

Tech-Clarity

making the value of technology clear

Maximizing Product Development Value

Realizing Value from New Products and Portfolios



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Executive Overview

It's the typical scenario again. The project that started with such high expectations has gradually slipped into the same category as the others—mediocre at best. The team begins second-guessing. Was this the right project to pursue in the first place? Why didn't we see the unexpected problems earlier? Could we have avoided the problems if we focused on them earlier? Could we have avoided investing so much time and money on this project? What other projects did we pass over for this—and was one of them the real gem? How can we have failed when we overcame the most challenging hurdles with flying colors—did we focus on the wrong problems? Management begins second-guessing as well. Where did the project value go? Were the initial projections merely hype? Was there real potential value that managed to slip away? Everybody wants to know why there are so many questions—but so few answers. Many companies today are turning to Product Lifecycle Management (PLM) for help.

PLM processes and software tools offer significant improvements to the development and introduction of new products. Updated design technology has collapsed development times, reduced product costs and improved product quality. New collaboration platforms have improved design processes, streamlined the handoff to manufacturing and increased project efficiency. Another category of PLM tools—Product Portfolio Management—has begun to streamline portfolio management and new product development processes. The use of these portfolio and project management tools has resulted in more efficient and effective introduction of product innovations to the market. In most cases, however, they have not delivered breakthrough improvements in portfolio value. Recent discussions with leading product development leaders point to a new, emerging approach to Portfolio Management. The new approach overlays strong decision support and project management tools with a critical element that is missing from many implementations—a focus on maximizing the value realized from new products and portfolios.

Clearly, value is the key element in any portfolio decision. Unfortunately, value is frequently the hardest thing to quantify when evaluating portfolios. Even harder than quantifying the value—and equally critical to developing high value product portfolios—is understanding the underlying factors that influence value. The true value of a project can only be evaluated properly if it is taken into context with the uncertainty and risk inherent in any development project. Creating high value portfolios is much simpler when the factors that create and destroy value for a project are clearly identified, quantified, and managed over the life of the project. Focusing on portfolio and project value throughout the product lifecycle—and particularly in new product development—promises to unlock the hidden potential missing in many portfolio management processes.

For Better Portfolios—Focus on the Value

Companies frequently struggle with a very fundamental business issue—where to invest their limited product development resources. Product and Project Portfolio Management tools have stepped in to address the issue. The problem should be a simple one—simply invest in the projects that hold the highest potential return for the investment. Portfolio management techniques, however, have educated us that the process is not that simple. Portfolios must be managed for value, but they must also be managed for proper balance, for alignment with resource availability and for alignment with company strategies. Many portfolio management tools and processes have been developed that offer excellent support for visualizing and analyzing projects for value, balance, alignment and resource allocation. Even with these tools, however, many companies fail at the very core of the portfolio management problem—identifying and achieving value from their projects.

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One of the root problems is that ascertaining value is not a trivial issue. It is much easier to manage a new product development process with measurements of activity than measurements of value. A project manager most likely will be able to tell you if their projects are on time, if key milestones are being hit, if project resources are working efficiently and if their costs are under control. Few project leaders, however, can determine the true economic value of their project. Analyzing the financial value of a project requires a thorough understanding of the project economics taking into consideration project uncertainty and risk. How can portfolios be optimized without a solid understanding of the financial value of current and potential projects?

***“Portfolio Management tools are only as good as the information that you feed them, you need a consistent valuation approach to support portfolio decisions.”
– Phil Russell, Weyerhaeuser***

“We wanted to view our project portfolio from more of a quantitative value perspective” said Phil Russell, Director Technology Implementation at Weyerhaeuser, *“to do that, we realized that we needed to understand the value of the actual projects.”* Portfolio Management tools frequently manage relative risk and relative value, but provide very little support for developing actual risk and value numbers. *“Portfolio Management tools are only as good as the information that you feed them,”* Russell continued, *“You need a consistent valuation approach to support portfolio decisions.”*

