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BUSINESS PROCESS MANAGEMENT WITH IBM WEBSPHERE TOOL

Ljubljana, August 2010   TAJANA SRAKA

STATEMENT

I, *Tajana Sraka*, hereby certify that I am the author of this diploma thesis that written under mentorship of *Prof. Dr. Mojca Indihar Štemberger*. I permit the publication of this thesis on the faculty's webpages.

In Ljubljana, _____   Signature: _____

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INTRODUCTION

The business environment in today's developed economies is characterized by increased change, increased competition and increased transparency. These changing market characteristics have influenced the priorities of business requirements. The need to support dynamic business environment by making change quicker and cheaper plays a critical role, since the companies that can adapt most easily to the changing environment are the ones that will recover the quickest from the recent economic downturn. Another driver is improved business and IT collaboration and alignment. If the business community has a more direct involvement in making changes happen, then this results in better understanding of business operations. Changes can be produced faster and more accurately and also closer alignment of business strategy with the IT-based process implementation is enabled (Craggs, 2010).

Business Process Management (BPM) provides an opportunity to implement those requirements. It allows optimizing business processes while improving its agility, business visibility and IT alignment. More effective and efficient processes will reduce costs while improving customer service and obtain greater business visibility. Business users can have closer involvement in defining, changing and measuring business execution. BPM can deliver these gains at the individual level, without requiring a full-scale enterprise-wide deployment (Miers, Harmon & Hall, 2007; Craggs, 2010).

The number of articles and papers being written about the idea of BPM has increased dramatically over the past few years. Business magazines are full of recommendations for the tools to easily transform the organization to be truly process centric. But the reality is, that in order to successfully implement the BPM vision, simply buying a new piece of software cannot be enough. The organization has to get familiar with this sophisticated approach and analyze its own requirements and capabilities. Until the company understands their business processes better, they will have problems when attempting to take advantage of the capabilities that a new piece of software offers.

The purpose of this thesis is to present the concept of Business Process Management and its underlying technology platform, while the goal of the thesis represents the analysis of possibilities of BPMS, the IBM WebSphere BPM Suite and the definition of its strengths based on the chosen criteria.

On the basis of the literature review, read articles and surveys, I will try to gain a wider perspective on the Business Process Management philosophy. The initial chapter is committed to the explanation of BPM itself, with a focus on its definition, life-cycle phases, objectives and challenges. It is followed by the analysis of BPMS tools, where I will be specifically concentrating on the functional capabilities, exploration of the state of the market and recent

trends. In the last chapter I use the theoretical frame built in previous chapters and apply it in the context of BPMS solutions to analyze their capabilities. On the basis of my own testing and chosen criteria, I will evaluate the tool for Business Process Modeling which is one of the key products of the analyzed suite. In the conclusion, I will be summarizing key findings.

1   BUSINESS PROCESS MANAGEMENT – BPM

The term "BPM" can be used in various ways and in many contexts. Some use it in the context of "Business Performance Management", others use it more narrowly, to refer to the use of software techniques to control the run-time execution of business processes. Again, others understand it as "Business Process Modeling". In this paper, I use it to refer to "Business Process Management", a management philosophy that strives to process optimization and excellence. The term will be observed and analyzed in great detail, but first we need to have a look at how its main component and focus, business process, is actually defined.

1.1 Business Process

There are many classifications of business processes. Palmberg (2009) covered literature on process management, from which it is clear, that there are various definitions of the concepts of process and process management. Business process, a key ingredient of BPM, is most commonly defined as "A Horizontal sequence of activities that transforms an input (need) to an output (result) to meet the needs of the customer or stakeholder". Figure 1 shows a graphical representation of the definition.

Figure 1: Business Process Diagram

Source: A. Kovačič et al., Prenova in informatizacija poslovanja, 2004.

Harrington (1991), for example, says that any business process consists of a group of logically related tasks that use the resources of the organization to provide defined results in support of the organization's objectives (Palmberg, 2010; Harrington, 1991).

Ramias (2007), in fact, agrees with that common definition of the business process, but he also prefers to upgrade it with some of the key principles of the process design. He defines the business process as an artifice or construct for organizing work so that it can be performed

effectively and efficiently, managed effectively while offering the potential for competitive advantage.

Kovačič, Jaklič, Indihar Štemberger & Groznik (2004) define the business process as the logical structure of such interlocking executive and supervisory activities that result in a product. Core business processes do not take place only in one organizational unit. Typically, activities are executed through various sections in an organization. In order not to face any delays, the flow of data, information and documents should be enabled between various sections.

Regarding BPM, the following assumptions apply for business processes (Westerman, 2009):
- Business processes are continuously developing
- Processes are interrelated and interdependent
- Processes flow between multiple organizations
- Processes interact with various systems and people (employees, partners, customers, suppliers)

1.2 Business Process Management Definition

The definition of business process management is, according to Palmberg, split by two different movements. The first movement is explained as "A structured systematic approach to analyze and continually improve the process" and is focused on improvement of single processes. The other movement promotes more holistic view on BPM as a part of management of the whole organization and is defined as "A more holistic manner to manage all aspects of the business and as a valuable perspective to adopt in determining organizational effectiveness" (Palmberg, 2010).

Many scientists and associations have created their own definition of business process management and few of them are presented here:
- Business Process Management should be thought first and foremost as a management philosophy that is driven from the top of the organization. It is not a new technology, rather it is a way of thinking that regulates the structure of the business and drives its overall performance (Miers, 2009).
- Business Process Management is a business approach to managing changes in business processes. These changes include the entire process life-cycle: from analysis and design, to the implementation, execution and automation of processes. It aims at integrating business partners' processes and their information systems. That includes dynamic adjustment of organization to business rules through analyzing and modeling processes and providing adequate software solutions to business users, implementation of processes and monitoring the execution of these processes (Kovačič & Bosilij-Vukšić, 2005).

- BPM is a structured approach to understand, analyze, support, and continuously improve the fundamental process such as manufacturing, marketing, communications and all other major elements of a company's operations. BPM is a wide and encompassing system that starts with the top managements' understanding and involvement, focuses on process improvement across the supply chain, instills a structured approach to change management, and emphasizes people management and development (Al-Mudimigh, 2007).
- BPM offers an opportunity to improve the efficiency of process management practices, while simultaneously aligning human and IT resources more effectively. Business process management refers to aligning processes with the organization's strategic goals, designing and implementing process architectures, establishing process measurement systems that align with organizational goals, and educating and organizing managers so that they will manage processes effectively (Business Process Trends, 2010).
- "BPM is defined as supporting business processes using methods, techniques, and software to design, enact, control, and analyze operational processes involving humans, organizations, applications, documents and other sources of information" (Van Der Aalst, Hofstede & Weske, 2003).

In order to compare the definition of the BPM from the companies' point of view we can contemplate the results of the survey "The State of Business Process Management 2010" that was executed by Wolf and Harmon and published in February 2010. Figure 2 shows the results of companies' understanding of the term "BPM". The most popular answers were "A top-down methodology designed to organize, manage and measure the organization based on the organization's core processes" with 36% and "A Systematic approach to analyzing, redesigning, improving and managing a specific process" with 34%. However, there was also a significant decline in answer that suggested that BPM is a set of new software technologies if compared to result of the survey from 2005 (Harmon & Wolf, 2010).

In my opinion, BPM is a structured approach that should improve business processes continuously. It should be thought of as a management discipline that is backed up from the top of the organization. It involves aligning processes with the organization's strategic goals, while striving to business effectiveness and efficiency, flexibility and improved business and IT collaboration. The focus should not be on new technology, but in order to implement the BPM vision, a technology platform is important after all.

Figure 2: The results of companies' understanding of the term "BPM"
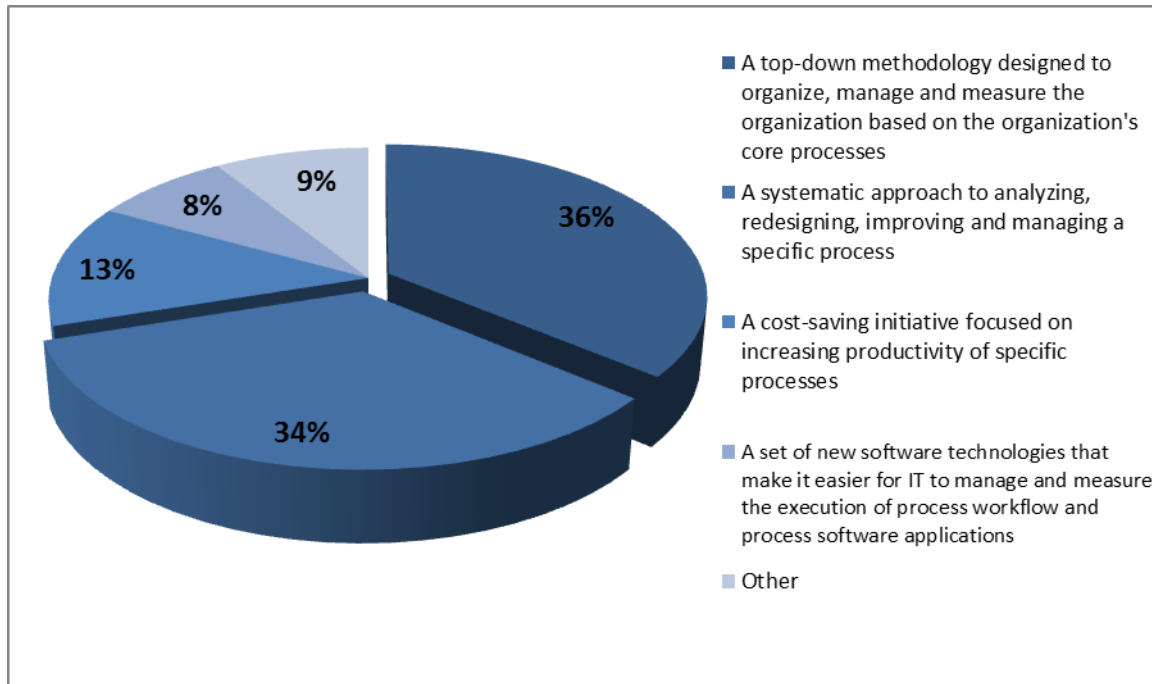
A top-down methodology designed to organize, manage and measure the organization based on the organization's core processes

A systematic approach to analyzing, redesigning, improving and managing a specific process

A cost-saving initiative focused on increasing productivity of specific processes

A set of new software technologies that make it easier for IT to manage and measure the execution of process workflow and process software applications

Other

Source: P. Harmon & C. Wolf, The State of Business Process Management 2010, A BPTrends Report, 2010.

