

Understanding Business Process Modeling & Analysis:

The First Step to Achieving Breakthroughs in Productivity Improvements

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Understanding Business Process Modeling and Analysis

“The use of business process modeling will surge during the next five years and create a round of economic-performance advances far beyond today’s performance levels in productivity, speed and cost.”
Gartner Group October 2000

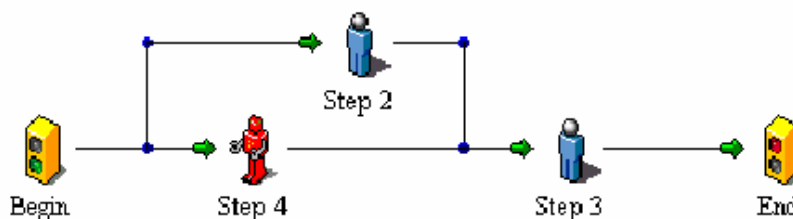
Business Process Modeling and Analysis (BPMA) leverages the computational power of modern software to enable organizations to document, model, understand and improve their business processes. BPMA software tools provide the ability to define and build a model of a business process and then use statistical modeling to analyze its behavior under various scenarios modeling real business conditions. Analysis of the modeled process leads to a better understanding the business operations, critical flaws in the current operational conditions, ways of optimizing them, and an assessment of the resources required to ensure performance consistent with expectations. Results from these analytical activities have often resulted in 50 to 80% improvement in operational efficiency and process improvement.

BPMA is much more than mere process mapping. Process mapping tends to be a static, two-dimensional representation of the process. What is often missing from a standard process map is the data that goes with the flow and the ability to analyze the data using powerful analytical engines. The data, the process flow and the analysis are often the combination that allows for clear identification of bottlenecks, waste in the operation, root cause determination and prioritization of breakthrough opportunities.

The emergence of sophisticated BPMA tools is the result of the confluence of two powerful trends in the past two decades. First the exponential increase in computing power and the increasing sophistication of software has made it feasible to define and analyze complex models of business processes. Second, in the face of growing global competition, businesses have evolved their understanding of key success factors from quality circles, to TQM, ISO 9000, reengineering and finally to Six Sigma methodology. With each evolution the focus has shifted more and more on the design, documentation and optimization of transactional business processes. BPMA tools such as Ultimius Process Designer are at the forefront of the relentless pursuit to optimize business processes, and make them ever more responsive to the needs of customers.

What is BPMA?

BPMA is a category of software tools and analytical activities designed to provide comprehensive capabilities for the design, modeling, analysis, improvement and documentation of business processes. A detailed examination of each component of BPMA is presented.



Design the current process flow

The first stage in BPMA is the design of the business process. In this stage business process owners use their process knowledge to define the “as is” business process. Modern BPMA tools allow users to perform several activities that cumulate in the design of a business process:

1. Graphically create a process map, or an “electronic sketch” of a process that specifies the tasks that must be performed and the sequence of the tasks in series or in parallel.
2. Specify business rules and special conditions that dictate the “flow” of the process. Also delineate the exceptions that are inherent in each process.
3. Identify the resources available to perform various tasks.
4. Outline performance expectations for the time and cost of completing each step and the overall process.

BPMA tools are used to design existing “as is” business processes. This is useful for describing a process the way it is and producing electronic documentation that may be necessary for compliance with ISO 9000 requirements, training employees, and for using the modeling capabilities to analyze the current process for critical flaws in the current process flow.

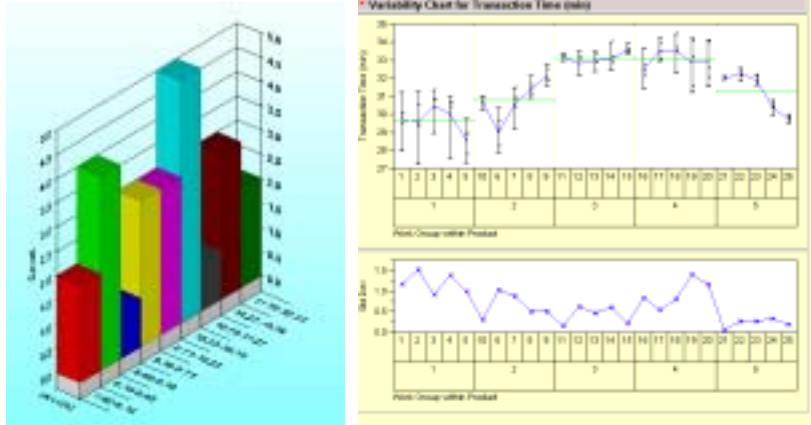
Model the process

Modeling is the second step in BPMA and is best performed by business analysts or process improvement specialists. It involves taking a business process design and making a number of assumptions about the time and cost of each task, and the probabilities of various events that may occur during a business process life cycle. These assumptions should be derived from empirical data generated from studying existing business processes, or can be “guesstimates” for new or uncharacterized processes. The following are some typical terms that need to be defined when modeling.

