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WebSphere® software

Driving strategic value with process automation

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Introduction

Although many organizations are investigating the applicability of end-to-end business process management for their organizations, it is clear that simply automating existing manual processes delivers strong tactical and strategic value. This paper describes the nature of process automation and helps you uncover and pursue high quality opportunities within your organization.

I. What is BPM?

Business process management (BPM) is a discipline that combines software capabilities and business expertise to accelerate business process improvement and to facilitate business innovation. BPM governs an organization's cross-functional, core business processes. It helps to achieve strategic business objectives by directing the deployment of resources across the organization into efficient processes that create customer value. This focus drives overall top-line and bottom-line success by integrating verticals and optimizing core work. This differentiates BPM from traditional, functional-management disciplines. A key aspect of BPM is having continuous process improvements, perpetually increasing value generation and sustaining the market competitiveness (or dominance) of an organization.

All of these goals are best achieved by following the primary phases of BPM: business process modeling and analysis, business process automation, and finally business process monitoring. Doing the phases in this order is important. Figure 1 outlines these phases graphically.

Business process automation is imbedded within BPM and reuses business process models that are captured, analyzed and optimized by line-of-business people. For automated execution, every activity outlined in the process model requires a piece of software that resides as a service in the underlying IT infrastructure. Each service is invoked from the process engine when navigating through the process model during run time. While the business processes are executed, data and events are generated and are presented for business process monitoring and further optimization. Business processes that are automated in that manner can be made available as services to be used by high-level business processes.

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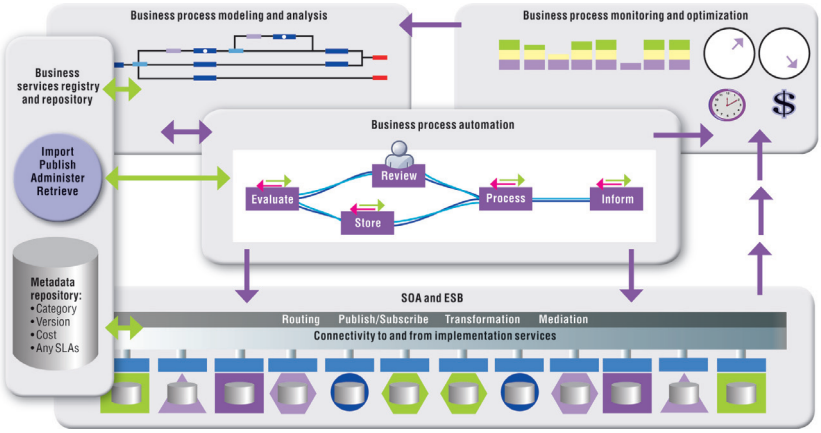

Figure 1. The phases of business process management

BPM automates business processes for performance monitoring after these processes have been analyzed by business process owners and business analysts for optimizing before going into production. Once in production, business process monitoring—based on predefined key performance indicators (KPIs)—allows active management of the overall performance of corporate business operations based on these processes. The services required for various process activities can be increasingly administered in services repositories, and can finally be used directly for business process modeling.

A. Looking back in history—what BPM really is all about

Apart from all technical issues and challenges (which will be discussed in this paper), BPM is all about people because it changes the way people do and will do their daily business. This affects people within organizations, and beyond. Studies show that in BPM only 20 percent or less is about technology—the rest is change management and business transformation, including changing business models sooner or later, organizational and cultural issues, questions about governance, and so on.

If you compare articles about industrialization, dating back to 1770, with what we want to achieve with BPM enabled by service oriented architecture (SOA), you will find quite a few similarities. It is interesting to remember that only a few inventions changed the world substantially—inventions such as the water (or spinning) frame machine, steam power and assembly lines. These three inventions led to factories, the railroads (which dramatically changed the speed and costs of transportation) and assembly lines, providing mass

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production at high speed and low prices. These inventions changed business processes and business models heavily. But besides all the process automation aspects, these changes were all done by people, and then enjoyed by people. Not only did enterprises change, the whole world changed. Many additional innovations and inventions were the result of the previously mentioned basic innovations. So if we talk about BPM and people, this is much more than just people interaction, including automating tasks that were done manually in the past. It includes how people model processes and services, what they do with the insights provided by business process monitoring, how they provide services and run an IT infrastructure, how they will change their business models followed by new business processes and services, and so on.

BPM and SOA are introducing virtual and global assembly lines. Services will move to places where they are implemented effectively at low cost. Transport cost does not matter, because delivering digital information through today's networks is almost free—today's telecommunication technology is what the railroads had been back in the nineteenth century. Just as with industrialization, organizations will see innovations in three areas:

1. New ways and technologies for implementing services (behind the services interfaces)
2. How perceptive people will invent new business models by using existing services in new ways (new "service choreography" styles), while requesting new services not yet in existence
3. Invention by individual people of new services for new businesses, which will again be used by bigger businesses

These virtual assembly lines are controlled by business processes. The identified and ad hoc steps of these processes are implemented in services and hosted in IT infrastructures following the concepts of SOA. Link that with Web 2.0 technologies and ideas of BPM 2.0 and you will see how all of this will accelerate over time—just as industrialization accelerated because various growing parties created requirements leading to common growth and wealth.

Let's call this trend digital industrialization. And we're just at its beginning. Business process automation, including how people interact with these automated business processes, is key for a successful business transformation required for doing business today and tomorrow.

B. Why is there so much interest in BPM today?

Introduction—Drivers of business process management

Today, more and more organizations facing aggressive market challenges share the same opinion: In order to be more agile and act faster in response to market changes, companies must understand not only their business processes better and in more detail, but they must be able to change them more quickly. Business processes represent the organization's key assets. The way a company invents, provides and controls its core products and services depends on its core business processes, and how efficiently these can be managed and adapted to market changes is critical. Therefore, management of business processes and their efficient execution on a large scale is more important than ever.

C. What are the key BPM capabilities?

BPM provides key capabilities that make it strategically important to your business:

- *Leverage for efficiency*
- *Respond faster*
- *Manage change*

These factors might seem unrelated to IT because they are typically things you would think about for strategy or organizational change, but that is why BPM is important. It really isn't just about software but what the capabilities do for you.

Leverage for efficiency

By leveraging your existing assets you create efficiency in your organization. BPM enabled by SOA provides the ability to leverage your organization's assets to their fullest extent. BPM solutions help you maximize asset reuse. You don't have to rip out and replace your IT systems and your existing applications, and have your developers and analysts learn new programming languages to take advantage of business process management. They are assets and become part of the greater BPM solution.

How does process automation work?

There are two basic requirements for process automation: First, to have a plan of how something should be done, and second, to have a machine that follows that plan. This means that smart people have to provide two things: the plan (or model) and the machine that understands the plan. Machines are not at all smart; everything that needs to be done automatically by the machine has to be defined by people before the machine can actually do it. The machine then simply follows the plan created by the people. A simple example of automation is a coffee maker. A coffee maker is a human-invented machine that automates coffee making, following predefined instructions. After a person provides the coffee, water, and cup and then presses the "start" button, the machine follows these instructions in the predefined sequence and delivers a hot cup of coffee—fully automated.

This concept of automation is true for more complex automation scenarios as well. Smart people have an automation idea, they need to create some kind of machine, and they must define the plan that describes what steps should be done by the machine and in which order. This plan generally includes requirements for resources that allow the machine to perform. (In the case of the coffee machine, the resources required are: water, coffee powder, coffee cup, electricity, and a human to get it started).

Respond faster

BPM allows your business to be agile and responsive to unpredictable market forces—such as mergers and acquisitions, expanding regulatory requirements, and globalization. It improves your business's ability to respond to customers, partners and the competition. BPM allows you to develop flexible business processes based on an SOA, which enables you to optimize business processes and functions, integrate business processes with your underlying infrastructure, and make changes on the fly without rewriting all your software. Building BPM capabilities on top of SOA enables you to achieve these advantages fast, with reduced risk and cost effectiveness.

Manage change

As your IT infrastructure becomes more complex because of expanding products or mergers and acquisitions, you must streamline processes to keep employees productive and to keep customers satisfied. BPM helps you align IT resources with business priorities, while increasing IT infrastructure flexibility.

BPM capabilities are based on the market-leading IBM SOA platform, an industry-leading middleware platform for end-to-end integration across the value chain. The products that make up the IBM WebSphere® platform are designed to help you maximize performance, scalability and adaptability, providing compounding value that enables:

- *Business-process change through process modeling and simulation.*
- *Business-process deployment and composite-application building through process automation.*
- *Business-activity monitoring through process management.*

D. What are the components of BPM?

BPM basic components are:

- *Modeling and simulation*
- *Business activity monitoring (BAM)*
- *Rules and pre-built frameworks*
- *Content-centric processing*
- *Process automation*
- *Collaboration between people*

How does process automation work?

In this paper we discuss what it takes to automate business process. As you might guess, conceptually you need the same ingredients as required for the coffee maker: You need smart people that think about the plan (which is the process model), then you need a machine (which is the process engine that understands the plan), and you need resources to allow the machine to execute the plan (such as process data, back-end application adapters or services that provide back-end invocation), maybe humans for human interaction, and so on. If you have all of this, you can automate your business processes.

After you automate a process, other people might use the "new" machine (or in our case, the new process model) for higher-level machines (or higher-level processes). Building on this, people will further innovate business models, reusing what others have created for a foundation.

Modeling and simulation

Modeling and simulating your processes enables you to gain an operational-level understanding of your business, provide valuable insight into why your business performs the way it does, and give you the tools and insight you need to identify how you can maximize business performance by creating a better business design. And the collaborative environment with version control creates a "sandbox" for business innovation—enabling you to test the impact of business-process change practically without risk.