1.3 Business Process Management Development

Already in 1993, Davenport in his book *Process Innovation*, states: "Business must be viewed not in terms of functions, divisions or products, but of key processes." Although Business Process Management is a new initiative, the idea of work being viewed as a process and then renewed is not so new. Many organizations have modeled and managed their business processes for years, using a variety of tools and techniques. In the early 1990's, Taylor's approach to industrial engineering and process improvement was widely recognized. But it was not until late 1900's that a serious talk about management's focus on business processes was started. In the 1980's there was a focal point on Total Quality Management (TQM) which was based on statistical principles, followed in the early 90's by Business Process Re-engineering (BPR) that started after Hammer and Champy's (1990) *Harvard Business Review* article called "Don't automate, obliterate". It promoted the radical, rather than incremental redesign and improvement of work. Another approach to process management is called Six sigma, which was developed at Motorola in the 1980's but became popular in the 1990's by adoption of General Electric. It represents a return to statistical process control, and focuses on relatively small work processes with the stress on incremental improvement (Jeston & Nelis, 2006).

The approach to BPM described in this paper is based on all of these previous approaches. In 2002 Smith and Fingar created the beginning of a new era in process management with the publication of their book *BPM: The Third Wave*. The stress of this approach is not upon

statistical process control, but the basics of process improvement and change. IT is not being treated as the core of process change, but also it is not ignored as it was in TQM and Six Sigma. On the whole, all of the major aspects by which organizations understand, measure and change how they work are included (Jeston & Nelis, 2006; Lusk, Paley & Spanyi, 2007).

1.4 Business Process Management Life-cycle

At a high level, BPM can be defined as a life-cycle consisting of five phases that are graphically presented in the Figure 3. Logically separated phases allow an organization to iteratively build and execute a business process management framework (Mitra, 2008).

Figure 3: Phases in a BPM lifecycle
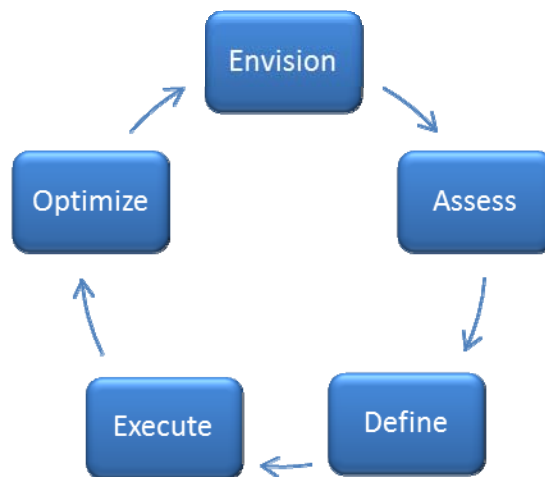
Source: T. Mitra, Architecture in practice, Part 6: Why business process management (BPM) is important to an enterprise, 2008.

- **Envision:** In this phase a vision for the BPM is developed. First, the business goals of the company should be documented and its KPIs analyzed to define performance requirements. This vision relates, in a significant manner, to the technology vision and assists as a map to define how the organization capabilities and strengths need to be developed to support a BPM-enabled business transformation.
- **Assess:** Here the "AS-IS" model or current state of the companies' processes is developed and analyzed. Organizational structure is assessed to determine if an organization can adopt the new business processes. Existing business measures and metrics, current IT architecture, governance around process design, application ownership model, and application portfolio analysis are some of the activities that need to be assessed in order to define gaps between what is and what is required. Evaluation also includes the overall road-map to realize the business transformation.
- **Define:** Here the "TO-BE", or model of the future state of business processes, is being developed. It is simulated to identify potential bottlenecks. The future model of the

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business architecture is developed around the people, processes, and information models. The technology stack that would support the life-cycle of the business processes (their modeling, design, assembling, deployment and monitoring) is also defined during this phase.

- **Execute:** In this phase, decomposed process models are used as one of the mechanisms to identify services. A process is assembled using the service and is deployed on a process run time engine. Running processes are monitored for performance and KPIs in order to enable sending out events and alerts that are represented through various dashboards.

- **Optimize:** The various aspects of the enterprise architecture are monitored, managed, and optimized for better performance in order to evaluate the success of the enterprise operations. Results from the executed processes are gathered and analyzed. Analysis usually reveals information that is inserted back into the first phase, where some business characteristics might be changed in order to best suit the actual operational needs for the enterprise.

1.5 Business Process Management Objectives

Some of the purposes to adopt a BPM philosophy that Palmberg (2009) indentified in her literature review include:
- to remove barriers between functional groups and bond the organization together,
- to control and improve the processes of the organization,
- to improve the quality of products and services,
- to identify opportunities for outsourcing and the use of technology to support business,
- to improve the quality of collective learning within the organization and between the organization and its environment,
- to align the business process with strategic objectives and customer needs,
- to improve organizational effectiveness and improve business performance.

Key drivers and objectives as defined by BPTrends association (Miers, Harmon & Hall, 2007):
- **Lower business costs and increased efficiency:** With BPM, the automation of repetitive steps is supported, integration of application systems is allowed and support for complex decision making enabled. On this platform the value delivered could be enhanced while lowering operational costs.
- **Increased adaptability and flexibility:** An effective BPM platform allows developing new products and services far more quickly and with greater degree of flexibility than previously possible. Taking core functionality of existing processes and reusing it in new processes without affecting the legacy applications improves the roll-out of new products significantly. Additionally, legacy systems could be replaced piece by piece, without affecting new applications based upon them.

- **Lower cost of system development and support**: BPM provides the opportunity for increased developer productivity which, in fact, lowers the cost of systems development. Functionality of legacy applications could be re-used in new applications, which means that adaptation of systems is enabled without expensive IT resources. The aim of most BPM initiatives is to enable expert end-users to develop, adapt and modify business processes without significant help from IT professionals. The more a system can enable that users themselves can develop and deploy their own processes, the lower the cost of ownership will be for that application.
- **Lower systems implementation risk:** BPM provides a more holistic view on organizing process changes. Managers are faced with lower risk when modeling entire processes and then making incremental, gradual changes.
- **Better governance and compliance:** The goal is to allow flexibility in the way processes can be interpreted while ensuring that the organization respects compliance with regulations. BPM represents a critical enabler in ensuring effective governance, since it can impose a way of working on employees by controlling how decisions and modifications to the processes are made.
- **Better customer service:** BPM technology provides the capabilities to integrate various customer interaction channels into joint, consistent processes, which ensures fewer errors (cases of work are not lost). In addition, shortening cycle times and ability to respond to variations in customer behavior usually provides ability to increase revenue and lower costs.

1.6 Key Success Factors for Successful Implementation of BPM

Implementing a BPM solution is a complex process that goes beyond departmental and organizational boundaries. Therefore, it is important to keep in mind following fundamental success factors that apply to all projects of BPM implementation:

- **Leadership:** Although the support from the top of the organization is extremely important for successful implementation of the concept, the reality is that few CEOs are aware of the importance and have the knowledge to transform their organizations into totally process-centric business. It is significant to have a leader who is the "head sales person" for BPM and have the capability of selling the expected benefits and outcomes to the top management. The stress is put upon having the attention, support, funding, commitment and time (Jeston & Nelis, 2006).
- **Linkage to organization strategy:** One of the major requests to successfully implement sustainable BPM on a long-term is that business processes need to be aligned with corporate business strategy. A well-defined strategy ensures that all people are working toward the same objective. However, this requires strong investment of time, effort and experienced team. Therefore, for a lot of organizations, this process is still an open issue. In fact, about 60 percent of the participants in "Status Quo BPM" survey did not have any

long-term connection between their processes and business strategy. The most common reason for that is lack of commitment of the top management that originates either from indecisive leadership or from absence of measurable goals. Some other reasons could be the absence of knowledge regarding the implementation of BPM or a lack of a well-defined business strategy (Neubauer, 2009; Jeston & Nelis, 2006).

