

What is Workflow?

Workflow can be described simply as the movement of documents and tasks through a business process. Workflow can be a sequential progression of work activities or a complex set of processes each taking place concurrently, eventually impacting each other according to a set of rules, routes, and roles.

A number of process-modeling techniques are available to define the detailed routing and processing requirements of a typical workflow. An example of one such method, called the Decision-chain process model, is shown in figure 1. This technique uses milestones and decision points to map out the process. In figure 2, the Event-flow process model depicts the process as a chain of manual and automatic events and allows for the inclusion of considerable detail.

Figure 1. Decision-chain Process Model 4(4)

Simulation, Prototyping and Piloting: Some systems allow workflow simulation or create prototype and/or pilot versions of a particular workflow before it goes into production.

Figure 2. Event-flow Process Model(5)

Workflow Management Systems

Workflow Management Systems allow organizations to **define** and **control** the various activities associated with a business process. In addition, many management systems also allow a business the opportunity to **measure** and **analyze** the execution of the process so that **continuous improvements** can be made. Such improvements may be short-term (e.g., reallocation of tasks to better balance the workload at any point in time) or long-term (e.g., redefining portions of the workflow process to avoid bottlenecks in the future). Most workflow systems also **integrate** with other systems used by the organization: document management systems, databases, e-mail, office automation products, Geographic Information Systems, production applications, etc. This integration provides structure to a process which employs a number of otherwise independent systems. It can also provide a method (such as a project folder) for organizing documents from diverse sources.

Figure 3. The Workflow Management Coalition Diagram of Process Flow Across Applications

Typical Features

Listed below are some typical features associated with many Workflow Management Systems.

- **Process Definition Tool:** A graphical or textual tool for defining the business process. Each activity within the process is associated with a person or a computer application. Rules are created to determine how the activities progress across the workflow and which controls are in place to govern each activity. Some workflow systems allow dynamic changes to the business process by selected people with administrative clearance.
- **Simulation, Prototyping and Piloting:** Some systems allow workflow simulation or create prototype and/or pilot versions of a particular workflow so that it can be tried and tested on a limited basis before it goes into production.
- **Task Initiation and Control:** The business process defined above is initiated and the appropriate human and IT resources are scheduled and/or engaged to complete each activity as the process progresses.
- **Rules Based Decision Making:** Rules are created for each step to determine how workflow-related data is to be processed, routed, tracked, and controlled. As an example, one rule might generate email notifications when a condition has been met. Another rule might implement conditional routing of documents and tasks based on the content of fields. Still another might invoke a particular application to view data.
- **Document Routing:** In simple systems, this might be accomplished by passing a file or folder from one recipient to another (e.g., an email attachment). In more sophisticated systems, it would be accomplished by checking the documents in an out of a central repository. Both systems might allow for redlining of the documents so that each person in the process can add their own comments without affecting the original document.
- **Invocation of Applications to View and Manipulate Data:** Word-processors, spreadsheets, GIS systems, production applications, etc. can be invoked to allow workers to create, update, and view data and documents.

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- **Worklists:** These allow each worker to quickly identify their **current tasks** along with such things as due date, goal date, priority, etc. In some systems, **anticipated workload** can be displayed as well. These systems analyze where jobs are in the workflow and how long each step should take, and then estimate when various tasks will reach an individual's desk.
- **Task Automation:** Computerized tasks can be automatically invoked. This might include such things as letter writing, email notices, or execution of production applications. Task automation often requires customization of the basic workflow product.
- **Event Notification:** Staff and/or managers can be notified when certain milestones occur, when workload increases, etc.
- **Distribution (Routing) Lists for Messages/Mail:** Distribution lists can be created for sending ad-hoc messages among the staff.
- **Process Monitoring:** The system can provide valuable information on current workload, future workload, bottlenecks (current or potential), turn-around time, missed deadlines, etc.
- **Access to Information over the World Wide Web:** Some systems provide Web interfacing modules in order to provide workflow information to remote customers, suppliers, collaborators, or staff.
- **Tracking and Logging of Activities:** Information about each step can be logged.
- **Administration and Security:** A number of functions are usually provided to identify the participants and their respective privileges as well as to administer routines associated with any application (e.g., file back-ups, archiving of logs).

