Applying the PVRO Framework to the Strategy-Implementation Gap

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Abstract

A recent, project design and management approach—the *project value, risk, and opportunity (PVRO) framework*—provides a potentially advantageous way to model the work and progress of strategy implementation. This paper briefly introduces the PVRO framework and illustrates its application to an uncertain and risky strategy implementation project. The framework provides a new perspective on project progress as the reduction of the portion of the project's value being put at risk by the possibility of adverse outcomes. Implementation progress occurs as the risks of failure decrease.

Introduction

Implementing a strategy typically requires work that can be characterized as temporary and unique. These happen to be the salient determinants of project work, which seeks to deliver a unique result by a deadline and within a resource budget. Thus, strategy implementation may be reasonably conceptualized and operationalized as project work, thereby benefiting from the ontologies, methods, and tools of project management. The implementation of a strategy usually requires many projects—a program or a project portfolio—but related methods exist for managing these entities as well. Sometimes strategy implementation is pursued explicitly through "strategic projects"; such terminology could be applied even more broadly. Examples of strategic projects include: developing a new product or platform, developing a brand, installing a new information technology system, reengineering a process, readying a new technology, establishing a new production facility, revamping the supply chain, acquiring another company, and divesting a business unit. Here, I define the "strategy-implementation gap" as the failure of strategic projects to achieve their stakeholder value goals.

Unfortunately, the conventional methods for project management (summarized, e.g., by the PMBOK Guide [PMI 2017]), while beneficial, have not proven sufficient to staunch the flow of failed and challenged projects. Many reasons contribute to explaining this situation, some pertaining to the methods themselves and others to the context and manner of their implementation (or lack thereof). Research continues for better understanding of and improved methods for project management. Hence, merely reframing the strategy implementation challenge as a project management one does not solve the problems. Doing so does, however, open the door to applying many useful constructs and techniques that could be quite helpful.

One such approach—the *project value, risk, and opportunity (PVRO) framework*—provides a potentially advantageous way to visualize, model, plan, and control strategy implementation work. Previous articles [Browning et al. 2002; Browning 2014; 2018] on managing product development projects introduced the PVRO framework (based on an earlier approach called the *risk value method*); readers are directed to these prior papers for fuller background and details. This article provides a brief overview of the PVRO framework and discusses its applicability to the strategy implementation challenge.

Situational Assumptions

A project may be designed (Browning 2017). Project design entails choices about the path (through a rugged and uncertain landscape) to its desired destination (result). Tactically, project design includes defining, assigning, scheduling, and budgeting project activities and commitments.

For the purposes of this paper, I take strategy as a given input and assume it is appropriate. Let us furthermore assume that an element of strategy implementation has been "projectized"—i.e., conceived in terms of a temporary organization with assigned resources, tasked to deliver a specified result by a deadline. This assumption is admittedly problematic, because often the specific resources, results, and deadlines are unclear—in which case an initial step in project design should be to obtain greater specificity of these aspects.

PVRO Background

It is helpful to distinguish four types of value from project work. A project's *actual value* is its final value at completion, based on how things turn out and where it ends up. (Actual value may continue to evolve, post project completion.) A project's *desired value* is the value its stakeholders seek from it. (This value may be difficult to characterize, as stakeholders may not be able to articulate their values, and they may not agree within themselves or with other stakeholders.) A project achieves its *goal value* (GV) if it meets its chosen goals/targets/objectives/requirements. Prior to project completion, a project has a forecast *likely value* (LV), given its resources and capabilities. The PVRO framework focuses especially on a project's GV and evolving LV. The key idea here is that a project's value depends on the overall costs and benefits of its *result* (not on merely on the work it does, as in "earned value management").

Each of these four types of value may be considered in terms of component elements called *project value attributes* (PVAs). PVAs are characteristics of the project's result that matter to stakeholders. For example, a product development project's PVAs would center on the characteristics of the designed product, such as its size, speed, price, etc. In strategy implementation, PVAs would be the major indicators of success, completion, instantiation, etc. PVAs are therefore related to (and are in some case synonymous with) key performance indicators (KPIs), measures of effectiveness (MoEs), and technical performance measures (TPMs). Because a project should focus on its 5-10 most salient PVAs, PVAs tend to be high-level, composite measures, each potentially driven by numerous sub-elements.

At the end of a project, each of its PVAs is more likely to be known with certainty. Before then, each may only be estimated. At its beginning, a project faces maximum uncertainty about its outcome for each PVA. Each PVA is modeled as a distribution of possible outcomes, called a *project capability distribution* (PCD). As the project progresses, updated estimates of its PVAs' outcomes revise the PCDs. Over project time, the PCDs tend to narrow due to new information and learning about the likelihood of various potential outcomes.

