

Enterprise Planning & Optimization: The Future of Advanced Business Planning

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"Plans are nothing. Planning is everything."

- **General Dwight D. Eisenhower**



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INTRODUCTION

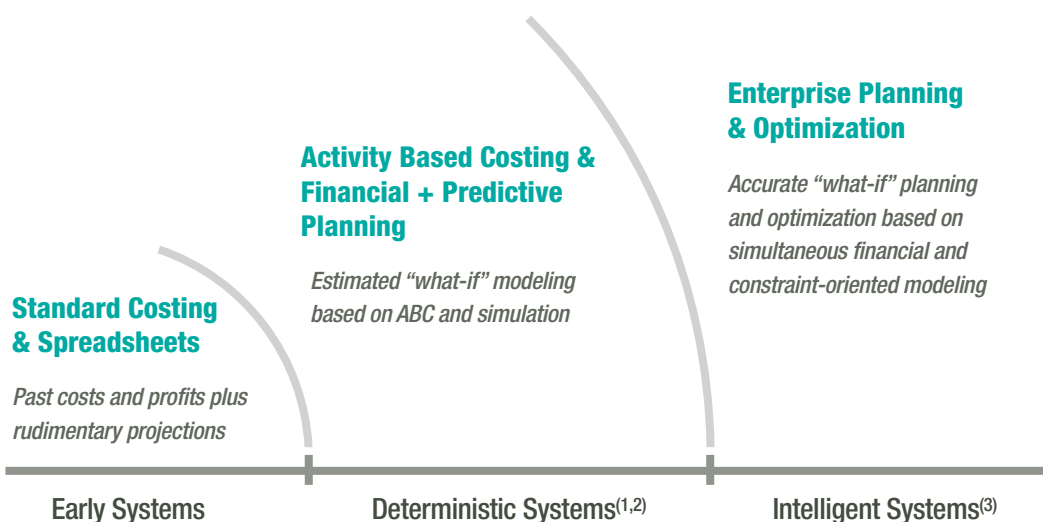
Most companies today operate with standard costing systems, using spreadsheets to evaluate strategic alternatives and make financial planning decisions. Increased complexity of operations, faster market changes and stronger competition are forcing companies across a variety of industries to re-evaluate these systems. The objectives are to improve their planning and decision-making, and to align execution with strategy.

The latest Financial and Predictive Planning systems, also called Predictive Analytics, have combined with Activity Based Costing (ABC) including new versions such as Time-Driven ABC⁽¹⁾, to add significant value by helping enterprises plan forward. In addition to providing a better understanding of costs, resource utilization, and product and customer profitability, these systems have evolved to enable managers with better decisions on “what-if” profit-modeling scenarios.

Predictive Planning systems, however, leave significant opportunity on the table. ***CFOs find that results are unpredictable and they cannot optimize strategic planning to a financial outcome.*** Business Unit Managers are left second-guessing their analyses saying: *“Is this the best we can do?”* and *“What are my top opportunities given my existing commitments and limitations?”*

This is because ABC-driven Predictive Planning systems are not able to model an enterprise and the inter-dependencies across multiple options in a way that truly represents reality. These systems can’t model processes and constraints simultaneously with the financials which creates a “blindside” in the analysis. The graph below illustrates the evolution of enterprise planning technologies.

Enterprise Corporate Planning Evolution



The following example of a CPG company will illustrate the problem. External events such as higher energy costs or changing customer preferences—which happen very frequently—forced the company to re-evaluate the plans. Using Predictive Planning software, the CFO, Business Unit (BU) Managers and VP of Supply Chain modeled various options, yet they could not agree on the course of action. What would be the impact on profits if they didn't react? Should they hold more inventory to reduce logistics costs? Should they re-allocate marketing dollars to different products and customers? If so, what would that do to their supply chain?

The reason the CFO, BU Managers and VP of Supply Chain couldn't agree was because they all saw information they didn't trust:

- The CFO knew the financial projections from “what-if” scenario modeling had always been wrong in the past and that there were too many inter-dependent options to find the path that would lead to higher profits for the company
- The BU Manager could estimate the revenue impact on her business unit but couldn't predict cost of goods sold and therefore profits
- The VP of Supply Chain could optimize the operation from a process perspective but didn't believe the model because it didn't calculate the marginal financial impact to the company

Companies will achieve far superior benefits by developing an enterprise-wide model of the business. Enterprise Planning & Optimization (EP&O) combines constraint-oriented process modeling with financial modeling to provide an accurate representation of activities, costs and profits as they are incurred. While Predictive Planning is useful in some cases, Enterprise Planning & Optimization goes beyond to include constraint-based process modeling, marginal possibilities, opportunity costs and financial-based optimization.