Interestingly, a consistent valuation approach does not lead to a single number for project value. The value of a project, as seen in Figure 1, has to be viewed as a range of potential values. There are commonly many factors—both internal and external—that can influence the market value of a project. The value of a project has to be considered in context with its associated risks and uncertainties to make good portfolio decisions. Understanding the uncertainty of the value of the project has additional benefits as well. Ralph Morales of HP’s New Market Development Finance Team highlights an additional benefit of determining the project value. *“Part of the value is the process,”* Morales offers, *“it is important to know the upper and lower boundaries of value, but understanding why it would be high and why it would be low may help you identify an embedded risk.”*

The value of a project has to be considered in context with its associated risks and uncertainties— viewed as a range of potential values—to make good portfolio decisions.

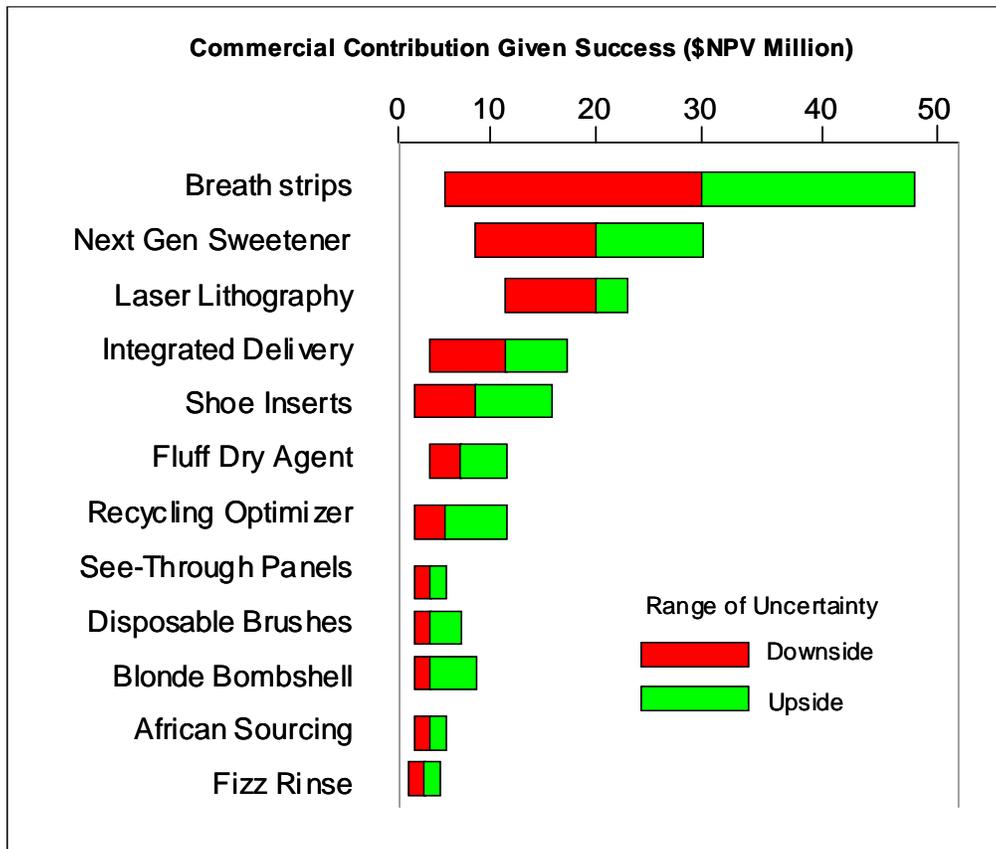


Figure 1: Ranges of Value in Project Value
Source: SmartOrg

Visualize Where Project Value is Earned

Each new product development project undertaken is a path that leads to potential value. Along the path to value, discoveries are made that will increase or decrease the value of the final destination. As more is learned about the project and the value at the end of the path becomes clearer, product developers may need to alter the path. Product developers may even choose to abandon the project altogether if the value at the end of the path is no longer as compelling as other potential opportunities. The key focus of these decisions, once again, is the achievable economic value.

Understanding value requires a solid understanding of the associated risks and uncertainties of the project—but more importantly how those risks and uncertainties can impact the value of the project.