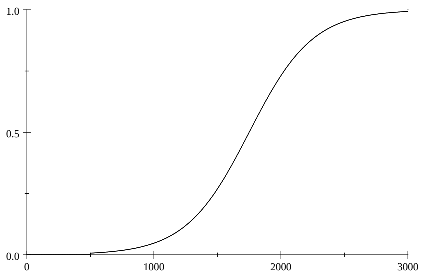
Let us assume each PVA also has a set goal. (A project that achieves all of its PVAs' goals provides its GV.) Any PVA outcome that fails to meet its goal (i.e., from the region of the PCD representing adverse outcomes) will reduce project value to some level below its GV. These consequential uncertainties threaten the project's value; they put a portion of the project's value at risk. Using a negative impact (penalty) function, which shows the loss of project value associated with each potential, adverse outcome, we can calculate the expected *value at risk* (VaR) for each PVA and for the project as a whole. We can also calculate the *value at opportunity* (VaO) for each PVA from the portion of its PCD that exceeds the goal, using a positive impact (reward) function. We may conceive the VaR as the portion of the project's value threatened by the prevailing uncertainty in the project's outcomes.

Quantifying and visualizing a project's VaR makes it possible to motivate behaviors associated with targeted learning that will serve to reduce the VaR more quickly. Activities "add value" to a project by eliminating the possibility of particular adverse outcomes for its PVAs (e.g., by proving that a PVA like "fuel economy" will be greater than some minimum amount). This drives out uncertainty earlier in a project: it provides a "big rocks first" approach to risk management; it supports a "fail fast" approach. This is in stark contrast to conventional approaches, which often incentivize starting low-value work too early and procrastinating with truly consequential tasks.

Designing a Strategy Implementation Project

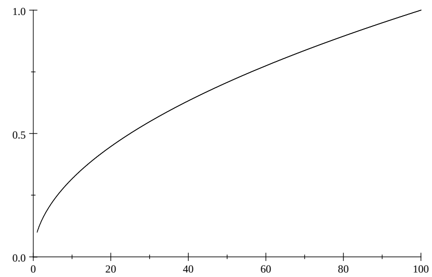
Let us consider a hypothetical project to reengineer a production process for greater agility in terms of higher production variety and lower changeover time. Table 1 lists six PVAs for the project and specifies its associated value function, $V(x)$. The value functions span a range from "delighting" to "disgusting" the stakeholders with the PVA outcomes, and each is specified in simple units of utility in [0,1]. (Other units of value, such as expected revenue or profit, could be used instead.) For the first two PVAs, "larger is better" (LIB), meaning that utility increases with PVA outcome, while for the last four "smaller is better" (SIB).

Table 1: Project Value Attributes (PVAs) and their respective value functions (y-axes are utility)



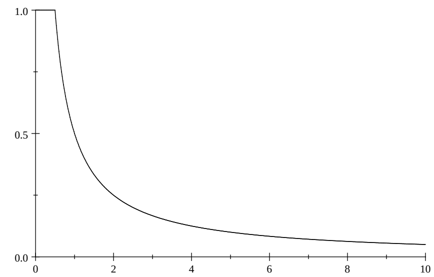
Production Rate

$$V_1(x) = \begin{cases} 0 & x < 500 \\ \frac{1}{1+e^{-.004(x-1750)}} & 500 \le x < 3000 \\ 1 & x \ge 3000 \end{cases}$$



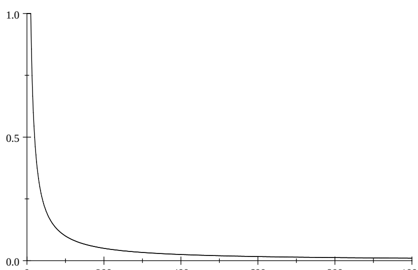
Production Variety

$$V_2(x) = \begin{cases} 0 & x < 1 \\ .1\sqrt{x} & 1 \le x < 100 \\ 1 & x \ge 100 \end{cases}$$



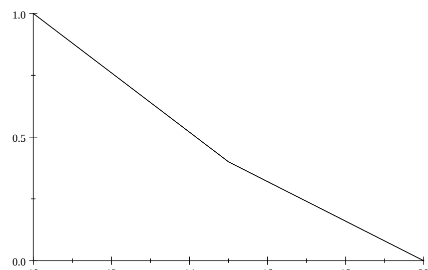
Changeover Time

$$V_3(x) = \begin{cases} 1 & x < .5 \\ \frac{1}{\sqrt{(2x)^2}} & .5 \le x < 10 \\ 0 & x \ge 10 \end{cases}$$