River Logic has built the leading Enterprise Planning & Optimization software, Enterprise Optimizer® (EO). EO enables companies to accurately model their entire business and to optimize planning to a financial outcome.

LIMITATIONS OF ABC-BASED PREDICTIVE PLANNING SYSTEMS

The most advanced Predictive Planning systems are built on ABC principles, including the latest innovations such as Time-Driven ABC⁽¹⁾. These systems are deterministic. They model activities, resources and financials to build an *approximation* of a business through a pre-determined sequence of events. When a scenario is entered, Predictive Planning systems use goal-seeking capabilities (i.e., Monte-Carlo simulation) to find the scenario with the best impact on costs and profits given the pre-determined structure.

Predictive Planning is useful for estimating the expected costs and profits associated with individual products or customers *given a predefined set of resources and assuming the flow of events and key variables not modeled will behave as they have in the past*. These systems enable companies to conduct financial planning, identify unprofitable products and customers, establish appropriate prices that cover full costs to serve, negotiate contracts and identify cost reduction targets, such as areas with un-utilized capacity. They allow users to assess “what-if” scenarios by projecting assumptions forward and modeling their impact on company financials.

However, most companies are complex enough that using Predictive Planning systems significantly undermines their ability to realize their full potential. Predictive Planning provides only a limited view of performance and opportunities, leaving executives with many unanswered questions as exemplified in the following statements:

- “We sold more of our most profitable product yet made less profits”
- “We added a large new customer and should have made money according to our [Predictive Planning] models, yet we lost money”
- “Our company expanded capacity expecting to reduce our costs per unit, yet they went up and our profits decreased”

Performance management is a difficult task under these circumstances. CFOs cannot understand the top profit drivers and therefore they are less confident of their financial performance commitments. ***Under this scenario visibility is poor; the CFO is therefore at risk of not meeting financial projections and cannot properly anticipate problems.***

The examples above reflect the limitations in decision making when using the current ABC-based Predictive Planning systems: ***Predictive Planning systems do not accurately represent reality.*** While there is accurate information on costs and profits in a *given past period*, this information is no longer accurate when evaluating *forward-looking* scenarios. Predictive Planning systems *cannot model processes and constraints* and therefore are unable to model all the variables that impact business decisions and their inter-dependencies. This limitation is apparent in the following areas:

1. ***Input materials costs and availability.*** In most cases input consumption and costs (e.g., raw materials, energy, salaries & commissions, etc.) are non-linear at different levels of output or activity. Consumption of resources comes in “batches,” such as adding a shift or purchasing raw materials in thousands of units at a time. The quality of inputs often declines with consumption, but at a non-linear rate.
2. ***Process flow.*** Often a process flow yields by-products (e.g. emissions) and other “off-grade” materials. These materials are then re-used as inputs into processes either upstream or downstream, sold for revenue, or disposed of at a significant cost. The economic impact due to the market and environmental consequences of these flows can significantly affect an enterprise’s profitability. Production, logistics, and inventory impose constraints, such as production sequencing and maximum inventory days.

3. **Resource productivity.** Resource productivity often has a peak, such as a machine operating at a “sweet spot” or labor reaching optimal level of productivity. Going past the peak often means resources become too strained. Commissioning new personnel or machines implies lower initial productivity and higher efficiency over time.
4. **Customer demand and end-product prices.** Customer demand sometimes depends on competitive actions and moves in non-linear ways. The end product prices exhibit non-linear elasticity curves. Prices are never static.

The deterministic nature of Predictive Planning models means that running scenarios that require changes in the model take many hours if not days. Because they follow deterministic flows and because they cannot properly consider all process metrics and constraints, **Predictive Planning systems cannot find the optimal course of action across multiple, interdependent options.**

Decisions are made based on an estimated outcome that assumes every variable that is not modeled behaves exactly in the same way as it did in the past. Answers can be wrong by over 100%! It is even more damaging that company executives do not understand their true profit drivers and the impact they have on their business.

While companies that have deployed Predictive Planning systems will get returns, the returns could be much higher. The maximum value is realized by utilizing the Enterprise Planning & Optimization approach.