1. The time it takes to perform each task expressed as a range.
2. The time an individual or a resource is available to perform a task.
3. The cost of the individual or the resources.
4. The probability of occurrence of certain events.
5. The rate or frequency at which new incidents or cases of the business process are initiated.

Based on these assumptions, the process map and the business logic, the BPMA software runs a large number of hypothetical incidents from start to completion. During the course of modeling it captures data about the performance of each step and the overall process. This data is saved for further statistical analysis. In order to clearly examine process behavior we typically need about 100 trials as a minimum. This allows for the ability to include both high and low probability events in the analysis. An output file of the data is then generated and ready for analysis.

A limitation of BPMA is that the data only represents the assumptions you defined when specifying the model terms. Failure to correctly map the process and define the terms in the model will create an invalid representation of the process once the model and associated data are generated. So be extra careful when defining the process flow and model terms.

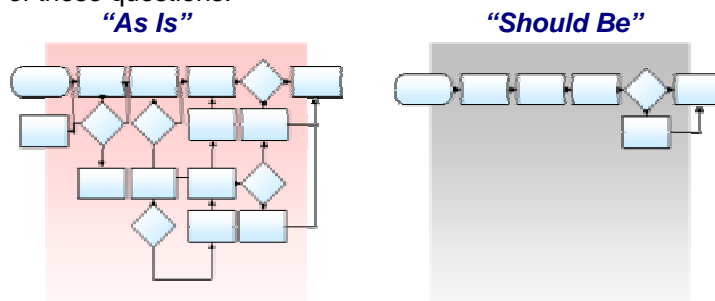


Analyze the data

Analysis of the data involves using the information gathered through modeling to produce metric reports and data tables that enable the analyst to evaluate the performance of the business process, identify bottlenecks, determine if performance is consistent with expectations and discover means of optimizing the business process for improved response or reduced cost. The following are common questions to be answered during analysis.

1. Where are the bottlenecks in the business process?
2. Is the average and standard deviation of the elapsed time for each process step consistent with the expectations of the customers and are the costs in line with what management is willing to pay?
3. How many units or cases can be processed in a given time interval?
4. How many additional resources will be needed to change the number of units processed but not decrease the process time?
5. If a new step is added to ensure compliance with customer requirements or federal regulations, how much will it add to the cost and time?

Modern BPMA tools such as Ultimus Process Designer have integrated analysis capabilities that can be used to answer many of these questions.



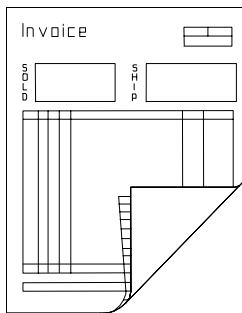
Improve the process

Once the process has been analyzed, process improvements need to be identified and modeled prior to implementation. BPMA should be used to define new variations of the process to create “what if” or

“should be” process models. These are defined as a part of reengineering efforts and allow business managers the ability to compare “as is” processes with “should be” process designs and determine the impact on the business, its resources and performance. The following are some of the core questions that need to be answered when modeling process improvements.

1. If the process is changed and some of the tasks eliminated, simplified or automated, how much will be the new throughput or cost savings?
2. Will key bottlenecks be removed once the process is changed?
3. What will be the new throughput and costs for each operation?
4. How many units can be produced with the new process?
5. What will be the resource requirements to run the new process?
6. Can resources be redeployed and savings generated with the new process?

Typically a pilot or validation phase occurs during the improvement process to determine the effectiveness of the solution and minimize potential risks prior to full implementation. Also we need to see if the predicted improvements are within, lower than or exceed our expectations and predictions.



Document the process

After a process has been designed, modeled, analyzed and improved, the last step in BPMA is documentation. The design of the process encapsulates information that defines the business process, its logic, rules, exceptions, expectations and resource requirements. This information is the essential core of what it takes to produce comprehensive documentation about the process. Documenting the process is valuable for several reasons.

1. Documentation enables the process design to be rendered in to hard copy that can be used for training of employees and the future maintenance and improvement of the process.
2. Documentation can be used for part of the compliance with ISO 9000 requirements. The essence of ISO 9000 is the phrase “do as you say, and say as you do”. The documentation capabilities of BPMA enable companies to readily and quickly comply with the second part – “say what you do”.
3. Documentation can be used to share business process definitions with customers and partners so that expectations are consistent across the supply chain.
4. After designing business processes, many companies take the next logical step of automating the process using workflow automation systems such as the Ultimus Workflow Suite. The documentation is an excellent means of providing the specifications for the development of

automated workflow processes. Workflow automation enables companies to “do as you say” and fulfilling the first half of the ISO 9000 motto.