IBM WebSphere Business Modeler is a tool that allows business managers to design and simulate end-to-end business processes. The tool includes drag-and-drop business-process modeling, providing a structured environment that allows easier participation in business-process design. Best-in-class simulation and analysis allow you to run the process with real business constraints, enabling your company to obtain valuable business-performance information.

Business activity monitoring

Complex, siloed processes, applications and infrastructure can make it difficult for business leaders to respond to market opportunities, competitors' moves and regulatory changes. You can track the real-time and historical process-performance times by monitoring key performance indicators (KPIs). Business-level dashboards enable you to track and audit individual work items for compliance. You can use this insight to understand where processes are slowing down—and make adjustments to continuously enhance the effectiveness of tasks and operations. By measuring business-process performance, you can help ensure that you provide the best possible service to your customers and trading partners. IBM WebSphere Business Monitor provides these functions and enables you to understand how processes are performing, where slowdowns occur and how work items are progressing.

Rules and pre-built frameworks

Businesses need a way to flexibly combine IT assets into composite business applications to achieve greater business-process flexibility, faster time to market and lower operating costs. Composite business applications are based on reusable, business-level building blocks called business services, which are policy-driven, customized by business context and dynamically called at run time.

IBM WebSphere Business Services Fabric is a comprehensive SOA offering that extends IBM's BPM offering to assemble and manage composite business applications. It uses business services as the primary element of reuse across multiple business processes and applications, and achieves increased levels of service reuse through the life-cycle management and governance of business services. Business-level policies and metadata determine the behavior of business services, which can be customized based on business context to meet the needs of different business users, customers, partners and IT-infrastructure environments. To accelerate the deployment of industry-specific composite business applications, optional IBM Industry Content Packs contain pre-built, industry-specific SOA accelerators and templates. In addition, IBM Global Business Services offers industry solutions with pre-built assets called composite business services that accelerate deployment of both vertical and end-to-end processes.

Content-centric processing

Certain business processes are content-intensive. Such processes typically involve creation, review and approval of content throughout. Content is usually maintained in a content repository and managed in an enterprise content management (ECM) platform, such as IBM FileNet® P8, that provides capabilities such as versioning, search and metadata management. IBM FileNet P8 is a unified ECM platform with comprehensive and integrated process, content and compliance solutions.

Process automation

The final component of BPM to consider is process automation. As demonstrated in Figure 1, this is the driver in the middle of the BPM process that bridges business process expectations (modeling phase) with business process reality (monitoring phase), accelerating overall business process efficiency in terms of process quality, cycle time, resource allocation and cost behavior. IBM BPM solutions reduce the resources required to update or automate integration solutions. The comprehensive BPM portfolio includes not only model-driven development tools and monitoring tools, but also includes IBM WebSphere Process Server, a business process server to help you automate formerly manual tasks to business processes across multiple systems or applications. The process automation that WebSphere Process Server provides, and what that means for your business, is the focus of this paper.

Collaboration between people

As outlined in the introduction, finally all efforts done for BPM, and all benefits achieved from BPM, are helping us—the people—to better manage our daily work, our business processes and business operations end to end, and therefore our businesses in total. This can be done only if all required insights into BPM are presented to us the right way by state-of-the-art, widely accessible (graphical) user interfaces. Because many different people with many different roles require access to the BPM system, this user interface must be able to serve all these different needs to allow people to work more efficiently with business processes, based on their individual job descriptions.

This unique and unified user interaction experience is provided by IBM Business Space, a framework to create business user clients that allows for composing multi-functional business process interaction aspects provided from various BPM components (as mentioned in this chapter) and beyond into a single graphical user interface. Whatever role you have, IBM Business Space gives you exactly what you need, be it business process maps to understand the processes, workbaskets to work on your work items, BAM dashboards to monitor business processes or selected KPIs, or any combination of these. IBM Business Space is fully customizable and presents exactly what people need to know, not too little and not too much. Business Space ships as a common business user interface component with the following BPM runtime products: WebSphere Business Monitor, WebSphere Process Server, WebSphere Business Services Fabric, and WebSphere Business Modeler Publishing Server, and it complements the out-of-the box administrative client that ships with WebSphere Process Server (BPC Explorer) that IT administrators would use.

II. What is process automation and how does it work?

Automation comes from the ancient Greek meaning "self-dictated." This demonstrates that automation is far from being something new. As people do things, they try to do them better, faster and with less effort. Many industries today that have already heavily automated their business operations—for example, car manufacturers or the manufacturing industry in general—have achieved almost 100 percent automation in some areas. This is the result of more than 200 years of industrialization, and this is not yet done and most likely will never be done.

IT agility and flexibility

As companies adapt their business models, initiatives are often constrained by the ability of their IT systems to evolve at the same speed. Rigid IT architectures can lock you into inflexible, undifferentiated molds. By implementing process automation you are able to create flexibility in the IT organization, enabling it to deliver new and emerging business models and ideas. Process automation supports the reuse and recombination of software and hardware assets to speed delivery of new initiatives and to greatly reduce maintenance as requirements change.

Through process automation you are able to extend packaged applications like SAS, SAP and Siebel, and incorporate them into your organizations in unique ways that bring you strategic value, thus allowing you to differentiate. Instead of sacrificing flexibility in your business models to fit the requirements of packaged applications, your unique business model is the driver for how you integrate processes.

Think of process automation as supplementing manual procedures with automatically controlled alternatives. This happens through the orchestration and integration of technology and human assets to form streamlined processes. These processes enable you to choreograph the activities between people, applications and external services. This choreography of processes and tasks (whether IT based or human) through process automation gives you the power to see all of these items as common elements in the overall process flow. With that, the process flow itself will be significantly improved, typically in terms of decreasing overall process cycle time while significantly improving process quality in various aspects—be it reducing cost, or better resource assignments, or other quality aspects varying from organization to organization.

A. Quick example of process automation

The more closely you look at a business process, the more you see its complexity. Some processes are quite large, with many tasks that must be performed by various people. Processes that include a number of applications (for example, sales order processes) can take anywhere from a few minutes to days, months or even longer to run.

When looking at business process automation from a technical execution point of view, this complexity is not a problem. It is much more of an issue from a conceptual point of view. This is when we have to think about breaking down a large business process into its fine-grained sub-processes, its single steps (known as tasks or activities). Then we must determine which interfaces are required to work with back-end applications, or are required to interact with the people who might be required for process completion.

Conceptually there is no difference between a large and a small process. Actually, every large process should be composed of a number of smaller processes. To explain what business process automation does and how it is done, we illustrate this using a very simple process (which however could be just a small part in a bigger business process), as shown in Figure 2.

IT agility and flexibility

Process automation also allows you to repurpose packaged applications. This simply means that process automation reuses existing assets. This is extremely important; these assets cannot be replaced by new applications, simply because it is too expensive and too time-consuming. Just the opposite is required to get started quickly: Process automation takes advantage of all these packaged applications, sequencing parts of them in a new and better order to create a better version of an existing business process. For example, the process might store customer records on the same back-end application as before, but maybe earlier during process execution because now the whole process is executed quicker. Or perhaps the process consumes the product information from the same source as before, but now delivers process-relevant data for automated decision making.

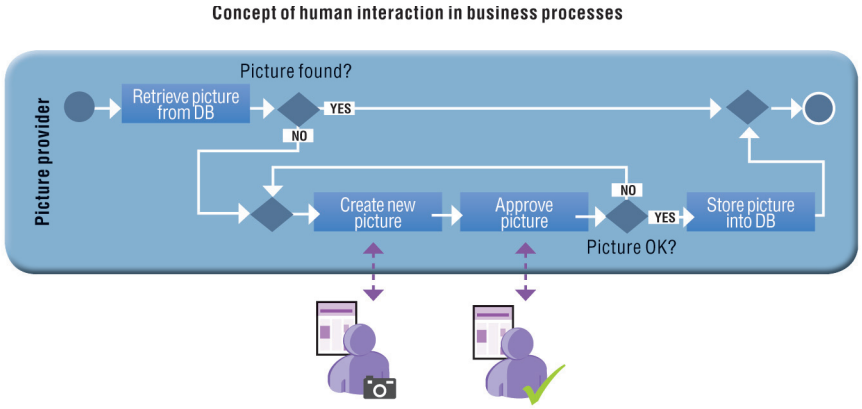

Figure 2. Sample business process automation

The sample business process shown in Figure 2 describes at a high level how an organization could offer and sell pictures. Let's assume this organization does that through a Web site. Customers can browse for pictures, and if the requested picture is available it is presented and offered to order. However, if the requested picture is not available, the company might decide to ask a contractor to visit the desired location, to shoot the picture, and to upload the picture. Next, someone within the organization needs to verify if the picture conforms to quality standards. Once the picture is approved, it is stored in the picture database to be presented to the customers, when requested. If it is not approved, the photographer has to take a second picture, which will again be verified, and so on. You can easily think about a number of extensions to that simple process idea.

IT agility and flexibility
Automating manual tasks

The ineffective use of employee skills for repetitive tasks rather than value-added brain tasks is not utilizing resources effectively and harnessing the power of the organization. If there are many processes with many manual steps and data reentry, they are candidates for automation. Through automation of repetitive tasks employees can work more effectively, and there is potential for significant revenue gains by focusing talent on business value like customer services. By employing IBM's process automation, you can seamlessly incorporate people and processes to execute automatically, improve quality and manageability, and harness the power of your workforce to provide more productive value-added services for your customers.