Understanding value requires a solid understanding of the associated risks and uncertainties of the project—but more importantly how those risks and uncertainties can impact the value of the project. David Leonhardi helps analyze and resolve critical business decisions for Boeing. A tool that he frequently uses to determine the value range for a project is the “value map.” The value map provides a visual representation of where value can be created or destroyed for the project. Leonhardi helps project teams explore the potential hurdles for the project and how they impact the value of the project. “We create a value map to identify where the value comes from, by asking what creates value and what destroys value,” Leonhardi explains, “We get a lot of new and innovative ideas from understanding where the value lies, and never quite end up with the project ideas that we started with.”

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- David Leonhardi, Boeing

Management consultants and highly trained product development professionals have recognized the need to focus on value in addition to more tactical project metrics like budget and schedule. These thought leaders have developed tools that help to visualize the value of a project in terms of the risk and uncertainty. Unfortunately, these tools have been highly dependant on the individuals using their methodologies, and have suffered from a lack of standardization and automation across a business.

Value maps as shown in Figure 2 provide the input to develop a realistic financial model for the project—one that acknowledges the variability and unknown factors that may impact the project. Russell says Weyerhaeuser uses value maps developed using software that provides a visual representation of the project hurdles and value drivers. “We use value maps primarily towards the early end of the stage-gate process—when the uncertainty is very high and there is significant technical risk that needs to be factored in.” Russell pointed out that Weyerhaeuser uses Decision Advisor® from SmartOrg—a PLM vendor specializing in improving the value of project portfolios—because it automatically generates the relevant spreadsheet-based financial models to evaluate the economic value of projects.

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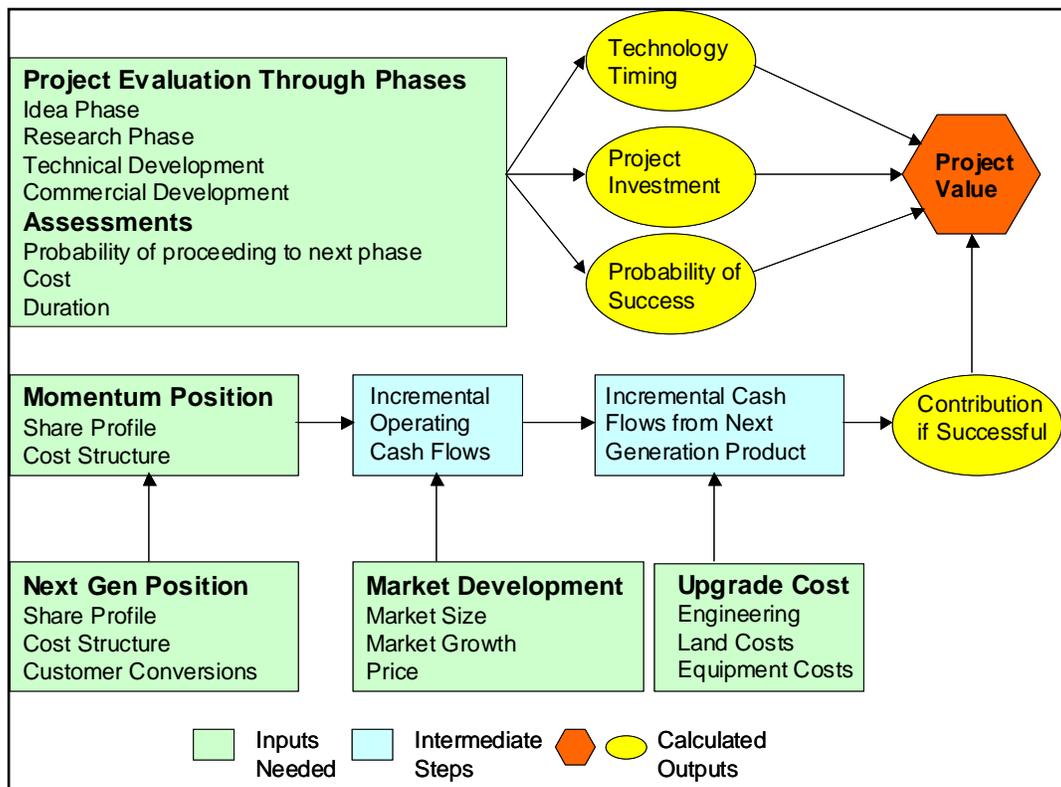