- **People management:** People are an organization's greatest asset since the processes are executed either by people or by people supported by technology. It is vital to spend enough assets on people aspects of the implementation project. When dealing with changes in their environment, employees will need support, thorough trainings, coaching and guidance (Jeston & Nelis, 2006).

- **Collaboration between business and IT:** One of the key elements of successful collaboration is mutual understanding. Common language between business and IT is a mandatory precondition when enabling synergetic cooperation. However, mutual language is not always enough. Because of the different backgrounds of the two parties, used words and statements do not always necessarily mean the same thing. A business process model can serve as a meaning to establish shared language between different domains of the company, which not only include the behavioral aspect of the business, but also the information aspect and the business rules that apply to the process (Musschoot, 2010).

1.7 Challenges of Business Process Management

Although many companies have already started with adoption of the BPM initiative, a lot of them are having difficulties in its execution. Participants of the "Status Quo BPM" survey understand the importance of BPM, but their perception of that concept is still very low. Companies do not yet understand the full advantages of the BPM concept, and they do not know how and why they should perform it (Neubauer, 2009).

Maybe these new principles, at first look, seem simple to apply, but in real-life, they are complex. Based on a study made by Hansson (2003), it is indicated that many small organizations perceive work with process management to be problematic. Implementing process management seems to be demanding. In practice, process approach appears to be difficult to understand and to put into action (Palmberg, 2010).

Another thing that can get in the way of successfully implementing BPM is the belief that expensive tools are necessary to get started. This assumption is often based on incorrect understanding of the concept. There are many definitions of the term BPM, used in many different contexts. Identifying and understanding BPM is crucial for the successful implementation (Lusk, 2009).

Unwillingness to change might be another problem. BPM requires business culture open to both operational and organizational change. It requires cross-functional team work to be oriented to successful execution of critical processes. If employees are not willing to cooperate in that vision, its successful execution might suffer some delays (Lusk, 2009).

1.8 Business Process Modeling

Business Process Modeling represents a vital part of the whole Business Process Management discipline. Although those two concepts share the same abbreviation (BPM) they should not be confused with each other (Business Process Modeling, 2010).

"Models are real-world images, which reflect performance or look at reality. They allow us to develop better presentation, definition and understanding of the problem" (Kovačič & Bosilij-Vukšić, 2005).

Modeling is the activity of designing processes in order to be analyzed and improved. Business process models are most often used to support the process improvement and analysis and to develop software solutions. They assist at getting to know the process which contributes to a better insight and overview. Using business process modeling helps to identify weaknesses in process implementation and also targets the core information needs that serve as a basis for the information of the processes. Nevertheless, before any implementation is completed, the renewed processes can be tested on models. The simulation points to the bottlenecks that should be optimized (Kovačič & Bosilij-Vukšić, 2005).

Without formal process documentation, process complexities can burden an organization with unnecessary hindrances and bottlenecks. A well-constructed business process model can assist in locating and eliminating those hidden inefficiencies, costs and delays (Wahli, Avula, Macleod, Saeed & Vinther, 2007).

Business process model shows an abstract view of complex structures, which has a number of advantages (Arjen & Petten, 2007):
- Meaning of each process is precisely defined;
- Models are graphical and therefore easy to understand which allow different users to interpret it the same way;
- New processes can be modeled by combining existing processes or components in new ways;
- It allows focusing on specific parts of a structure, in a way that key relationships are highlighted and less relevant aspects ignored.

Figure 4 shows the process improvement process. As a part of this process, modeling comes up in two phases (Kovačič, et al., 2004):

- Process models "AS-IS": In order to thoroughly get to know and analyze the processes, the currently existing state has to be modeled. The current model has two primary purposes: to identify problem areas such as bottlenecks and inefficiencies and presents a basis for the improved model.
- Process models "TO-BE": They represent various improved and optimized models, from which one model is identified as the best solution.

Figure 4: Business process improvement
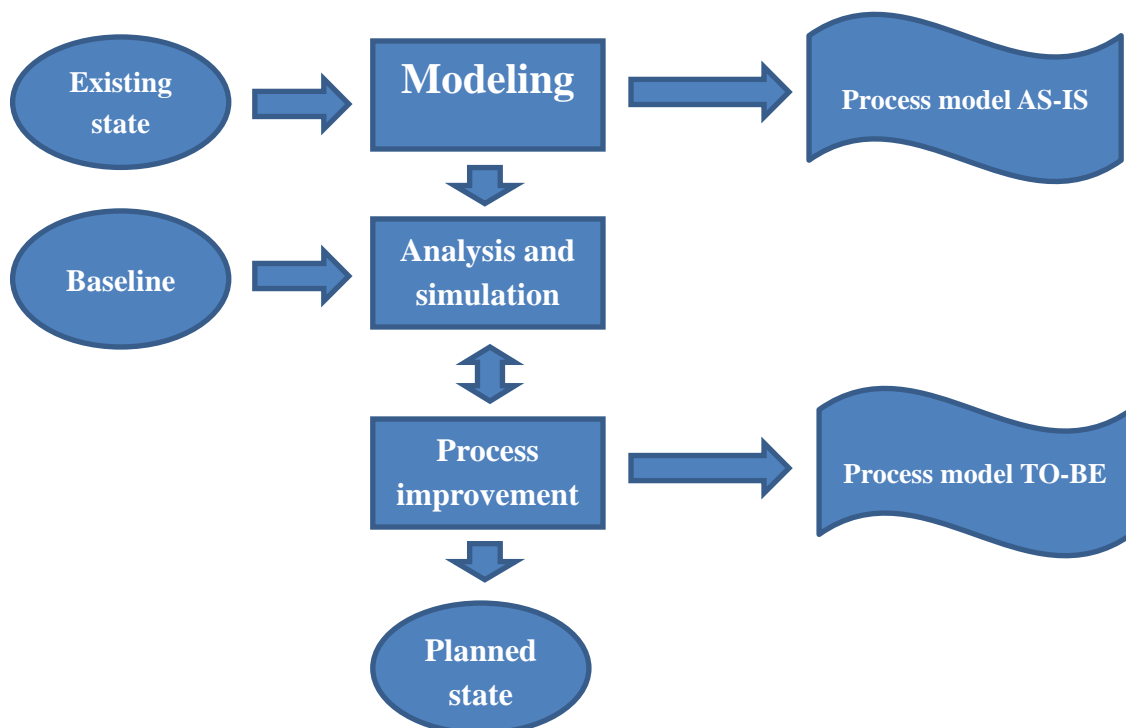
Source: A. Kovačič et al., Prenova in informatizacija poslovanja, 2004

2   BUSINESS PROCESS MANAGEMENT SUITES

If, with the term "BPM", there were some difficulties when trying to achieve a consensus about its definition, the agreement about the meaning of "BPMS" is even less defined. In literature, it generally appears as "Business Process Management System" or "Business Process Management Suite". Although there is no great difference between the two, I used the latter in any point in this paper to avoid misconceptions.

2.1 The development of Business Process Management Suites

In the 1970's and 1980's, there was a great demand for applications that would cover specific functional needs. Each department had their own application with its own database. However, in the 1990's, the emphasis on business process reengineering began to arise, and, therefore, companies wanted to integrate departmental activities into processes that crossed functional boundaries. To facilitate this transition, two different types of software tools evolved (Harmon, 2007):

* *Workflow tools:* Their aim was to facilitate managing processes in which employees processed documents. Workflow systems speeded up processing time, since there was no need to physically move documents between workstations. Also, as soon as one employee finished working with a document, the workflow tool ensured that the individuals responsible for the next task were notified and received the data they needed to execute their stage of the process.
* *Enterprise application integration (EAI) tools:* Those tools made it possible to manage a set of applications as if they were integrated. A number of applications were connected with a single tool which would make it possible to move information from one department to another, ensuring that information was kept consistent.

However, there was still a lack of common infrastructure which made operating with both applications very expensive. In the late 1990's, companies implemented internet use which introduced a set of common, open standards. Thus, the development of technical standards, such as XML, made it possible to merge older software systems with the internet and facilitate the integration of applications. By 2002, a number of white papers, books and articles were written about creating a new type of software that would combine the features described above. The vision of the new system contained workflow elements that would enable managing human tasks within the process, EAI elements which would manage software applications during the execution of the process, and access to the internet which would enable overall integration via open protocols. This system was termed BPMS (Harmon, 2007).

2.2 Business Process Management Suite Definition

Thinking about BPM, purely in terms of technology only, is definitely a way to failure. Yet, in order to successfully execute a BPM vision, the technology platform does play a vital role. It is critical to realizing innovation, compliance, agility and efficiency. This technology platform is called a BPMS (Business Process Management Suite) and supports the whole process implementation life-cycle, from modeling to implementation design, execution and monitoring, with feedback for continuous performance improvement (Silver, 2007).

BPMS is a new layer of software that is placed above other software applications and uses business process specifications to determine when to call apon other software applications. A BPMS application describes a business process and incorporates a BPMS engine that will execute the business process in real time (Harmon, 2007).

Gartner defines a BPMS as a set of integrated collection of software technologies that enables control and management of business processes. The stress is upon user involvement in the entire process improvement life-cycle. The model-driven approach is used to coordinate interactions among people, systems and information (Hill, Cantara, Kerremans & Plummer, 2009).