That's all. In reality, the process might be a bit more sophisticated. But this tiny process reflects the key aspects of business process automation:

- *The process combines automated steps (Retrieve Picture From Database, Store Picture Into Database) and manual steps (Create New Picture, Approve Picture).*
- *The process requires back-end integration (of the Picture Database) as well as human interaction, which means that the process needs to present to the humans what they need to do in order to complete the process.*
- *The process offers more than just one path for execution, namely the one that identifies that the requested picture is available, and the one that requires a photographer to shoot the picture.*
- *In the case of human interaction, this becomes a long-running process, lasting for a few days until the picture is approved and stored in the Picture Database. Therefore, the process has multiple states throughout its life cycle that can be monitored (for example, how long does it take to shoot the picture, how much is it allowed to cost and so on).*

To avoid over-simplifying our example, let's assume that this "Picture-Provide Process" is part of a bigger process, which might allow any user to search for a certain picture. Once the user makes a selection, the requested picture—if available—is presented. If not, a photographer is contracted to take the picture. Once the requested picture is available and has been stored in the Picture Database, the process can then notify the former requester (e.g. via an e-mail) that the requested picture is now available (the e-mail could include a link to that picture). The requester may then order the picture. Therefore, the "Picture-Provide Process" could be part of a bigger "Picture-Order Process."

Now let's have a look at the advantages and benefits once this process is automated.

B. Automating a manual order management support process using process automation

How is process automation typically used? What are some high-level use cases for process automation?

Now, in business process management, we are about to achieve just the same results as process automation, but this time not for all the traditional manufacturing processes. Now we address all the business processes that run our administrative business processes within all industries, including the manufacturing industries, but also others, such as:

- *Banking and finance: Account opening and account management, loan and mortgage, loan origination, any kind of exception handling (errors, overdue, claims handling, and so on), risk management, bonus club (membership, points, benefits), customer services and research (CRM) and so on.*
- *Insurance: Sales, underwriting and renewal, claims processing, and so on.*
- *Telecommunication: Provisioning (global order management), trouble ticket (customer service), marketing processes to create and advertise new products and others.*
- *Government: Tax processing, federal debts administration, pension funds, retirement systems and more.*
- *Transportation and logistics: Shipping goods, track shipping, railway operations management, bonus club for airlines (membership, points, benefits) and so on.*
- *Manufacturing: E-commerce and global business operations, procurement exceptions, sales order processes, release to manufacturing, supply chain integration and others.*
- *IT: Hardware and software ordering (for new and existing employees), service request processing and more.*

There are many other business processes in other industries that are either common or more specific.

There is no limitation in the business processes we could address for BPM and business process automation purposes. It is important to start with business process candidates having the best potential to lead to successful BPM projects—especially when it comes to return-on-Investment (ROI) discussions. Therefore some processes are better candidates than others based on various criteria, and we will address this in the course of this paper.

III. What are the opportunity areas for process automation?

This chapter helps you to identify your opportunity areas to get started with process automation:

1. Business process management
2. Human task management
3. Regulatory compliance
4. Systems choreography
5. Composite business applications
6. Web-based front office
7. Partner integration

A. Business process management

Companies that have identified the need for a business process management initiative require a partner with the most comprehensive BPM technology and implementation experience. Not leveraging the best-in-class technology and expertise could cause many of the benefits of your BPM project to be missed or delayed. What does BPM mean to you? Have you looked at the full business value which a well-executed BPM initiative can bring to your company? Are you confident you can achieve all of that value without a best-in-class technology partner like IBM? At IBM we have put tremendous emphasis and investment into delivering value for our customers through our BPM portfolio. IBM is a BPM market leader with outstanding assessments from the major analyst firms. We take BPM extremely seriously because we believe that it is one of the best ways for us to help you to realize business results through efficiency, competitiveness, business innovation or compliance.

B. Human task management

The beginning of this paper discussed the required involvement of people in business processes. WebSphere Process Server handles all people interaction requirements through its Human Task Manager component. Because this is so important, let's take a closer look to understand how this works in more detail.

The Human Task Manager component offers these advantages: all human interactions are fully system-controlled, and humans can use Human Task Manager features to create additional ad hoc human tasks to collaborate with others in order to complete their tasks. This is a huge benefit, enabling the workforce to get all the work done more effectively and efficiently.

The sequence in which people interact with business processes is shown in Figure 3. Let's look at the individual steps:

1. As WebSphere Process Server navigates through the business model, it invokes one process step after the other, calling the components that are implemented as services.

2. A process step that requires people to interact with the process is handled by WebSphere Process Server Human Task Manager, which receives the data required. As required, data is presented to the user.

3. Human Task Manager needs to find the people who are authorized to complete the human task. In order to do so, during design time, business analysts have identified who should be assigned to that task at run time. Technically, Human Task Manager queries an external People Directory, sending a staff query to receive a list of users that are allowed to complete that task. For each user, the Human Task Manager creates a work item that is placed on the work list of all these users. The first user who picks that work item from the work list presented, e.g. from IBM Business Space, becomes the owner of that task and is responsible for completing the task. Human Task Manager deletes all other work items created for this task from the work list of all the other users.

4. After starting the work item, Human Task Manager presents the task implementation to the user. These users interact with WebSphere Process Server Human Task Manager through a business-user client implementation, which can be IBM Business Space or any other Internet application, or it can run in WebSphere Portal or any other custom-developed interface (based on APIs).

5. When the picture is taken, the task owner completes the task by uploading the picture (offered as a function from the task implementation), and clicks "complete."

6. Under the covers, the picture is uploaded into the Picture Database, and Human Task Manager returns a confirmation back to the process instance executed by WebSphere Process Server. After Process Server confirms the completion of the human task, it can move to the next step in the process.

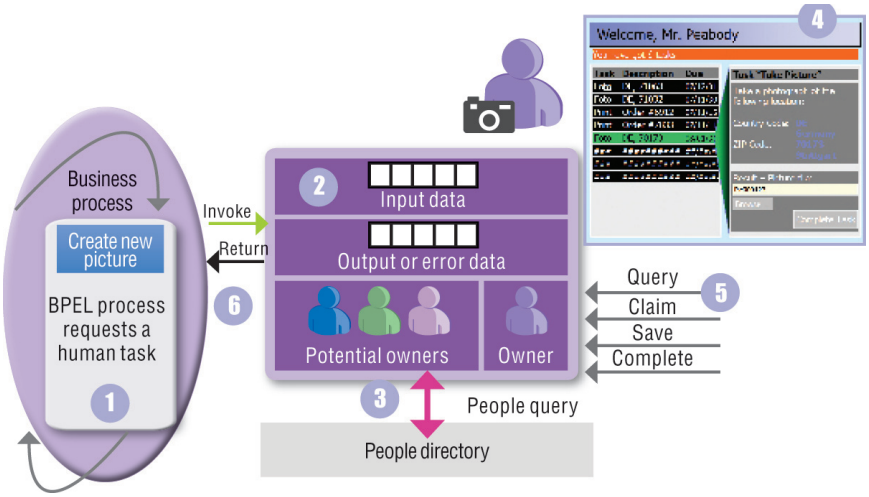

Figure 3. The sequence of how humans interact with automated business processes

Figure 3 introduces just the basic features of Human Task Manager. As you can imagine, there is much more when it comes to more sophisticated staff assignments, like task escalation, task notification, support for various people directories, additional ad hoc human interaction capabilities, and support for various supported business user client technologies, including the fact that business user clients can be generated based on task data.

C. Compliance

Businesses need to be able to prove that their processes are doing what they claim they're doing. Assuring that operating procedures are in line with the legal and industry regulations is extremely important in a number of industries. It can be extremely costly if you are out of compliance with regulations or internal controls. However, a growing number of companies are finding it difficult to ensure that their business operations run precisely as documented, because their processes aren't truly automated and therefore they can't ensure consistency. IBM's process automation ensures your processes run consistently and that only the right people execute the right steps at the right time, thus helping to ensure regulatory compliance.

D. Systems choreography

When a business examines its processes closely, it often finds that employees are repeatedly performing sets of basic tasks that could be automated. This is especially true in areas such as orders, claims, and so on, where the same part numbers or account numbers are entered or queried more than once for the same event. As a result, employees are wasting time that they could better spend doing more intelligent work—work that only a human can do. Worse still, inconsistency in responses can lower customer satisfaction and revenue. Are the employees at your company repeatedly entering the same data? How does that affect your efficiency and error rate? IBM's process automation ensures that separate steps in a process are consistently linked with the same inputs and outputs, smoothly resulting in the same responses. Human error is reduced, and employees are freed to participate in more interesting and demanding work.

E. Composite business applications

Businesses need a way to flexibly combine IT assets into composite business applications to achieve greater business process flexibility, faster time to market and lower operating costs. Composite business applications (CBAs) are based on reusable, business-level building blocks called business services, which are policy-driven, customized by business context and dynamically called at run time. A CBA uses business services as the primary element of reuse across multiple business processes and applications, and achieves increased levels of service reuse through the life-cycle management and governance of business services. Business-level policies and metadata determine the behavior of business services, which can be customized based on business context to meet the needs of different business users, customers, partners and IT-infrastructure environments. To accelerate the deployment of industry-specific composite business applications, there are pre-built, industry-specific SOA accelerators and templates to make sure the full value proposition is realized in those industries.

F. Web-based front office

Web-based front offices are deployed to save money and increase customer satisfaction through self service. To ensure that customers get the same consolidated responses every time, regardless of the entry point, front-line applications must be coordinated with each other and in their access to reusable data. Are you able to successfully deliver and manage change for self-service solutions for your customers or business partners today (for example, order management, account opening, claims processing, and so on)? IBM's process automation provides the technology for building powerful self-service solutions. The technology goes beyond conventional programming technology with the tools and a deployment engine to connect customers seamlessly to accurate information and processes.

G. Partner integration

Connecting business processes and IT systems with Business Partners can be harder than expected due to differences in systems, applications, custom or nonstandard interfaces, and undocumented processes. Often, inefficient linkages in the supply chains with customers and suppliers can significantly affect revenue and costs. In addition, inconsistent response times and procedures can lower customer satisfaction and affect revenue. Integration efforts often require significant knowledge of technical interfaces between the various systems. IBM's process automation can help you avoid the high cost of hard-coding a variety of complex integrations between in-house and supplier or customer applications. In addition, it helps ensure that your integration is flexible enough to allow for inevitable subsequent additions and changes.