Figure 2: Project Value Map
Source: SmartOrg

Managing for Value

Boeing’s Leonhardi discussed how to leverage information about the sources of economic value to capture the maximum value from a project or portfolio. “*You have to determine the project uncertainties you can and can’t control,*” Leonhardi explains, “*Once you have this insight, you can put plans in place to take advantage of the value increasing opportunities along with plans to mitigate the value decreasing risks.*” He points out that not all risks are equivalent in terms of value. Figure 3 highlights this point by visually displaying the potential impact of each risk on a “Tornado Diagram.” By focusing attention on the risks that have the largest impact on the value of the project, companies can better allocate their time and resources to the issues that matter the most.

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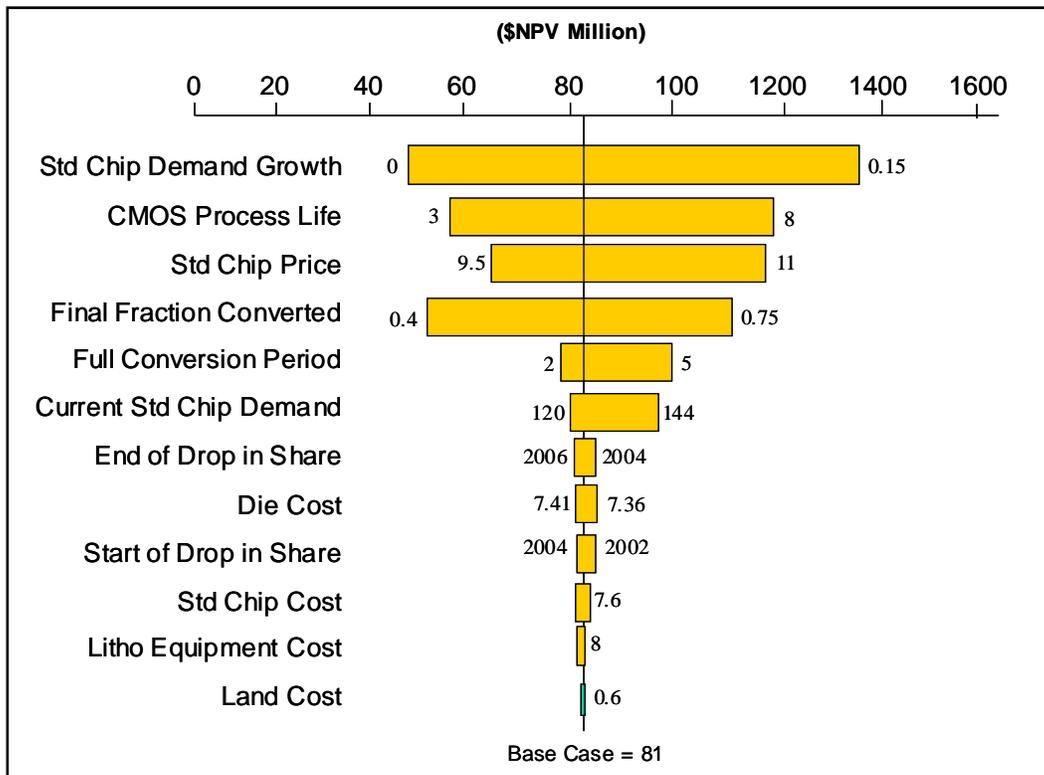


