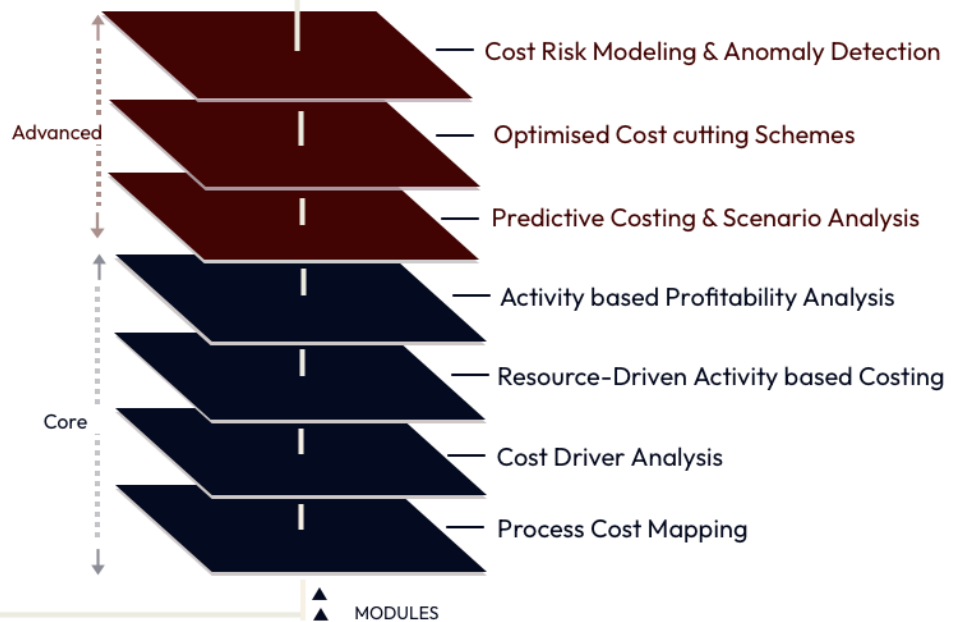


Multi layer Solution Framework

- During solution design, modules are selected based on client needs and readiness.
- Core modules are prerequisites for advanced modules.
- Module scope varies based on complexity, objectives & deliverables.



Process Cost Mapping

CIE-01



Core



Descriptive

▲ Back to Framework

Documentation of all key business processes, activities, and the organizational resources (people, equipment, space) consumed in fact-dimension data model format and analysing the interaction (consumption flow).

Methodologies

- Process Mining & Workshops
- Stakeholder Analysis & Data Modeling
- GL Mapping & ETL Pipelines
- Statistical Modeling & Regression Analysis
- Taxonomy & Business Rule Engine
- Variance Analysis Algorithms & OLAP
- Feature Importance & Model Interpretability (XAI)

Key Deliverables

- **Activity Dictionary:** A comprehensive list of all business activities with clear definitions and descriptions.
- **Cost Object Definition:** Clear specification of what will be costed (e.g., specific products, services, customer segments, projects).
- **Fully Populated Cost Assignment Matrix:** A technical document (often in a system or sophisticated spreadsheet) that maps costs from resources to activities using resource drivers, and from activities to cost objects using activity drivers.
- **Resource Cost Pools:** Categorized lists of all organizational costs assigned to primary resources.

Cost Driver Analysis

CIE-02



Core



Descriptive & Diagnostic

▲ Back to Framework

Identification and quantification of the underlying factors that influence costs across products, processes, and resources, enabling precise, targeted efficiency improvements.

Methodologies

- Multiple regression analysis
- elasticity & sensitivity analyses
- ML algorithms (e.g., random forest, SHAP analysis, feature importance)
- Variance Analysis Algorithms
- OLAP Cubes & SQL Queries
- Unsupervised Learning: K-means clustering
- Time-Series Analysis

Key Deliverables

- **Resource & Cost Driver Catalog:** A library of the factors that cause costs to be incurred
- **Resource & Cost Driver Catalog** – A structured library of all key cost drivers linked to activities and resources
- **Driver-Cost Relationship Models** showing how each driver impacts cost levels and variability.
- **Driver Classification Framework** – Segmentation of drivers into *controllable vs. non-controllable*, *volume vs. complexity*, and *structural vs. behavioral* categories.
- **Variance Attribution Report** – Breakdown of cost variances by driver to pinpoint root causes of deviations in actual vs. planned costs.
- **Driver-Based Performance Dashboards** – visualising cost driver insights, thresholds, and trends.
- **ML Driver Discovery** – to detect hidden or non-linear cost drivers and predict future cost behavior.

Resource-Driven Activity based Costing

CIE-03



Core



Descriptive &
Diagnostic

▲ Back to Framework

Advanced costing system that traces resource costs directly to activities and cost objects. By blending ABC & RCA, this module offers holistic yet actionable insights into cost drivers, idle capacity, and process efficiency.