IV. How does process automation drive tactical value?

Business process automation provides business value for all, as shown in Figure 4.

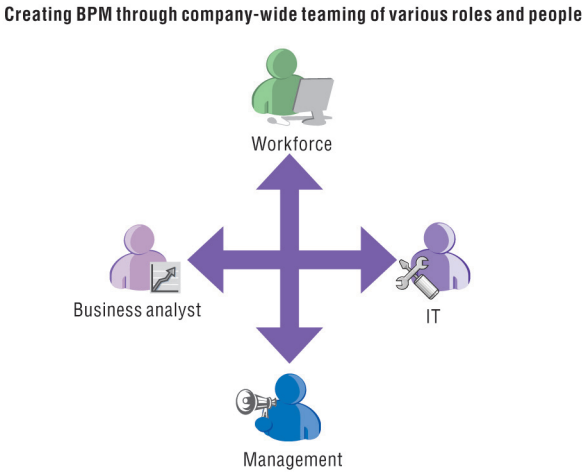

Figure 4. BPM requires these four major groups in organizations to team together. If one group is not involved as required, BPM projects tend to fail.

Bringing together people from these four groups is key for BPM initiative, not only because they finally help to get the best business process alternative identified and automated, but also because they receive all the benefits after the business process is automated.

Remember the "Picture-Provide Process" outlined earlier in this paper. In terms of BPM, we have a graphical map of the process model describing how the process works. Everyone can understand the process simply by looking at the diagram, which is exactly what we aim for when performing business process modeling. This is a huge advantage, because you don't need to find an expert to ask about the process—it's laid out in the process model. With some more detailed process information, business analysts could simulate the process in terms of cost and cycle time, thinking about process improvements. This is not a big deal in a simple process like our example, but imagine being able to simulate the cost or cycle time of a large "Sales Order Process" from a retailer, comparing overall cycle times when taking into account various resource allocations and process volumes. Insights like that help to streamline and optimize a business process before it is automated.

As the business process is automated, additional benefits are delivered to the users, supporting various needs depending on their role:

- **Standardized business process execution (business analysts):** *All requests asking for pictures are handled the same standardized way, as modeled in the business process. Every incoming request starts an instance of that process, and the process engine always handles every request the same way.*
- **Streamlining of multi-channel process invocation (business analysts):** *The process is always executed no matter from where the process is requested. Requests could be triggered from an internal Web site, from the Internet, or from a company employee meeting a customer face-to-face in an office.*
- **Automatically interacting with people and requesting the right people (business analysts, management, workforce):** *If a requested picture is not available, the procedure for engaging a photographer is standardized as well. The photographer receives information about what to photograph, with what quality, and in what time. This eliminates the need for people to send notes or place phone calls. The work that needs to be done in order to complete the business process is detected and created by the BPM system.*
- **Notification and escalation (management, workforce, IT):** *Expectations for when work (process steps) should be completed is expressed in the process model, and controlled during execution. If process steps are not completed as expected, people can be escalated, and management can be notified to take action. This also works for fully automated steps so that IT can be notified to address system slowdowns or application failovers.*
- **Automated routing of work depending on the process model (business analysts, workforce):** *When work is automatically routed, an additional reviewer receives a work item in its workbasket presenting what needs to be reviewed. Work items can be prioritized based on process-relevant data. For example, in terms of process quality, a Gold customer should be able to order a new picture earlier than a new customer.*

- **Unified access to process-relevant data (workforce):** *After a reviewer accepts an assigned work item, the business user client takes care of finding the picture or opening the application for viewing the picture, freeing the reviewer from the need to locate these items. This business user client is part of the business process automation software. It presents the picture and offers relevant action commands, as in this case: approve picture and reject picture. Once the reviewer completes the work item, the process engine continues to navigate through the process model, invoking the next steps.*
- **Insight into business process execution (business analysts):** *While the process is automatically running, all execution-relevant data is available (for example, when the process started, when it ended, the duration of each activity, who performed a specific activity, and so on). All this data can be collected and aggregated for presentation in a business process dashboard. This delivers real-time insights into business process execution.*
- **Business process monitoring (business analysts, management):** *Based on the process model, business analysts can create key performance indicators (KPIs) that are presented in a business dashboard for business activity monitoring (BAM) purposes. For example, a KPI can define that if a new picture needs to be taken, the requested picture should be presented for ordering to a Gold customer in less than 24 hours, in 95 percent of all requests. Thanks to business process automation, this KPI is constantly calculated, aggregating all business process instances in a given timeframe. If the KPI is not met, an alert can be sent to the business process owner, requesting corrective actions. (For example, one reviewer might not be able to review all new pictures, and a second reviewer needs to be assigned to help. Or a certain photographer does not deliver the picture quality required and pictures from that photographer frequently need to be redone.)*
- **Continuous business process improvement (business analyst):** *All the process execution data can now be reused to further optimize the current business process, because the duration of each activity is collected directly from the production environment and can be fed back to the process model, allowing more precise simulations on accurate process data.*

All these benefits can improve overall business process quality and decrease the cost of business process execution cost while also decreasing overall business-process cycle times. In addition, all the required resources, whether they are IT systems or people, can be better assigned to the business process because the BPM system knows about necessary resource requirements. This re-assignment of resources can be automated even further by the BPM system or done manually while informing management or IT to provide resources.

A. Redeployment of human resources

The workforce—which is all of us, the people—is the most valuable asset in our organizations today and should be assigned wisely to all the different tasks of today's and tomorrow's business operations. How can human resources be redeployed to improve business process execution?

First, to the extent possible, automate manual tasks in the business process. Typically, routine manual tasks can be immediately automated, or possibly even eliminated (for example, tasks related to data transformations that are already handled by the system). The remaining human tasks often require more significant skills in order to be completed. For example, these tasks might require humans for exception handling, where an exception drives processing that deviates from the default or standard paths. Over time, in the course of constant process improvements, more and more former exceptions will be automated, and the exceptions that remain will demand higher and more sophisticated skills. Assuming that better and more qualified business processes will generate more and more business, it is likely that organizations will not decrease the number of people they employ. Instead they will increase the number of very well-educated people that are required to handle rather complex business exceptions.

Second, in the future, organizations will need to ensure that the right and best resource assignments are in place. In terms of human resources, this means having the right number of the right people assigned to the expected tasks created by the process engine. Apart from predefined resources requests (defined during modeling time), runtime characteristics (such as the volume of process instances) will drive the number of people to assign to process tasks in order to meet the KPI targets.

The process engine addresses predefined resource assignments as well as dynamic redeployment of resource assignments. Using process model information as well as business-process execution characteristics, the process engine determines which tasks should be assigned to which people to achieve the best process execution performance. If the assigned resources are not sufficient, or if the process needs additional optimization for specific business needs, authorized personnel can overrule the assignments that have been made and manually re-assign humans to business process tasks.

B. Reliable, repeatable processes

Reliable, repeatable processes are ensured through process integrity. This means that nothing gets lost or executed twice across the end-to-end process. Even in the event of catastrophic system failure, your system knows exactly where to resume processing. It therefore provides for long-running processes with asynchronous interactions, and it automates a chain of independent transaction processes and synchronous interactions. A reliable process engine utilizes a system where each application can participate in a "two-phase commit" with compensation support, which triggers compensating transactions to undo steps that were previously completed. Also, there are adapters to leverage open standards (such as -BPEL, XA and JMS), enabling integration with various application functions that do not support XA and allowing compensation transactions for those applications.

C. Process service and performance levels

Business process service and performance levels are identified during business process modeling. At that time, business process analysts or business process owners define the key performance indicators (KPIs) for their processes. Common KPIs are overall, aggregated business-process cycle time, overall process cost, or KPIs that indicate how often business process instances deviated from the default path (as a percentage of all executed instances), or how often humans had to interact with the business process for completion. Many other KPIs are already known. Some are standardized in a way to allow for identification of an organization's competitiveness in certain business areas. Some organizations have additional, very specific customized KPIs that are not shared with the public, but are used only for internal functions. Business process automation aims to achieve—and over-achieve—all these

identified KPIs, and aims to present business process service and performance levels to the people in charge. Therefore, during automation, the process engine creates events and records the execution of the business process instances. This information is gathered and presented in business dashboards, allowing business process analysts, business process owners, or business operations managers to not only see what happens when it happens, but to take action as well, whenever KPIs are not met. The data can be used immediately, to take corrective actions while business process instances are running, or later, to create the next—and better—version of the current business process.

D. Process exception notification and action

The term *business process exceptions* does not refer to technical exceptions, but to business exceptions, which actually means that KPIs were not met. These KPIs can be defined at the level of the business process instance, or at the level of the overall business process, in which case they reflect the aggregation of a number of business process instances in a given time-frame. When KPIs are not met, a business exception occurs that needs some special handling. For example, a business process owner might need to be notified to take action. This capability, which is provided by the process engine, is extremely valuable because it allows immediate action in real time exactly when action is needed, and not the next day, week, month or quarter. Because the business processes are automated, the "machine" knows what happens when and why, and who needs to be informed when specific situations occur. For more advanced processes, some situations can be linked to automatically trigger compensating actions, and people are notified for information purposes only.

V. How does process automation drive strategic value?

Many companies fund their strategic initiatives through continuous cost-cutting measures, but executives are struggling with new ways to improve their bottom line. Downsizing and outsourcing can only go so far. Businesses must focus on improving processes in order to increase profits and create differentiated value. Most firms try "quick fix" improvements, such as resource actions and cuts in sales expenses. But with the prolonged economic downturn, executives are forced to look beyond these no-value-add strategies to broader initiatives that involve smart orchestration and automation. Focusing exclusively on bottom-line cost can limit top-line potential.