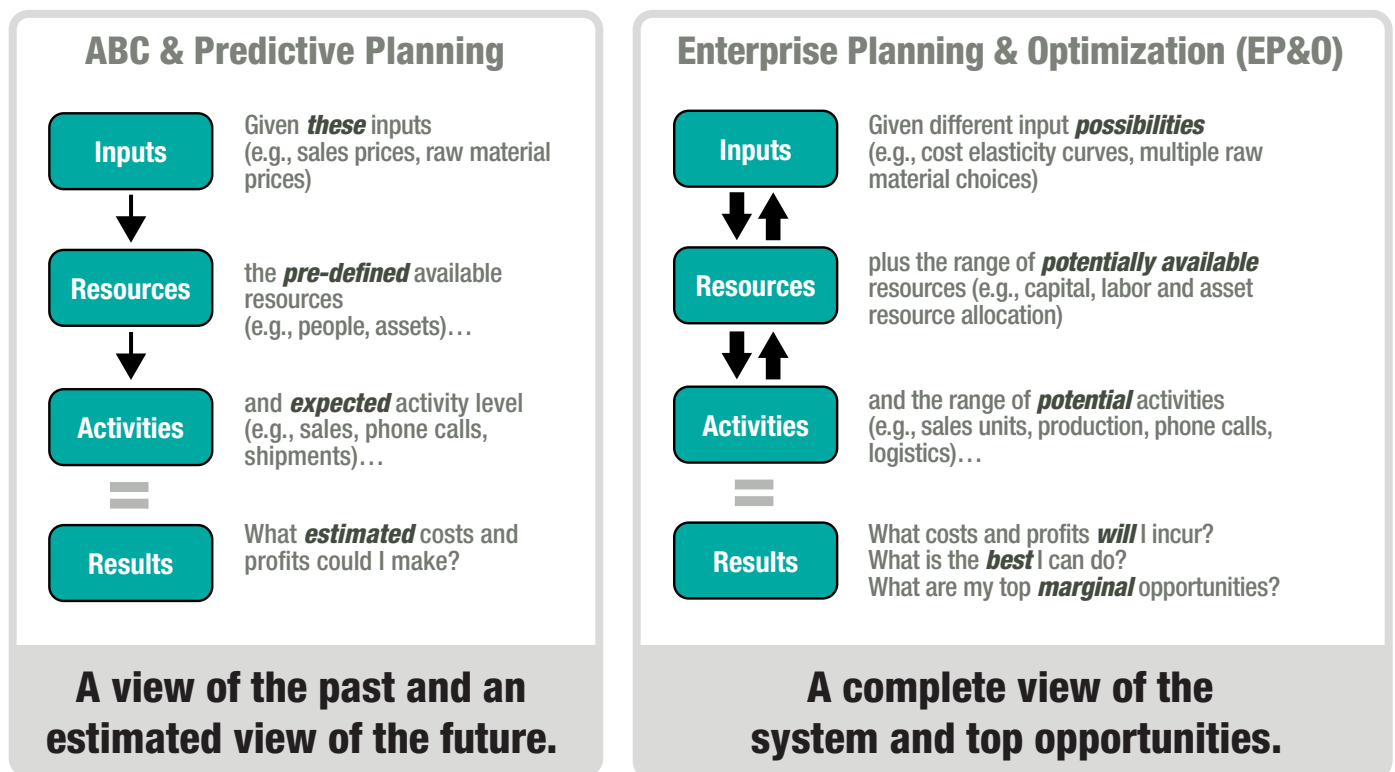
THE NEED FOR ENTERPRISE PLANNING & OPTIMIZATION (EP&O)

Companies should move towards a more comprehensive system that allows managers to identify the decisions with the best strategic and financial impact to the company. An Enterprise Planning & Optimization system incorporates ABC, constraint-oriented process modeling and comprehensive financial modeling to provide an enterprise-wide view of the business that supports all the important strategic and tactical decisions. Key capabilities of this system include:

- **Financial planning** that validates to a past period with audit-quality while projecting full financial statements forward
- **Operational & financial metrics** as well as business constraints considered simultaneously in the same model
- **A system-wide view of the business** that considers all variables and inter-dependencies, including suppliers, channel partners, and customers as required
- Full costs and profits calculated using **ABC methodologies** (e.g., pull, time-driven)

- **Marginal opportunities** calculated including all variables, (e.g., input costs, resource productivity, etc.) and taking into account all business constraints and inter-dependencies to yield an accurate measure of “what would happen with the next unit of work, product or the next customer”
- **Balance sheet and cash flow impact** of decisions properly included as part of the decision
- **New opportunities** quantified taking into account all existing commitments and constraints, including opportunity costs
- **Optimization** used to find the “best a business can do in a given scenario.” Objective functions can be financial, operational or key ratio metrics
- **Rapid scenario analysis** results in “what-if” scenarios that can be structured and evaluated in minutes

The graph below illustrates the capabilities of each approach:



Enterprise Planning & Optimization is a much more robust system that cuts across company silos to identify the best company-wide decisions. A fully optimized company is able to make the following types of decisions which are perfectly aligned with each other and with the company’s financial and strategic opportunities:

FINANCE

- What should our profit targets be for the quarter and year?
- Which investments and budgets best support our targets?
- Which metrics should we use to set targets? What are the implications?
- What is the impact of changes in supply costs, product demand, new regulations and competitor pricing on our P&L? What should we do as a result?
- What should our future business model be? Should we acquire/merge with another firm?

