# A Single Comparative Measure for Decision Support in Project and Portfolio Management [1]

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## Introduction

Imagine that in your portfolio management system, you have an invisible assistant: an AI-enabled module that collects data from various sources, forecasts the outcomes of your portfolio, and evaluates the impact of alternative methods and decisions that you could implement—all in real time. Wouldn't that be a true Decision Support System?

But an important condition for such a system to work is the existence of a way of evaluating alternative methods and decisions.

In a LinkedIn discussion, Bill Duncan asked what exactly does better project management mean, and how can it be measured. If we answer this "Better-PM" question, we will provide a necessary component for Decision Support Systems in project and portfolio management.

Project management is a discipline that is "evolving" rapidly, and this implies improvement. However, if we have no means to identify and measure the impact of one method, principle, or decision compared to others, how can we claim that they are better in a specific context? How do we direct our efforts if we have no compass? How do we avoid favoring isolated effects that often have more to do with personal preferences or established conventions than with the fundamental role of projects?

Until we start answering these questions, many discussions in the project management community will continue to resemble scholastic disputes.

But that's not the point. What's more important is that project management will continue to evolve on the principle of local "improvements" that "inevitably" lead to global improvements in "project success," no matter how success is defined. Decision Support Systems will either be tools for "more of the same" or be involved in endless "great" local optimizations.

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This article addresses the issue of measuring improved project and portfolio management from a systemic and holistic perspective and proposes a specific Better-PM metric for this purpose: **avoided systemic waste**.

The article is divided into two parts. The first part justifies the Better-PM metric, and the second demonstrates its use in portfolio optimization.

## Part 1 - Conceptual Measure

## The Two Views

Let's start by introducing two major perspectives on project management, because they approach the issue differently.

The **delivery-centered view** considers project management primarily as a delivery discipline. According to this perspective, projects have always existed and always will exist. That is, projects are a natural, objectively existing phenomenon, and the task of project management is to manage them efficiently and in accordance with their goals. Good project management provides benefits to the wider environment (system) within which they are implemented or which they affect. But projects themselves have separate, autonomous project-specific goals, determined in each specific case by the stakeholders.

According to the **system-value view**, projects are a means to improve the overall value-creating system and ultimately to increase the net value created by the system. By design, they have no independent role beyond their contribution to achieving the system's goal (but may have externalities). Projects have project-specific (scope-specific) immediate objectives, but they do not have project-specific goals. Their goals stem directly from the goals of the overall value-creating systems they serve. Other stakeholder expectations are not ignored, but, like legal and ethical requirements, are considered guardrails.

*What would measuring better project management look like from these perspectives?*

Proponents of the delivery-centered view would argue that better project management means more efficient execution (more efficient use of resources) and better achievement of project goals. And since in this world project goals are very diverse, the measures of better management would be very diverse and strictly contextual. The famous motto “it depends” disarms all other arguments. The effect for the project portfolio is that often, project goals cannot be aggregated and can be in conflict.

For those who hold a system-value view, the task seems easier, or at least simpler, because they are freed from the individualism of individual projects. Others would say that they are simply avoiding responsibility or ignoring "project interests." For systems actors, it is sufficient to measure better project and portfolio management by their contribution to achieving the goal of the overall system. Not "the interests of the specific are subordinate to the interests of the common," but rather "projects do not have independent goals; goals are realized at the level of the overall system."

Since measuring better project management from a delivery-centered perspective is an overwhelming task for the author (and the "it depends" argument would make his efforts meaningless), he will focus on the context of a system-value view. But in fact, the proposed approach applies even to isolated and self-sufficient projects, as each project is a system in itself.

## If We Could Compare… Just Two Numbers

If we could measure the progress towards the goal of a system with a single number, then things would be very simple. The difference between the contribution of a project or portfolio to the system's goal when applying method/decision A and the contribution when applying method/decision B, C, etc., will show whether management of type A is better and by how much.

We can directly use a single number if the system has fixed resources (including project resources) and only one quantifiable goal. In any case, resources must be taken into account, since decisions about their use in one way or another affect the achievement of the goals of the system.

Let's consider the aspects of resources and goals separately.

*Resources and Profit*

Open systems, such as business and social systems, do not have fixed resources, but we can assume that resources are fixed in the short term and variable in the long term.

Let us call the progress towards the system's goal "value." Then, the difference between the value and the resources invested in its creation is "net value" or "profit." Here, by "profit" we mean the net contribution of the project or portfolio to achieving the system's goal, whatever that goal may be.