Methodologies

- Process Mining & Value Stream Mapping
- ETL/ELT Pipeline Development
- Relational Data Modeling & SQL/Python Scripting
- Capacity & Idle Cost Analysis
- Data Visualization & Dashboard Development
- Version Control & Change Management

Key Deliverables

- **Conceptual RCA/ABC Model Design:** A blueprint of the costing model, showing the flow of costs from resources to activities and finally to cost objects.
- **SQL/Python Script of the Costing Model:** Full data model implementation based on the preexisting data management/ERP ecosystem.
- **Activity Cost Analysis:** Reports highlighting the cost of performing specific business activities.
- **Resource Utilization Report:** showing the cost of supplied capacity vs. used capacity highlighting the cost of idle resources.
- **Cost Analysis Dashboard:** for real-time visibility into cost structures, trends, and key drivers.
- **Activity Cost Attribution Matrix** – Allocates indirect and shared using drivers.

Activity based Profitability Analysis

CIE-04



Core



Descriptive &
Diagnostic

▲ Back to Framework

Provides a in-depth view of profitability by tracing activity costs to specific products, customers, and channels. By combining activity-based costing with revenue attribution, it reveals where value is created or eroded – enabling smarter pricing, product portfolio decisions, and strategic resource allocation.

Methodologies

- SQL JOINS & Data Integration
- Contribution Margin Calculation
- Interactive Dashboard Development
- Waterfall Chart Algorithms
- Random Forest & XGBoost
- Monte Carlo Simulation
- SHAP Analysis

Key Deliverables

- **Cost Object Profitability Reports:** showing the *true* profitability of products, or customers after allocating indirect costs accurately.
- **Profitability Mapping Model** – Links revenues and activity-based costs across products, customers, and channels to show true contribution margins.
- **Product & Customer Profitability Dashboards** – highlighting high- and low-margin segments, value-destroying products, and unprofitable customers.
- **Profit Bridge Analysis** – Waterfall views explaining margin shifts over time, decomposed by activity cost changes, volume, mix, or price effects.
- **Machine Learning Profitability Drivers** – to uncover hidden patterns affecting margins and predict profitability under different scenarios.
- **Scenario & Sensitivity Models** – Simulate pricing, volume, or cost changes to evaluate profitability impact and guide decision making.

Predictive Costing & Scenario Analysis

CIE-05



Advanced



Predictive

▲ Back to Framework

This module uses statistical and machine learning models on historical data to forecast future costs and simulate financial impact. It enables data-driven planning and risk assessment by projecting expenses and profitability under different scenarios.

Methodologies

- XGBoost/LightGBM/SARIMA
- Monte Carlo Simulation
- Time Series Analysis
- Sensitivity & Elasticity Analysis
- Neural Networks (LSTMs)
- SHAP Value Analysis
- Multiple Regression Analysis

Key Deliverables

- **Predictive Cost Models** using ML models **trained** on historical data to forecast future costs & expenses.
- **Scenario Simulation Tool** with Interactive interface for creating and comparing "what-if" scenarios (e.g., material cost increases, demand changes, process improvements). Using spreadsheets or Visualisation tool to help the user run different cost/price scenarios.
- **Cost Forecast Reports** Regular automated reports showing projected costs across different time horizons (30/60/90 days).
- **Sensitivity Analysis** : in order to identify which variables have the greatest impact on costs.

Optimised Cost cutting Schemes

CIE-06



Advanced



Prescriptive

[▲ Back to Framework](#)

This module uses ABC/RCA data to identify and prioritize cost-cutting opportunities like overstaffing and excess inventory. It applies optimization models to generate targeted reduction schemes—such as resource reallocation and order adjustments—ensuring strategic, data-driven savings without disrupting core operations.

Methodologies

- Gradient boosting
- Natural Language Processing
- Linear & Integer Programming
- Network Optimization Models
- Queueing Theory & Simulation
- Data Envelopment Analysis (DEA)
- Stochastic Optimization
- Knapsack Algorithms

Key Deliverables

- **Waste & Inefficiency Identification Report:** Pinpoints specific areas of avoidable cost like overstaffing and underutilized assets.
- **Cost-Cutting Opportunity Register:** A prioritized list of actionable cost-reduction initiatives with projected savings.
- **Optimised Procurement Solutions:** Identifies saving opportunities through contract renegotiation and order consolidation.
- **Inventory Optimization Model:** Calculates ideal stock levels to minimize carrying costs without disrupting operations.
- **Implementation Roadmap & Business Case:** Outlines the steps, timeline, and financial justification for executing cost-cutting plans.
- **Savings Tracking Dashboard:** Monitors realized savings against targets in real-time post-implementation.

Cost Risk Modeling & Anomaly Detection

CIE-07



Advanced



Predictive & Prescriptive

[▲ Back to Framework](#)

This module uses statistical analysis and machine learning to identify abnormal spending patterns and quantify financial risks. It provides early warning of cost overruns, fraud, and operational deviations through continuous monitoring and predictive alerts.

Methodologies

- Monte Carlo Simulation
- Isolation Forest & DBSCAN
- SHAP Analysis & Logistic Regression
- Control Charts & Statistical Process Control
- Time-Series Forecasting (Prophet, ARIMA)

Key Deliverables

- **Anomaly Detection Alert System:** Flags unusual transactions or cost patterns in real-time for investigation.
- **Risk Heat Maps:** Visualizes areas of highest financial exposure and volatility.
- **Root Cause Analysis Reports:** Automatically investigates and explains the drivers behind identified cost anomalies.
- **Risk Mitigation Dashboard:** Tracks key risk indicators and the status of mitigation actions.