BUSINESS UNITS

- Given our targets and the market conditions, which products and customer segments should we emphasize?
- Where are our best profit improvement opportunities? Should we change our pricing, marketing messaging, sales coverage model or channel incentives?
- Where do we best allocate R&D dollars?

OPERATIONS

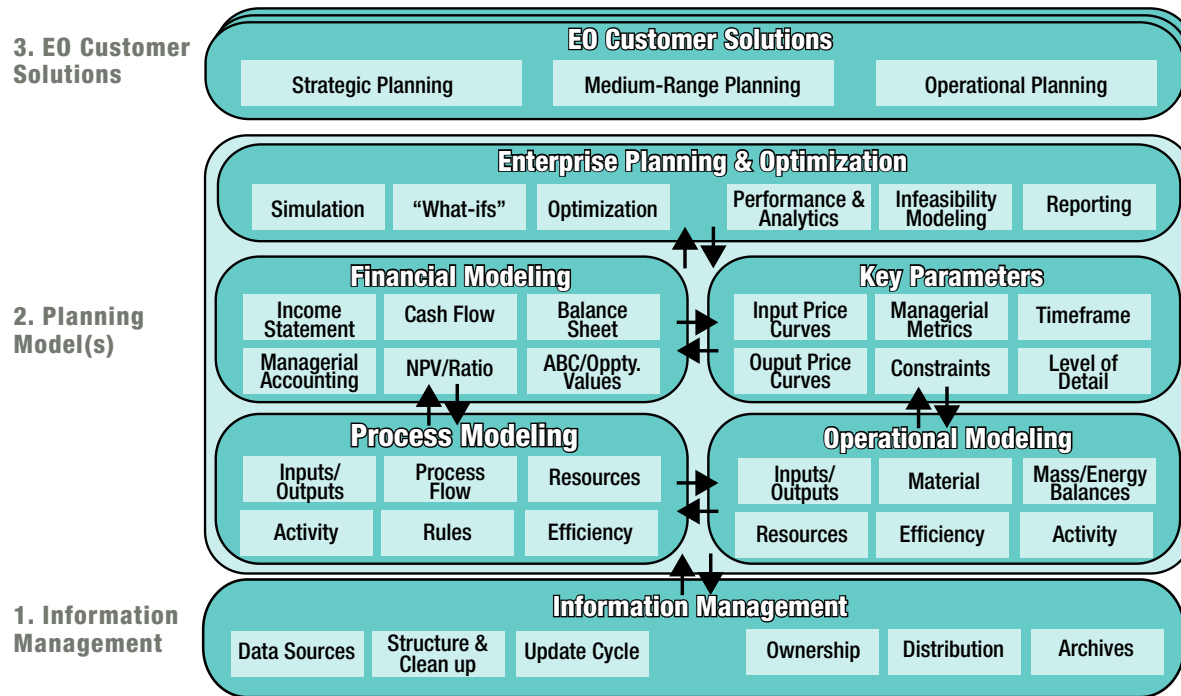
- What should our long-term capacity be? Which resources are the highest priority for investment in the short-term? Should we open/close any facilities?
- What are the procurement, order allocation, distribution model and inventory strategy policies that would maximize our profitability and flexibility while maintaining existing commitments?
- What is the optimal production and shift-scheduling plan?

Implementing an Enterprise Planning & Optimization system can lead to significant improvement in performance. Companies that have deployed such a system enterprise-wide have seen as much as a 400% improvement in profits. ***Unlike other systems, the first wins can be gained in as little as three months.***

RIVER LOGIC'S ENTERPRISE OPTIMIZER® (EO), THE LEADER IN ENTERPRISE PLANNING & OPTIMIZATION

Enterprise Optimizer® (EO) radically changes the way companies make planning decisions at the strategic, medium-range/detailed and operational planning levels because they can now find the optimal path at every level of decision. EO combines enterprise-wide process, constraint and financial modeling simultaneously to provide the most accurate representation of costs, profits and balance sheet metrics as they are incurred by a business.

The graph **on the next page** illustrates a typical EO solution.



