



Business Process Management in a Manufacturing Enterprise

An Overview



Michael McClellan
© Collaboration Synergies Inc.
Camas, WA 98607
360-833-8400
www.manufacturingbpm.com

PPM Series Paper # 1 2-23



Author

Michael McClellan

Michael has over 30 years of experience serving and managing manufacturing enterprises. He has held a number of positions in general management, marketing, and engineering, including President and CEO for companies supplying capital equipment and material management systems. In addition to numerous articles and white papers on manufacturing systems, he has written two books: *Applying Manufacturing Execution Systems*, which defines and explains manufacturing execution systems and *Collaborative Manufacturing: Using Real-time Information to Support the Supply Chain*, the first definitive examination of collaborative manufacturing concepts. He is also a major contributor to a new book on business process management titled, *In Search of BPM Excellence*. Mr. McClellan has served over six years on the Manufacturing Enterprise Solutions Association (MESA) Board of Directors. He can be reached at mm@cosyninc.com.



Business Process Management in a Manufacturing Environment – An Overview

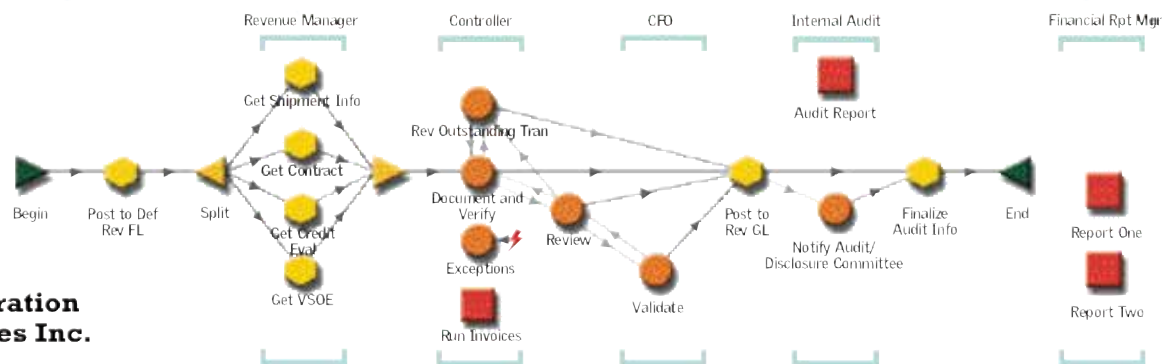
Business Process Management (BPM) is a rapidly growing technology application idea with great potential for operational improvement and cost savings within manufacturing enterprises and their value chains. If you are like most companies the new Enterprise Resource Planning (ERP) system is firmly in place and the Customer Requirements Management (CRM), Product Lifecycle Management (PLM), and supply chain applications are on line. But, even with all the newest technology firmly in place, there are some operational capabilities missing.

1. Major information system applications are still merely islands of information leaving obvious gaps that prevent full information exchange between participants.
2. The promise of collaboration between entities (departments and/or companies) seems impossible due to wide systems disparity and the high cost of programming required to make the desired changes.
3. Functional information interoperability as seen from the managerial perspective is still frustratingly lacking. Departments are still interacting by "throwing it over the wall".

Solving these problems has long been the objective of many people but real help may be on the way if we start to look at operations in a somewhat different view and examine our processes.

What is a process? A process is a series of steps or tasks aimed at accomplishing a defined business objective. There are manufacturing processes, accounting processes, credit approval processes, material receiving processes, inspection processes, product design processes, and so on. A business can have hundreds of processes and most processes can be broken into smaller and lower-level processes and process components that include people and/or information system sources.

Ideally, processes within a company are related and all aimed, directly or indirectly, at serving customers most effectively. In many industries it is not the product that differentiates one company from another but the processes within the companies used to meet customer requirements. It is this process centric view that successful companies are using to meet modern competitive achievement objectives.



Processes have generally developed around commonly accepted business practices. In many companies these practices and consequent processes have never been questioned. Today, extensive operational improvements can be gained through simple observation of how existing processes work and seeking improvement alternatives. Examination of how work gets done has come about due to modern business systems such as ERP that are based on and require consistent business processes. Optimistically what these systems have delivered are, in fact, best practices. Unfortunately, we all know even the best systems are silos of information with obvious voids that require people to do mundane tasks to make the business perform.

