

Value Engineering Client Success Story



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Decision Analysis Approaches

- Can an optimized portfolio approach to investing in technology "Value Engineering" projects improve returns?
- Can less budget/spend achieve the same profitability?
- Client Example: \$100M/year budget (\$25M/quarter) allocated for investment in projects ranked by risk-adjusted NPV

Results

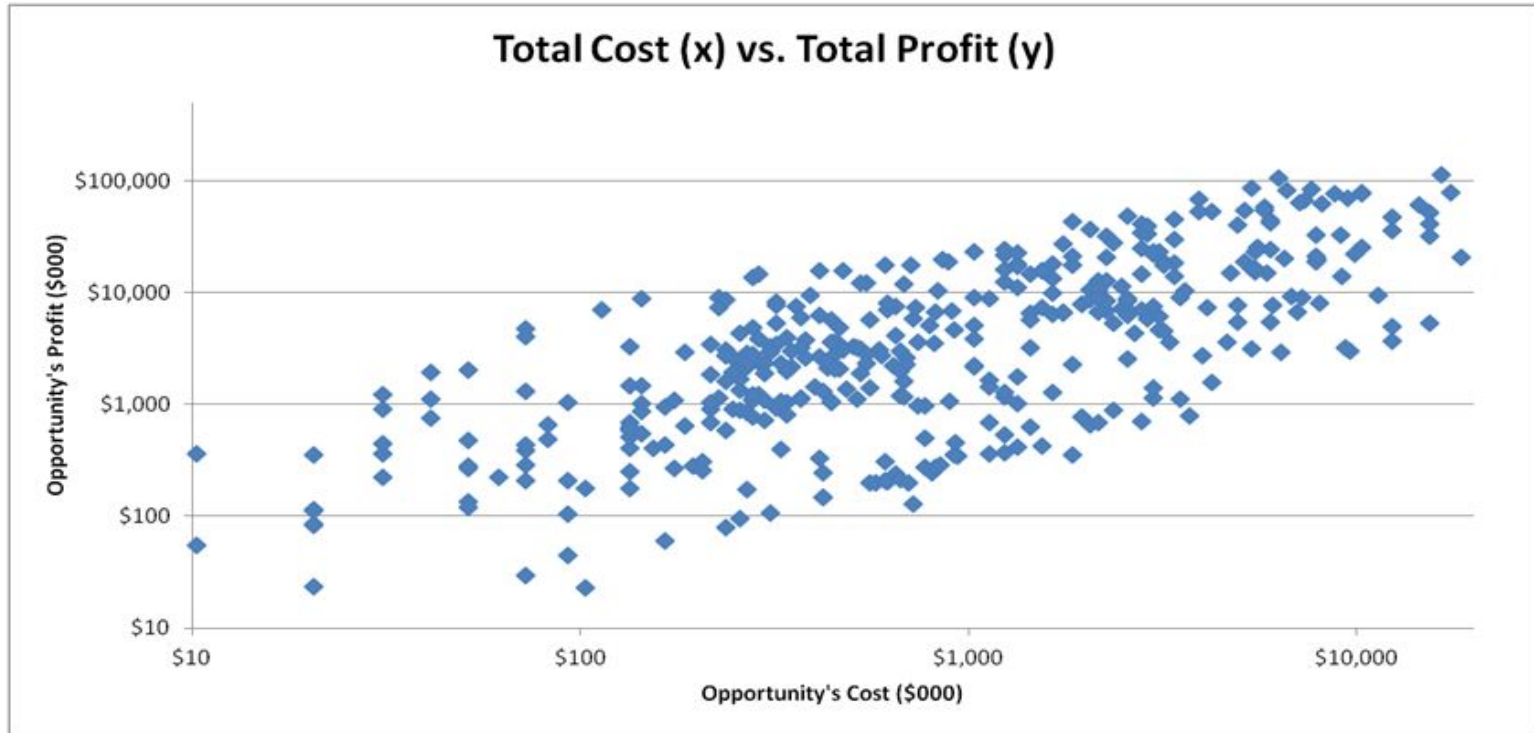
	NPV Approach \$25M/Qtr	Optimized \$25M/Qtr	Optimized \$20M/Qtr
Total Profit 5+ years	\$2,016M	\$2,533M	\$2,093M
Total Allocated Capital	\$215M	\$215M	\$160M
# Projects Selected	36 projects	144 projects	134 projects
Quarterly IRR	66%	75%	78%

- Optimized \$25M/Qtr : **25% increase** in returns while keeping budget flat
- Optimized \$20M/Qtr : **4% increase** in returns while **reducing budget 25%**