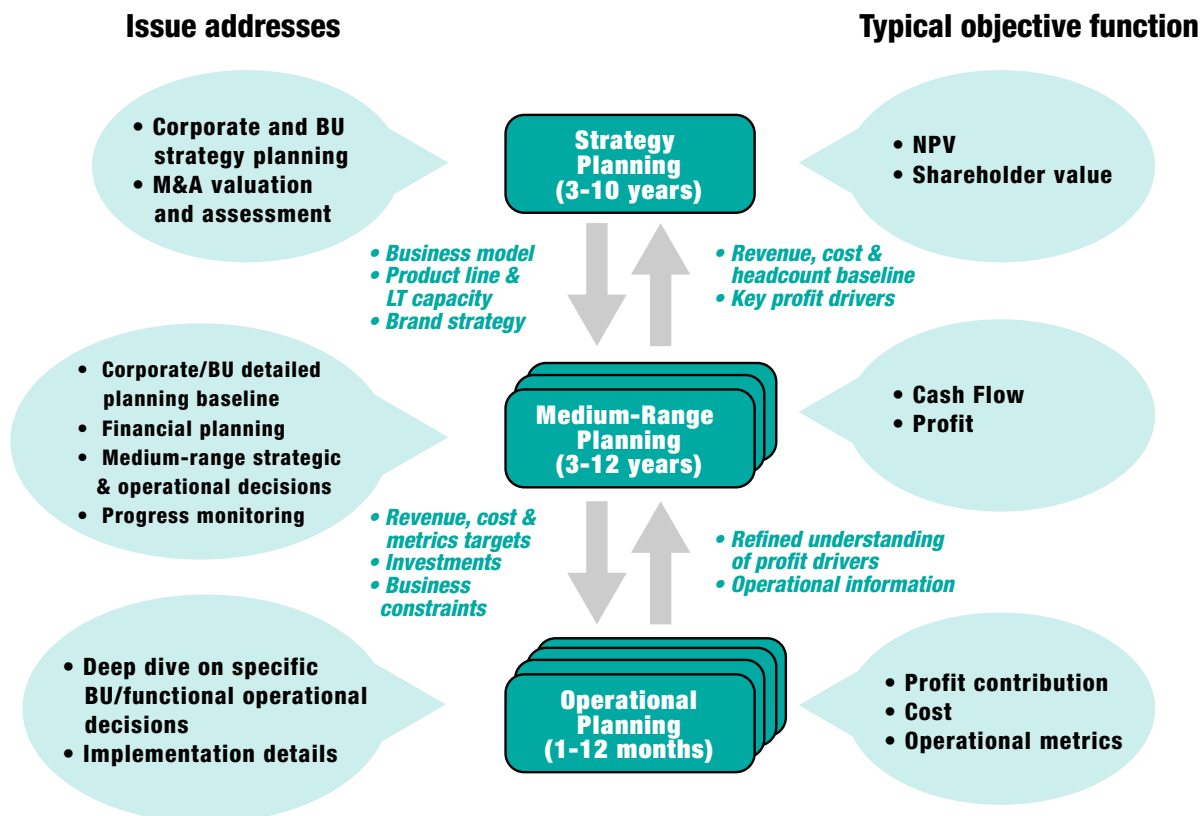
An EO Enterprise Planning & Optimization system has three primary components:

1. **Information Management:** This component ensures the data fed into the system is clean, accurate, from the right source and refreshed at the appropriate intervals depending on the planning decisions made. Data from any system is adequate including ERP, data warehouses, desktop applications and the web. This module also manages the distribution of results and past performance and analyses to identify and manage trends, impact of past decisions, etc.
2. **Planning Model(s):** The model is the core engine of the system and it has two primary components:
 - a. **Financial, Operational & Process Modeling and Key Parameters.** These components enable the users to set the key parameters of the system and to model any process, operations and financials simultaneously. Planning models are usually validated in whole or partially against a past time period. It is important to highlight that, while they are part of one simultaneous solution, each component is independent of the others. This means the user does not need all three to use the system. For example, some planning decisions might only require operational modeling such as a simpler truck-loading planning system.
 - i. Process modeling includes any type of process including those that are purely digital. Examples include product design, IT services, customer billing and order management
 - ii. Operational modeling includes any physical operation such as manufacturing, logistics, purchasing and inventory management
 - iii. Financial modeling includes P&L, balance sheet and cash flow statements as well as NPV and core financial ratios