Process automation and orchestration initiatives can help businesses achieve a competitive edge not just from a cost-cutting perspective, but also in developing game-changing strategies. Winning strategies not only reduce operational costs, but do so while taking actions to create value, such as improving customer service, adding new revenue sources with new products and services or alternate channels, lowering the price of goods and services rendered, or increasing decision-making abilities. Too often, companies focus on what they are doing today, instead of looking at the potential of what new things they can do tomorrow. Automation can extend an organization's ability to service new markets in cost-effective ways and to deliver new products and services before their competitors can establish a foothold.

We only have to look at the automotive industry, the European and Asian markets especially, over the last few decades to see examples of how automation allowed this industry to respond to customer demands. Here are some examples:

- *Significant reduction in the cost of the products manufactured. Today, almost no one could afford to buy a car that is assembled manually, which is true for almost all car manufacturers.*
- *Significant increase of the product variants offered to the markets (every car leaving the assembly line is different from all the others cars leaving the same assembly line) in very short time periods (compared to the complexity of a car when including its overall development cycle).*
- *Significant reduction in the time needed to complete a car. The fastest car manufacturers complete their cars in less than six hours.*
- *Significant quality improvements to allow using various components from various partners at the assembly lines. These improvements, brought about by automation, drive the need for and implementation of standards to allow various partners to cooperate on a very detailed level during the manufacturing process.*
- *Significant detailed insights into the manufacturing processes as a result of detailed monitoring capabilities on various levels. These insights allow action to be taken in almost real time—for example, to respond if machines or components are not available.*

All these benefits resulting from the high degree of automation of these manufacturing processes allow the mass production of better cars, in less time, with less cost, and with an ever-increasing number of variants that customers can order. The ability to provide lots of variants to address more potential customers increased the number of cars sold. Here automation is one of the drivers leading to more variants generating more business. This connection between automation and demand generation is important, because after automation comes the next step in business transformation, which is generating new business strategies to gain market share, or to even create new markets.

The following sections provide additional examples of how companies can leverage process automation and orchestration as strategic differentiators.

A. Operational excellence

Within a single company, core processes often cross different organizational silos and often extend to external partners or suppliers, as well as engaging the customer directly. Higher return on investment strategies can be uncovered by focused process orchestration and automation of end-to-end processes. The human cost of manually orchestrating all of the status-related activity of an end-to-end process is staggering, not to mention the quality and cycle-time implications that affect customer satisfaction. Process-automation initiatives need to first eliminate non-value-add tasks across the end-to-end process and then achieve the highest rate of straight-through processing that is feasible, without compromising the quality of the outcome or customer experience. These initiatives also need to ensure that action items are completed when they should be, or escalated for resolution if they are late. In order to truly achieve sustainable process efficiency, there must be an ability to link a process to other processes and thus provide an orchestration of effort that results in the successful completion of the end objective.

Many financial institutions and insurance organizations are achieving operational excellence through automation and orchestration. In the insurance industry, improving the one-and-done rate for handling claims ensures that claims are automatically directed to the right claims processors with the right skill and experience. The process has built-in escalations to

ensure timely resolution. In addition, simple claims under designated dollar-value thresholds are automatically resolved upon receipt through the automation of validations and business rules. Automation can extend to actual claim payment, explanation of benefits, and automated customer-satisfaction surveys. In growing top-line revenue, Insurers are expanding to new channels through automated quote services for brokers and agents, and even automated quote services directly to customers.

Brokerage firms have not only lowered their costs by automating trade services, but they have extended their revenues by reaching new consumer segments in new regions. Firms that achieve operational excellence recognize the value of technology not only for gaining efficiencies but also for opening up new opportunities.

B. Enhanced brand value

The core processes of an organization should differentiate a business from its competition in the eyes of the customer. For example, retail organizations understand the need for brand differentiation. Most successful retailers have automated their supply chain to ensure that they not only get the best price from their suppliers, but that they have enhanced their brand in these efforts by retaining top-quality suppliers that provide the best quality and variety of products. Another example is the bonus programs from different airlines. The more often an airline customer flies, the more he qualifies for different programs depending on the status he has achieved. The better these programs are, the more often a customer will fly with that specific airline, to further qualify for upcoming bonus programs. There is huge automation potential for these kinds of processes, because the booking system can simply inform the bonus system when the customer books a trip. The bonus system itself can automatically inform the CRM system when the customer qualifies for the next bonus level. And the CRM system can inform the booking system on request about discounts for highly qualified customers when the customer makes the next booking. This all can be done without any human involvement. However, business people must still decide what bonus level qualifies for what discounts (via business rules or business policies)—this is handled outside the automated process and requested during the automated execution of the booking process.

C. Personalized customer experience

Although some organizations feel that automation has the potential to reduce the personalized customer experience, automation facilitated by business services that are driven by policies and business rules that can be changed dynamically or by business users in real-time can bring tremendous competitive advantage. Offers and services can be tailored to unique and varying customer sets based on context or contractual agreements. New markets can be entered in new geographies by taking into consideration the variation for regional policies and laws, without disrupting the underlying core process. Process automation can allow an organization to achieve its overarching goal: to be able to use what exists, extend its value to any line of business, and dynamically adapt behavior by channel for a personalized experience—all with speed to market, low risk and lower cost. Banks are deploying automation in many of their core processes but doing it in a way that delivers a unique customer experience. Insurance, Telco and many other industries and sectors (including government) are beginning to understand and deploy process automation solutions that allow great efficiency but do not compromise the customer experience.

D. Organizational design flexibility

As more processes involve outsourcers, temporary workforce alternatives for peaks, and external partners and suppliers, process orchestration is as important as process automation in ensuring flexibility and process agility. Electronic firms often outsource different parts of manufacturing and services portfolio. Many firms turn to specialty providers that have expertise in the target technologies, and scale efficiencies that they cannot achieve alone. Having the ability to automatically redirect workloads based on the availability and expertise of external and internal providers is key to expanding into new product areas and to supporting organic growth.

For internal processes such as employee on-boarding, the automation of key process activities not only reduces the cost of the process, but also helps ensure that the employee is quickly integrated into the organization and is productive before competitive offers are made.

VI. How do you find candidates for process automation within your company?

BPM with IBM—identifying opportunities for business process automation

Business processes are everywhere. Because so many activities are based on a process, you might think that every process is good to start with for BPM. However this is not true. Some processes are better candidates than others. Within your organization—independent from the specific business processes—areas of opportunity are not distributed equally. Here are some examples of areas that are likely to be good candidates for business process automation:

- *Human task management (business processes with a high degree of manual interaction)*
- *Business process optimization (improving a business process that is widely accepted to be painful, slow, and cumbersome)*
- *Compliance (streamlining business processes to conform to governmental regulations or company policy)*
- *Building or expanding composite applications (introducing "process-oriented thinking" to prevent the hard-wiring of services)*
- *Business activity monitoring (to improve insight into business operations)*
- *Partner interaction (to improve the design of interfaces to partners and the hand-shaking between in-house and business partner operations)*

In addition, because BPM enabled by SOA is new to many organizations, the first project should not be the most complex one. However, it should have some visibility within the overall organization, so it can be used as a showcase when it is done, and it should address and solve a real business problem.

To help you successfully get off the ground with BPM enabled by SOA, IBM offers a variety of assistance, whether through its consulting or services support organizations. We can point to the experiences of customers who have implemented BPM enabled by SOA to demonstrate that the technology is ready for production, both for small projects as well as for very large projects. However, BPM enabled by SOA requires more than just technology, as outlined previously. IBM delivers consulting expertise, industry-reference models, industry solution packs, and diverse best practices, workshops, and

practical advice to deal with the challenges that organization face during business transformation. We can also address requests for architectural and technical specifications and standards.

A. Who typically drives the discovery and development of process automation opportunities?

Identifying business automation opportunities is typically done by business analysts, because they are in charge of improving the business operations that are already in place. Other people (especially the workforce and the management) might help to identify shortcomings in business processes, but thinking about real automation potential requires business process expertise in terms of clearly understanding the work product of a process and how to best achieve that result, considering overall process quality, time, cost, and resource requirements. This is a very focused job done full-time. As for the actual execution of the process, IT staff is extremely important, because IT provides the "machine" (process engine), and it knows how all the parts are implemented and are connected to the process engine. In software systems today, this knowledge is important when designing new and better process alternatives. Clearly, goal-oriented teaming between business analysts and IT staff is a key requirement for successful BPM projects.

Business analysts are usually the key drivers for business-process automation projects. However, in some organizations, IT staff might start these projects. This is because nowadays, the majority of business processes are implemented in IT, and as a result, IT is well positioned to provide business process insights. Although IT does not generally know how to improve business processes with respect to business management reasons, it can engage business analysts to offer their services for business-process automation initiatives. Collaboration between these two parties is key, no matter which group takes the first step.

B. Characteristics of high-quality candidates for process automation

The best candidates for process automation are business processes that—once automated—promise significant improvements with regard to the execution of business operations. The key question is: What is a significant improvement? Each organization must find its own answer to this question, because

organizations have different needs and expectations. Areas of focus include cycle-time reduction, cost reduction, overall quality improvements (such as customer satisfaction), better resource alignment and streamlining existing execution procedures. Automating business processes can improve all of these areas, but not all of them with the same magnitude.

If you are not yet sure what to focus on, IBM provides consulting expertise as well as industry experience to help identify the best candidate for the first business process automation project. Keep in mind that the first project should improve an existing business process that has enough visibility to demonstrate what can be achieved through business process automation, in order to serve as a showcase for follow-on projects.