*Single or multiple goals*

Complex systems do not have only one goal. For example, they must reconcile the goals of survival, adaptation, and growth. This opens the door to endless options for multi-criteria evaluations, often chosen without clear justification.

However, improving project management cannot be measured by arbitrary, contradictory, and subjective criteria that constantly “adapt” to “changing conditions.” It's better to have one imperfect but consistent criterion than a practical lack of criteria.

Given multiple goals, there are several approaches by which we can measure them with a single numerical metric.

1. **Integrative indices**

Through normalization and weighting, different goals are measured with a common metric. A well-known example is the UN Human Development Index.

2. **Common measure**

Goals are measured by a common measure, typically a monetary unit, thus becoming comparable and can be aggregated.

3. **North Star and Guardrails**

A commonly used approach is to choose a single growth goal (the North Star), and to keep the other goals in balance through guardrails. In the context of business organizations, the growth goal is typically financial profit, while other goals, such as the existence of the organization, ethical and environmental considerations, customer satisfaction, and employee turnover, can be ensured “unconditionally” at the appropriate level.

Moreover, compromising the guardrails usually results in and can be measured in lost (unrealized) profit, so these different goals are not incompatible.

Nonprofit organizations can also use the North Star and guardrails. Progress towards the North Star (“profit”) can be measured in Value-Cost Units or Benefit-Cost Units [1]. Through them, benefits and costs are measured in the metrics of benefits, such as hours of free time or the number of lives saved.

## The Single Metric

Yes, no method for arriving at a single metric of system goals is perfect. Yes, such measurement is not always easy or accurate. However, if an organization cannot or will not measure in this way, that is not a project management problem. After all, projects are not mandatory. The option of "doing nothing" is always an option.

Yet, if an organization arrives at a single metric at least at the portfolio level, measuring better project management becomes possible.

If, when solving a project or portfolio problem, the application of Method A yields an incremental risk-adjusted profit X, and the application of Method B yields a smaller profit Y, then X-Y shows how much unrealized profit B leaves compared to that achieved by A. Of course, the method-specific costs must also be taken into account when they have different costs to apply. Also, the challenge remains of isolating the effects of the different methods.

In this case, X is the reference outcome against which the lost profit is measured. Accordingly, (X-Y)/X (%) shows the share of the unrealized profit of method B relative to the reference outcome of method A.

This absolute and relative difference can be interpreted as a **waste**—profit forgone when applying one method or decision instead of another. We are not looking for absolute superiority of one method, but superiority in context.

Therefore, better project management can be measured through **systemic waste** or through **avoided systemic waste**. Systemic waste indicates a loss of systemic efficiency—it shows the possible but unrealized progress towards achieving the goal of the system.

**Systemic Waste % = (Reference Profit – Method Profit) / Reference Profit (%)**

For comparison, the **reference profit** is the highest estimated incremental profit obtained from the application of the alternative methods or decisions considered.

The **percentage of systemic waste** was chosen as a **Better-PM measure** because it does not indicate an abstract performance gap. It indicates the unrealized potential of the system when "better project management" is not applied.

The **avoided systemic waste** is the reduction in systemic waste when one method or decision is applied instead of another.

Management maturity scales, such as CMMI, could be used to the extent that a correlation between them and systemic waste is established.

## Part 2 — Demonstration of the Better-PM Metric Through Portfolio Optimization Lab

### A Tale of Four Organizations

We will show how measuring better project and portfolio management works in practice with "A Tale of Four Organizations." Let's imagine that four organizations have the same set of potential projects, budgets, constraints, and uncertainty, yet arrive at four different "best" portfolios because they apply different allocation methods.

We will compare four methods for optimizing (allocating and reallocating) a project portfolio and will determine which of them and by how much are better in the specific context:

1. **Multi-Step Allocation (MSA)**

MSA models and upgrades the typical governance-driven allocation process commonly encountered in practice. It involves selecting projects within the available budget using a specific criterion (in this case, project profit), prioritization and sequencing based on managerial judgment, and portfolio scheduling and staging to avoid resource contention. Taking into account the time-dependent erosion of profit, MSA uses a governance heuristic to determine urgency within three urgency classes.

2. **Standard Octane (Octane)**

This method is based on *throughput contribution per unit of time of constraint usage*, Goldratt's constraint management metric [2]. Subsequently, its application in project management became popular as "Project Octane." In the context of portfolio allocation, the metric can be represented as Profit Contribution per Unit of Constraint Use (PCUCU) [3].