Figure 3: Risk Factors and Their Impact on a Tornado Diagram
 Source: SmartOrg

Phil Russell describes a situation where focusing on the right issues paid off for Weyerhaeuser. *“Sensitivity diagrams, or tornado diagrams, show where the value of the project can swing very significantly—indicating where the project resources and time should be spent.”* By using this approach, Russell and his team discovered some *“eye-opening”* things about their business. For example, Weyerhaeuser projects often involve a significant capital investment. The capital intensive nature of their industry has forced Weyerhaeuser to develop capital project management as a key competency. They spend a lot of project resources and energy developing narrow ranges for project capital and managing projects to stay within those budget ranges. The financial return of many projects, however, is not significantly impacted by the range between the high estimate and the low estimate of these costs. What emerged was that other issues—such as market readiness and available market size—had a much larger impact on the project’s value. *“The perspective that is added by analyzing the impact of the risks and uncertainties helps us build a credible case for spending less effort on the things that we like to do—and are good at—and forces us to focus on the harder—but more important—issues.”* Russell states, *“As you get better at doing these—and gain comfort in addressing uncertainty and risk—you have a much better chance of determining the factors that have the highest economic impacts on the project.”* *“Sometimes you learn that you have to totally change your priorities to improve the chances of making the project successful,”* he added.

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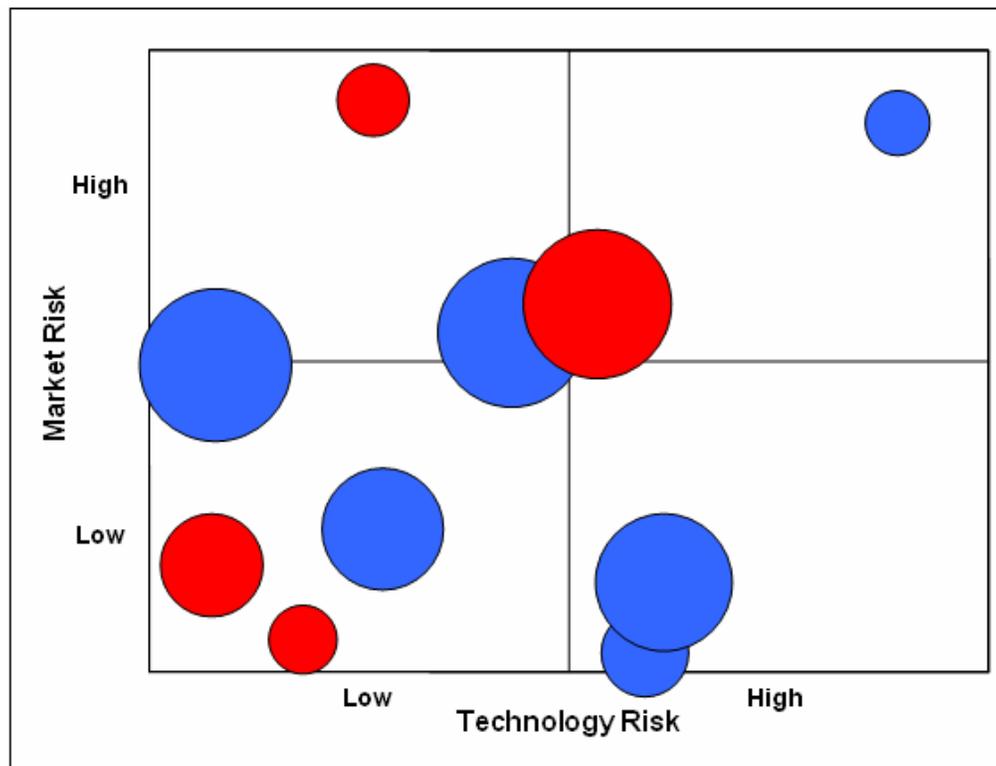
- Ralph Morales, HP

Identifying risks and uncertainties provides the opportunity to better manage them. Sensitivity analysis forces project teams to not only quantify what they know, but more importantly quantify what they don’t know. By providing this strategic layer on top of the stage-gate process, companies have the opportunity to reduce the uncertainty on the project value by focusing on those issues first. If market readiness is the issue, for example, then R&D expenditures can be minimized in favor of additional market tests. If the market tests prove that the achievable value is lower than expected, the company now has the opportunity to avoid these R&D expenditures and focus on more valuable projects.

