THE FUNDAMENTALS OF BUSINESS PROCESS MANAGEMENT

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Abstract

The general principles of Business Process Management will be discussed. What Business Process Management stands for in terms of the present-day concepts and which different aspects must be integrated in a comprehensive Business Process Management will be presented. The underlying Business Process Management Lifecycle as a basic concept for management of business processes will be analyzed. The cycle also defines requirements on a comprehensive Business Process Management System.

Introduction

The goal of every company is to make products and offer services which meet the needs of its customers and whose realization on the market contributes to the economic success of the company. These products and services are generated in the course of processes which describe internal operations. Thus a process can be defined as a series of activities, which generate a defined result of the work (output) from a defined input [cf. Schmelzer, H. J.; Sesselmann, W. (2004), p. 45 et seqq.].

However, the term "process" gives no information about the range, content, structure and use of the output of the process. Combination of few activities can also be described as a process. In other words an enterprise consists of a number of processes which serve for execution of a specific function. Specific combination of these individual processes, designed to meet a defined business goal, is described as a Business Process. There is no precise definition of a business process in the literature, so here are some of the definitions:

Business process is a process designed for production of specific products. These products can have a physical nature (e.g. a plane or bridge) but they also can be immaterial, such as a design, recipe or evaluation. In other words, a product can also be a service [cf. van der Aalst, W.; van Hee , K. (2004), p. 346].

Business process is a group of activities, which uses different types of input to generate output, which has a value for the customer [cf. Hammer, M.; Champy, J. (2003), p. 38].

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Business process is a structured, measurable number of activities designed to generate a specific output for a specific customer or market. In this regard there are two approaches: either it is important how the work is organized within the enterprise or it is important what is made, if the product instead of the business process stands in the forefront [cf. Davenport, T. (1993), p. 5].

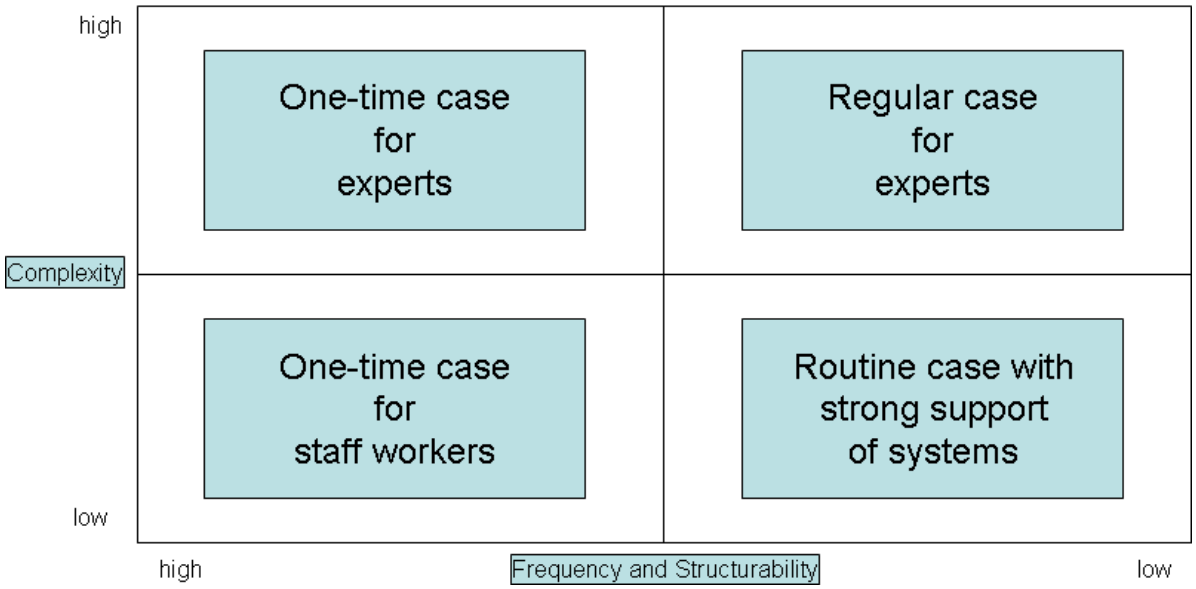
Business process is a number of interconnected procedures or activities, which fulfill a common business goal or pursue a common business strategy; usually, this approach is used in the context of an organizational structure, in which functional roles and relations are defined [cf. w/o author WfMC (1999), p. 10].

To understand, what specific parts of a business process stand for and how the above definitions should be interpreted, individual element types of a process will be analyzed in the next part.

Classification of Business Processes

After the analysis of composition of a business process, the question how processes can be classified arises.