Projects are sorted by Octane number (PCUCU) in descending order. Selection and sequencing are determined simultaneously by this order. If necessary, a structural repair is made to the selection so that it does not include dependent projects without including prerequisite projects.

3. **Adjusted Octane (aOctane)**

aOctane is author's extension of Standard Octane designed to better account for the effects of time-dependent profit erosion and variations in budget and constrained resource consumption.

The initial selection, sequencing, and staging are inherited from Standard Octane. aOctane then attempts local optimization by swapping project positions. Project selection may change if a structural repair is necessary.

Each swap is accepted if it increases the portfolio profit at the chosen Profit Confidence Level. The increase cannot be guaranteed, as there may not be a single acceptable swap.

4. **Stochastic Combination-Permutation Algorithm (sCPA)**

This method is based on the Combination-Permutation Algorithm (CPA) for portfolio optimization [1, 3]. CPA radically changes the approach to portfolio allocation and optimization. Instead of first answering the question of WHAT to do and then the question of HOW to do it, it answers both questions **simultaneously**, since they are **inseparable**.

sCPA generates all global portfolio configurations and, in stochastic mode, selects the best among the admissible configurations according to the chosen Profit Confidence Level.

Initially, sCPA generates all combinations of potential projects and excludes the structurally invalid ones—those that include projects that cannot exist because other projects have not been selected.

For every structurally valid combination, sCPA generates all permutations of the projects that define the possible sequencing orders. For each permutation, staging is simulated, completion dates are calculated, and cost-of-time profiles [3] are applied. The resulting time-adjusted project profits are finally adjusted for synergy and the total portfolio profit distribution is computed.

For the simulation described below, the full exhaustive sCPA is not computationally feasible. Therefore, the simulation uses sCPA-lite—a heuristic version of sCPA. sCPA-lite starts with the best configurations identified by the other methods and aims to improve them through constructive portfolio generation, greedy project insertion, and local search/swap improvement.

## Portfolio Optimization Lab (POL)

The comparison was conducted using the Portfolio Optimization Lab (POL), a methodology developed by the author that contains a detailed description of the methods, algorithms, operational rules, and input schema. POL offers enhanced capabilities that go beyond the typical application of even well-known methods such as MSA and Octane: stochastic input and output data, per-period resource constraint and budget availability and consumption, per-period time-dependent profit erosion, admissibility assessment with respect to budget and constrained resource, repair of structurally invalid project combinations, and accounting for synergistic dependencies between projects.

POL operates with a preidentified resource constraint, in the sense of the Theory of Constraints. However, this does not prevent POL from being applied with any potential resource constraint. The portfolio budget is defined as a per-period limitation within the portfolio planning horizon. And, of course, POL is neutral with respect to the measure of the goal or "profit" and can operate with financial or non-financial goal measures.

Key elements of the POL's input data structure include:

- Base profits and cost-of-time profiles.
- Period-specific budget and constraint capacity (portfolio level) and budget and constraint consumption (project level).
- Structural and synergistic inter-project dependencies.
- Three-point distribution of stochastic parameters: base profit, profit erosion, duration, resource constraint consumption, and budget consumption.

Based on POL, a simulation engine was created, implemented in Python, and the application of the four methods was simulated.

Each method must find the best portfolio configuration, measured by P85 profit (85% probability of being achieved), with selected projects sequenced by order of implementation and staged, i.e., it must generate a master portfolio schedule. For a portfolio to be admissible, a minimum of 80% budget confidence and a minimum of 80% constraint confidence are required. Confidence levels account for the stochastic per-period budget and resource constraint consumption, and are defined as the ratio of the number of feasible iterations of the portfolio configuration to the total number of iterations in a Monte Carlo simulation.

## The Simulation and the Application of the Better-PM Metric

The simulation covers ten portfolio worlds, with potential projects and input data at the portfolio and project levels. Each world has a planning horizon of 22 periods and 38 potential projects, including 10 U, 12 B, 8 E, and 8 F projects, as well as two structural and two synergistic dependencies.

U (urgent value) projects have high value and significant time-dependent profit erosion; B (balanced) projects have a moderate profit and low constraint consumption; E (expensive) projects require a high budget and high constraint consumption, and F (filler) projects have moderate constraint consumption and limited profit—they can be used to increase the portfolio profit when spare capacity is available.