Business Process Management (BPM) is aimed at filling those voids between your existing processes. A few examples of BPM will include:

- Adding functionality to existing business systems, such as CRM, ERP, manufacturing execution systems (MES), warehouse management systems (WMS), etc.
 - It is probably less expensive and quicker to extend an older existing application using BPM than to install new software or reprogram the existing software.
 - Design and add new processes as requirements change.
- Link business systems to aggregate data and processes.
 - Build new processes between acquired company systems to provide a full view of inventory information.
 - Connect the MES systems within a value chain to support where-to-build strategies with real-time information.
 - Connect disparate sources of business intelligence within the company or across the value chain to support Sarbanes/Oxley compliance.
- Link a number of systems to provide and support new processes.
 - Build a process to provide demand driven schedule data across a value chain.
 - Connect the manufacturing execution systems to the planning and scheduling system.
 - Develop a process that allows certain CRM users to view and exchange data with the warehouse management and the manufacturing scheduling systems.
- Design, build, simulate, and finalize new stand alone business processes using data from any source.



In most manufacturing companies these ideas would require a significant investment in time and money and, most likely, will not fully satisfy the requirements when the project is finished. Typical implementation usually follows these steps.

- Step 1.** The functional manager or the operations committee is required to define the desired new process outlining in detail what is to be changed. This usually requires an "as is" view along with a "to be" vision.
- Step 2.** When the operations committee has completed their homework the project is turned over to the IT department for development and implementation. IT is not typically sitting on their hands with nothing to do. They have an existing backlog of work that requires the new project to be examined for its worth and put into the queue based on some evaluation process.
- Step 3.** The IT analyst begins by delving into the project requirements and examining the ability to satisfy the project needs using as much existing information tools and data as possible. A budget has been set and it is the analyst's job to meet the requirements within the cost constraints. Based on the analyst's concept, a detailed plan is built identifying all the systems work necessary to do the job. A fundamental part of this is the graphical outline of the process indicating process steps such as events, inputs, decision points, etc.
- Step 4.** The programmers swing into action developing new code to fit the application based on what they interpret from the analyst's presentation. Code is written and tested, and equipment is purchased.
- Step 5.** The finished product is presented to operations. Necessary changes are made to debug the system, respond to new requirements, and address requirements that could not be met.
- Step 6.** The operations committee finalizes and accepts the end product in spite of changes that should be made based on items not seen prior to coding and implementation. Business conditions have changed and some revisions to fully satisfy the users are requested. IT is busy so the requested changes must be again put into the queue awaiting action. Typically, when there is available staff to make the changes, the original person or group is on another project and the learning curve restarts from some point just above zero.



In some companies this development process goes a long way to build what has been called the great IT divide – that no-mans-land between IT departments and the operational departments that rely on their expertise. A significant promise of BPM is to radically alter this very difficult relationship by a) vastly shortening the process; b) putting the process more or fully in the hands of operations; and c) building and implementing processes in a way that they can be easily and quickly designed, developed, simulated, revised, implemented, and revised again and again as necessary to meet changing business needs.

BPM is a far advancement from hard programmed workflow systems but you are still NOT going to turn process development over to the janitor. This is very serious work that requires understanding the current state of existing processes within the company and being able to visualize the new. A key perspective here is to see BPM as a enabler of business unit processes, not as a technology. Where applications such as CRM, manufacturing execution systems or warehouse management systems are an assortment of technology function, BPM is a tool that allows users to design, build, and implement functions and processes that suit their needs. As Microsoft Word is a tool to create and manage documents, BPM is a tool to create and manage processes.

With BPM process development is speeded up by system modules used to model the new process, identify the operations required, identify and locate the data sources and convert this to an operating process. The process can be simulated to identify any operational problems or design faults. The process can be revised with each change identified and tracked, thus building a process lifecycle history. Other versions of the same process could be used to accomplish other tasks. The beauty of this approach is the ease of process development and implementation. The ability to simulate the process and observe actual performance brings great real-time management control. Process changes do not require coding but are accomplished through applying icons from a palette. In fact it is likely that a large number of processes will be developed and applied with copies held in libraries for later use in other requirements. Another approach is to use slightly varied instances of a process such as order entry for a retail item, each designed to fit a specific customer or group of customers such as WalMart, Sears, Safeway, Albertsons, and Target. It is likely that each company would have its specific process or processes.



