Predicting the ROI of Change

Implementing process change is a risky business, fraught with uncertainty and unknown cost. Discover how Process Simulation Modeling (PSIM) can help you zero-in on the changes that will deliver a positive ROI!

How Valuable Is Process Simulation Modeling (PSIM)?

Process Simulation Modeling (PSIM) can provide real business value to organizations that are trying to change processes. When companies use the appropriate software simulation – designed for their industry to evaluate process performance, these organizations can improve their operations and achieve higher levels of process maturity with the integration of CMMI. However, regardless of what changes a company is considering, there are always costs and risks involved with any type of change.

PSIM allows a company to examine the changes it want to make, analyze these changes, and determine the impact the change will have on a company's process. "Any changes that have a significant impact on the product outcome can cause a risk exposure – especially if the organization is investing a significant amount of money in terms of tools, technologies and the training or retraining of people," says David M. Raffo, PhD, a full professor at Portland State University with joint appointments in the Business Administration, Engineering and Computer Science Departments. As the co-author of Moving up the CMMI Capability and Maturity Levels Using Simulation, he has extensively studied the benefits of using PSIM to improve organizations and to keep these companies focused.

Dr. Raffo's report, itself, is aimed at practitioners – especially software and systems project managers. Dr. Raffo focuses on how PSIM can be used to evaluate issues related to process strategy, process improvement, project management, technology and tool adoption, and control and process design. He stresses that PSIM is a flexible tool that can aid in quantitatively testing ideas such as how to configure a process – or how to configure a software acquisition supply chain. Moreover, this model fulfills the requirements for Process Performance Models (PPMs) that are essential for high maturity organizations as specified by the CMMI.

Who Should Use PSIM?

When a company has expensive processes or when a company is developing safety or mission critical products, PSIM should be considered. "Recent developments in PSIM tools have drastically cut the costs to develop models for evaluating such issues, and new methods have been developed to apply PSIM – enabling it to rapidly provide greater business value," he says. "At the same time, trends within the software industry towards improving operations and reducing costs have heightened the need for tools to better plan and manage processes."

Dr. Raffo notes that competition in the software industry, and the continuing pressure from low-cost economies, is pressing companies to improve their efficiency – and to find ways to optimize their development and quality assurance activities – locally and globally. "Furthermore," he adds, "as companies improve their operations and establish metrics in order to achieve higher levels of CMMI, the data collected can facilitate the construction of quantitative models."

Today, certain industries such as healthcare, automotive, aerospace and software system development – as well as world governments and the U.S. Department of Defense, are using PSIM to determine if their processes are efficient, and to reduce the risk associated with any changes. Dr. Raffo believes that, in most cases, process simulation more than pays for itself on large projects when this tactic is used to evaluate even one decision.

"What is amazing about simulation is that you can try before you buy," Dr. Raffo says. "You can see what a new tool or improvement would be like on your process and predict your overall performance benefit before you expend the resources to deploy it. That's where your real value comes in. Why spend $100,000 on something that will not work?"

Company Pitfalls if PSIM is not used

Many times, vendors claim a tool will provide a savings or performance improvement. However, when a company uses software simulation to see if that claim is true, this simulation can determine if the tool is right for the company. PSIM can determine if the tool will provide a sufficient benefit even if it does not perform as

well as promised – or if the tool is only half as effective as the original claim. At that point, a company can decide if the purchase of the tool will still provide a return on the investment in training, cost, and time.

Any company can receive benefits by using PSIM, but as with any tool, it is important to know how to use PSIM in order to gain the maximum benefit. The key to using PSIM is to follow a good methodology while creating the model. Most organizations find that working with people who have experience creating process simulation models is a highly effective way to get started. After all, a company needs individuals with experience, and individuals that can transfer that experience to a specific project.

Using PSIM allows a company to evaluate their work flows and quality assurance activities – down to a detailed level if necessary. For instance, by using PSIM, company can evaluate the impact of sending a portion of their product through very specific testing processes while other portions of the product receive standard testing or quality assurance. PSIM then predicts the overall impact on project performance. PSIM also allows a company to implement other "what if" analyses in order to view different scenarios – including best-case, worst-case, and expected case scenarios.

Two Real World Company Scenarios

There are many examples of organizations in the aerospace, automotive, telecommunication and medical software and systems industries that benefitted substantially from the use of PSIM. The following two examples from Dr. Raffo's experience reveal the potential power of applying PSIM.

In the first situation, applying simulation models to evaluate the software development process saved an organization from a potential disaster and quality assurance risk. "If an aerospace organization that we worked with had applied the automated code analysis tool as it originally intended, a major quality exposure would have occurred. Instead," Dr. Raffo points out, "We were able to identify specific project conditions and specific places in the process where the tool could be applied and actually give it value."

In a second case, Dr. Raffo worked with a company that adopted a requirement analysis tool. Everyone at this organization believed that t adopting this tool would provide a great benefit – and all of these individuals were correct. However, when Dr. Raffo and his team performed the analysis, they were able to show the managers that if the tool was placed at an entirely different point in the process,, the organization could save an additional $400,000 to $500,000 per large-scale project.

The Benefits of PSIM Implementation

Organizations can gain many benefits when they utilize PSIM before implementing considerable business changes.

- PSIM improves bottom-line profits – and it can be used to estimate project costs from the bottom up
- PSIM can reveal how to streamline processes within an organization
- PSIM provides higher quality assurance
- PSIM reduces cycle times
- PSIM lowers the risk of making a costly error
- PSIM provides a deeper understanding of the many factors that influence success for complex software development projects.

For instance, PSIM allows an organization to evaluate strategic issues such as optimizing its quality assurance strategy – as well as its validation and verification strategy. By adding specific quality assurance activities, a company can pinpoint where, how much, and what portions of the product should be inspected or tested. This situation enables a company to be very specific about its quality assurance activities – instead of using a broad brush or shotgun approach.

PSIM offers a company a way to gain control of its processes. For example, tools can be inserted in specific places in specific parts of the process – or tools can be used under specific project conditions. As Dr. Raffo says, "PSIM provides a handle on metrics and gives added business value. More software manufacturers and companies are turning to PSIM to support achieving higher CMMI levels or to support their Six Sigma activities".

In addition, PSIM can be used to evaluate the number of sites a company may want to possess and determine if all of these sites are economically feasible. Other benefits of PSIM include assessing the cost of new tools and technology and planning a company's processes.

PSIM is truly an educational software tool, and these models can be tailored to suit an organization or a specific project. An organization simply only needs to look at the data to discover the impact on a particular project. PSIM can be used to process simulation to bring your lessons learned to life. "The whole idea is to see the impact that changes to the process have on project performance. We learned this lesson on one project. Here is what will happen if we apply it to your project," says Dr. Raffo. One of the important facts about process simulation is to realize that ideas that work well for a group in one division - –may or may not work on the processes in another division of the company. Using PSIM, employees can see the impact if the same change is made on their own project. That's true business value".

The Time is Now

Dr. Raffo believes that the time for PSIM technology is the present. "PSIM is the perfect fit for organizations that want to improve process planning, speed technology adoption, optimize process improvement, step up to quantitative project management and move to the higher levels of CMMI."