- iv. Key parameters enable users to establish the core design inputs for the model, such as the time frame (e.g., how many time periods? How long?), the level of detail required, the pricing scales or elasticity curves, key managerial metrics (i.e., market share) and constraints (e.g., physical, regulatory, financial, managerial)
- b. **Enterprise Planning & Optimization** enables the user to find the optimal plan, implement feasible decisions and analyze performance. The system has a series of capabilities that include:
- i. Forward-looking **Simulations** that project a scenario forward to understand the impact of the situation on performance
 - ii. **“What-if”** scenario analysis evaluates the impact of changes to the model, such as new product introductions or open/close decisions
 - iii. **Optimization** finds the best solution for any given scenario and provides a clear view of marginal opportunities by evaluating the net value to the company of an additional unit sold, an extra customer of a given type or an extra hour of a resource while taking into account all marginal and opportunity costs
 - iv. **Performance & Analytics** dives deep into the drivers to identify the core drivers of past and future performance
 - v. **Infeasibility Modeling** identifies scenarios that are not feasible under “hard” or “soft” constraint situations and provides the “next best alternative” to the modeled scenarios when “hard” constraints are present
 - vi. **Reporting** produces any type of performance report required ranging from purely financial reporting—useful for auditing and financial planning—to detailed costing and opportunity cost assessments
3. **EO Customer Solutions:** The solutions enable management and key users to interact with the system directly, quickly and with minimal IT support. EO supports a variety of dashboard and data visualization products that make definition and analysis of scenarios very easy, requiring no formulas or complicated coding. There are three types of solutions:
- a. **Strategic Planning.** This solution enables CFOs and VPs of Strategy to drive the long-term strategic planning process. The objective functions are typically cash flow, profit, NPV or a measure of shareholder return. The solution covers enough financial and operational detail over a multiple-year timeframe to represent the major strategic alternatives and to accurately quantify and optimize the outcome of each scenario. Firms will often model an entire industry or value chain in search for the best strategy. Sample strategic planning scenarios include analysis of alternative business models, value-chain re-engineering, company transformation /restructuring plans, long-term capacity and M&A.

- b. **Medium-Range Planning** solutions enable corporate and/or business unit CFOs and management teams to drive more detailed planning, typically with a horizon of 3-12 months. These solutions track full financials, all major processes & operations as well as important business constraints. Companies typically optimize medium-range planning for operating, net profit or cash flow. The model validates to a past period and produces a financial and operational baseline for planning & forecasting. Management can then conduct simulation, “what-if”, optimization and other analyses to find the best medium-range plan given the company’s strategic objectives. Sample analyses include product & customer portfolio, strategic pricing, supply chain optimization, process redesign and capital expenditure allocation.
- c. **Operational Planning** solutions enable planning and business unit/functional managers to optimize operational decisions. The objective function is typically profit contribution, but can also be cost minimization or a process metric that acts as a proxy for financials (as in a truck-loading model, for example). These solutions typically cover shorter-time frames than Medium-Range Planning solutions and include finer detail such as individual resources, customers and SKUs. They address decisions such as production allocation, bid support, workflow/process optimization, shift scheduling or staffing and production sequencing.