Using risk management to drive the appropriate project plan provides better returns. *“The right project without the right plan won’t fly,”* says HP’s Morales, *“We use 90-100 day milestones and set our next step as learning about the biggest risk.”* *“With this approach,”* Morale explains, *“We are not just plowing money into R&D—we are spending the money on understanding and overcoming the biggest risks to achieving project value.”*

Asking the Real Portfolio Questions – Where to Invest

The key decisions to make when managing a portfolio of product development projects are to determine where and how much should be invested in product development. Product and Project Portfolio Management tools and processes provide valuable information to use when selecting between available projects. With visual representations of projects and their associated characteristics, for example, management can easily view how well balanced their projects are. Figure 4 highlights a common approach to visualizing project balance in terms of risk vs. reward, allocation to business areas, and contribution to strategic objectives among other views.



Circle size = R&D resources to each project ● Early Stage ● Late Stage

Figure 4: Sample Portfolio Management “Bubble Diagram”

Most Product and Project Portfolio Management tools also provide the ability to rank projects and display scorecards to try to prioritize projects with the highest value and strategic fit. These tools by themselves, however, do not answer all of the portfolio questions that must be asked.

Jeff Jeffers, VP of business development for Scholle Corporation provides a good example of the challenges companies face when looking for the most valuable projects to fund. Initial portfolio management attempts at Scholle resulted with more routine projects, such as cost reduction projects and product line extensions, ranked as the most important projects. Scholle noticed that these projects, which had very predictable returns, were ranked higher than more innovative projects that had a higher potential return. The portfolio management tools did not differentiate between projects with a relatively secure—but marginal—return and more innovative projects with significant upside potential. The innovative projects were being crowded out by projects with more predictable results, primarily because the evaluation tools looked at project value—but did not consider a range of potential values for a particular project

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For Scholle, a Portfolio Management view that shows ranges of value—as shown in Figure 1—helped to provide a solution. This view highlighted not just the current value of the project, but also presented management with the visibility to the range of potential values that the projects could achieve. Scholle found that this approach allowed them to shift attention from projects in their comfort zone towards projects that created more significant value for the business.

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“The bottom line for Scholle is that we were able to increase the return on our product development investments,” Jeffers stated, “Before we had too many project fighting over too few resources, but now we have cut the number of projects substantially.” Jeffers said the amazing thing is that project teams have changed their view of what it means for a project to be successful. “Most of the low value projects were withdrawn by the project teams once they realized that the value was just not there” Jeffers concluded.

Asking the Real Portfolio Questions – How Much to Invest

In addition to determining where the R&D budget should be allocated, the critical decision when managing a portfolio is to determine how much should be invested in R&D. Common Product and Project Portfolio Management tools, however, do not provide a clear picture of economic tradeoffs as funding is increased or decreased. For strategic business planning, the issue at hand is frequently not how to fill the R&D budget with projects—but what the R&D budget should be in the first place. Another value-oriented Portfolio Management view, shown in Figure 5, provided insight into how much R&D should spend as opposed to simply filling the available budget with projects. By mapping the financial return to the necessary investment—in terms of real economic value—companies can optimize the amount they invest to get the maximum ROI.

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A major oil company implemented a portfolio view that highlights cumulative investment against financial return. Their goal was to extract greater value from their portfolio of investments based on a fundamental analysis of the potential profitability, the business opportunity, and the risks. “*We immediately elevated the level of discussion,*” remarked their Heavy Oil Portfolio Manager, “*everyone knows that technology must match business opportunity, but (SmartOrg’s) Portfolio Navigator™ made it practical and easier.*” Weyerhaeuser’s Russell also mentioned the value of using SmartOrg’s Cumulative Productivity chart to help create more valuable product portfolios.