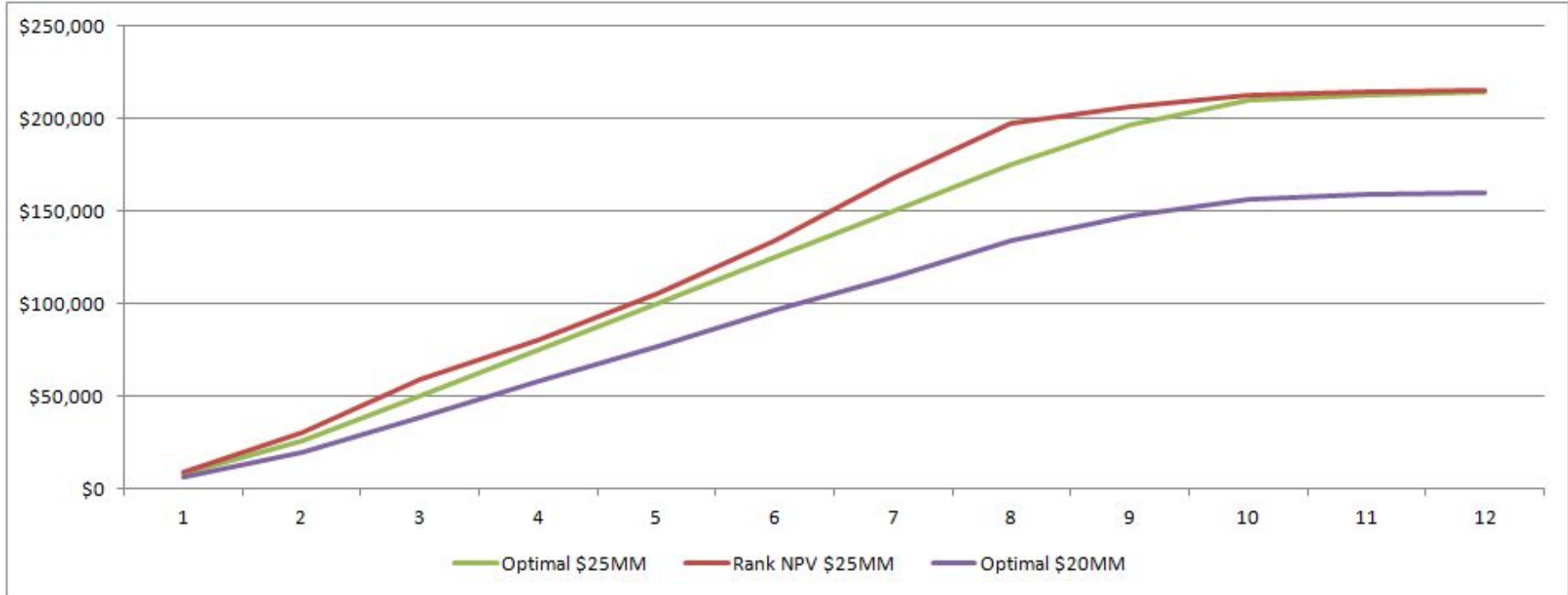
Bake-off Methodology

- 400 opportunities randomly selected for analysis
- 50 opportunities available for consideration each quarter
- NPV Approach funds highest NPV projects up to budget
- Optimized approach selects projects that together maximize total profits and/or spend constraints
- 5-year Window: Up to 8 quarters spend ; 12 quarters profit

