

The Efficient Frontier Technique for Analyzing Project Portfolio Management

A UMT White Paper
Nov 2003

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IN BRIEF

Constrained by finite budgets, staff, and other resources, companies are continually faced with the issue of deciding where to invest money and effort to deliver the most value to the business. With millions of dollars in project investments at companies each year, it makes sense to treat these significant investment decisions in a manner similar to how a fund manager determines a portfolio of stocks.

What does an “optimized” portfolio really mean? How optimized are your project portfolio investments? Most IT portfolios fail to employ even the most basic optimization techniques in favor of simpler methods. The article asks the C level executives to consider a readily available and easy to use methodology for portfolio performance optimization. It offers a first guide to treat portfolio optimization as an economic computation.

It naturally follows to adapt concepts from Economics, particularly Harry Markowitz’s Nobel Prize winning Efficient Frontier and Modern Portfolio theory. Although the Efficient Frontier uses a few advanced portfolio optimization programs, it should not be seen merely as a computing procedure but as an economist’s way of thinking about investing in projects.

WHY DOES THE EFFICIENT FRONTIER MATTER?

Research suggests that in the United States, 40 percent of Information Technology investments fail to deliver their intended results¹. Recent estimates indicate that \$2.3 trillion is spent on projects in the United States, yet the Meta Group suggests that:

- 84% of companies either do not conduct business cases for any of their IT projects, or perform them only on select, key projects
- 89% of companies are flying blind, with virtually no metrics in place except for finance

¹ TechRepublic and Ted Smith, IT Project Management Research Findings (Louisville, KY: TechRepublic 2000).

- 84% of companies are unable to adjust and realign their budgets with business needs more than once or twice a year

The result? Close to \$1 trillion dollars in underperforming investments. Not only is the spending huge, but it is typically poorly managed in a fragmented manner, using project focused rather than portfolio focused methods. The majority of companies simply do not employ a portfolio management strategy.

MOVE ALL YOUR PROJECT PORTFOLIOS ON TO THE EFFICIENT FRONTIER

The Efficient Frontier is a fundamental scientific method – a method that is extremely effective in visually summarizing the information required to understand all of the portfolio possibilities, the cost tradeoffs, and the factors that affect the efficiency of the portfolio

Companies make capital investments to exploit opportunities and create value, so any opportunity to save money and create value is clear and sensible. However, only using the net present value approach to make investment selections is not sufficient or plausible for portfolio level decisions. This understanding leads us to modern portfolio economics and the adaptation of a powerful investment theory tool – the Efficient Frontier.

Every field has its own language and its own way of thinking. While, physicists talk about motion, forces, energy, etc, they learn and analyze nature using the language of mathematics. Portfolio management is no different. When the ideas of Portfolio Management are expressed in economic and mathematical terms they are easier to understand and verify. Most economic models are built using the tools of mathematics. Efficient Frontiers, alignment, resource scarcity, capacity, waste – these terms are part of the Portfolio Management language.

The Efficient Frontier is a fundamental scientific method – a method that is extremely effective in visually summarizing the information required to understand all of the portfolio possibilities, the cost tradeoffs, and the factors that affect the efficiency of the portfolio. Furthermore, this method allows stakeholders to organize, explore, search and select the optimum Portfolio.

The Efficient Frontier answers three key Portfolio Management questions:

- What are the best possibilities of projects that an organization can implement given the available budget and organizational capabilities?
- Are we getting the best from our potential portfolio of projects? If not, why are we not getting the most from our investment portfolios?
- Are we over-investing in IT?

Note that these same questions are usually asked by CEOs, COOs, and CFOs. With analysts and the board increasingly challenging the CEO to translate investments into bottom line results, it is natural that he/she may question the

value of IT and the soundness of the decision making involved in selecting where to invest. This leaves the CIO and his team under scrutiny, challenged to justify the value and method of IT investment decisions.

The Efficient Frontier helps managers and executives from the IT and the business sides of an organization to understand the tradeoffs between portfolio value and cost. It is an applied economics method that shows how companies manage its scarce resources, specifically it will help:

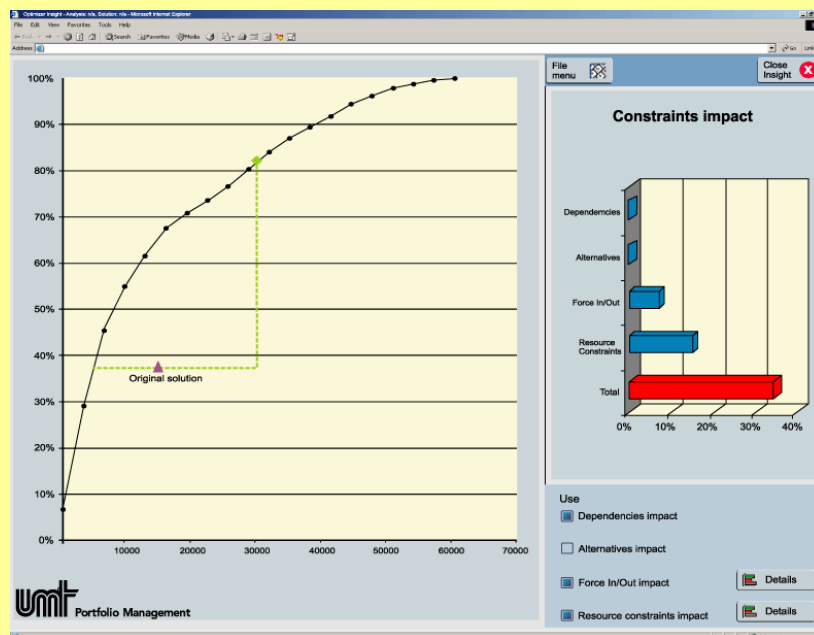
- To understand the concept of "scarcity" and its consequences.
- To understand "value and cost" and its graphical presentation.
- To understand the concepts of and relationships between value, cost and current operating practices.
- To understand "breaking the constraints" and its influence on the Efficient Frontier.

Applying the Efficient Frontier to Portfolio Selection

The Efficient Frontier curve shows all of the best possible combinations of project portfolios and the value that can be created with available capital resources in an unconstrained mode. In this example, the cumulative business value or discounted cash flows are on the vertical axis and available budgets are on the horizontal axis. The vertical value measures the value of the opportunity based on the impact and alignment with business drivers.

The Efficient Frontier

The company can select a portfolio of projects on or under the Efficient Frontier. Portfolios along the curve are said to be efficient because the company is getting the maximum value from the available budget. Points under the Efficient Frontier curve represent inefficient portfolios.



The Efficient Frontier allows us to understand the value that is destroyed by each constraint (ie. Labor Demand vs. Supply, lack of efficient alternatives, lack of consensus etc).

As we move from left to right, the quantity of cost increases while the value increases. This illustrates an important point: When a company is employing all available resources, it faces a tradeoff. The only way it can have more value is by using capital.

Any point above the Efficient Frontier is not possible. The company can select a portfolio of projects on or under the Efficient Frontier. Portfolios along the curve are said to be efficient because the company is getting the maximum value from the available budget. Points under the Efficient Frontier curve represent inefficient portfolios. Many reasons cause a portfolio to be under the curve including forcing in too many low value projects or a significant mismatch between supply and demand of skill competencies, leaving the portfolio to yield less than it could have from the available budget. This brings us to an important lesson: Any factor that moves the portfolio's position away from the Efficient Frontier should be challenged.

Another important outcome from Efficient Frontier modeling is the opportunity cost. The Efficient Frontier shows the opportunity cost of investing an additional dollar versus the additional value received. When the company is discovering the most valuable projects for the investment – those with the highest value/cost ratios - the Efficient Frontier is quite steep (ex. when the company plotted above uses \$15 million, which is 21% of the budget, and gets 70% of the possible value). In contrast, when there are very few valuable projects left – those with the worst value/cost relations - the Efficient Frontier curve is quite flat (ex. when the company plotted above invests from \$35 million until \$70 million, 50% of the budget only yields an additional 15% of the possible value). So we see in this case that investing the first 21% of the available budget on the projects with the highest value/cost ratio provides 70% of the possible business value, whereas spending the last 50% of the available budget on projects with a lower value/cost ratio can only deliver an additional 15% of value.

Conclusion

The Efficient Frontier simplifies a complex Portfolio Management problem to highlight and clarify some basic questions: scarcity, efficiency, tradeoffs, opportunity cost and the value of breaking the constraints. It offers a simple way of thinking about investment decisions, discovering ways to increase the efficiency of portfolio investments, and avoiding investment in regions of diminishing returns.

Both the business and IT sides of an organization should get comfortable with Efficient Frontier thinking and analysis. The single most important purpose of this paper is to help you learn the economic ways of thinking that are applied to portfolio management. We have covered a balanced approach to applying the model based on both theoretical foundations and practical applications. Because of the mathematical foundation of the Efficient Frontier model, our experience shows that this approach together with a set of tools like UMT Portfolio Management are required to help you maximize the value of your investment immediately.

Our experience shows that organizations that used Efficient Frontier principles together with accurate portfolio valuation are able to reduce waste or increase value creation opportunity by 20% to 40%.

Of course, the Efficient Frontier is just one critical part of a successful portfolio management program. Keep in mind that the key prerequisites for success in using the Efficient Frontier are the ability to translate the business strategy into business drivers, rank and weight the drivers, identify the quantifiable impact that the projects will have on the business drivers, and derive the potential value created by the projects. At that point you can use the Efficient Frontier framework to further understand and remove constraints and to optimize labor supply and demand.

This rational approach helps to break the traditional wall between the IT and business sides and improves the way people interact with one another and make decisions.



Dec 2003
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