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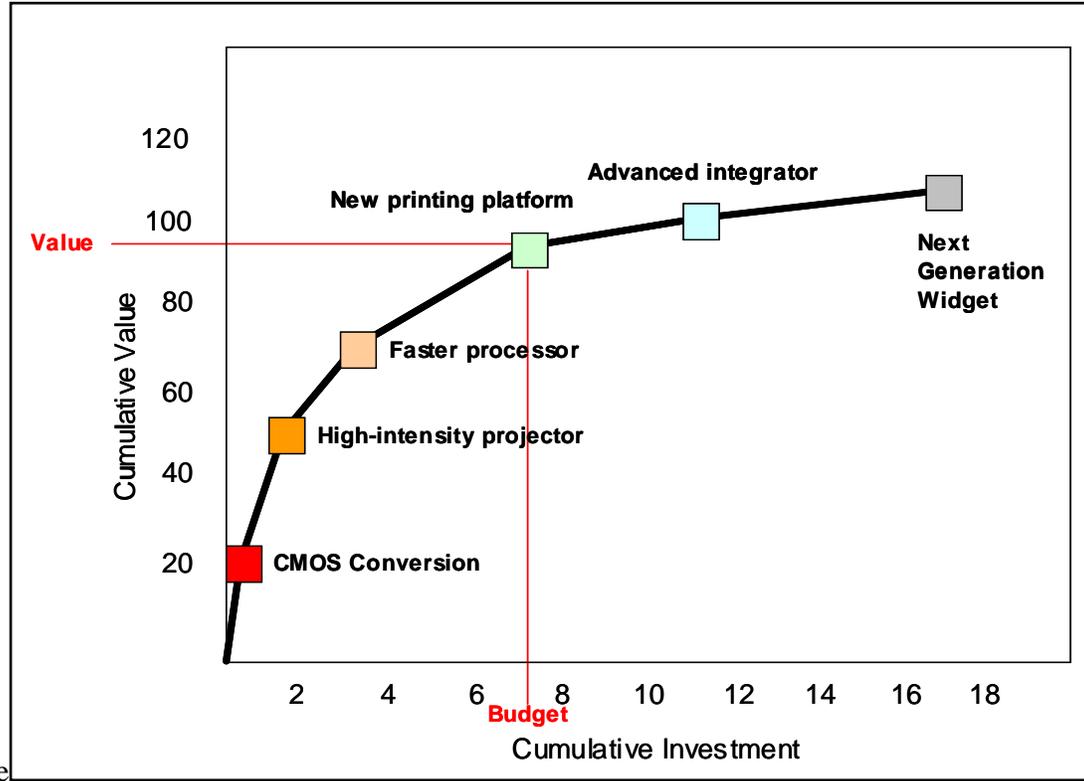


Figure 5: Cumulative Value of Portfolio Returns vs. Cumulative Investment
Source: SmartOrg

Realizing the Benefits - Managing Portfolios and Projects for Value

Focusing on project value is not an entirely new concept. There have been numerous attempts including the use of Real Options, formal Decision Analysis and other techniques. Most of those approaches, unfortunately, have been difficult to understand and implement. Risk and uncertainty by themselves are hard to identify. They are still harder to quantify in terms of project impact. The answer to identifying the risks and issues lies within the multi-disciplinary project teams working on the projects. What is needed to harness that knowledge and creativity of the team is an inclusive way to bring people together—with the right processes and tools—in a way that they can more readily comprehend and contribute to the analysis of risk, uncertainty and value. Workshops and honest conversation about the value of projects and the potential roadblocks are key elements. Without translating this into an actionable model, however, the workshop would lack tangible impact on the project.

Bringing people together is a key to success. Weyerhaeuser runs facilitated workshops—enabled by project valuation software from SmartOrg—with all key project stakeholders to evaluate project risks and uncertainties that can impact economic value. *“In almost every workshop, no matter how routinely the technical people and the business people talk with each other, we surface some jaw-dropping disconnects that exist between these key stakeholders,”* says Russell, *“Our workshops get to important information that is not being discussed in other forms of meetings and updates.”* HP also runs facilitated workshops. Morales describes how the process has convincingly helped projects pass the internal review board for future funding. *“The critical questions have already been identified, and we can show that we have a plan to address them,”* says Morales, *“it makes it easy for the review board to see the value of the project.”* Morales also mentions that other projects have been killed by the project team before being brought to the review board, because the team had already discovered that the project had questionable value based on the workshops. Most of the companies interviewed have used a combination of internal resources and resources from SmartOrg to run the workshops, and are transitioning to run the workshops themselves—what Morales calls *“SmartOrg teaching us to fish.”*