Smith and Fingar (2003) describe a BPMS as "...a modeling, integration and execution environment for the design, manufacture and maintenance of business process...". Hollingsworth (2004) defines a BPMS as "...supporting a similar process design-execution-redesign cycle via an evolution of workflow management systems and their convergence with enterprise application integration and world wide web technologies..." (Shaw, Holland, Kawalek, Snowdon & Warboys, 2007)

BPMS is a convergence of various existing technologies and approaches. It brings together a number of elements into a single platform, an independent process layer, which is separated by underlying applications, their connections and data. This layer allows presentation of a complete view of all the activities and brings together both existing and future investments of any IT technology (Westerman, 2009).

2.3 Key features of a Business Process Management Suite

Figure 5: An Architectural overview of a Business Process Management Suite
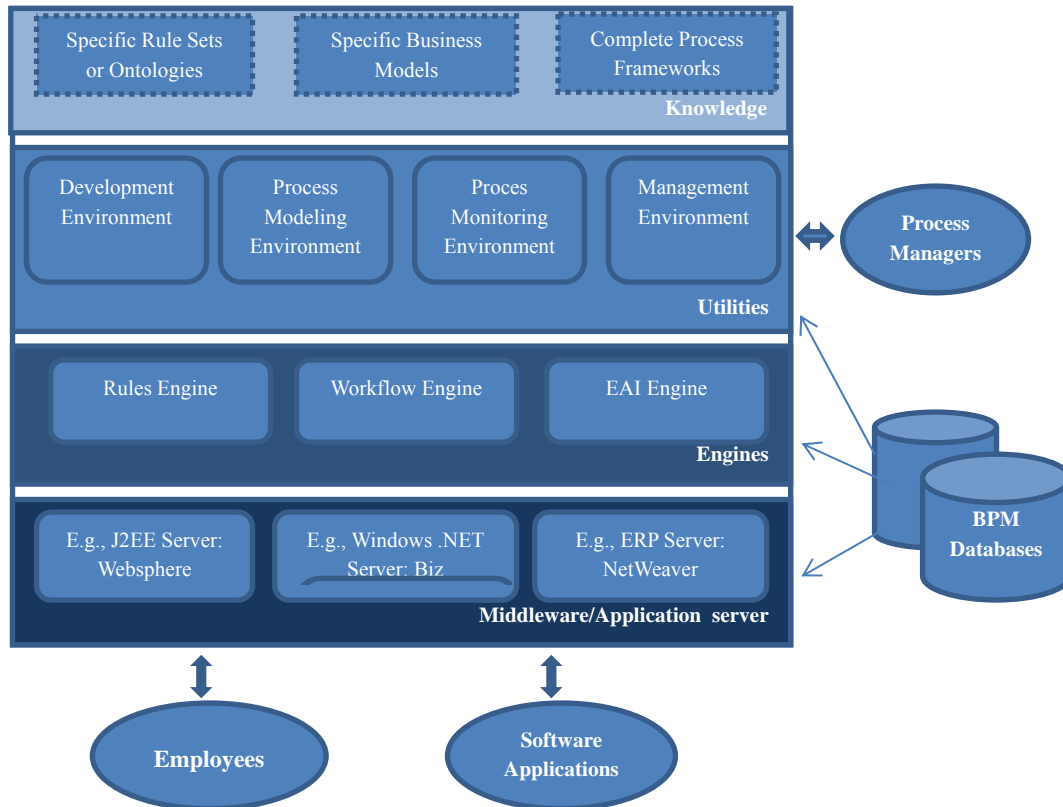
Source: P. Harmon, Business Process Change: A guide for Business Managers and Six Sigma Professionals, 2007.

Yet, there is no agreement about what should be included in a BPM suite. But we can define two core elements that every BPMS tool contains. One is the graphical modeling environment which allows the developer to define a description of a business process. The other main component is a BPMS engine that generates instances of the application when specific cases are processed. But that is a rather simplistic view of a BPMS. A more comprehensive tool or suite would contain a number of other elements (e.g. simulation, business rules, monitoring, business intelligence, ...) that can be divided into four layers that are presented in Figure 5. Each layer uses technology defined at the lower layer, while adding additional features to integrate the levels below. The bottom layer is called Middleware/Application Server. It manages the access of other software applications. The most popular platforms are IBM's Java server WebSphere, and Microsoft's Windows .NET BizTalk server. Most BPMS products offer two or three engines that manage the runtime execution of the business process instances. One engine manages human tasks within the process (workflow engine). The other (EAI engine) is responsible for the coordination of software applications required for executing the process data transfer to and from databases. Third engine is normally used to manage execution and

maintenance of business rules. The third layer consists of utilities that are required for the development of a BPMS application. Process managers and IT developers need an environment where they can describe the process, manage it, and modify the application if necessary. Elements that are found in the fourth layer were just recently introduced into BPMS tools. The packages of knowledge elements are designed for specific industries in order to facilitate creation of particular types of business process applications (Harmon, 2007).

2.5 A Business Process Management Suite

In order to take advantage of the full potential of BPM technology, it is important for a BPM system to feature some key characteristics: Defining processes by modeling and simulation, defining business rules, integrating together people, processes and applications, running processes by execution engine, managing processes by real-time monitoring and optimization and connecting users to processes.

2.5.1   Functional capabilities

- **Discovery and Analysis:** These capabilities help to define opportunities for process improvement, priorities and challenges. It allows non-technical BPM stakeholders (business analysts and decision makers) to work together to perform sophisticated analysis. Therefore, modeling tools should be easy to use for non-specialists, which facilitates the collaboration between IT and business. Tools should support the creation of multiple process improvement versions, its comparison, and analysis. It should also be able to capture process information concerning concepts (about organization, goals...). To use the work that has been done previously, the tool must have the ability to import documentation that has been created in external tools. On the other hand, ability to export models to more structured tools for further use must be supported by the tool (Ward-Dutton, 2009; Craggs, 2010).
- **Design and development:** This is the most mature area of BPM technology, since companies have had the ambition to model processes for many years. These capabilities help to document "AS-IS" processes and design "TO-BE" processes. Tools should be able to support specialized views of models for different audiences (both technical and non-technical) and enable modelers to easily specify, without coding, key information about processes (KPIs, events, timers, organizational information...). It should be possible to easily import information from external sources and reuse models across projects (Ward-Dutton, 2009; Miers, Harmon & Hall, 2007).
- **Simulation:** These capabilities enable simulation and analysis of modeled processes. Users can specify a variety of parameters that will influence how the simulation proceeds – for example, costs and durations, distributions and likelihood of events at decision

points. More sophisticated tools also enable comparison between multiple simulation runs that are based on different scenarios. Some tools also support usage of historical data from real executions of processes which can best help decision-makers to interpret simulations. It should also support the exportation of data to specialized analytic tools (Ward-Dutton, 2009; Miers, Harmon & Hall, 2007).

- **Rules:** These capabilities enable users to specify decision rules regarding business process definitions. One of the most important factors in this area is the dynamical supply of rule parameters by the process engine at run-time, rather than being taken for granted at design-time. Defining rules should not be a complicated process, but on the other hand, the tool should allow writing more complex rules, when needed. Rules definitions should also be easy to reuse within a specific project (Ward-Dutton, 2009; Miers, Harmon & Hall, 2007).

- **Integration:** In the past, a great deal of costs for a successful implementation of a system was spent to enable the integration into the existing environment. However, advances in technology have transformed the integration landscape a great deal. Recently, XML and Web Services have enabled integration of even the most complex applications and lowered the degree of technical expertise required. However, the BPM tools still vary significantly in the sophistication of providing the assistance to the integration of processes with external applications, systems and data sources. Integration with customers' existing infrastructure should be a must have of each tool. It is crucial that there is an overall integration point between technological components originated from different places (Ward-Dutton, 2009; Miers, Harmon & Hall, 2007; Craggs, 2010).

- **Deployment and execution:** These capabilities are concerned with deployment and execution of process designs in the context of customers' existing information sources. Tools should be able to import models from process design tools and compile those models to appropriate forms in order to be executed onto process servers. Technical experts should have the possibility to check the variables for the potential problems in a debugging mode. At run-time, the process server should be able to change, manage and dynamically create new processes, data objects and decision options. Forming lists of tasks and individual user interfaces should also be supported (Ward-Dutton, 2009; Miers, Harmon & Hall, 2007).

- **Monitoring and optimization:** Many products have integrated monitoring capabilities, but there are still major differences in their offerings. At a minimum, BPM Suites should be able to report data about a specific process, and analyze and filter it in order to provide useful information for senior managers. More sophisticated systems offer also possibility of combining data with external multiple data sources. Those have integrated Business Intelligence systems to analyze the data and look for patterns (Miers, Harmon & Hall, 2007; Craggs, 2010).

2.5.2   Other core product features

- **The Server environment:** In this paper, the term "server" refers to a piece of software that performs some specific purpose and is not meant as a hardware component. Every BPM Suite is organized around *Application Server* that is usually provided from one of the major IT vendors, e.g. IBM or Microsoft. It is a software component that dynamically generates Web pages. Another type of Server is *BPM Engine* – a process server. It plays the vital role of executing, controlling and monitoring all business processes. It manages employee interaction with processes and assures that the required work is accomplished. The BPM Engine is also responsible for coordinating integration of external applications and utilization of process-related data. Another point worth considering is the environment that is required for a specific Suite to run on, as only a few engines run on both J2EE and Microsoft platforms (Miers, Harmon & Hall, 2007).