Earlier the steps to develop or make changes to business processes the old fashioned way were shown. The time and effort to make the same changes using BPM is substantially easier and faster.

- Step 1.** Step one still requires identifying what the revised process is to do, the necessary process steps and logic, data sources, and necessary human intervention. BPM brings nothing new here until we have a library of processes to review, modify, and reuse.
- Step 2.** Model the process using graphical icons representing the steps and flows within the process and between the process and all resources. Flow is modeled by using icons representing different activity types. The model is created graphically and saved in a process modeling language that is also used to generate the runtime components. Modeling the process does not require programming or significant IT skills. My preference is that the modeling should be done by operations people that best understand the context behind how the process is to function.
- Step 3.** Simulate the process in operation and make changes using the graphic icons. At this point the logic of the process has been fully developed with no code development. Identifying and connecting to the process resources is likely to require IT presence depending on the breadth of the new process but most of the software to make the connections should exist in the library of the BPM system supplier. Simulation allows viewing the process under operating conditions and provides an environment where changes can be made prior to actual use.
- Step 4.** Run the new process. The BPM system comes with modules that convert the model to an operating process and run the process. The process can be managed, viewed, tracked, changed and measured. There can be any number of instances of the process and the full history of the process lifecycle is available. Instead of specific software coding the process now is similar to any document, available for reuse or revision as necessary.



A modern BPM system is typically made up of these modules.

Process modeling The new business process is modeled and developed through the use of graphical tools that define steps and events in the process. By using 30 to 40 drag and drop modeling icons available from a palette the process can be outlined and reviewed.

Process connectors BPM packages come with a library of software components that form the links with the new process and the various connect points of the process such as ERP systems or MES systems. This could include existing processes and procedures from existing process sources. The connectors are frequently based on web access to various systems but connectors can be provided to legacy systems without web access.

Process manager One of the more significant impacts of a BPM system is the ability to manage processes and make changes easily and quickly. It is possible to simulate a process using real data prior to actual use to identify potential problems and make changes. Measurement of the performance of a process to see frequency, cycle time, and process histories is common. Process lifecycle management provides the ability to trace the full development and history of the process much like reviewing the revision levels on a product design. It is possible to use instances of the process with variations to suit specific business needs. One example is a shipping process that is tailored to fit individual customers.

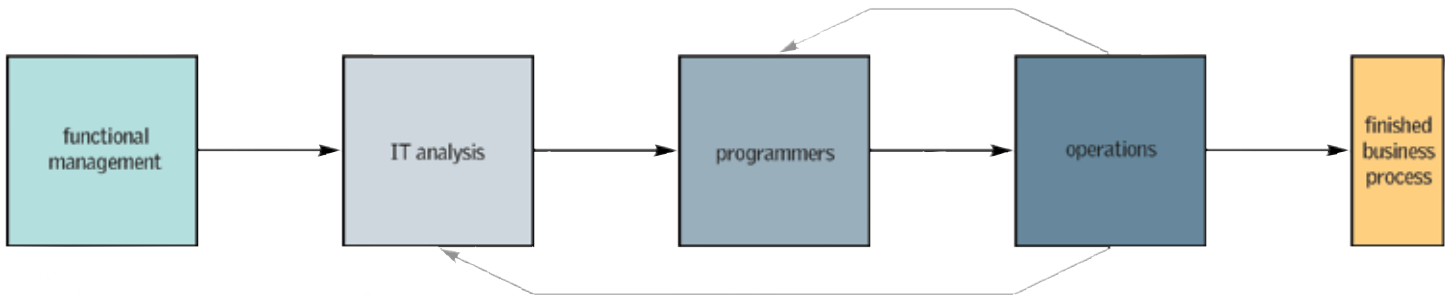
Process system server This is the core system component that provides the transactional execution of the processes.

Begin by assessing where you are and how the technology might affect your company over the next few years. Examine your ability to make changes to processes or even understand how the existing processes work and/or were developed. Think in terms of cross functional requirements that begin with the customer and conclude as a satisfying financial return. If the vision is adequately holistic and seen from the high-level, lower level processes and their intersection with departments and information sources will be somewhat self-evident.