Benefits

The introduction of workflow management tools should be seen as an opportunity to improve both the underlying business process and the existing organizational structure. Many benefits can be accrued if the workflow management system is implemented as part of a broader business solution.

Opportunities for Organizational Change: Workflow Management Systems can help agencies and departments achieve the organizational changes necessary to operate effectively in today's world. These changes might include the move to a **flatter organizational structure** and **greater team orientation**. Since activity steps, roles, and rules are built into the system, less intervention should be needed to manage the business process. In addition, improved communications provided by notifications, document sharing, and an improved understanding of the process itself can lead to increased collaboration among team members and/or across teams and business units. Workflow management systems tend to unify people with diverse skills into a more cohesive unit.

Workflow definition tools also allow for the **separation of IT from workflow management**. This puts the business process immediately and directly under the control of the people using the system.

Opportunities for Process Change: Since workflow systems force organizations to examine and define their business processes, it is the ideal time to consider **business process reengineering**. In fact, it is essential that an underlying process be analyzed and improved prior to workflow system implementation in order to avoid further embedding of bad practices. James Kobiellus suggests that an organization optimize a process with any of three goals in mind: "minimizing process time, maximizing value-added process content, or maximizing flexibility at the initial point of customer contact." (6) He provides some guidelines for achieving each of these:

- To minimize process time
- To maximize value added content (i.e. improve the quality of your product or reduce its price)
- To maximize flexibility (i.e. more fully address customer needs) at the initial point of contact

Just as important as reengineering is workflow management's support for **continuous business process improvement**. Systems which log information about how the defined process is actually working in practice provide valuable insights into areas which might be better tuned. Since business people can define workflow without IT involvement, there is more likelihood that process changes will occur.

Improved/Increased Access to Information: Workflow management systems build corporate knowledge. **"Workflow takes the business intelligence that comes from experience and embeds it ..."** (7) Process information that may have been scattered among various staff members is now combined and available to all employees. This is especially useful to newer employees who may have limited understanding of a more complex business operation.

"Workflow environments encourage knowledge workers to add greater structure - in the form of routing lists,

receipt notifications, version controls, (and procedures)...”(8) Staff are now more likely to provide information to other members of the team. **For any particular project or job, more information about both the history and the current status of the process** is now available for any staff member to view.

Improved Security and Reliability: Workflow management “provides secure storage and access to a consistent set of all of the data related to a service.”(9) Workflow management unites data from many different applications and provides this data with organization and integrity. Using mechanisms such as role privileges (determines who can access and/or change information), process control (e.g. a document may need management approval before moving on to the next step), version control, and system back-ups, the data becomes more reliable.

Trade-Offs

Investments in workflow tools will not solve underlying problems in the business process if the tool is simply used to automate existing bad processes. In fact, problems can accelerate as bad processes are hard-wired and flexibility is removed. Issues to consider before implementing any workflow system include the following:

Worker Resistance: Human-factor issues represent the greatest obstacle to the acceptance of workflow applications in more than 50 percent of cases, according to Thomas Kolopoulos in his book **The Workflow Imperative**.(10) Many workers will see workflow management as a mechanism for removing their decision-making power or will see it as an instrument of downsizing. Others will resent being monitored and feel that the system is an invasion of their privacy. Still others will miss the interpersonal give-and-take which might now be replaced by an automated system.

Overmanagement: Workflow processes can be defined at any level of detail. A system which attempts to dictate and monitor every detail of the process may be excessive and incur unnecessary overhead as well as worker resistance.

Loss of Flexibility: Some business processes require workers to remain flexible and use personal judgment. These are generally not good candidates for workflow management.

Technical Implementation Costs: Workflow management systems can be complex, requiring a variety of resources to implement and manage. Cost considerations include development and maintenance of the network, the purchase price of the workflow software products, application development and implementation, and customization of the product.

Costs of Defining Complex Processes: The business process itself may be difficult to define and even more difficult to reengineer. Success depends on management and staff commitment and can be expected to take a considerable amount of time. A reliable workflow definition requires a detailed understanding of the underlying business process.

Creation of New Work: Managing the business aspects of the system as well as the technical aspects of the system will create additional work which must be offset by anticipated savings or benefits.