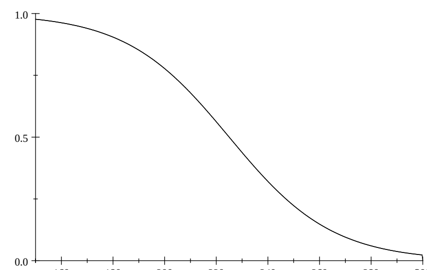
Product Quality

$$V_4(x) = \begin{cases} 1 & x < 10 \\ \frac{1}{\sqrt{(.1x)^2}} & 10 \le x < 1000 \\ 0 & x \ge 1000 \end{cases}$$



Resources Used

$$V_5(x) = \begin{cases} 1 & x < 10 \\ -.12x + 2.2 & 10 \le x < 15 \\ -.08x + 1.6 & 15 \le x < 20 \\ 0 & x \ge 20 \end{cases}$$



Completion Time

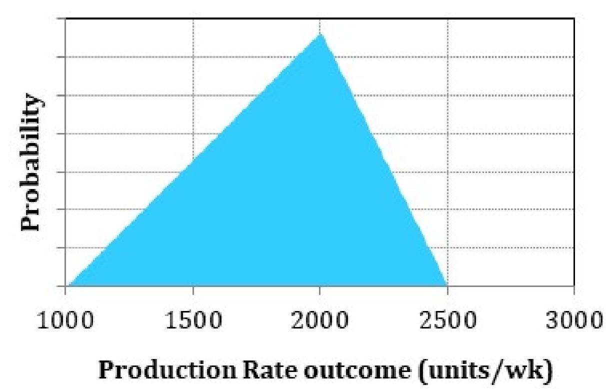
$$V_6(x) = \begin{cases} 1 & x < 150 \\ \frac{1}{1+e^{.05(x-225)}} & 150 \le x < 300 \\ 0 & x \ge 300 \end{cases}$$

Table 2 lists the six PVAs, along with units of measure, type, and weighting of relative importance to the project's overall value. Next, the table specifies the initial estimate of each PVA's PCD in terms of a triangle distribution (although any type of distribution could be used), where a and b represent the extreme estimates of optimistic and pessimistic outcomes (which is which depends on SIB or LIB) and m represents the estimated most likely outcome. Figure 1 provides an example for the first PVA. Comparing this distribution of potential outcomes to its corresponding value function (upper-left of Table 1), we may observe that the most likely outcome (2000 units/wk) provides fairly high utility (0.73), while the best possible outcome (2500) provides excellent utility (0.95). The worst possible outcome (1000) provides very poor utility (0.05). The PCD shows that the project has a range of possible outcomes that will result in a wide range of eventual utilities (0.05 to 0.95). Outcomes closer to 2000 are relatively more likely than outcomes close to either extreme. For any PVA outcome in the range [1000,2500], we may use the PCD and the value function to determine its probability and utility, respectively.

Table 2: PVRO model for baseline production reengineering project

PVA	Units	Type	Weight	*a*	*m*	*b*	*G*	*GV*	$\mathcal{R}$	$\mathcal{O}$
Production Rate	units/wk	LIB	0.17	1000	2000	2500	2200	0.86	0.29	0.00
Production Variety	versions	LIB	0.19	10	50	70	25	**0.50**	0.01	**0.16**
Changeover Time	min.	SIB	0.19	0.5	1.25	4	1	**0.50**	0.20	0.01
Product Quality	DPMO	SIB	0.17	15	40	150	15	0.67	**0.49**	0.00
Resources Used	$M	SIB	0.13	10	14	20	12	0.76	0.30	0.01
Completion Time	workdays	SIB	0.15	150	175	275	170	0.94	0.22	0.00
Project	Utility	LIB	1.0	n/a	n/a	n/a	n/a	**0.69**	**0.24**	**0.03**

Figure 1: Project capability distribution (PCD) for the Production Rate PVA



For each PVA, Table 2 also lists its selected goal (e.g., 2200 units/wk for Production Rate), the value attained by achieving that goal ($GV = V(G) = 0.86$ units of utility), and the expected value of the PCD (the PVA's likely value, *LV*). We also consider the *GV* and *LV* of the overall project as a composite function of the PVAs. (Various models may be used for this, each with advantages and disadvantages.) Here we show results for the overall project in terms of two models, the weighted average (results given in the bottom row of Table 2, using the weights shown in the table) and the most constraining attribute (result given by the bold-faced, minimum PVA numbers in Table 2). Which of these two models makes the most sense depends on the situation, but, generally, as the difference between their respective results increases, the more the most constraining attribute model may apply (because a horrible outcome with one of the PVAs would be more likely to overshadow decent outcomes with all of the others).