C. What are the steps to finding good candidates?

Selecting the right process candidate for the first business-process automation project is important. Follow these recommendations:

A. Ask your sponsor what he or she wants to improve in general. This goal should be part of the project scope from the very beginning, and should address a concern such as basic cost savings, cycle-time improvements, better resource alignments, other aspects of improving process quality, or a combination of all of these. The goal should also identify a specific business process area, indicating the business units that must be involved to optimize the final candidate.

B. Ask individuals about their experience with current process implementations and encourage them to let you know what they want to see improved.

C. Start with documenting identified business processes as they are done today. Identify improvement potential, and talk to the workforce to capture the process as it currently exists. Also, look for existing business-process documentation, even if this material is outdated.

D. Create alternatives for an improved business process, and then analyze and communicate these alternatives. Simulate the alternatives to understand the effect of process change in terms of cost, cycle time and resource assignments. Then communicate the results.

E. Align with IT to understand which of the best alternatives for the business process can be brought quickly into production while considering existing IT limitations in terms of technology, budget skills, and resources.

F. Select the candidate that promises enough improvement potential and that can be automated by IT within the given time frame without exceeding the budget.

G. In summary, a rather small project is more beneficial for a first business-process automation exercise, simply because solving any complex business scenario comes with a number of challenges by itself, independent from the concept and technology that are chosen to address it.

These steps can help you select a candidate for business process automation that can be handled successfully by all the parties involved.

VII. What do you do after identifying opportunities for process automation?

A. Building your process automation project team

Which people are needed to get started with business process automation?

Because of the focus on business processes, the most important people in the beginning are those who know about processes. Therefore, initially, your team should include these people:

- *Business process thought leader: These people understand the value of first knowing business processes in detail, in order to improve them, and who understand that business process automation is just one way to optimize business processes. In addition to the basic business-process improvement work, these people introduce "process thinking" into the organization and can help to transform the whole organization into a process-centric organization. This actually means talking to all parties involved (workforce, business analysts, management and IT staff), explaining how and why this transformation has to be done, and what the benefits are for every individual.*

- *Business process owners: These people are in charge of identified business processes and are responsible for ensuring that their business processes meet the predefined performance targets, in terms of cost, cycle duration, optimized resource alignments and a number of customized KPIs. They define process execution goals in order to meet business operations requirements provided by management.*
- *Business process analysts: These people actively work on documented business processes in order to implement business process changes, using business-process analysis technologies to identify the best alternative candidates for the business process. Whatever the best alternative finally is—depending on specific business-process characteristics—the automation of the selected process is done by process engineers and other people from the IT staff.*
- *Business and IT mediator: Some organizations have already started to create roles that mediate between business requirements defined by business people and IT personnel that will provide the technical solutions. That role is known by various names, such as business requirement manager or business customer manager. Regardless of the job title, these people are part of the IT organization. They channel all business requirements to understand the synergies from various business units, and their goal is to prevent IT from duplicated development work in the course of implementing an IT strategy that meets all these requirements. The larger an organization is, the more important this role is. The creation of a BPM Competency Center or SOA Center of Excellence is recommended to put these people in an organizational unit that can mediate between business and IT.*
- *Process engineers: These people take the optimized business-process models created from business analysts and enrich them with technical information that is required for automated execution, in accordance to the chosen IT concept that is used under the covers (from a business point of view) for business process automation.*

- *IT staff: Owning the IT environment, these people provide an IT infrastructure that allows business process management and automation as well as the services required for all the automated business-process activities. In addition, they are in charge of performance and volume tests, they have to find answers to all technical issues (for example, security, reliability and scalability), and they will have to run and administer the production environment.*

We strongly believe that these business-process automation projects require a center of gravity where the business process expertise resides, strongly fostering the goal-oriented teaming of business and IT. These centers might be called a "Business Process Management Competency Center (BPM CC)" or "SOA Center of Excellence (SOA CoE)," formalizing the teaming of business and IT and anchoring all this work in overall programs that care about business transformation.

A. Few more words about the BPM CC or SOA CoE

The name of this organizational unit is not important, but its mission within the organization is to bring these business processes and services into production through information technology. Therefore, this center unites personnel from business as well as IT, bringing both parties together to discuss how business requirements can be more quickly implemented with IT to provide business value to the whole enterprise and its customers. Because this activity must follow an overall strategy, this center translates business requirements into IT requirements, following strategic ideas and a known and agreed-on BPM and SOA governance, helping IT to serve their business units better. This is a win-win situation: Business—represented by business process and business services owners—presents its business needs to IT—represented by IT architects, IT system owners and other IT managers—in order to improve the implementation of business operations, together. The strategy must also include the user perspective, to help people to work more efficiently and effectively within these processes and services. A January 2007 study by Nathaniel Palmer on BPTrends.com, A Survey of Business Process Initiatives, shows that having a center like this definitely leads to significantly higher return on investment (ROI) of BPM-related projects.

B. Big bang versus incremental approaches

Business process management is all about reusing existing assets for business process automation. No one can afford to re-write all these business applications that run the business today. Much more than that, BPM makes use of these existing assets and 'just' uses the bits and pieces as outlined in the business process models. This means that large business applications will have to be componentized (various technologies to do so apply), these components will be wrapped with services interfaces, and finally these services will be called from process engines according to the process model definitions. Not all applications might be componentized as required by the best process alternatives, but this trade-off between implementing the best process alternative and how costly that is when taking into account existing IT limitations is one of the most important tasks for the BPM CC, additionally taking into account the overall strategy for Business Transformation.

C. Selecting your first process automation project

Selecting the right candidate for the first process automation project is critical, just because it is so important that the first projects end successfully, otherwise the whole concept of business process management is in doubt. However, as process-thinking is new, as many different parties need to team closer together than before, and as new technology needs to be introduced, one should not select a business process that is large and complex. Good starter candidates are rather small processes that still have some visibility within the organization and that deal with a real business problem.

With the first project, you want to choose a business process that:

- *Promises to be successful (***plan for success!***)*
- *Solves an existing business problem*
- *Is not too complex*
- *Has some visibility within the broader company*
- *Creates reusable assets for follow-on projects (***Keep reuse in mind!***)*
- *Shows advantages and benefits of BPM and SOA*
- *Is measurable (compare old versus new) for communication*

If the right process is selected, if the right people are in board, and if budget is available to be invested for education and communication, then the first process automation project will succeed and will be a great incubator for many follow-on projects that are all harvesting from the strategic investments done for the first candidate.

Business process automation projects always achieved cost saving, reductions in process cycle time, better resource alignment, and a number of customized KPIs. However, the problem is that organizations tend to select a rather complex business process for their first project, and project failure happens; not because we make use of BPM concepts and technologies, but because the business process itself cannot be handled in terms of transforming and optimizing IT no matter with what technology, or even without technology, but simply because of the chosen complex business challenge addressed.

Business Process Transformation raises a lot more cultural issues within an organization than it raises technical issues. Therefore organizations should be smart enough to avoid being faced with too much cultural and organizational change when performing the first project. Technology can be handled much easier than organizational units or individuals that are not willing to change.

D. Discovering and building process automation value

The value of business process automation can be simply discovered by a) understanding how a certain business process is done today and then b) how it will be done tomorrow. You can only measure the difference if you know the key characteristics of the process as-is today, compared with the characteristics of the expected to-be process you are about to create. This all can be done on rich business process models, using a business process modeling and analysis tool.

Therefore, you should keep the following in mind:

- *A. Understand in detail how the selected business problem or process was solved* **before** *being solved by business process automation ("As-Is" analysis).*
- *B. Define how to measure the success of business process automation upfront, and then compare this with the "As-Is" implementation.*
- *C. Communicate achievements:*
  - *A. Cost and time reductions? (execution as well as implementation)*
  - *B. Increase of flexibility?*
  - *C. Reuse potentials?*
  - *D. Overall impact? (pros and cons)*

When done with the first project, that means that the targeted business process is automated, then you need to report your achievements comparing them with the business process implementation before it was automated. The automated version will be less costly, execute faster, and meet other KPIs better than the old one. If this is shared with the project stake holder and sponsors correctly and on time, this will be rewarding for the project team and the project team lead.

VIII. How do you select a process automation approach and technology?

All business process management initiatives will finally be cast in IT technology. Therefore, selecting the right technology is critical for overall project success. You should consider the following:

- *The IT technology for business process automation has to:*
  - *Allow that various components can be loosely coupled*
  - *Support business process automation and monitoring*
  - *Be scalable for high volumes (future expectations)*
  - *Be robust (supporting mission critical business processes)*
  - *Be high performing (granting end-user acceptance in high volume scenarios)*
  - *Be open and standardized (for future enhancements)*
  - *Deliver dedicated tools for various audiences*
- *As Business and IT are teaming for business process automation, the final solution has to be beneficial for both with respect to: Tools, dashboards, repositories, end-user GUIs*

A. Technical capabilities needed for process automation projects

The technical capabilities for process automation projects need to cover all disciplines of business process management as outlined in the beginning of this paper.

When it comes down to these technical capabilities, we have identified four key capabilities that must be in place: model, assemble, run and manage. For an overview, with the availability of the capabilities listed above, IBM provides BPM solutions that help deliver flexibility, speed and competitive business differentiation to your company, while allowing for the following:

- *Modeling and simulating business processes and deploying process definitions with a click of a mouse to automate how business processes run*
- *Supporting business-process integration, workforce management, application transformation, and application connectivity in a single offering*
- *Leveraging common business object models within integration middleware*
- *Offering industry-specific business objects and business-process templates to resolve business issues common to specific industries (such as finance, insurance, retail, telecommunication, automotive and electronics)*
- *Monitoring and managing how business processes run in business dashboards to accelerate decision making based on real-time business facts*

Now let's examine these four capabilities.