Business processes can be classified according to various criteria. One of the possibilities is to structure them according to their complexity and frequency. In this regard, figure 1 shows a reasonable classification:



Source: Gadatsch, A. (2003), p.30

Fig. 1: Differentiation of Business Processes

Classification takes into account the frequency and structurability (x-axis) on the one hand and complexity (y-axis) on the other. According to these criteria, business processes can be classified into the four categories described below: [cf. Gadatsch, A. (2003), p. 30]:

1. One-time case for experts – this type of process represents a unique process which does not repeat and which is in general given to hands of experts.
2. One-time case for staff workers – this includes unexpected problems or interference from the outside. This process also represents a one-time event, but this time it is an event which is in general manageable by accountable workers without specific know-how.
3. Regular case for experts – this is a recurrent process which must be handled by experts with specific know-how.
4. Routine case with strong support of the system – this type is characterized by a high frequency of the process and its low complexity. Tasks which must be fulfilled in such process can be handled by ordinary staff workers.

The above-mentioned categories indicate how complex the business process is. Afterwards it can be assumed whether the process can be (partially) automated.

Business processes can also be differentiated according to their relation to core business2 of companies. In this regard it can be distinguish between core processes and supporting processes.

Core processes represent essential processes which are directly engaged in the production process and which hence require specific know-how [cf. Bullinger, H.-J.; Schreiner, P. (Publ.) (2001), p. 40 et seqq.]. These processes are in general crucial for success in the competition as their results form the essential part of the value offered to the customer. They represent core qualities of the enterprise which can use them to distinguish from its competitors. These processes indicate the position of companies and decide about their economic success or failure.

Supporting processes serve as a basis for operational business activities and provide resources for core processes [cf. Bullinger, H.-J.; Schreiner, P. (Publ.) (2001), p. 43]. They do not enter directly into the value offered to the customer and are not crucial for success in the competition.

Business Process Management

So far, companies have concentrated either on modeling and communication of their business processes or on integration of applications at a data or system level [cf. Krameyer C.

[2] The core business describes the main activities which are direct linked with the creation of products or services in the scope of the company. It includes the core competences, core products and end products.

(2004)]. However, business demands have now become much more important. Companies must make their production more profitable and at the same time increase their productivity. They also must achieve higher loyalty of their customers which requires closer cooperation with their external business partners. This leads to highly integrated business processes, which should also be flexible and capable of respond to short-term changes. The figure 2 below shows an example of such integrated process.

Therefore, business processes must be managed. In other words, there must be controlled integration of the business process and IT systems. This is the first prerequisite for implementation of Business Process Management.

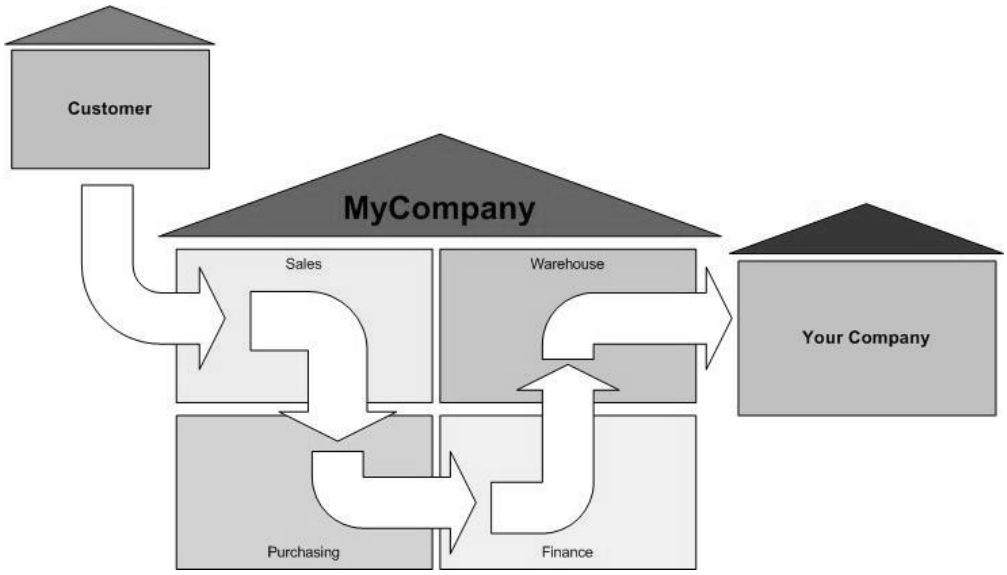


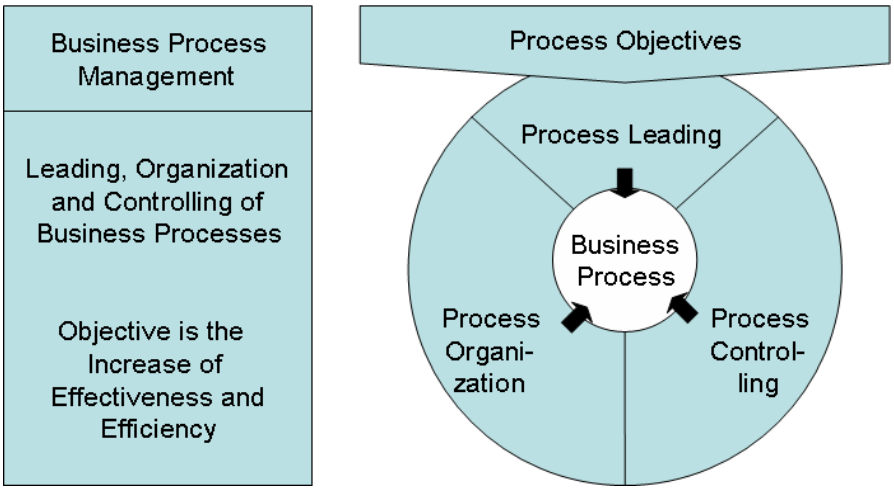
Fig. 2: Example of the Integrated Business Process

Business Process Management (BPM) stands for an integrated concept of management, organization and controlling, which enables strategic direction of business processes and heads the company towards satisfaction of customers needs as well as needs of other interest groups (employees, creditors, owners, suppliers, partners) [cf. Schmelzer, H. J.; Sesselmann, W. (2004), p. 5].