If we draw a vertical line at the goal ($G = 2200$) in Figure 1, we split the PCD into regions of desirable ($x \geq G$ for a LIB PVA) and undesirable ($x < G$ for a LIB PVA) outcomes. When we weight the probability of each undesirable outcome by its value loss ($V(G)$-$V(x)$), we calculate the expected value loss implied by the uncertainty in that PVA's potential outcomes—i.e., the portion of the PVA's value being put at risk, $\mathcal{R}$. Similarly, we calculate the PVA's expected value at opportunity, $\mathcal{O}$, by weighting the probability of each desirable outcome by its value bonus ($V(x)$-$V(G)$). Again, across all PVAs, we can model the overall project's *value at risk* (VaR) or $\mathcal{R}$ as the weighted average of $\mathcal{R}$ for all PVAs or in terms of the single riskiest PVA. In Table 2 we interpret the overall project $\mathcal{R}$ as putting 0.24 of the 0.69 units of project GV at risk, while 0.03 units of additional project *value* are *at opportunity* (VaO). Note that $\mathcal{R}$ and $\mathcal{O}$ are each a function of both the project's capabilities (represented by the PCDs, the likelihoods of achieving various outcomes) and its specified goals. All else being equal, shifting the PCD for a LIB PVA to the right will decrease $\mathcal{R}$ and increase $\mathcal{O}$, as will shifting *G* to the left (making the goal less challenging).

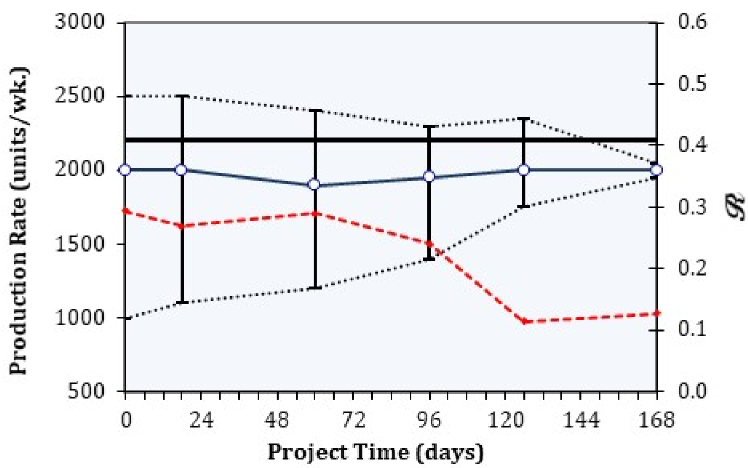
Examining the situation in Table 2, we may observe that the goal of 2200 units/week for Production Rate seems very challenging (in fact, 88% of PCD outcomes fail to achieve it); it puts 0.29 units of the project's *GV* at risk. Meanwhile, the goal for Production Varity is quite tame (over 90% of PCD outcomes achieve it); it puts very little of the project's value at risk, but it leaves 0.16 units of value "on the table" by choosing such an easy goal, and it lowers the project's overall *GV*. If possible, project planners should consider trading off some Production Variety for an increase in Production Rate. Changeover Time is a more problematic PVA, because its chosen goal, while providing little *GV*, is still quite risky to achieve. Additional resources, technologies, and/or other capabilities might need to be added to the project to shift this PCD in a more favorable direction. The Product Quality PVA contributes the greatest risk to the project's value. The goals for Resources Used and project Completion Time are also fairly optimistic, given the PCDs for these PVAs. Project planners may also explore alternative settings for project goals and capabilities. For example, it is likely that the allocation of additional resources could shift some PCDs in favorable directions, and some goals may be relaxed or increased so as to design a project for a desirable level of risk.

While not shown in this example due to space constraints, the next step in applying the PVRO framework is to isolate the subset of the project's activities which, when completed, are expected to generate new information that will revise one or more PCD estimates. The finishing times of these activities will designate updates to the values in Table 2. Project planners may simulate project progress with anticipated activity finish times and revision magnitudes, and, as shown below, project monitors and controllers may replace these estimates with actuals as the project unfolds.