- **User Interface:** The point of interaction between users and computer is usually enabled through web-based browser. Support by plug-ins can provide users with an opportunity to operate with different views. It often works close together with e-mail to deliver work notifications (Miers, Harmon & Hall, 2007).

- **Process Adaptability:** This sort of functionality refers to support adaptation of process at run-time. It is just a matter of time before process models will be required to change, and, therefore, it is expected from a BPMS to support flexible and adaptable solutions. Most products function in a way that all changes must be reflected in the process model beforehand. Any exceptions that may come up later are handled manually by a supervisor, who, very often, becomes the bottleneck as cases mount up. A more flexible approach allows end-users to have the ability to create their own process fragments and apply them within an individual case. The user is now able to interpret the task at hand and adapt it in line with the single instance. The mechanisms used to enable adjustment rely on the underlying architecture and whether it can handle more than one process associated with a work item. With the gradual development of the market, more and more systems will be able to respond to the needs of individual work items without having to revert to changing the original process model (Miers, Harmon & Hall, 2007).

- **Templates and Frameworks:** Many vendors offer their clients templates and frameworks for a particular industry that simplify the initial BPMS implementation and provide support for specific type of business processes. The use of framework components and rules can lead to a substantial reduction of development time (Miers, Harmon & Hall, 2007).

2.6 The BPMS Market

Although, in the last few years companies were concerned with financial downturn, recent results of the survey "The State of Business Process Management" show that the business process market is in good shape. The overall growth of the market just slowed a bit, it did not decline. Moreover, the BPMS market even continued to grow. The most popular answer, when being asked how they reacted to the economic downturn regarding business process initiatives, was 35% of all respondents did not cut back their BPM spending at all. Many companies rather held-off making new commitments, rather than try to scale back major, ongoing projects. The table of complete results on how companies responded to the financial downturn can be found in Appendix 3.

This same survey also shows that the tools most commonly chosen were sold by IBM, Oracle and SAP. But it is not the large players only who take the whole market share. There are still lots of small and mid-sized vendors who continue to remain in the market and are promoting and selling BPMS products (Harmon & Wolf, 2010).

In 2009, Gartner (Hill, Cantara, Kerremans & Plummer) developed a Magic Quadrant for Business Process Management Suites that is presented in Figure 6. In order to evaluate this market, the top 22 vendors that achieved the largest market share and offer multiregional, cross-industry BPMSs are positioned across the quadrant based on vendors' ability to execute and their completeness of vision. The clustering of dots in the diagram point out the trend of the maturing market, and the lack of differentiation across vendors. For the first criterion (ability to execute) capabilities of a product, sales execution and pricing, customer experience and marketing execution play the most important role. The assessment of the second criterion (completeness of vision) strongly relies on vendors' understanding of the market, their product strategy and innovation as an extremely important factor for a long-term differentiation.

Figure 6: Magic Quadrant for Business Process Management Suites
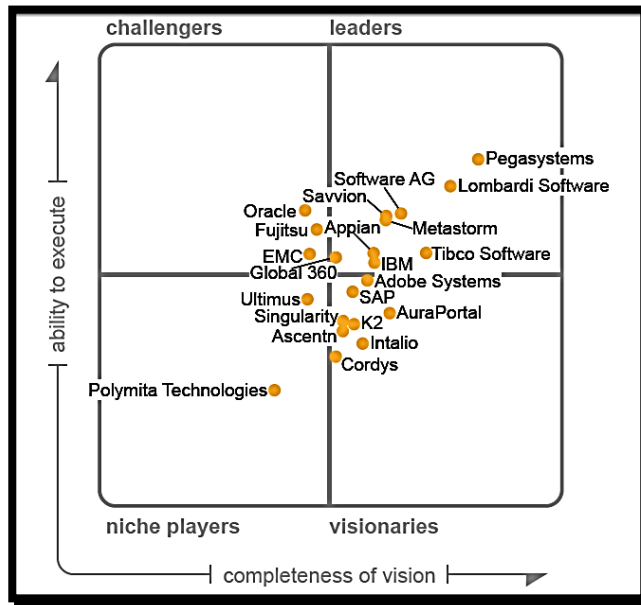
Source: J. Hill, M. Cantara, M. Kerremans & D. Plummer, Magic Quadrant for Business Process Management Suites, Gartner, 2009.

Based on how vendors apply to the presented criteria, they are divided into four quadrants (Hill, Cantara, Kerremans & Plummer, 2009):

- **Leaders** (e.g.: IBM, Metastorm, Pegasystems, Software AG, Appian, ...): These vendors offer products and services that best meet the criteria written above. They promote the idea of business analysts being empowered to transform processes with model-driven approaches, rather than coding. They enable strong collaboration between business people and IT professionals. Their product supports gradual, iterative process improvement and visible and flexible processes without having to sacrifice management control. Demonstration of strong innovation in their business models and consulting or educational services help to achieve superior sales results.

- **Challengers** (e.g.: Oracle, Fujitsu, EMC, ...): These are all strong companies that have recently faced some major change in their organization or products. Their products are weaker in supporting continuous process improvement and could provide better usability for less technical oriented people. They do not enable as strong collaboration between business people and IT professionals as the leaders do.

- **Visionaries** (e.g.: Adobe Systems, SAP, K2, Intalio, ...): Vendors in this quadrant are innovators. They entered the market recently and thus have weaker recognition and fewer references. Most visionaries are small and highly innovative, and, therefore, more attractive for acquisitions.

- **Niche players** (e.g.: Ultimus, Polymita Technologies, ...): Niche vendors are oriented to targeted markets and are offering solutions that are solving specific business issues. Their products are architecturally more unified and therefore delivering a stronger BPM user experience.

2.7 The Business Process Management Suite trends

2.7.1   Business activity monitoring

For the most managers, the idea of obtaining better information and control over their processes is critical in deciding whether to embrace the whole BPM deployment. They want to have the ability to track and monitor their business, have an overview on how individual departments are performing and compare the impact that one variable has over another. Business activity monitoring (BAM) is a term that refers to different approaches of gathering information about processes and providing data to managers. The aim is to provide real time information about the status and results of various operations, processes, and transactions through aggregation and analysis of data about activities. Most BPMS products that are on the market today provide limited functionality that satisfies only operation level monitoring. Advanced monitoring demands more technological resources. To create a more sophisticated dashboard, it would be necessary to combine data from specific processes with information from numerous other sources which would then be combined in one place, analyzed and filtered to provide only summary data for the strategy level monitoring. The analysis and filtering operations are usually executed with data mining systems and business intelligence techniques (BI). Today only a few BPMS products are able to support those technologies, but as BPMS products become more mature, it is likely that they will incorporate data warehouses and BI elements to provide more advanced BAM capabilities. In addition, most analysts assume that, ultimately, any BPMS solution will be combined with a BAM solution that managers can monitor, and assure that both processes and BPMS system is performing as they should (Harmon, 2007, Miers, Harmon & Hall, 2007).

2.7.2   Service Oriented Architecture

The Service Oriented Architecture (SOA) concept is based on developing and using a reusable business service instead of building monolithic applications in silos that are self-contained and not compatible with other computing applications. In combination with BPM, SOA provides the ability to create process independence and thus greater business agility. Indeed, each business process is modeled as a set of individual tasks, which are normally implemented as services within an organization. SOA exposes services and BPM consumes them. Single service can be reused in multiple business processes and shared across various systems independently of underlying technology architecture. Its change should not affect processes and similarly process modifications should not affect the core integration technology. Currently, SOA is being extensively promoted as a key BPM technology, but in the survey "State of Business Process Management" that was executed in 2010, only 15% of

the respondents said that they are already using this concept. It has not yet become recognizable as a key element of BPM effort, but in spite of that result, many predictions of experts point to its more important role in the future (Behara, 2006; Dwyer, 2006; Sweeney, 2008; Harmon & Wolf, 2010).

2.8 The Business Process Modeling Tools

A business process modeling tool offers a user interface for creating diagrams on the computer. In addition, for each process, sub-processes can be defined. For every activity we can define specifications (activity input and output, employees involved, units per hour, cost per hour, ...) and relationships between them. Business process modeling tools are not only meant to define and document business processes. Rather more important is the storage of information about the processes. Any professional business process modeling tool should be able to store all these model elements in a database, which is normally called a repository. This allows that any information inserted to be reused, maintained and updated easily which facilitates the creation of diagrams. Most modeling tools support code generation from a database in order to exchange information about processes with other tools more easily (Harmon, 2007; Wolf & Harmon, 2010).

Harmon (2007) separates two groups of products for business modeling. If we compare individual process modeling tools and process modeling tools that are incorporated in BPMS, there exists a basic difference in the purpose of their development. The first were developed to facilitate work for business people in redesigning and analyzing processes. Since they have been present on the market for many years now, they are much more mature than BPMS products. The latter are designed to support the run-time execution of large business processes, which makes them a lot more complex and not nearly as friendly to use by business people.