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Beyond the Bubbles – A New Breed of Portfolio Software

The value of bringing people together in workshops is greatly enhanced by a new breed of Value-Based Portfolio Management Software. The current Product and Project Portfolio Management tools are very valuable for solving the problems that they are designed to solve—those of project balance, resource allocation and alignment to strategic goals. Another important genre of tools—which can enhance an existing Portfolio Management investment or work independently of one—provides the needed focus on value. *“I call it Rapid Decision Modeling, it’s like the Computer Aided Design (CAD) system for building decision support models”* says Boeing’s Leonhardi, *“You can have a conversation about a project with a project team, and model the project value during the conversation.”* Leonhardi points out that many project teams can articulate the risks and uncertainties in words, but can’t translate to cash flows and the impact on the balance sheet. *“SmartOrg’s Decision Advisor® allows teams to articulate and visualize the elements of a project’s business model and then creates the financial model based on that information”*

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HP’s Morales explained that they had tried to use mathematical techniques behind technical achievement, but they found that telling the manager the value of the options isn’t the issue. *“What the managers want to know is how to capture the value,”* Morales says, which he supports through the use of Value Maps and Tornado Diagrams.

This new breed of Portfolio Management software manages projects for value—providing a greater focus on project commercial returns for the project teams. The new breed also goes beyond managing the flow in the new product development funnel with support for stages and gates and provides real insight into what should be in the funnel in the first place. In addition to scorecards and bubble charts, Portfolio Management tools are beginning to adopt a more value-based approach to project selection. By reflecting the risk and uncertainty inherent in new product development, portfolio management tools allow businesses to make portfolio decisions on realistic ranges of financial returns and invest in the right selection and number of projects to achieve higher returns on their R&D investments.

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Scholle and others are also leveraging the Internet to improve their portfolio management processes. *“Putting everything onto the web using SmartOrg’s Portfolio Navigator® made managing for value routine”* says Scholle’s Jeffers. Scholle now tracks how project values change as project teams learn about the uncertainties with the greatest potential impact on the project. Scholle now shows the full portfolio in their executive meetings, providing a solid foundation for business planning. *“We saw how likely we were to achieve our corporate growth goals and found a sizeable gap,”* Jeffers remarked, *“With a more realistic picture of project value, the management team recognized the gap in time to close it and achieve our goals.”*

Conclusion

Product Lifecycle Management processes and software tools offer significant improvements to the development and introduction of new products. One category of PLM software—Value-Based Portfolio Management—promises to provide manufacturers with strategic level value through the development of more valuable product portfolios. This new type of Product Portfolio Management solution—focused on the identification and attainment of portfolio value—promises to provide the more strategic benefits not yet achieved through traditional approaches. The new approach promises to unlock greater potential to achieve real values for projects and product portfolios by providing tools and processes to actively analyze and manage portfolio value, uncertainty, and risk in a straightforward way.

One category of PLM software—Value-Based Portfolio Management—promises to provide manufacturers with strategic level value through the development of more valuable product portfolios.

About the Author

Jim Brown has over 15 years of experience in management consulting and application software focused on the manufacturing industries. Jim is a recognized expert in software solutions for manufacturing companies and has broad knowledge of applying Product Lifecycle Management (PLM), Supply Chain Management (SCM), ERP, and e-business applications to improve business performance. Jim began his professional experience at General Electric before joining Andersen Consulting (Accenture), and subsequently served as an executive for software companies specializing in both PLM and Process Manufacturing solutions. Jim is the president of Tech-Clarity, a research and consulting firm dedicated to making the value of technology clear to business. Jim also serves as the PLM Analyst for Technology Evaluation Centers and The PLM Evaluation Center.

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