Model—Process modeling and analysis

The model capability includes product offerings to model and simulate business processes to graphically represent the flow of work across people and application systems. These products leverage business benefits and enable your company to perform business process analysis by allowing you to:

- *Quickly redesign processes or plan future processes as business needs change.*
- *Document processes in business terms to share across the enterprise and improve communication of business objectives.*

- *Provide projections and show business benefits of streamlined future business processes when performing business process analysis based on business process simulations.*
- *Optimize processes and improve effectiveness of business interactions before retraining and retooling, and before handing them over to IT for automation.*
- *Obtain a fast strategy to process automation by deploying process model definitions directly to process engines for immediate implementation.*

Assemble—Process engineering and service composition

The assemble capability gives you the tools you need to transform business processes that help you reuse existing applications in an on demand business environment. Discover the benefits of a mixed-workload solution in which legacy systems are integrated with newer transactional platforms, such as Java™, to achieve an optimal balance of performance, cost and risk. The IBM Enterprise Transformation portfolio provides tools that allow you to:

- *Enrich business process models with technical attributes for high performance execution.*
- *Reuse business process models created by business analysts for immediate automation without having to re-create the technical execution model.*
- *Improve the workflow and navigation of host applications.*
- *Provide host access through a Web browser or portal.*
- *Convert legacy processes into reusable, shareable business components.*
- *Use Java connectors to integrate legacy applications with IBM WebSphere Application Server, for example.*
- *Discover the unrealized business value in your existing legacy assets.*
- *Develop new applications that reuse existing code for greater efficiency and flexibility.*

Assembling and integrating applications, data and development processes is extremely important to support BPM by providing the flexible IT infrastructure required to quickly change how business processes are implemented.

Run—Process execution engine

The run capability is the engine that drives business end to end. This capability allows you to:

- *Integrate people, partners, processes and applications on a common infrastructure for maximum efficiency.*
- *Address your integration needs, no matter where you are on the integration continuum. From simple connectivity to the requirements of a fully integrated, on demand business.*
- *Respond rapidly to business events, reduce inventories and shorten new process cycle times at lower costs by reusing existing processes, applications and other IT assets.*
- *Drive horizontal processes across vertical applications and across systems.*
- *Improve service and business agility by responding to business-driven integration changes rapidly and at lower cost.*
- *Optimize dealings with partners and customers with a single view of data.*
- *Easily add new packaged applications and systems to your environment without disrupting existing business processes.*
- *Better position your company for mergers and acquisitions.*
- *Improve tooling using the Eclipse framework to help minimize cycle times from line-of-business concept to IT production, and in some cases, eliminate the need for Java developer skills.*

Manage—Process monitoring

The manage capability provides a set of product offerings that can show immediate operational results in business processes. With this critical knowledge, you can review processes over a period of time and identify where to perform process changes to achieve ongoing business-process improvements. The manage capability also allows you to:

- *Generate immediate alerts to management about unfavorable conditions through customized dashboards designed for line-of-business management.*
- *Use a business dashboard to generate reports based on real-time and historical data, using analysis tools, such as trend and quartile analyses.*
- *Leverage the monitor capability and provide analysis of the operational view of the company processes specific to users' roles.*

- *Dynamically change business processes and reallocate resources in real time to meet shifting business conditions.*
- *See operational metrics and simulated process results to show actual realized improvements.*
- *Return monitored information to the model, to facilitate continuous process improvement.*

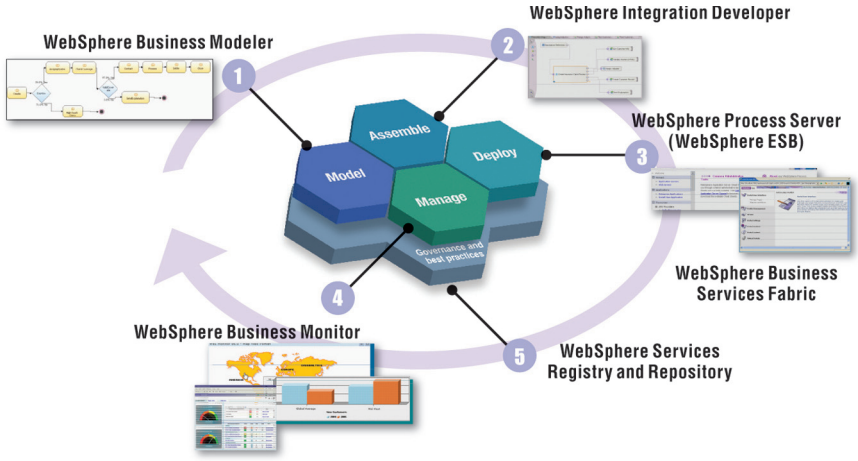

Figure 5. The IBM BPM offering is composed of several products to model, automate and monitor business processes. Not all of them are immediately required when getting started with BPM.

Application and platform integration—BPM enabled by SOA

Separating business-process logic from business-process implementation provides process independence. It defines what needs to be done, when and why, and how it is done, by whom or by which application. This separation of the process function and how it is implemented enables the concept of business flows to be separated from underlying organizational and IT resources that support it.

Business-process definitions, along with procedures and policies, are stored in a repository and are available to employees for documentation and as a foundation for ongoing improvements. This availability allows you to take the first step toward capturing corporate knowledge so that it can be disseminated throughout your value chain. By making the business process independent of business logic, line-of-business managers can make changes to the business process, without depending on IT personnel to implement the changes.

So as the business processes themselves are independent from the underlying IT infrastructure, there has to be an IT infrastructure that serves as the runtime environment for all of these automated processes, as well as providing all the services required for invocation during process execution.

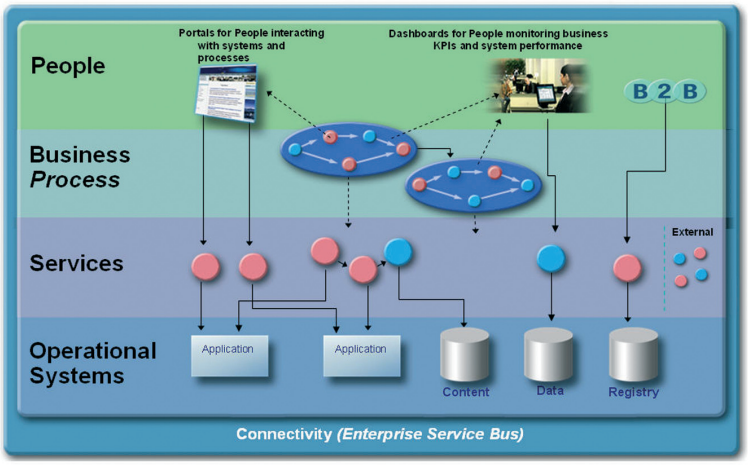

Figure 6. The cosmos of BPM on SOA: Processes in the center call services that are implemented in various ways using various technologies. People interact with the BPM system for various reasons, using graphical user interfaces.

Figure 6 shows the final architecture for business process automation, implementing BPM enabled by SOA. Business processes are in the center orchestrating services as defined in the process model. Services reside somewhere in the IT architecture. All the process needs to know are the service interfaces to be called. 'Technology' finally cares about service discovery and invocation, services results are sent back to the process engine. All human interaction, be it for process completion, monitoring or administration, is done from standardized and centralized user interfaces, tuned to be best used and most efficiently by various audiences.

Due to the concepts of SOA, there is no limitation in services implementations—existing back-end systems as well as newly written components are integrated via the business process model, and automatically invoked and executed during runtime. The technology layer of such a BPM solution is completely hidden from a "business" process point of view—and this is exactly what we want to achieve when combining BPM and SOA.

B. Stand-alone versus end-to-end approaches

Service-oriented architecture (SOA) is the approach that can help you build distributed systems that deliver application functionality as services to either end-user applications or other services. An SOA enables flexible connectivity of applications or resources by:

- *Representing every application or resource as a service with a standardized interface.*
- *Enabling applications to exchange structured information (such as messages, documents and business objects).*
- *Mediating the message exchange through an enterprise service bus (ESB).*

As you already know, every node in a process model requires some piece of software implementation once the process is run automatically. These software implementations can be very well understood as any kind of services the process is consuming as it runs. From the business process point of view, all the consumed services have to publish are their interfaces, such as, offered functions and required data, and some administrative information to be found and invoked. The business process does not need to know any technical information about how the service itself is implemented. The process just requests a function from the service, and if needed, waits for the results. How and where the required service is found in the network is done directly on the ESB that implements the SOA.

SOA therefore supports end-to-end BPM in small as well as in large scales—stand-alone approaches as implemented in silo applications do not scale as required when expecting increasing volumes and constantly increasing requests for further business process flexibility.

Together BPM and SOA help facilitate the next phase of business process evolution—going from merely automating repeatable processes to flexible automation of dynamic processes. This evolution is occurring because enterprises must compete more effectively by adapting to market changes faster, improving efficiency continuously and streamlining collaboration across traditionally siloed departments. Modern BPM solutions providing capabilities

such as 'model' and 'manage' have helped to dramatically simplify the modeling, monitoring and redesign of extremely complex processes containing automated functions and personnel decision making.

These BPM solutions make process models living representations of how organizations operate to deliver value and how organizational operations can change to help increase that value. Making those value changes to processes a reality requires integration between existing and future applications that automate specific business functions. Automation only becomes flexible if it can be reused and reintegrated in a dynamic manner. A standards-based SOA infrastructure is designed to deliver the automation flexibility, and Web Services are designed to provide the technology standards to make dynamic integration a reality across departmental and enterprise boundaries. Technical BPM solution capabilities such as 'assemble' and 'run' help simplify the transition from business process models to actual implementation by creating an SOA infrastructure that provides integration flexibility.