Monitoring and Controlling a Strategy Implementation Project

As a project unfolds, its activities generate new information that may be used to revise the PCD estimates and thus $\mathscr{R}$ and $\mathscr{O}$. Continuing with the example project, Figure 2 shows an example PVA tracking chart over project time. Time zero corresponds to the situation in Table 2, at the beginning of the project, where the PCD is a triangle distribution defined by the three points (*a*, *m*, *b*) indicated by the vertical bar overlaying the left *y*-axis. The initial $\mathscr{R}$ for the Production Rate PVA, 0.29, is indicated by the left-most point along the larger dashed line (and measured by the right *y*-axis). At day 18, new information revises the worst-case outcome from 1000 to 1100 units/week, which causes $\mathscr{R}$ to drop slightly. Further revisions change the PCD parameters in random ways, but, overall, the PCD tends to narrow as information replaces uncertainty about project outcomes. By day 168 the outcome has settled well below the goal, leaving 0.13 units of the *GV* at risk.

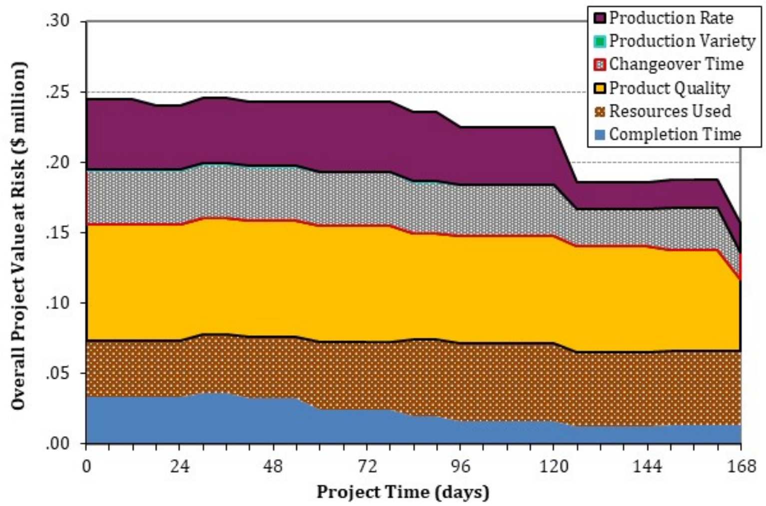
Figure 2: Tracking PCD evolution and $\mathscr{R}$ over project time for the Production Rate PVA



By its completion, a fully successful project should drive its VaR to zero. Projects that do not have failed to meet one or more of their goals. Figure 3 tracks the example project's overall VaR in terms of the weighted contributions of its PVAs. As of day 168, the Production Rate PVA contributes $w\mathscr{R}$ = (0.17)(0.13) = 0.02 of the project's overall VaR of 0.16, where *w* is the PVA's weight. Product Quality and Resources Used, each with a weighted contribution of 0.05 at that point, make up the largest components of the project's VaR. Thus, this example project has not fared well in terms of its ultimate results. Although the project made some significant progress around days 126 and 168, it was too little too late: the overall risk profile remained stubbornly high over the course of the project. A more desirable VaR reduction profile for each PVA and the overall project would look more like the Changeover Time value function in Table 1, with a front-loading of the work that would quickly drive out the biggest risks—or, failing that, enable an earlier project termination decision (a "fail fast" strategy).

For a related application of part of the PVRO framework to a real project, along with a simulation of the emergent path across the project's rugged landscape, see [Lévárdy and Browning 2009].

Figure 3: Tracking the project's overall value at risk ($\mathscr{R}$) in terms of the weighted contributions of its PVAs



Conclusion

So how could the PVRO framework help close the strategy-implementation gap? By helping plan and manage the work of implementation as a project—one that achieves its aims by reducing the likelihood of adverse outcomes in terms of the key attributes of stakeholder value—the PVRO framework helps focus attention on the most important areas as the project evolves. It helps participants think and act in terms of uncertainty and risk, rather than mere point estimates. It provides a new way to think about progress and adding value. Rather than viewing "value added" as work done, the PVRO framework makes a subtle shift by equating progress with the removal of "anti-value" (threats to project value) by doing work that creates useful information that reduces the risk of *not* getting the desired result. Like a sculptor of marble, the desired result emerges by chipping away the undesired material—here, potential, adverse outcomes. Rather than having all project indicators showing "green" until things go wrong (when they suddenly turn "red"), the PVRO framework looks at the indicators as red until proven yellow and then green.

This way of viewing projects holds potential for designing and managing the progress of the project-type work of implementing strategy. Going forward, it would be very interesting to compare applications to a variety of strategic projects.

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