EO Customer Solutions



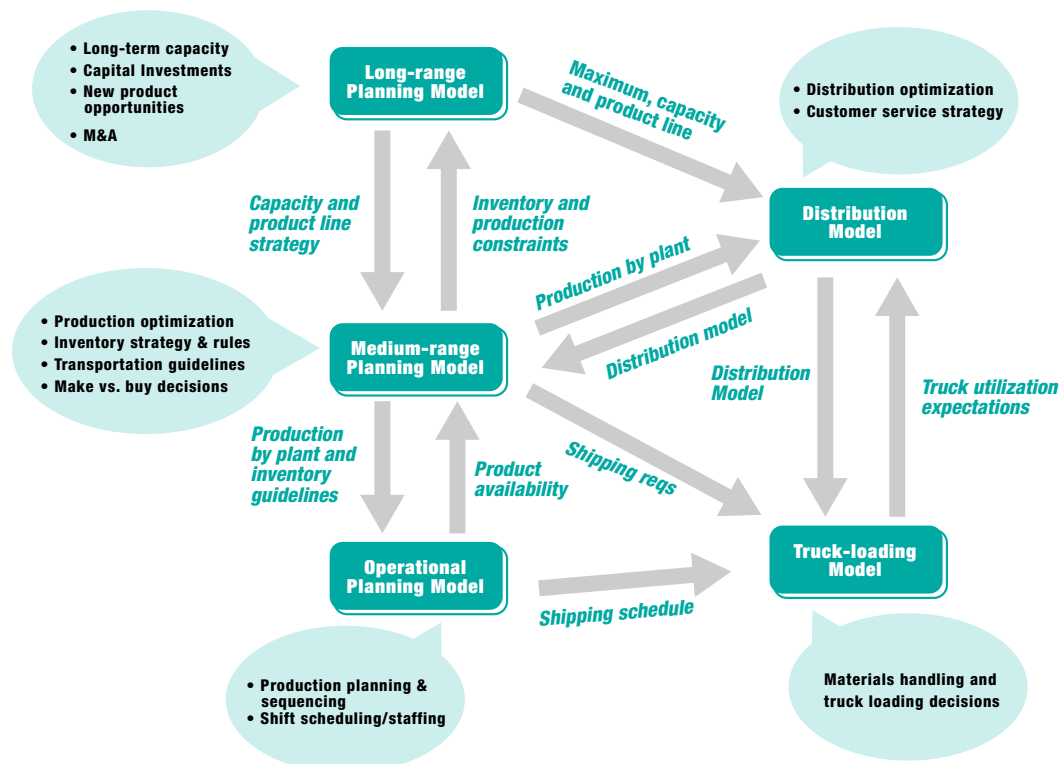
A CPG CASE EXAMPLE

A \$1 billion revenue CPG company has deployed five EO models to optimize enterprise planning at the strategic, tactical and operational levels. Despite several investments in profit modeling tools, business intelligence systems and supply chain management solutions, management had been unable to answer their most important business questions:

- How to maximize profitability of the product portfolio?
- Where to add or subtract capacity to maximize ROIC and profits? (e.g., plants, production lines, distribution centers, etc.)
- Which customers to serve and how?
- What manufacturing plants to make which products?
- Which inventory strategy to yield the highest cash flow and profits while maintaining product availability and quality guidelines?
- How to maximize logistics efficiencies to maximize overall profits?
- Which production and shift-staffing schedule to maximize profitability?

Three of the models enable the company to build a holistic plan of the business by focusing on strategic, tactical and operational requirements through system-wide modeling of operations and finance. Two additional models address distribution and logistics issues within the boundaries set by the strategic and tactical models.

CPG Company's EO Enterprise Planning & Optimization System:



The company has realized tremendous benefits from its EO investment, including better decisions and monetary returns. More importantly, the insights derived from working on the EO models have led to new and improved ways of managing the business. ***Based on the impact from these models, this company has already achieved an ROI of 2,000% on its total EO investment.***

The VP of Planning commented:

“As our business grows it becomes more and more challenging for us to ensure we have an optimized supply chain. The sheer magnitude of all the variables and options make it very time consuming and tedious to determine which combination of options will yield the greatest net income.

For many years I have been looking for, and dreaming of, an optimization tool that would allow us to model our business and solve for the optimal solution. EO is meeting that need. We are finding that ‘if you can model it, EO can optimize it’.

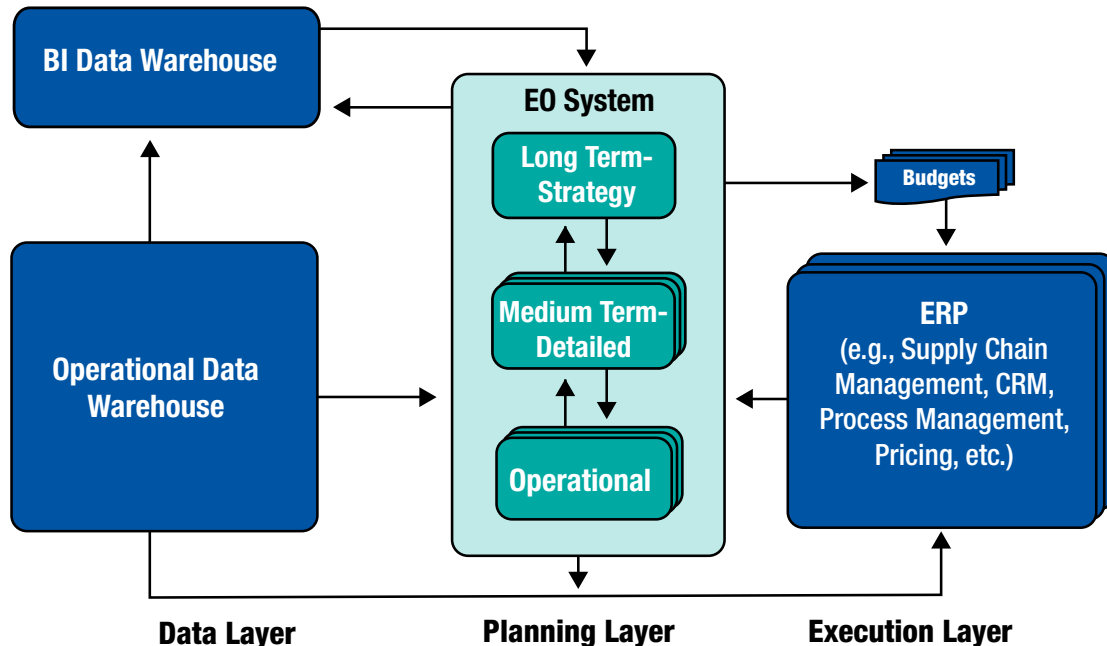
Today we are using EO for big strategic decisions (where should we add capacity) all the way down to very tactical decisions (what product should we produce on a specific day, line and shift). To date, every opportunity where we have built and applied an EO model it has given us a better solution.”