To date there is no uniform definition of Business Process Management. In the literature it is described as a continuous process which includes definition, modeling, implementation, control and monitoring of business processes.

Business Process Management hence encompasses all measures for planning, organization and inspection as a basis for strategic management and control of processes. Processes are examined, controlled and improved in BPM (compare also figure 3). Thus process management analyzes core- as well as supporting processes, so that redundant processes and process stages can be eliminated. Core processes which contribute to generation of the value are put to regular tests of

effectiveness and efficiency because requirements on processes are subject to a permanent change. The objective of process management is therefore to standardize processes in order to make them reproducible. This makes processes more economic which leads to increased effectiveness and efficiency and in the end also to higher benefits from customers [cf. Schmiemann, M. (2004), p. 15].



Source: Schmelzer, H. J.; Sesselmann, W. (2004), p.5

Fig. 3: Objectives, Functions and Components of BPM

The number of stages in which process management should be realized may differ. In the next part 5 stages will be introduced, in which process management should take place [cf. Schmiemann, M. (2004), p. 17 et seq.]:

Stage 1:

At first a person accountable for the process and process master should be appointed. The process master assumes responsibility for the process either on a basis of his position in the organizational structure or this task is simply assigned to him. His job is to define, measure and manage the process as well as push through his continuous improvement. He must understand activities in the process and act as a middleman between the supplier and customer. He can provide required resources and exert influence over the process. He is responsible for execution of the next 4 stages.

Stage 2:

Description of the process – description of the process requires documentation of the customer's demands and demands on the supplier as well as description of partial processes. Its advantage lies in clear specification of customer-supplier relations, engagement of all the participants and clear specification of responsibilities. But it also enables clear definition of activities, so that problems can be recognized in time. It leaves the potential for improvements open and makes the overall process transparent.

Stage 3:

Measurement of the process – to find out whether the process meets the defined requirements, relevant measurements must be made. It can be verified whether the input satisfies the requirements on the process and whether the output is up to demands of the customer. It can also be examined whether inside the process the requirements are met. The main objective is to have all information collected to get an suitable statement about the effectiveness and efficiency of the process.

Stage 4:

Mastering the process – the process is mastered at the moment when all the requirements are satisfied while at the same time quality of measurement criteria are preserved. It means that customers are satisfied, all the activities take place as defined in the description, warnings are issued prior to significant mistakes if there are discrepancies and improvements are made either as precautionary measures or remedies to defective products and services which do not measure up to standards. It is also important to find the roots of the problem to prevent the same mistakes in the future.

Stage 5:

Improvement of processes – the last step is then the improvement of the process through permanent advancement of its quality. In this stage the process master should create conditions in which no mistakes are made in course of the process. Reduction in the rate of defectiveness not only increases the quality of offered products and services but also cuts costs that would have to be otherwise incurred for elimination of defects. To reach this objective the last step will be a recurring step because it is one continues procedure to improve the quality.

To meet the above-mentioned requirements on Business Process Management, it is essential to make arrangements for process modeling, workflow management, Enterprise Application Integration (EAI) as well as process monitoring.

Process Modeling

Modeling is a procedure for construction of a model. There are two roles to be distinguished in a process of modeling: knowledge holder, who has specific know-how about the process and modeler, who is responsible for production of the model. Both roles can be embodied in one person. The modeler discusses objectives with the knowledge holder and collects all information required for modeling. This data is then structured and described with a help of suitable methods. The knowledge holder must in the end check whether the produced model is consistent. This procedure

can repeat several times if the model does not meet expectations of the knowledge holder [cf. Richter-von Hagen, C.; Stucky, W. (2004), p. 59 et seq.].

A process model is an important instrument for communication of process ideas to employees and managers. It is an abstract, simplified picture of a real process with all relevant functions and aspects. It shows all essential interrelations of the process in a simple construction and hence demonstrates development of individual partial processes [cf. Schmelzer, H. J.; Sesselmann, W. (2004), p. 157et seq.].

Functions and Objectives of Process Modeling

Process modeling demonstrates essential functions of a process in an abstract model. It enables the reduction of the complexity of real processes so that processes in a model become more transparent. A process model can hence be used as an information- and communication instrument for all parties taking part in the process. Process modeling is a basis for retrieval of information for controlling and quality management. Process models help systematize processes in a structure which shows system defects, interrelations and personal responsibilities. Process modeling makes the process transparent for all the participants, which in result facilitates communication because the process and its structure are clearly and uniformly described.