This is a rapidly growing area of manufacturing enterprise management progress with major analyst firms estimating growth as high as 30 percent or more per year. After some initial assessment it would be surprising if you could not see major opportunities for improvement by using this tool. Initial demonstration and proof of concept can be very inexpensive and frequently done in a matter of days. Review other areas of the Collaboration Synergies Inc. website to go over our manufacturing information technology system strategies, needs assessments, and implementation methods. You will also find information on application suitability assessment, executive overview presentations, and user level training. Call if you have any questions.

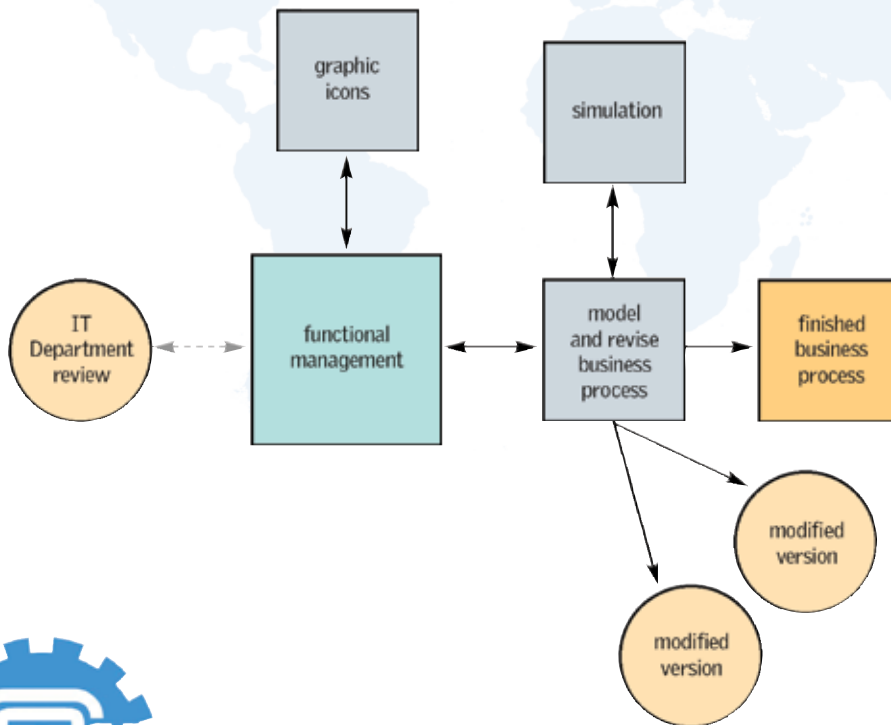


Time to beneficial use – weeks to months



1. Functional management defines the new process, outlining in detail what is to be changed. Provide an "as is" view and a "to be" vision.
2. Turn project over to IT for implementation. IT provides new input, accepts the project places the project into the current queue.
3. IT begins analysis. Detail work includes estimating costs, process event and data definitions, schedule, equipment, programming needs, etc.
4. The analyst relays his requirements to programmers. Coding of the process and information sources (other systems) gets developed and tested. Equipment and available software is purchased.
5. The finished product is presented to operations. Some changes are made. Time is a major constraint.
6. Operations finalizes and accepts the deliverable in spite of revisions necessary due to business changes and conditions not seen prior to coding. Temporary workarounds are put in place.
7. IT puts the project back in their schedule to make the revisions until there is acceptance.

Time to beneficial use – days to weeks



1. Functional management defines the new process outlining in detail what is to be changed developing the "as is" and "to be" visions.
2. The process is modeled by functional management using graphic icons to identify the "to be" process steps.
3. The modeled process is simulated to test the assumptions and examine performance.
4. Changes are made to suit and the process is converted to a run environment.
5. The process is viewed, tracked, measured, and changed, using the BPM system. Changes are easily made to fit new business issues and modified versions of the process are used elsewhere.

Fewer people involved
Substantially less time
Significantly less cost





Michael McClellan
© Collaboration Synergies Inc.
Camas, WA 98607
360-833-8400
www.manufacturingbpm.com