EO Enterprise Planning & Optimization within a Company’s IT Infrastructure

EO does not replace a company’s IT investments. Instead, EO increases the value in two ways. First, EO dramatically increases the value of the data produced through its powerful analyses. Second, EO leverages its reach in the organization to facilitate communications throughout the company.

Below is a simplified view of an EO Enterprise Planning & Optimization system IT architecture. The EO system which includes a single application that can be run on a laptop takes data from any system, including ERP, business intelligence solutions, data warehouses and Microsoft products. The EO-based planning system analyzes the data to provide the right strategic, medium term/detailed and operational planning decisions. The planning results in budgets and execution direction ensuring strategy and execution are aligned and that the strategic, detail and operational plans are optimized to financial outcomes.

Holistic Enterprise Planning & Optimization System



In summary, the EO Enterprise Planning & Optimization system is unique and valuable for companies as well as their consultant advisors because:

- 1) EO models processes/operations, constraints and financials simultaneously to create an accurate representation of costs, profits and balance sheet metrics as incurred by a business.
- 2) EO scales to complex and enterprise-wide solutions including interactions between different activities, all within the same system therefore providing the most accurate operational and financial impact of planning decisions.
- 3) EO provides the broadest set of Enterprise Planning & Optimization analyses in the market. For example, it optimizes for any financial metric (e.g., profit, cash flow, ROIC) or operational variable (e.g., throughput, inventory days). EO can even optimize taking into account a unit/pricing forecast or a non-linear elasticity curve, often revealing possibilities that wouldn't/couldn't have been considered.
- 4) EO's artificial intelligence components enable companies to build the core Planning Model(s) without writing any formulas, coding or mathematical equations. Therefore, the time to value is really fast and low-cost, the risk of error is minimal and users learn to interact with the system very quickly.
- 5) Moving from decision to execution is simpler. EO creates a fact-based roadmap to execution by reporting all the required information such as Time-driven ABC, marginal costs & profits, opportunity costs, key performance indicator and operational metrics.

With EO, companies can optimize their planning and decision-making by identifying the best combination of enterprise-wide strategic, tactical and operational decisions. EO links decisions to implementation for fast, accurate monitoring, enabling strong visibility, better predictability and an ability to anticipate and address problems early.

Executives now have the opportunity to take their companies' financial performance to a new, higher level through the unprecedented power of EO's Enterprise Planning & Optimization system.

CONCLUSION

Today as companies operate in increasingly complex and fast-changing markets, the need to maximize overall financial performance to enhance profitability has never been greater. EO, River Logic's Enterprise Planning & Optimization solution, integrates constraint-oriented process modeling with ABC and comprehensive financial modeling to provide an accurate, system-wide view of costs, profits and balance sheet metrics as they are incurred by the business.

Successfully modeling and implementing strategic and tactical decisions in such a system requires cross-functional collaboration to structure and interpret the results of the analyses. It's important that Executive Management fully embrace the Enterprise Planning & Optimization approach because it's likely that company silos will be resistant to this significant change.

This evolution in business planning allows organizations to quickly identify and quantify the decisions that have the greatest impact on their financial performance at strategic, tactical, and operational levels.

For the CFO who is seeking the best solution to drive stronger and more strategic planning while managing the business to financials, EO is the only true Enterprise Planning and Optimization system which provides strong visibility and predictability of financial performance.

Footnotes:

(1) Robert Kaplan and Steven Anderson, Time-Driven Activity Based Costing, Harvard Business Review, November 2004

(2) Gartner (January 2004), Drivers and Challenges of Corporate Performance Management,

"The key to breaking reliance on a fixed budgeting and planning cycle is to move to a predictive model in which managers can quickly revise forecast and their likely performance."

(3) Morrissey, P., Beyers, T. (2007), "The Global Advancement of Enterprise Performance Management.

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