Process modeling also helps document knowledge of individual workers so that this knowledge is available for all other participants in the process3. This is especially useful for a newcomer who must familiarize himself/herself with his/her new job – not only because knowledge of their colleagues is documented, but also because they get to know where specific information are stored and learn to find their position in the process. The latter argument is important for all workers as it helps them recognize their share in results of the organization. They have a chance to give concrete suggestions about how the process could be improved since, e.g. redundant activities or excessive interfaces may be recognized. Modeling helps simulate should-be processes that can be compared to actual processes in order to discover further potential for improvements [cf. Allweyer, T. (2005), p. 129 et seqq.]

Scheer provides a list of these objectives, which are pursued in course of process modeling [cf. Scheer, A.-W. (2002), p 3]:

- Optimization of organizational changes in a field of Business Process Reengineering.
- Storage of an organizations knowledge, e.g. in form of reference models.

[3] It's describes a kind of process oriented knowledge management to keep the process knowledge within the company.

- Use of process documentation for ISO-90004 et seqq. – certification.
- Calculation of costs incurred in business processes.
- Use of process information for implementation and adaptation (customizing) of standard software or workflow systems.

Process modeling enables control and supervision over the overall process. Process models provide a support for maintenance works and planning related to the process. For instance, use of resources can be better planned. Process modeling is a basis for analyses of the process which makes potential changes easier [cf. Gadatsch, A. (2003), p. 60 et seq.].

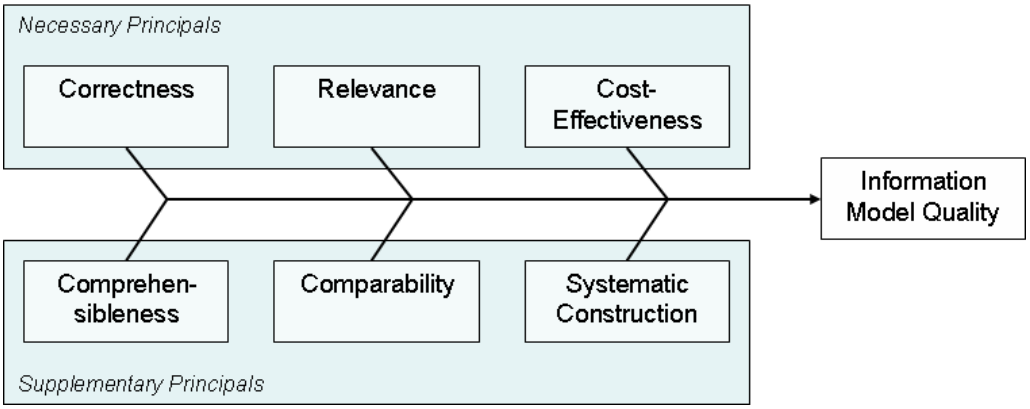
In particular, analysis of the process enables to verify whether the model reflects reality, whether it is correct and whether the process is efficient. To carry out such analysis, process modeling must meet certain criteria which will be explained in detail in the next section.

Requirements on Process Modeling

A process model must meet certain requirements to perform its functions and bring significant benefits to its user.

Process modeling must create a picture of a real process in a simplified form. A process model must be generally true and holistic. Its inner complexity and interrelations should be presented. It must be transparent, understandable, easily adaptable and open to extension. At the same time it is necessary to take account of possible general requirements and secure comprehensiveness of system structures. To produce different levels of detail, hierarchical structure of the model should be applied [cf. Becker, J.; Kugeler, M.; Rosemann, M. (Publ.) (2005), p. 46 et seq.].

[4] ISO 9000 is a quality management norm. It describes requirements which the management of a company have to fulfill to reach a certain level of implementation of a quality management. It's used for the internal definition of the quality level but it's also an external reference for customers that certain quality levels are reached.



Source: Schmiemann, M. (2004), p. 28

Fig. 4: General Principles of Standard Modeling

As real processes are in general quite complex, the problem of complexity must be mastered in the course of process modeling. Therefore Principles of Standard Modeling (PsM) were developed. These should help produce objective models (i.e. reduce subjective factors during construction of the model) and increase quality of the model. The quality of the model is high if it meets the demands of the modeling user. Principles of Standard Modeling are based on the idea of general accepted accounting principals [5] (GAAP). The PsM architecture distinguishes among general PsM and concrete measures (level- and language-specific PsM). Thus there is general as well as specific description of the principles. Depending on a point of view PsM are further specified at concrete levels (e.g. process level or data level). The PsM document general objectives of model construction which are listed below [cf. Becker, J.; Kugeler, M.; Rosemann, M. (Publ.) (2005), p. 47 et seqq.]. They can be classified into necessary principles, derived from objectives of companies, and supplementary principles, as shown in the figure 4.

Principle of correctness

Both syntax and semantics of a process model must be correct. A model is syntactically correct if it is holistic and consistent in comparison to its Meta model. A model is semantically correct if it corresponds to structure of a real process and if it there are no discrepancies. Models must meet demands of professionals[6].