3   IBM WEBSPHERE

3.1 About IBM

IBM (International Business Machines Corporation) is one of the world's largest IT companies with revenues of more than 100 billion dollars in 2009. IBM is offering a wide variety of products and services in order to best suit their clients' needs. Its business is composed of six functions: hardware, software, services, technology, financing and research. IBM has been quite active in a wide range of BPM initiatives. Assisting in developing technology standards (i.e. BPMN, BPEL, XML, e.g.) that will define the market and then demonstrating the value of its approach to its customers, has been its focus for many years. IBM is also well aware of the fact that most corporate environments are heterogeneous and

therefore is offering the architecture that supports multiple platforms and interoperability. As an international company, IBM operates in a global environment. The company has assets to execute their services from almost any location in the world. Their consulting services are considered to be their greatest differentiators in BPM (Ward-Dutton, 2009).

IBM has experiences in providing technology for process automation for almost two decades. Most of the time, its focus was on workflow technology, but in recent years, the company has been developing their own process management platform and also buying some major, already established BPM players (i.e. Filenet, Lombardi and ILOG). The IBM BPM Suite, therefore, brings together diverse technology in order to provide complete solutions for their clients. Regarding BPM, the company offers three fundamental options that are bundled within BPM Suite, each with specific strengths that can be used individually or in combination (Bhadriraju et al., 2010):

- IBM WebSphere Dynamics Process Edition: Based on SOA, it is oriented toward solving highly demanding cases regarding integration, and supports critical, human-centric processes. This product will also be the subject of more detailed analysis.
- IBM Filenet Business Process Manager: It provides best environment to support content-centric scenarios and primarily focuses on document-driven processes.
- Lombardi: Contains easy-to-implement solutions that can be quickly deployed by major involvement of business people who have minimal integration requirements. The focus is based on collaborative process improvement.

3.2 IBM WebSphere Product Overview

The results of the survey "The State of Business Process Management 2010" (Wolf, Harmon, 2010) show that the IBM WebSphere BPM is the most popular choice among BPMS products. In 2009, 15% of all respondents were using this solution in their organizations. (The table with results on the most used BPMS tools can be found in Appendix 4).

IBM is offering a series of products that can be combined to provide an organization with a complete BPM suite. The key products in the IBM WebSphere BPM suite include (Bhadriraju et al., 2010, Keen, 2010; Miers, Harmon & Hall, 2007; Ward-Dutton, 2009):

- WebSphere Business Compass: This is a server based platform that enables the execution of SWOT analysis and identification of key capabilities and areas for BPM focus. In this environment, high-level process maps can be defined and reviewed by authorized staff before any implementation by IT people is done.
- WebSphere Business Modeler: This is a common process modeling and simulation tool, used by business analysts that will be explained in more detail in the next chapter.
- WebSphere Integration Developer: This is a software design and development tool used to build services and SOA-based integration solutions. It adds implementation details to process models created in WBModeler.

- WebSphere Process Server: This is an engine that orchestrates people, processes, and information services through support of human tasks, business rules and security on a common SOA platform.
- WebSphere Business Monitor: This tool offers a technology platform that provides business users with an end-to-end view of business process performance through customizable business dashboards. It enables monitoring and analysis of processes through calculated key performance indicators and other metrics.
- WebSphere Business Services Fabric: This is a design and run-time environment which assists organizations to realize the SOA-based integration and enables architectural agility and reuse of services.
- WebSphere Industry Content Pack: This product supplements BPM solution development with a library of assets that contains a wide variety of industry standards and IBM's best practices.
- Business Space powered by Websphere: A browser-based graphical user interface that provides common ground for business users for integration of interfaces across the IBM WebSphere Business Process Management portfolio.

3.3 IBM WebSphere Analysis

The following analysis of IBM WebSphere Suite is based on the functional capabilities (Discovery and Analysis, Design and development, Rules, Integration and execution and Monitoring and optimization) that were theoretically described in the previous chapter. I included some other significant criteria (User Interface, Process Adaptability, Templates and Frameworks and Platforms and standards). Table 1, summarizing all criteria, is presented at the end of the chapter.

- **Discovery and Analysis:** To best understand the BPM initiative and to spread the process awareness throughout the organization, IBM is offering a set of tools that allow non-technologist to define strategy maps, capability maps and abstract process models that could later be exported to more sophisticated tools for further development. IBM is offering support for process discovery that covers the whole BPM life-cycle. The tools allow users to first identify what their business priorities are and later use this information to define the desired process capabilities and proceed to the process design stage (Ward-Dutton, 2009; Craggs, 2010).
- **Design and development:** IBM, in its design tool WBModeler, supports sophisticated, high-level modeling work. It enables users specification of process models, process resources, organizational, and information models, which are stored in a joint library. All those models can be reused in WBModeler environment. The tool allows to specify a great deal of implementation detail, but unfortunately some of the details are lost when they are exported to WID in order for processes to be deployed live because they are not supported by the BPEL standard (WID currently supports only BPEL-compliant models).

Those imported specifications are valid when running process simulation and specifying Key Performance Indicators to set orientation for monitoring and analyzing processes at run-time. But still, changes made in WBModeler after data was exported to WID can be merged into WID models and vice-versa; model changes made in WID are highlighted to WBModeler users for manual adaptation, if relevant. Human tasks are modeled as process tasks that are factored into service components and grouped together as run-time modules. The tools supports internally developed business process notation that is derived from the BPMN I.I standard (Ward-Dutton, 2009; Miers, Harmon & Hall, 2007).

- **Rules:** To best serve the needs of its customer, IBM collaborates with various rule engine vendors instead of offering its own, major business rule engine. Therefore, clients can choose the product that best matches their requirements. The rule-based support is optional and thus offers a user the flexibility to choose when applicable. In addition, IBM is also supporting the development of business rule standards in order to develop open standard models, and, consequently, achieve greater compliance between various rule engines (Ward-Dutton, 2009; Miers, Harmon & Hall, 2007).

- **Integration and execution:** IBM has also developed SOA based integration infrastructure that spans through the whole WebSphere offerings. That functionality provides connectivity to many different environments and applications. IBM also provides a rich set of technology adapters in order to create integrated enterprise applications. Great support for transferring information from its BPM environment to IT software development tools to modify the underlying technology is provided. It is possible to shift from one process modeling tool to another or from a process model to a UML model for further software development with a minimum of difficulty (Ward-Dutton, 2009; Miers, Harmon & Hall, 2007; Craggs, 2010).

- **Monitoring and optimization:** Regarding monitoring capabilities, in comparison with most of today's BPMS's that are limited to only operational monitoring, IBM offers a sophisticated solution with advanced monitoring functions. Those capabilities are provided by a combination of WebSphere products. When modeling, tracked process variables and KPI's for those business measures can be defined. Using a plug-in, these elements are later related to the components and modules and details of event responses are defined. On the basis of both historical and real-time data, the results of the analysis are displayed on graphical and configurable dashboards. It is also possible to look at graphical views of running process instances. For deeper analysis, drill-downs are available (Ward-Dutton, 2009; Miers, Harmon & Hall, 2007).

- **User Interface:** IBM has developed a capability, called Business Space, that provides single, unified, roles-based interface across the whole BPMS. It is tuned to a business-based skill set, rather than a technical one. As a web 2.0 application, it leverages the web browser display by exposing various custom functionalities integrated from the whole stack. Business Space assists at improving the ease of use which results in lower cost of training and a greater productivity (Miers, Harmon & Hall, 2007; Craggs, 2010).

- **Process Adaptability:** IBM WebSphere also provides great mechanisms to support error or faulty handling. In order to deal with exceptions without extra human intervention, it is possible to build various scenarios that might occur. A user can edit the model. It is also possible to bypass, redo or rollback steps related to the current process instance, as needed and apply the changes selectively (Miers, Harmon & Hall, 2007).
- **Templates and Frameworks:** IBM offers a number of vertical industry templates and frameworks that can accelerate and enhance the development of specific types of business processes with the assets based on industry standards and IBM's best practices. IBM licenses solutions specifically in the area of **i**nsurance, banking, telecommunications, healthcare and product life-cycle (Miers, Harmon & Hall, 2007; WebSphere Business Modeler Advanced, 2010).
- **Platforms and standards:** IBM's BPM Engine is called WebSphere Process Server and it is based on WebSphere application server that is built on J2EE and on Eclipse. Process Server uses BPEL to support the execution of the process flow, which does not yet support employee interaction. Thus, human interaction is represented as a service in the process flow. Process Server also provides the environment that allows external applications to be fully integrated into an existing system. IBM products are compatible with the entire range of Web Service which they also helped create - XML, SOAP, BPEL, ... (Miers, Harmon & Hall, 2007).

Tabel 1: IBM WebSphere Analysis - summarized findings

Capabilities:	Summarized findings:
Discovery and Analysis	IBM is offering support for process discovery that covers the whole BPM life-cycle.
Design and development	The sophisticated, high-level modeling work is supported. The tool enables specification of process models, process resources, organizational and information models, which are stored in a joined library.
Rules	IBM collaborates with various rule engine vendors and also supports the development of business rule standards. The rule-based support is optional which provides great flexibility.
Integration and execution	SOA based integration infrastructure provides connectivity to many different environments and applications.
Monitoring and optimization	IBM offers a sophisticated solution with advanced monitoring functions. The tool supports analysis based on predictive, real-time and historical data.
User Interface	The solution provides unified interface for the whole BPMS and is specifically customized for each role and position which makes the tool easily manageable and provides higher ease of use.
Process Adaptability	The adaptation of processes at run-time is supported. In order to avoid extra human intervention, it is possible to build various scenarios in advance.
Templates and Frameworks	IBM offers extensive industry-based contents that cover a wide range of needs and enhance the development of specific types of business processes. The solutions are based on industry standards and IBM's best practices.