Based on the improved process flow, modern BPMA tools assist the users by providing the ability to create documentation of the process flow by using Microsoft Word templates designed by the users themselves. The output can then be further edited and expanded using Microsoft Word.

Applications of BPMA

BPMA tools can be used to analyze any kind of process that involves activities (tasks), time, cost, events, rules/conditions and exceptions. These include but are not limited to the following:

1. *Business Processes*: Orders, claims, reviews, trouble-tickets, helpdesk requests are a few examples of the many business processes that can benefit from BPMA. Furthermore, all such business processes are likely candidates for workflow automation, as we shall discuss in a subsequent section. Business processes can either be human-centric workflow processes, or enterprise application-centric EAI processes. Both categories can benefit from BPMA.
2. *Discrete Manufacturing Processes*: Discrete manufacturing of piece goods follow a “production line” process that is very amenable to analysis and improvement by BPMA tools. There are many parallels between business processes that move information from worker to worker in order to produce a result, and discrete manufacturing processes that move parts from worker to worker on the production floor in order to produce shippable products. Batch or continuous manufacturing, such as that involved in the manufacture of chemicals is also a good candidate for BPMA; however, it requires some special considerations.
3. *Service and Logistics Processes*: Any process that involves serving customers or managing logistics may also be designed and improved using BPMA methods. Some examples are: airport security checkpoints, hospital emergency room operations, branch bank teller, fast food counter, etc.

There are a tremendous number of processes that could benefit from BPMA, and in most business operations this is a large potential source of financial savings. Due to the nature and complexities associated with process modeling, BPMA may differ from other process modeling and simulation tools. For example, the tools required to optimize software development may require specialized features not found in most Business process modeling software.

BPMA and Six Sigma

Six sigma improvement projects are becoming common within business operations in order to reduce business costs and improve customer satisfaction. As companies explore opportunities for improvement they discover that somewhere in the area of 60-70% of their projects are transactional business processes as opposed to design or manufacturing related. During Six Sigma projects the role of the Black Belt is to map the process, determine root cause of process problems and determine breakthroughs in performance. Black Belts use the Define, Measure, Analyze, Improve and Control (DMAIC) methodology as their roadmap for improvement.

The following table shows the relationship of Six Sigma activities and BPMA as they relate to business process modeling and improvement.

Six Sigma	Activity	BPMA
Define	High level process map (SIPOC) Detailed Process Map	Design the process map
Measure	Gather empirical process data Determine process capability	Model the process
Analyze	Analysis of data Determine root cause	Analyze the data Identify potential improvements
Improve	Determine "should be" process Eliminate, simplify and automate Determine risks Pilot and validate improvements	Improve the process Automate the workflow Model all improvements Validate improvements
Control	Determine controls Complete all documentation Compute benefits	Document the process Determine cost savings

As you can see from the table BPMA is a natural and integral extension of Six Sigma particularly when the project is heavily weighted toward transactional activities.

Because BPMA software tools are simple to train, simple to use and create an organized method for process mapping and analysis, it is an ideal addition to the tools, methods and software currently used for Six Sigma. Core competency for Black Belts and Master Black Belts include the ability to use BPMA tools for process mapping, modeling, analysis and improvement and as the front-end to further process automation.

BPMA and BPM

When considering business process modeling and improvement, processes can be one of two types: 1) human-centric business processes that involve people and desktop applications commonly called workflow processes or 2) enterprise application-centric business processes that involve back office enterprise applications like ERP, CRM, SCM and sales force automation.

Both types of processes involve the routing of information for the purpose of making decisions or delivering goods and services to internal and external customers. Business process management (BPM) refers to the electronic means of automating both these types of processes. BPM can be an expensive and time-consuming endeavor. There are three major steps in the early life cycle of BPM projects: 1) the design of a business process that involves discovering the business requirements of current or new processes and establishing expectations, 2) model and analyze the business process in order to ensure that it is optimized and must be done prior to the development of the workflow solution, and 3) documentation of the business process using a specific template so that it can be given to the developers for implementation, and is as complete as possible.

BPMA is a powerful and important front end to all BPM activities. A key component of good BPMA software is the ability to use the process flow and documentation features of the software and integrate them for further workflow automation development activities.

Conclusion

Business process modeling and analysis is a key component for understanding, improving and documenting business processes. Expected results from BPMA include the following.

1. Improving business processes “as is” by understanding bottlenecks and capacity constraints
2. Reengineering processes by analyzing “what if” scenarios and Six Sigma methodologies
3. Documenting processes for compliance with ISO 9000 requirements that promote quality through consistency and repeatability.
4. Automating business processes by facilitating workflow automation that can render paper based business processes into electronic based, and ensures that nothing falls through the cracks

BPMA tools such as Ultimus Process Designer provide organizations the means of understanding and improving their business processes and embark on the path to significant productivity improvements through BPM.

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