Principle of relevance

According to this principle, only elements relevant to modeling can be modeled. At this stage inner content of the process is determined. If the model loses on its value for its user because certain elements and relations are omitted, then these elements and relations are considered relevant.

[5] The general accounting principals (GAAP) is the general term for USA accounting regulations which rules the financial accounting and annual statements for companies.
[6] In this case professional are the employees in the area which are modeled.

Relevance depends on objectives of modeling and must be determined accordingly. The user and modeler must agree on a purpose of modeling in order to define its content.

Principle of cost-effectiveness

This principle is a limit to the model to the extent to which economic aspects must be taken into consideration. Economic goals must be taken into account. A model is economically sustainable until its benefits exceed its construction costs.

Principle of comprehensibleness

This principle requires a simple model. It must be structured, understandable, lucid and legible. Its user must understand it well. This is achieved through graphical presentation, uniform definitions and selection of an understandable modeling language. Nevertheless, it depends on a subjective point of view, whether formulation of the model is clear or not. If this principle is complied with, the model can be offered to a host of users, which is in accordance with the principle of cost-effectiveness.

Principle of comparability

This is a cross-model principle which gains on importance especially if several people cooperate in construction of a model and if models must be integrated. Comparison of models (is/is, is/should-be or is/reference model) is possible only if relevant Meta models are transformable into each other.

Principle of systematic construction

The principle of systematic construction requires a cross-level Meta model so that individual levels should be integrable. There must be several different levels to systematize the model and reduce its complexity. Specific connectors then enable, e.g. to retrieve information from documents stored at a data level and transfer them to a process level.

The above-mentioned principles should not be evaluated as separate groups. Some of them support each other, while others are contradictory.

One of the crucial aspects of process modeling that should be pointed out is that different modeling methods should be used for different levels. It also happens quite often that several workers must take part in the project to consider its aspects from different process level. Modeling methods should fit the purpose and stage of planning to reach an adequate level of abstraction and detail. Therefore it is reasonable to set requirements according to methods which enable required

level of detail. At higher levels abstract construction should be chosen which would aim attention at the most important aspects, while at lower levels those methods should be chosen which support operational processes and deliver all the required information [cf. Gadatsch, A. (2003), p. 54 et seqq.].

Process Automation

Process automation is one of the most important steps in the overall BPM. It is based on operationalization of business processes with the aim of their subsequent automation via massive IT support. In general, Workflow Management Systems are implemented to accomplish this task. In this context the term workflow processes is used instead of business processes even though a workflow process is nothing else than automated part of a business process [cf. Richter-von Hagen, C.; Stucky, W. (2004), p. 27 et seqq.]. In consequence, the term BPM becomes obsolete and the term Workflow Management puts down roots instead.

Therefore, the highest degree of automation of a business process will be reached if Workflow Management Systems are implemented in all parts of this process [cf. Bullinger, H.-J.; Schreiner, P. (Publ.) (2001), p. 64].

Functions of Workflow Management

Workflow management is designed to organize workflow in relation to goals specified prior to the process modeling, so that the right information is delivered to the relevant work processes at the right time, in the right place and in the required structure [cf. Momber, O. (1995), p. 11].

Process-oriented companies must abandon labor-intensive accomplishment of tasks and struggle to implement integrated solutions. Implementation of Workflow Management enables simultaneous performance of several activities and automatic adoption, management, administration and audit of routine tasks by the system.

Process control is thus one of its crucial functions. If a start event occurs, it will launch the processing of this business process (or its part) in accordance to the specified rules and then provide efficient support for this process. Workflow Management Systems (WfMS) are characterized by direct and active support of teams as well as automation and coordination of processes. The support includes first of all access to data, information, transactions and applications required to be processed. Process control is described as active because it provides automatic control of processes according to rules of the process specification. These rules help WfMS since business processes are under total control and supervision. WfMS check whether functions are performed and whether defined deadlines are met. At the request it can also be checked out what the status quo in the

process is and whether time development of the process meets expectations. In addition, WfMS takes active control over the process. It automatically informs the user that new requests are pending and provides all needed resources for their processing [cf. Momber, O. (1995), p. 11 et seqq.].

Categories of Workflow Management

It is difficult to identify, which types of functions should be integrated in WfM. There arises a question whether only routine functions with a high rate of recurrence or also less structured functions with lower frequency of use should be integrated. There is no consensus on this problem in the literature. As might be expected, a type of system implemented in WfM is also a limiting factor. In general, WfM should perform these functions [cf. Richter-von Hagen, C.; Stucky, W. (2004), p. 139 et seqq.]:

- Planning and modeling of a process definition
- Model-analysis and simulation of a workflow process
- Installation, operation and control
- Analysis and improvement of processes

Application areas of WfM can be identified according to a degree of structuring and computer support.