3.4 IBM WebSphere Business Modeler

The IBM WebSphere Business Modeler (WBModeler) is an open-standards oriented product that operates on Eclipse environment. It is a business process analyst tool that is used to model, design, simulate, analyze, and improve on business processes and also monitor and take actions based on key performance indicators (KPIs), alerts and triggers. To simplify business process modeling, it already provides an embedded library of open-standard KPIs. The product allows integrating new and revised processes and assist at defining organizations' resources and business items. WBModeler enables business and IT experts to work together, define business models, and share them using a Web browser (WebSphere Business Modeler Advanced, 2010).

The WBModeler is much more than just a tool for creating models. In the next paragraph I will briefly describe some of its most significant capabilities (WebSphere Business Modeler Advanced, 2010):

- Business Process Modeling: The tool not only allows creating visual representation of data, but also its association with supporting information (modeling business items, resources, business rules, human tasks, structure and organization modeling). In addition, it has the ability to attach forms and documents to the model itself.
- Business Measures Definition: By adding business measures (key performance indicators and metrics) to the modeled processes, the precondition to evaluate and continually improve business performance is set. Those metrics associated with a process can be exported as a monitor model and be used for additional analysis.
- Simulation of business processes: The tool provides a simulation function that allows simulating and analyzing business processes under a wide variety of conditions. It is possible to simulate different scenarios and alternatives, without the need to remodel the business process. The tool allows running simulations with imported historical process data to provide best information for decision makers.
- Analysis of business processes: It is possible to perform both static (information about models in their static form) and dynamic process analysis (information based about the results process simulations).
- Report generation: The tools supports generating predefined or custom reports based on the process data**.**

3.5 IBM WebSphere Business Modeler Analysis

In the following chapter, I observe more closely and analyze the IBM WebSphere Business Modeler Advanced 6.2., since the primary focus of the BPMS is put on the modeling tool, and, therefore, the application deserves some special attention. Also, I have had the chance to test it myself. In the case of the sample process I modeled, I have evaluated the solution on

the basis of the criteria that is presented in the following paragraphs. The criteria were chosen based on the article "Business Process Management software selection – two case studies" (Indihar Štemberger, Bosilij-Vukšić & Jaklič, 2009). Table 2 at the end of the chapter presents the summarized evaluation and the grade of each observed criterion on the scale from 1 to 5 (presented with stars).

3.5.1   Clarity and comprehensibility of models

Process models have to be easy to design because the modeling environment is usually meant for business specialists who do not have extensive programming background. The WBModeler is a user-friendly tool, allowing a great deal of flexibility regarding modeling specifications which assist at providing the environment that is most comfortable for users. The tool supports a common BPMN style notation, which sets the user, from the start, in a familiar environment and thus the educational expenses are considerably reduced. Additionally, it is possible to customize the icons that appear on different element types using a predefined image or one of the user's own images. The models can be arranged in either a free-form, which allows one to arrange their process diagrams the way that they want or a swim lane layout that arranges diagram elements in rows according to pre-defined attribute, for instance, an organizational unit. To simplify the modeling process, it is possible to simply drag elements needed into a process diagram. The tool also supports decomposition of process diagrams into sub-processes at various levels. A number of business modeling modes are supported to view and develop processes. A user can also switch between various modes depending on the level of modeling detail preferred and whether to export the models to different technologies. Appendix 1 presents the modeling process of issuing a gift voucher in the WBModeler tool (WebSphere Business Modeler Advanced, 2010).

3.5.2   User interface and usability of the tool

The WBModeler interface provides the user with comprehensible and well-structured solution. Overall, the tool consists of four different panes (the Process editor (diagram), the Properties view, the Project Tree view, and the Outline view). Appendix 2 presents the actual WBModeler's user interface. It is possible to maximize any view or apply the desired number of pane layouts by simply clicking on the icons situated above each pane. Of course, most of the work will be done in the Process editor where the process can be visually composed with easy-to-use, drag-and-drop technology. Existing elements can be similarly dragged from the Project Tree view without having to minimize the diagram or change the current view. Additionally, to make the user experience even more customizable, the layouts of specific components can be placed throughout the pane. To assist users when having difficulties, the dynamic help pane can be turned on to provide the user instantly with some search results that might be related to the specific issue. Clarity of the tool is increased with the explanation of

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the button icons by placing the mouse above them. The design of the tool is aesthetically formed and thus provides an environment that is pleasant to work in. The WebSphere Business Modeler does not require much technical skill; therefore domain knowledge can be enough to develop detailed process models (WebSphere Business Modeler Advanced, 2010).

3.5.3 Expressiveness

The tool is one of the most complete and sophisticated solutions in the market today. It covers the whole range of first class modeling, simulation and analysis capacities. The application from IBM is great for companies that are looking for a comprehensive tool that supports the complete range of capabilities and want a first-class solution.

3.5.4 Price and implementation costs

Price and implementation costs: The user license of IBM WebSphere Business Modeler Advanced is 10.316,00 €. User license lasts for 12 months and provides customers with product upgrades and technical support in order to conduct successful software deployments. The individual components cannot be ordered separately, only together, offered as a complete solution. Total cost of ownership of the tool is relatively high compared to other modeling applications (WebSphere Business Modeler Advanced, 2010).

3.5.5 Local vendor support

IBM has been present on the Slovenian market for over 70 years. Employees regularly upgrade their knowledge and skills in IBM education centers around the world, so they are up-to-date with new technologies and modern methods of work. In Slovenia, the company is successfully operating in the areas of marketing hardware and software services, technical support, training and advisory services and transferring knowledge and technology (IBM Slovenija, 2010).

3.5.6 Good reputation

To ensure adequate reliability of the tool, the good reputation of the provider plays an important fact when buying a new solution. IBM is one of the few information technology companies with a continuous history dating back to the 19th century. With almost 400,000 employees worldwide, IBM is the second largest, and the second most profitable, information technology and services employer in the world according to the Forbes. IBM employees have earned many world renowned prizes, including five Nobel Prizes. The higher education

structure of IBM's employees ensures that the company operates professionally and efficiently. Regarding BPM, IBM has many references and stories of successful implementations. For example, Mobitel, Slovenia's largest mobile communications company, has successfully implemented two IBM products; IBM WebSphere Business Modeler and IBM WebSphere Business Monitor that enable Mobitel to achieve business optimization (IBM Slovenija, 2010; IBM, 2010).

3.5.7 Integration with other products

IBM WebSphere Business modeler allows import and export of existing business process models and data in various formats to be compatible with other product for further development. As a starting point for a modeling project, it is possible to import existing business process models or data from various formats (e.g. Microsoft Visio models, text files, spreadsheet data...). Also, it is enabled to export project elements from one project and reuse them in another one. WebSphere Business Modeler also complements the SOA modeling capabilities of tools. To integrate the system with other solutions with different underlying technology, SOA assists with allowing services to still exchange information using an open communication environment. This connection of interrelated business processes makes it possible to share information across multiple BPM applications.

Tabel 2: IBM WebSphere Business Modeler – summarized evaluation

Criteria	Grade	Comment
Clarity and comprehensibility of models	* * * * *	WBModeler is a user-friendly tool which allows a great deal of flexibility, support for a common BPMN style notation is enabled
User interface and usability of the tool	* * * * *	The tool provides comprehensible and well-structured user interface that is aesthetically formed and does not require much technical skill
Expressiveness	* * * * *	The solution covers the whole range of sophisticated modeling, simulation and analysis capacities
Local vendor support	* * * * *	On the Slovenia market IBM is offering a wide range of products and services that incorporate new technology and modern methods of work

Good reputation	* * * * *	Regarding BPM, IBM has many references of successful implementations, IBM is the second largest and the second most profitable information technology and services employer in the world
Integration with other products	* * * * *	Import of existing models in various formats is allowed, also the export of models for further development is supported
Price and implementation costs	* * *	Total cost of ownership of the tool is relatively high compared to other modeling applications
Overall impression	* * * * *	A comprehensive, easy-to-use tool that is best suited for organizations that have highest requirements

CONCLUSION

Business Process management has become a key focus for many companies. It could be argued that BPM is the most important topic on the management agenda today. No longer is BPM only an academic approach, but is slowly evolving as a discipline. Managers are becoming aware that BPM should be implemented continuously rather than regarding it as a miraculous approach that could solve all their problems instantly.

Successful implementation of BPM provides organizations an opportunity to reduce costs and improve customer service, gain better visibility into the business, align business processes with strategic objectives, remove barriers between functional groups, and bond the organization together.

Although there is a large industry focus on BPMS (Business Process Management Suite), technology itself should not be the initial focus in the BPM implementation. It is far more important to first improve the processes, before considering any implementation of the technology. But in order to successfully implement the BPM vision, a technology platform is, indeed, needed. There is still considerable diversity of technology products on the market, since there is, as yet, no agreement as to what should be included in the BPMS. In spite of the recent economic downturn and the problems associated with it, the BPMS market continues to grow.