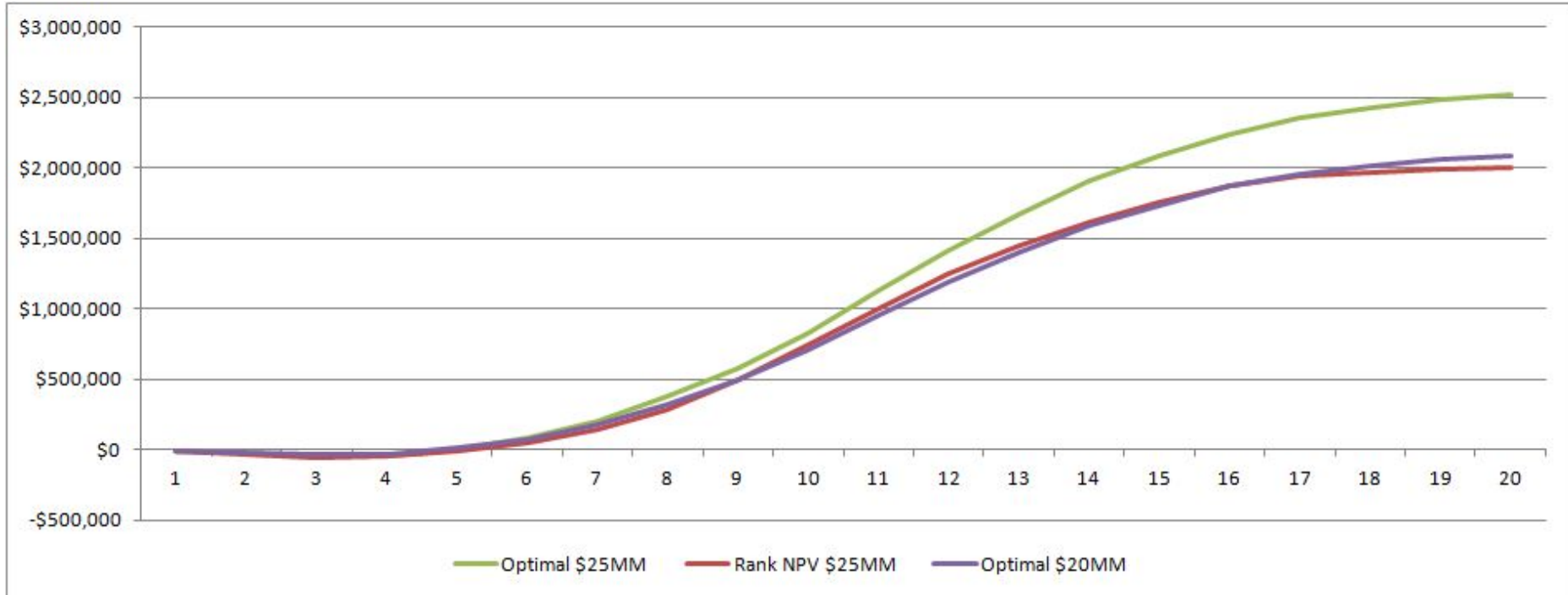
Set of Opportunities



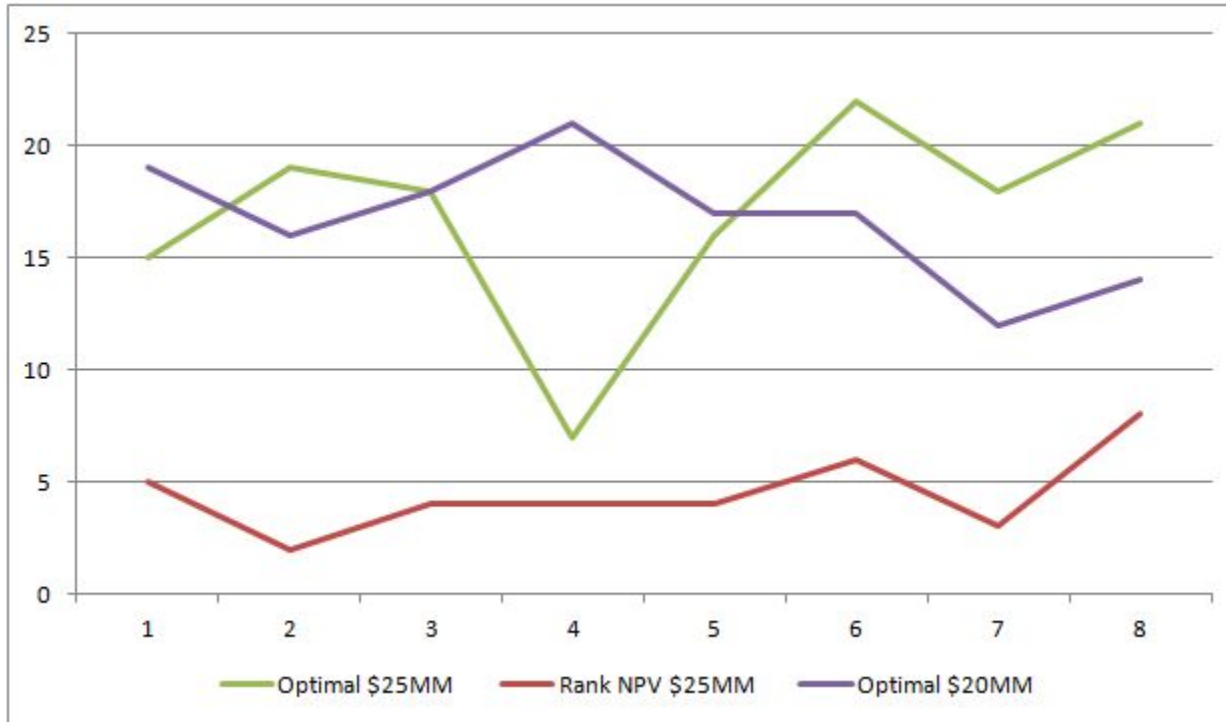
Cumulative Investment



Cumulative Profit



Projects Started



Input Data Forecasts

- Portfolio-level constraints on quarterly and total spend
- Individual project key-drivers within a given VE Portfolio
 - Cost
 - Demand
 - Schedule
 - Budget
- Each project has 4 potential outcomes (probability %)
 - 50% Deliver on baseline commitment
 - 15% Exceed baseline commitment
 - 20% Miss schedule milestones by at least 1Q
 - 15% Miss budget spend profile

What is Value Engineering?

- Reduce cost of products in their sustaining life-cycle phase
 - Component part replacements and eliminations
 - Alternate sourcing of suppliers and commodities
 - Manufacturing process and technology changes
 - Die shrinks and tooling changes (soft to hard)
 - Board re-designs and device package changes
- Our approach combines venture capital investment principles with portfolio optimization to maximize returns

Summary

- Portfolio optimization at each decision point improves profit
 - Make **25% more** profit with same capital
 - Make **4% more** profit with **25% less** capital
- Margin impact is immediate, scalable and measurable
- Too many variables to evaluate manually (spreadsheets)
- Portfolio-level uncertainty and risk outlook enhances executive acceptance of forecasts and goal-setting



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