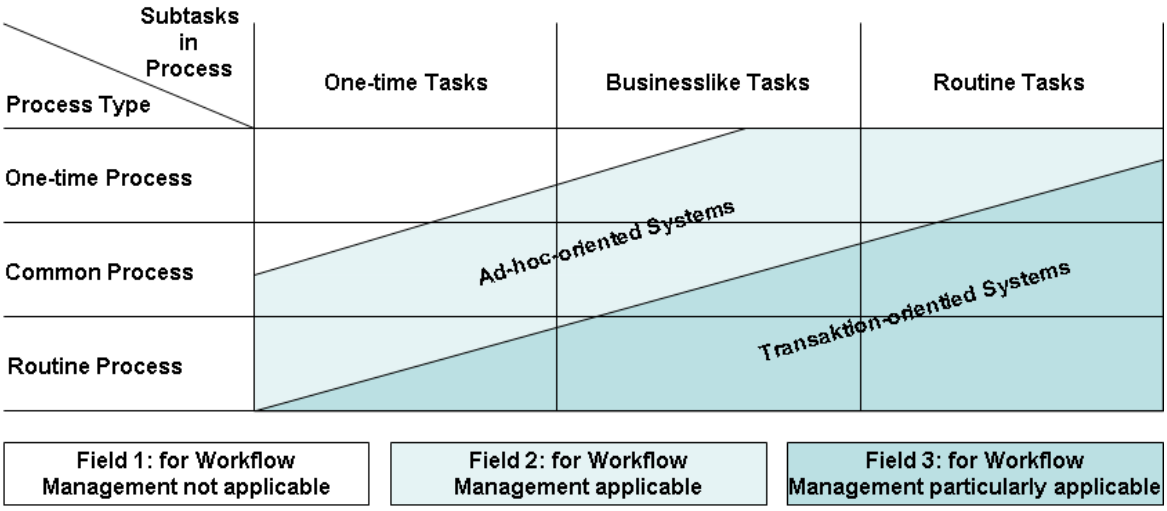
As for degree of structuring, workflow systems can take one of the following forms [cf. Gadatsch, A. (2003), p. 36 et seqq.]:

- Common Workflow
  a. Work processes can be structured in detail
  b. Large proportion of work processes contain recurrent elements
  c. No degrees of freedom for involved employees regarding the control of the process flow
  d. Working steps are defined in advance
- Case-Specific Workflow
  a. Work processes cannot be structured into the details
  b. Only some work processes contain recurrent elements
  c. To a certain extent, workers are able to control the process
  d. Some working steps can be defined in advance
- Ad Hoc Workflow
  a. Work processes cannot be structured
  b. There are just few processes with recurrent elements

c. Workers have a free hand in control of the process
d. Working steps cannot be defined in advance

Levels of computer support can take one of three forms. Free workflows are operated manually by one person. Partially automated workflows are supported through information processing programs operated by one worker. Automated workflows do not require manual operation any more.

Application areas can also be classified according to division of process types into routine, regular and one-time processes. The figure 5 shows this type of structuring:



Source: Momber, O. (1995), p. 14

Fig. 5: Eligible Processes for WfM

Field 3 is most eligible for implementation of WfM. In this case the WfMS automatically performs its functions according to the defined rules because it has to do with a combination of routine processes and functions. In the field 2 the WfM can, to a certain extent, support the user by means of various applications. It is more difficult to schedule these processes so that the user must decide on their execution. Field 1 cannot be structured, planned and predicted according to the specified rules, because it contains mostly one-time processes and case-specific functions. Thus WfM is not applicable in this area [cf. Momber, O. (1995), p. 14 et seqq.].

Enterprise Application Integration

Enterprise Application Integration [cf. Arora, S. (2005), p. 36] is another important component of BPM. It was developed to cope with changes of the IT infrastructure. Until the late

80´s companies had a central computer (host/mainframe) that processed all requests for data processing. All applications for business support were run on this computer. At the end of the decade Personal Computers (PC) triumphed and brought massive changes in the world of IT. It soon became possible to install applications on these computers so that partial functions could be performed in these applications without a central computer. Client Server Architecture (C/S) was another step in the technological evolution. It enabled the storage of application data at a central computer (so-called server) so that all users had a chance to share these data. However, applications were still run on personal computers. In consequence, applications on a central computer were gradually superseded by C/S applications. These specialized applications were designed for specific application areas and often assigned to concrete departments. Introduction of ERP systems [7] (Enterprise Resource Planning) was then the first attempt for integration of business applications. It was the first tool for integration of all functions required for business administration into one system. These days most companies have the ERP system that covers sales execution processes as well as applications which perform specific business operations. In addition to C/S architecture, web architecture for business-specific applications had established in the past years and replaces these applications continually. However, there arises a problem: applications include redundant functions, some functions are implemented several times and all of them have their own data content. This is a big challenge for IT because these must be reengineered in such way that all applications will be able to process their operations with the same functions and data. Today it still happens that, for instance, one customer has the same identification number in all systems but there are different plausibility's for verification of his data in the applications. If one therefore wants to find out which data refer to a given customer, it will in fact be impossible because there is no uniform mechanism that is able to identify data about this customer in different systems.

It is therefore a big challenge for Enterprise Application Integration to secure consistent use of operations, functions and data in companies.