The stress of this thesis was on the analysis of the IBM WebSphere Suite. In the first part, I analyzed the tool based on the functional requirements that were explained in the BPMS chapter. Secondly, I tested the IBM WebSphere Business Modeler and evaluated it based on the chosen criteria.

In the field of BPM, IBM offers a comprehensive solution that combines both home-developed and combined technologies to best serve their customers' needs. I can conclude IBM WebSphere BPM is a highly sophisticated tool, which supports the idea of business analysts being empowered to transform processes with model-driven approaches. This is enabled with the high degree of business and IT collaboration. The solution provides highly flexible and unified interface across the whole BPMS that is specifically customized for each role and position. This functionality makes the tool easily manageable and provides higher ease of use. IBM offers its customers a wide choice of rules integration that is enabled through collaborations with many rule engine vendors. Another value added from IBM comes in the context of their templates and frameworks offerings. It is providing extensive industry-based contents that cover a wide range of needs and enhance the development of specific types of business processes. Overall, individual products in the suite have rich and strong functionality and have proven to be extremely well developed. However, in combination, the possibilities can be overwhelming. Customers will usually require help from a service provider, which can make the whole implementation process much more expensive.

The modeling tool itself is also comprehensive software that offers much more than just plain modeling. It supports the common BPMN style notation, which sets the user in a familiar environment and offers great integration capabilities. IBM WebSphere Business Modeler does not require much technical skill to operate. To easily create models, a graphical environment is provided which increases the ease of use. Integration capabilities can be viewed as highly competitive since IBM is offering SOA technology, which provides connectivity to many different environments. The tool is one of the most complete and sophisticated solutions on the market today. It is best suited for organizations that have the highest requirements and want a first-class solution. For small organizations, however, acquisition costs tend to be high, and ongoing operational support and maintenance commitments could represent undue investment.

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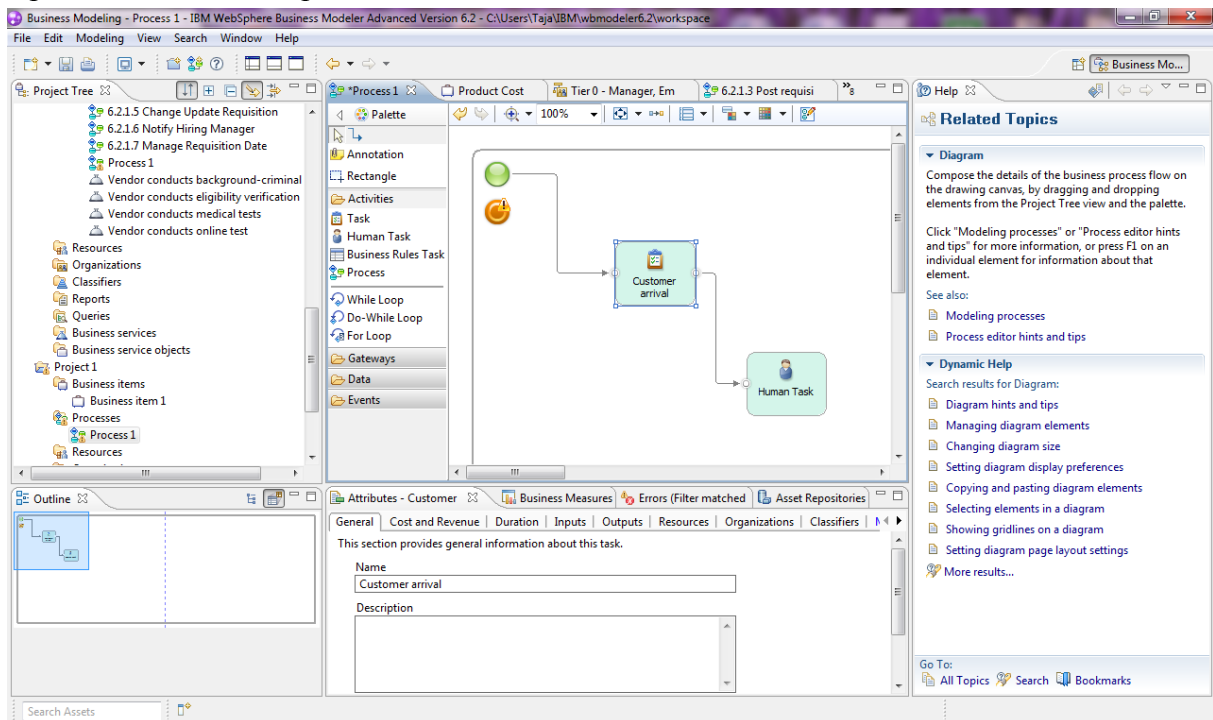
APPENDIX

Appendix 1: Modeling process in a *IBM WebSphere Business Modeler tool*
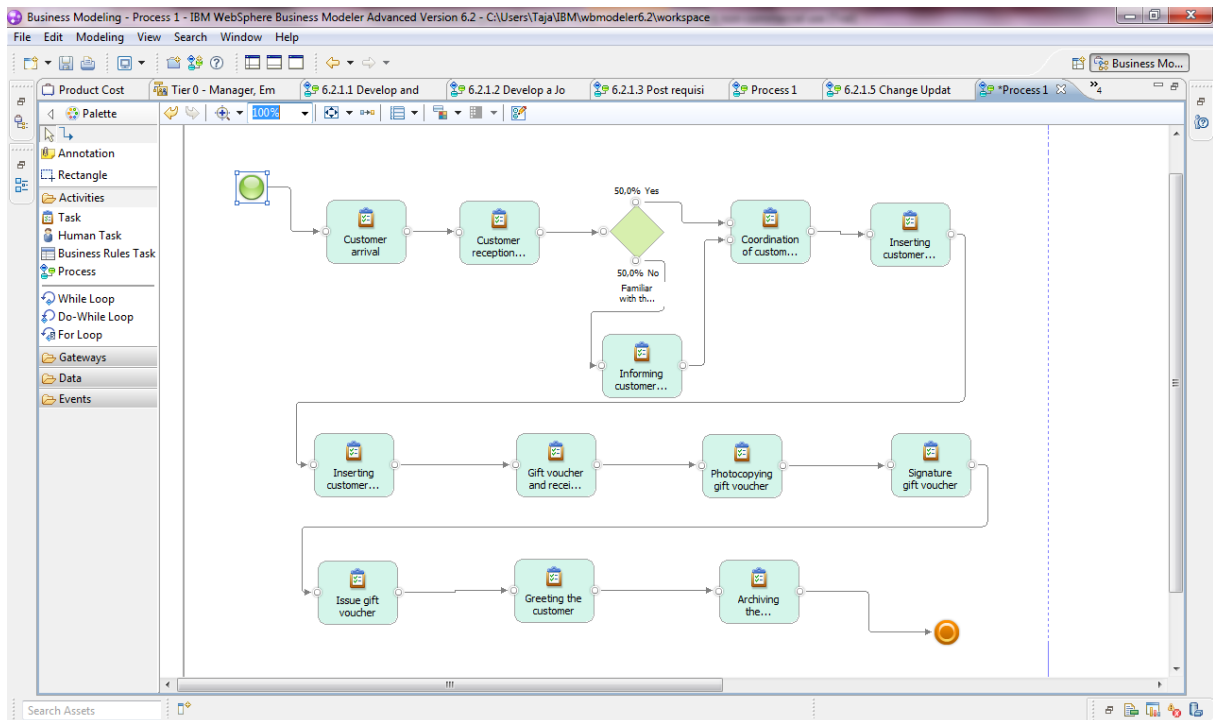
Apendix 2: IBM WebSphere Business Modeler's Interface

Appendix 3: The results of companies' response to the economic downturn in relation to BPM

Every company has responded to the worldwide downturn of the last two years. How would you describe your company's response – as far as business process initiatives are concerned?		
	2009	
We cut back sharply, as a result of the economic downturn, and there's no end in sight	25	10%
We cut back sharply, but now are beginning to become active again	30	12%
We cut back, but have continued BPM efforts	75	29%
We cut back, but are now beginning to accelerate again	19	7%
We didn't cut back our BPM spending	90	35%
Other, please specify	21	8%
Total	260	100%

Source: P. Harmon & C. Wolf, The State of Business Process Management 2010, A BPTrends Report, 2010.

Appendix 4: BPMS tools used

If your organization is using a BPMS Suite, what Suite are you using? (Choose one or more)	
Adobe Lifecycle Workflow	3%
Appian	2%
Ascents AgilePoint	1%
BEA/Fuego BPM Suite	3%
EMC/Documentum	5%
Global 360 Ent. BPM Suite	1%
Handysoft BizFlow	1%
IBM WebSphere BPM	15%
IBM/Filenet	4%
Intalio	4%
jBPM	4%
Lombardi	5%
Metastorm BPM	5%
Oracle BPEL Process Mang.	9%
Pegasystems Smart BPM Suite	5%
SAP NetWeaver	8%
Savvion	2%
Singularity	1%
TIBCO iProcess Suite	9%
Workpoint	0%
Ultimus BPM Suite	2%
webMethods Fabric	2%
Other, please specify	51%

Source: P. Harmon & C. Wolf, The State of Business Process Management 2010, A BPTrends Report, 2010.