SOA assumes that IT portfolio items will change over time. SOA infrastructure assumes that business processes dictating how and when those items will be used and communicate with each other change over time. Keeping the process independent from the implementation of specific automation components helps make technology resources as flexible as the process models provided by the BPM solution. Enterprises may then fully merge process improvement efforts with technology resource management. When both are done together, enterprises may achieve dramatic improvements in market capture, cost effectiveness and profitability.

C. Fixed workflow versus dynamic assembly

Business process automation leads to process-centric solutions, which are composed of various components that again are implemented 'behind' services interfaces. Therefore, what we actually create with BPM enabled by SOA are called composite business applications (CBAs).

These CBAs are therefore not programmed, but dynamically assembled from existing components, and the components are sequenced as defined in business process models. Component implementations are hidden behind services implementations, and these service implementations can be

exchanged without touching business process logic. Also, entire components can be exchanged without affecting the business process execution logic. Business Process dynamicity can be implemented on various levels, and if done as recommended in the concepts of BPM enabled by SOA, business processes are no longer fixed workflows, but highly dynamic, flexible, and adaptable on various levels. This delivers a bunch of new and unexpected advantages, and significant business value:

- **Improved flexibility:** *Ease of making changes to business processes with minimal impact on other parts of the system.*
- **Increased programmer productivity:** *Using a single unified programming model that encapsulates technical implementation details accelerates the development and deployment of composite applications.*
- **Technology neutral:** *Businesses are able to substitute implementations or change protocols, deployment targets or other environmental concerns without changing the composite business application (CBA). Single components can be exchanged without affecting the master application– the CBA.*
- **Reuse:** *Clearly defined, loosely-coupled services are the hallmark of any well implemented SOA, and as such, lend themselves for easy inclusion in other business processes and composite applications.*
- **Composition:** *Services can be composed together through SCA assemblies to build more complex composite applications.*
- **Adaptability to change:** *Allowing business analysts to substitute new pricing models without having to "wait" overnight or for a weekend maintenance run. Note: This does not imply that you bypass testing! In many cases, you still want to test a new pricing model before deploying it into production.*

The technical concepts and programming model that allow provision of CBAs as discussed above are described in a standard proposal named "Service Component Architecture (SCA)" given to OASIS for further specifications.

D. The importance of industry standards

BPM enabled by SOA, as a design approach, can be implemented with virtually any existing integration technology. Indeed, several enterprises have made forays with service oriented approaches using object brokers, frameworks such as CORBA, and message oriented middleware. The problem with these implementations is that not every application vendor or internally-developed application is implemented in a specific integration technology.

Without widespread adoption of standard integration protocols, any SOA may be doomed to be limited in scope. With limited scope comes the need to build integration links between the different SOA implementations, and enterprises can end up where they began—supporting spaghetti links. Quite simply, the standards and protocols must be ubiquitous for SOAs to facilitate the loosely coupled integration software support across departmental and enterprise boundaries.

Widely adopted standards such as Web Services provide the opportunity to truly create an enterprise-wide SOA for two reasons. First, implementation and location dependencies can be removed, because the only requirement for communication is that the interface remains stable and each endpoint application understands Web Services standards. This understanding allows each application to send requests to the appropriate resources and interpret the response. It also allows software vendors to automate the creation of those application requests.

Second, most software vendors already support or plan to support Web Services standards and protocols. This near universal standards support means that regardless of the packaged applications, application development platform, or integration technologies in use today, enterprises start using these software resources as services with loosely coupled integration. Widely accepted standards such as Web Services can make existing information resources and existing automation applications available for a process designer to use and reuse at will in an SOA environment.

For example, processes automated with our IBM BPM Portfolio can include a Web Services compliant service, regardless of the vendor technology used to implement the service. Many enterprises have invested too much in older

application and integration technologies simply to throw them out and start anew. This evolutionary approach is a realistic option for many enterprises to adopt SOA over time.

E. The truth about SOA and BPM

Business process automation–founded on SOA

You now have an understanding about how business processes are automated and assembled using various components that hide their implementations behind services interfaces. This concept delivers new business values, just because the business logic (as outlined in the business process) is completely separated from the implementation of the services required for the business process activities.

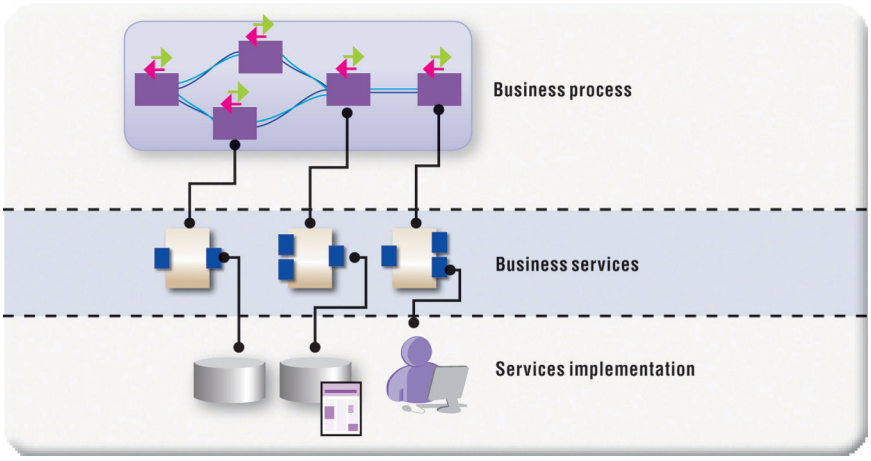

Figure 7. Separation of business process logic and business process implementation, provided by business services

As Figure 7 shows, business processes are composed of services, whereas the service implementation is hidden behind the service interface and unknown to the business processes itself. This allows exchanging service implementations without touching the business process: A former human task could easily be exchanged by a business rule without affecting the business process. A business process itself again can be wrapped into a new service.

This now allows business analysts to change business processes without forcing business service implementation changes, and IT personnel can exchange service implementations without touching the business logic as captured in the business process. The resulting business solutions following this concept are much more flexible than traditionally programmed software applications.

In addition, new business processes can be more easily composed of existing services, and if services do not yet exist as required by the business process, IT personnel can create new services using whatever technology, and then use these services to quickly assemble new business solutions by wiring these services to the new business processes.

Business process automation, based on SOA and in part BPM, not only speeds up the execution of business processes while increasing overall quality and reducing costs, it also accelerates the creation and deployment of new business processes. This is a tremendous value for IT personal, because now they are able to better deliver value to their business sponsors who are requiring adapting business processes quickly to constant market changes.

Numerous benefits are provided:

- *Process automation requires linkage to new or existing assets*
- *WebSphere Process Server isn't just a BPM tool but the business process automation SOA platform that allows for encapsulation of all the assets required for automation*
- *Acceleration of BPM initiatives and SOA initiatives*
- *Overall quality of overall project improvements*
- *Overall cost reductions*
- *Ability to quickly adapt to market-based changes through reusable IT components*

IX. Planning for success

A. Critical success factors

If you start with BPM and business process automation on a larger scale, you should know that you are following a strategic approach. If so, then keep in mind the six important steps to success that you should know:

1. Identify high-level management sponsor (C-level)
2. Establish an overall BPM/SOA governance
3. Create goal-oriented teaming of Business and IT
4. Choose the first BPM project wisely and know how to follow the selected BPM methodology in detail
5. Select the IT technology that best fits your needs
6. When done, review your success, and identify where to improve for future projects

These recommended six steps to success are further refined when remembering that:

- *We recommend establishing a BPM Competency Center (BPM CC) that strategically drives the rollout of BPM enabled by SOA throughout the organization. The BPM CC plays an important role to help business and IT people to translate business requirements into IT deliverables. If customers can not–for whatever reason–formally establish the BPM CC, we recommend doing this informally. This just means that people from business and IT regularly convene to talk about business requirements and IT facts. The broader BPM enabled by SOA is rolled out within an organization, the more important the BPM CC is, in order to benefit from reuse potentials (with respect to business processes and services provided and consumed) and to create an overall SOA as an enterprise-wide IT infrastructure, supporting business process automation.*

- *We recommend incrementally approaching BPM rather than following Big Bang approaches. This just follows the idea that BPM reuses existing assets that support all the business operations in use today. No one can afford to redo or rewrite all the assets that were written in the past, therefore BPM has to make use of them to allow completing business process automation projects on time.*
- *We recommend selecting the first BPM project wisely as stated above.*
- *We recommend constant communication of the good news of discovered business processes, their optimization potentials, the expectations in terms of KPIs once in production (and therefore then automated), and addressing Business Transformation issues that have an impact on the organization as well as on individuals on various levels within the organization.*

B. The importance of past success

Past success drives the next projects and rewards those that did the first projects. Therefore you should follow the recommendations given in this paper, and document the improvements that were made by changing from manual to automated processes.

Summary

How IBM can help you discover, validate and pursue process automation opportunities—Now it's time to get started

Now—in 2008—it's time to get started, or to be even more precise: To follow those who have started already.

BPM and SOA together help to move into the next phase of business process evolution—going from almost no business process automation into flexible, highly adaptable and—most importantly—measurable business process execution, giving access in real time to mission-critical business operations. Organizations can not escape from their market and customer demands asking for new and better products and services, delivered on time at lower cost, with ever-increasing quality expectations.

BPM focuses on how to execute business processes better and more flexibly, where SOA delivers the infrastructure and componentization required to handle expected business process volumes while operating in heterogeneous IT landscapes.

Finally, BPM and SOA are for the sake of all of us: The people! It doesn't matter if we are business analysts, managers, IT personal or any other player within the workforce, BPM enabled by SOA will foster innovation and allow for creating new businesses and business models—Let's all take care to be a driving part of that journey.

For more information

To learn more about process automation solutions from IBM, please contact your IBM marketing representative or IBM Business Partner, or visit the following Web site:

ibm.com/software/integration/wps/

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