Process Controlling

Process controlling is the last discipline of BPM. Until the implementation of process controlling, companies are not able to control and direct their processes on a basis of process information [cf. Khan, R. N. (2004), p. 17].

Process controlling is a method for direction, permanent development and improvement of business processes. Furthermore, it enables audit processes and hence determines process

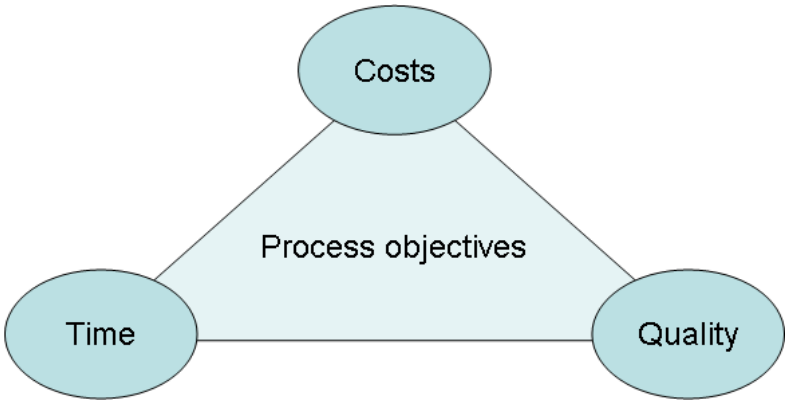
[7] ERP system is the generic term for business applications which supports typical functions in a company like financial accounting, goods management and stock keeping. The main target is to integrate all this function within one application.

performance. Thus the main function of process controlling is to make process performance measurable and deliver process information in a suitable form. In consequence, process controlling enables to discover problems in performance of processes in time and take immediate and adequate counter-measures.

To evaluate effectiveness and efficiency of processes, relevant information must be retrieved from operational systems at first. This information must contain data about:

- costs – which costs are involved,
- time – how long the process (part) execution take and
- quality – are the defined quality criteria are met

to control the process objectives (see figure 6).



Source: Horváth & Partners (Publ.) (2005), p. 160

Fig. 6: Dimensions of Process Controlling

Naturally, it means that process objectives must be defined prior to controlling. In the next step it must be measured on a regular basis whether the defined objectives are being met. If this is not the case, adequate measures must be taken [cf. Horváth & Partners (Publ.) (2005), p. 160 et seqq.].

Two main application fields of process controlling include controlling of strategic and operational process performance.

Strategic Objectives

In general, strategic objectives are set to reach a targeted market position and increase competitiveness of a company. In this case process controlling is implemented to find out whether the right processes are realized from a strategic point of view and whether these processes produce targeted results.

Operational Objectives

Operational objectives are in general focused on quantifiable output of core business processes of a company and thus reflect its short-term success. They should be monitored within

process controlling according to defined indicators and if there are discrepancies, short-term modifications of these objectives should be made.

Conclusion - Business Process Management Lifecycle

The Business Process Management Lifecycle once again summarizes all the issues which were discussed in this chapter. It is a schematic cycle for BPM and describes interrelations between its disciplines (see figure 7). The first stage of this cycle is modeling, in course of which the business process should be analyzed and constructed. This is often accompanied with reengineering. In other words, the goal is not only to document the is-process, but also develop the should-be process in a framework of process optimization.

In the second stage of the cycle the process should be set up. It means that the model constructed in the first stage should now be transformed into a practicable model. This is an essential condition, because it is almost impossible to set up the process model automatically in practice in 1:1 ratio. Therefore, preparatory steps for automation of the process must be taken. Next, integration of the system environment must be carried out in this stage. This is also an essential condition, because in general already an IT infrastructure exists which needs to be integrated.