Choosing the Right Process

Processes which will benefit most from managed workflow are those that will find advantage in a defined or controlled process as well as profit from the integration of that process across coordinated systems. Typical candidates are those processes which are document intensive, include lots of hand-offs among participants, and require high process integrity. However, simple and/or ad-hoc processes can also benefit from managed workflow if they are implemented with a corresponding simple and flexible workflow management system.

The following criteria for spotting processes which might benefit from workflow management have been suggested by James G. Kobielski in **Workflow Strategies**.(11)

- **Speed:** Prolonged processes are often the first to get attention when looking at workflow solutions. Complaints from customers, suppliers and managers (“Why does this take so long?”) often provide the incentive for improvement.
- **Cost:** Costs to be aware of include high labor costs and frequent routing of simple tasks to high-priced personnel.
- **Accuracy:** Danger signals might include complaints about process integrity as well as problems pertaining to accurate record keeping.

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- **Quality:** Is the quality of the end-product inconsistent?
- **Customer Satisfaction:** Does the process generate a steady stream of complaints or citizen confusion?
- **Flexibility:** Rigid procedures will usually benefit from allowing some sort of employee override, as long as the staff is required to explain and justify their actions.

Once candidates for process reengineering are identified, priority can be given to those solutions which will most positively impact the organization. One method is to prioritize an organization's critical success factors (perhaps from the above list) and then obtain consensus on which projects will address the highest ranked items.

Success Factors

Intergraph's publication, **Intergraph Asset and Information Management**,⁽¹²⁾ and James Kobiellus' book, **Workflow Strategies**,⁽¹³⁾ each outline a number of recommended practices for implementing successful workflow management systems. Among these are the following:

Focus on Business Objectives: Spend some time studying the organization and determine which potential workflow management benefits are most important to overall success. Choose projects which support core objectives.

Focus First on Projects that are Well Understood: For initial implementations, choose projects with clearly understood process activities.

Use Metrics: Take baseline measurements so that expected benefits can be quantified. Once implemented, track these metrics in order to spot favorable or unfavorable trends. Examples of metrics include: length of cycle, labor hours to complete the process, length of worklist queues, number of errors, time used to access data, and revenues generated.

Obtain Support of Upper Management: A quantifiable business justification is most persuasive in obtaining senior management support. It is important that this support be available and visible for the long-haul (planning, implementing, and refining) and not just for project approval.

Obtain Support of Staff: The staff must be involved in the redesign process and understand that the new process will fail without their commitment. Reassure staff that the new process will automate mundane tasks in order to free up their time for more productive work. Although more structure is being added to the process, critical tasks will still be dependent on employee knowledge and effort. Staff should also know that they will receive adequate training and will be given enough time to learn the system before benefits are expected to accrue.

Integrate with Current Systems and New Systems: Many of the advantages of workflow management systems are the result of its integration with existing systems already being used in the business process. The purpose of workflow is to integrate these systems and add integrity to the process. In addition, many of the goals of workflow reengineering can only be obtained as a result of new systems being implemented along with workflow management. These might include document management systems, enhanced transaction applications, or Internet/Intranet access.

Implement in Phases: Start with a small first-phase with just a few users and/or a limited number of activities. In later phases, expand the number of users quickly and expand the system's functionality (but do not expand both in one phase).

Seek a Scalable Solution: Although an organization might wish to start small, it is important to be able to grow with whatever technical solution is chosen. Plan for the long term.

(4) James G. Kobiellus, **Workflow Strategies**, 52.

(5) James G. Kobiellus, **Workflow Strategies**, 53.

(6) James G. Kobiellus, **Workflow Strategies**, 39.

(7) **IW**, August 18th, 1997. Vol. 6 Iss. 11, 23.

(8) James G. Kobiellus, **Workflow Strategies**, 28

(9) **Intergraph Asset and Information Management**, Ch. 4, 3.

(10) Thomas Koulopoulos, **The Workflow Imperative**, 40-41.

(11) James G. Kobiellus, **Workflow Strategies**, 20-21.

(12) **Intergraph Asset and Information Management**, Ch. 4, 5, and 6.

(13) James G. Kobiellus, **Workflow Strategies**, Ch. 1 and 2.