The simulation uses asymmetric uncertainty for profit, duration, and budget and constraint consumption. The final comparison of the methods is performed using a common-sample Monte Carlo simulation with 1,000 iterations within each world-method.

The simulation output includes, for each world-method: selected projects, sequence, constrained resource and budget feasibility and utilization, staged portfolio schedule, P85 profit, portfolio ROI, Work-in-Process (WIP) measured in number of projects, and waste.

The unused budget in each selected portfolio configuration is treated as a management reserve; therefore, both the ROI on the used budget and the ROI on the full-period budget are calculated. The average constraint utilization indicates the level of planned (not actually expected) utilization of the constraint.

To illustrate the comparison of different methods using a single Better-PM metric (waste), we present the outcomes for one of the portfolio worlds—World 3. To indicate what can be expected from the four methods in the context of portfolio worlds similar to those studied, we present the aggregated results for the ten worlds.

The goal here is not to identify a universally "best" method, but to measure "better project and portfolio management" in this specific context, which would aid in decision-making.

*Table 1: Method comparison — World 3*

| Method | Selected projects | Portfolio duration | P85 portfolio profit | Waste vs best | Waste % | Avg constraint util. | Avg budget util. | ROI used budget | ROI full-period budget | Avg WIP |
|---|---|---|---|---|---|---|---|---|---|---|
| **MSA** | 30 | 22 | 660 | 3,953 | 86% | 71% | 76% | 4% | 3% | 2.4 |
| **Octane** | 26 | 18 | 1,627 | 2,986 | 65% | 72% | 74% | 12% | 8% | 2.6 |
| **aOctane** | 26 | 17 | 2,026 | 2,586 | 56% | 76% | 78% | 15% | 10% | 2.8 |
| **sCPA-lite** | 27 | 22 | 4,613 | 0 | 0% | 72% | 80% | 28% | 23% | 2.2 |

All four methods yield admissible outcomes in this world. sCPA-lite yields the highest estimated P85 profit, and the measured waste when applying other methods (and, accordingly, the waste avoided by applying sCPA-lite) ranges from 56% to 86%.

sCPA-lite yields the best estimated P85 portfolio profit and zero waste in all 10 worlds studied. Here are the summarized data with median values.

***Table 2: Ten-world method comparison (aggregated median values)***

| Method | Selected projects | Portfolio duration | P85 portfolio profit | Waste vs best | Waste % | Avg constraint util. | Avg budget util. | ROI used budget | ROI full-period budget | Avg WIP |
|---|---|---|---|---|---|---|---|---|---|---|
| **MSA** | 29 | 22 | -97 | 4,028 | 102% | 70% | 77% | -0.6% | -0.5% | 2.4 |
| **Octane** | 28 | 20 | 938 | 3,063 | 75% | 70% | 78% | 5.8% | 4.6% | 2.6 |
| **aOctane** | 26 | 19 | 1,128 | 3,007 | 71% | 69% | 77% | 8.4% | 5.5% | 2.3 |
| **sCPA-lite** | 26 | 19 | 4,163 | 0 | 0% | 69% | 80% | 28.2% | 20.3% | 2.4 |

In this illustrative simulation, sCPA-lite yields significantly better portfolio profit than the other three methods. However, for each context, the comparison must be made for a specific portfolio world.

The complete package for reproducing the simulation can be obtained from the author.

## Conclusion

The net contribution of a project or portfolio to achieving the goals of the overall value-creating system it serves can be called "profit." Better project management can be measured by the waste avoided—the loss of profit avoided as a result of a better method or decision.

A clear criterion for measuring better management would facilitate the development of Decision Support Systems that evaluate the impact of alternative methods and decisions.

The article provides an example of using a Better-PM metric (systemic waste) to evaluate different methods for allocating a project portfolio and demonstrates that such a metric can be operationalized to support decision-making.

## References

[1] Apostolov, A. (2026). Advancing the Combination-Permutation Algorithm, *PM World Journal*, Vol. XV, Issue II, February.

[2] Goldratt, E. M., & Cox, J. (2004). *The Goal: A Process of Ongoing Improvement (Third Revised Edition)*. North River Press.

[3] Apostolov, A. (2025). The Combination-Permutation Algorithm: Optimizing Portfolio Allocation with TOC and Cost of Time, *PM World Journal*, Vol. XIV, Issue VII, July. https://pmworldlibrary.net/wp-content/uploads/2025/07/pmwj154-Jul2025-Apostolov-Combination-Permutation-Algorithm.pdf

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