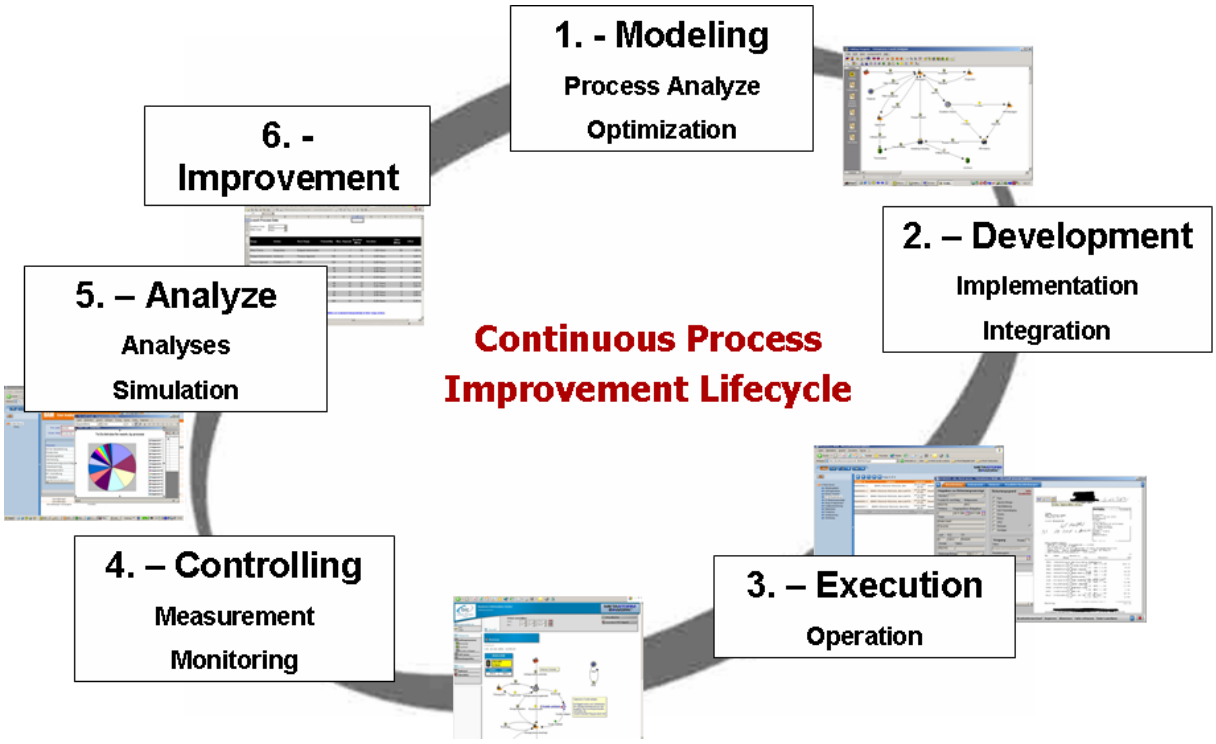


Fig. 7: Business Process Management Lifecycle

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In the next stage the process set up to use should be performed. In general, a workflow system is implemented to put process description for automation into practice. In this stage the declarative process description turns into a "living" process and mechanisms are established to provide information about the process performance. These mechanisms must be directed and their functioning must be checked.

The process is now being performed and thus it should be audited. In other words, the mechanisms of the process are measured to find out whether the defined requirements are fulfilled, e.g. lead times. Next, information about the process is recorded in this stage.

In the next stage, data collected during the course of the audit are subject to the analysis. This analysis should provide information about the process and give advice for its improvement. However, it also informs whether there are disorders in the process and whether additional resources are needed to accomplish the tasks. Furthermore, the retrieved data can be used for simulations so that business scenarios based on real data can be discussed in order to take adequate measures in time.

In the last stage of the lifecycle information from the analysis flow back into the process, i.e. the findings are used for continuous improvement of the process. At this point the lifecycle starts again.

References

[1] ALLWEYER, T. (2005): Geschäftsprozessmanagement – Strategie, Entwurf, Implementierung, Controlling. 1. revised reprint, Herdecke – Bochum.
[2] ARORA, S. (2005): Business Process Management – Process is the Enterprise. w/o location
[3] BECKER, J.; KUGELER, M.; ROSEMANN, M. (PUBL.) (2005): Prozessmanagement – Ein Leitfaden zur prozessorientierten Organisationsgestaltung. 5th Edition, Berlin et al.
[4] BULLINGER, H.-J.; SCHREINER, P. (PUBL.) (2001): Business Process Management Tools. Stuttgart.
[5] DAVENPORT, T. (1993): Process Innovation – Reengineering Work through Information Technology. Boston.
[6] GADATSCH, A. (2003): Grundkurs Geschäftsprozess-Management. 3rd Edition., Wiesbaden.
[7] HAMMER, M.; CHAMPY, J. (2003): Reengineering the Corporation – A Manifesto for Business Revolution. New York.
[8] HORVÁTH & PARTNERS (PUBL.) (2005): Prozessmanagement umsetzen. Stuttgart.
[9] KHAN, R. N. (2004): Business Process Management: A Practical Guide. Tampa.
[10] KRAMEYER, C. (2004): Business Process Management: Prozesse nicht nur optimieren, sondern durchgängig umsetzen und leben. Frankfurt.

[11] MOMBER, O. (1995): Workflow-Management: Möglichkeiten und Grenzen. Justus-Liebig-Universität. Gießen.
[12] RICHTER-VON HAGEN, C.; STUCKY, W. (2004): Business-Process- und Workflow Management. Wiesbaden.
[13] SCHEER, A.-W. (2002): ARIS – Vom Geschäftsprozess zum Anwendungssystem. Berlin et al.
[14] SCHMELZER, H. J.; SESSELMANN, W. (2004): Geschäftsprozessmanagement in der Praxis. 4th Edition. München – Wien.
[15] SCHMIEMANN, M. (2004): Business Process Management – Methodische Grundlage, Prozessdokumentation und Prozessmodelierung am Beispiel eines Prozesses bei der Universal Manufacturing & Logistics GmbH, FH Osnabrück.
[16] VAN DER AALST, W.; VAN HEE, K. (2004): Workflow Management – Models, Methods and Systems. Massachusetts.
[17] W/O AUTHOR WFMC (1999): Workflow Management Coalition Terminology & Glossary. Document Number WFMC-TC-1011. Hampshire.