

The Efficient Frontier Technique for Analyzing Project Portfolio Management

(extract from the book *Project Portfolio Management* by Harvey A. Levine, chapter 4.4 by Mike Gruia)

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 funds 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.

This approach draws on 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.

Move All Project Portfolios on to the Efficient Frontier

Companies make capital investments to exploit opportunities and create value, so any opportunity to save money and create value is clear and sensible. However, using only the net present value approach to make investment selection 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.

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 that is extremely effective in visually summarizing the information required to understand all of the portfolio possibilities, the cost trade-offs, 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 Frontiers answers three key portfolio management questions:

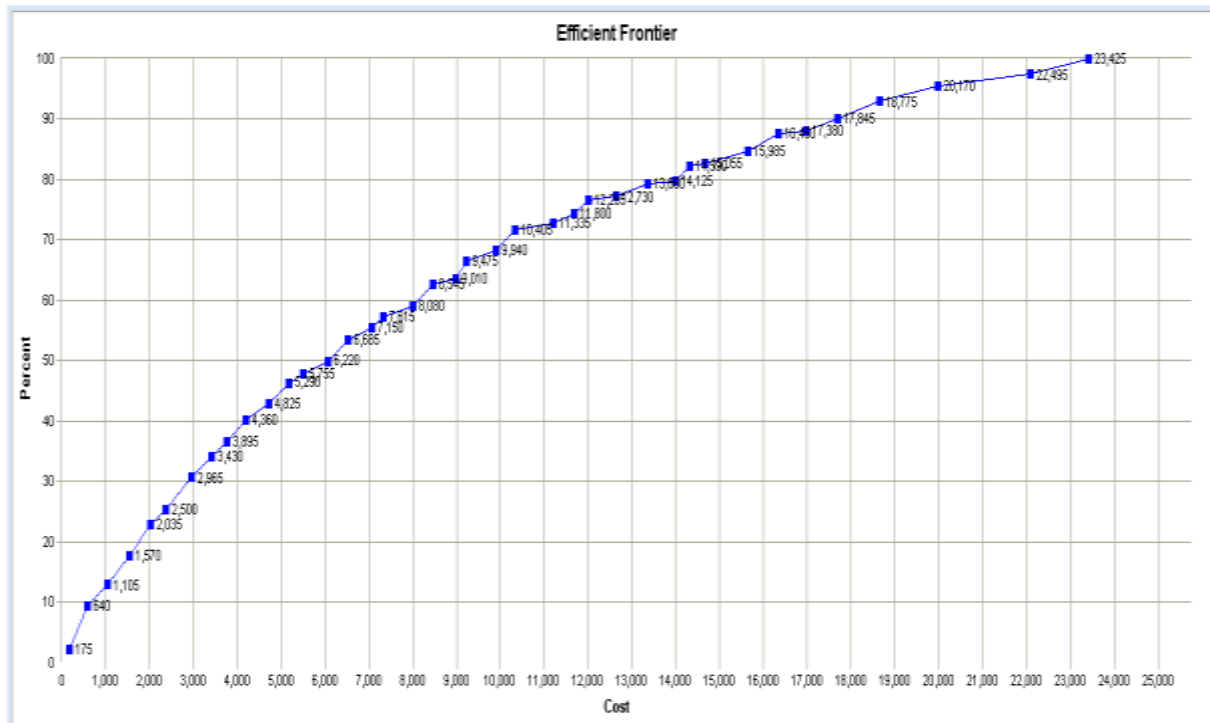
- What are the best possibilities of projects that an organization can implement given the available budget and organization capabilities?
- Are we getting the best from our potential portfolio of projects? If not, why are we not getting the most from our investment portfolios?
- Are we overinvesting?

The Efficient Frontier helps managers and executives from the IT and the business sides of an organization understand the trade-offs between portfolio value and cost. It is an applied economics method that shows how companies manage their scarce resources. Specifically it will help in understanding the following:

- The concepts of scarcity and its consequences
- The concept of value and cost and its graphical presentation
- The concepts of and relationship between value, cost and current operating practices
- 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 combination of project portfolios and the value than can be created with available capital resources in an unconstrained mode. In the example below, the cumulative business values 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.



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 trade-off. 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 fact 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 of the investment – those with the highest value/cost ratios—the Efficient Frontier is quite steep. In contrast, when there are very few valuable projects left—those with the worst value-to-cost relations—the Efficient Frontier curve is quite flat.

Conclusion – Efficient Frontier

The Efficient Frontier simplifies a complex portfolio management problem to highlight and clarify some basic questions: scarcity, efficiency, trade-offs, 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.

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 it are the ability to translate 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.