BUSINESS PROCESS MATURITY LEVEL DETERMINATION: A METHODOLOGICAL OUTLINE

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Abstract. *Extensive literature on business process management (BPM) suggests that organizations could enhance their overall performance by adopting a process view of business. Hammer (2007) states that, in virtually every industry, companies of all sizes have achieved extraordinary improvements in cost, quality, speed, profitability, and other key areas by focusing on, measuring and redesigning their customer-facing and internal processes. In reality, many things need to be changed to harness the power of processes, but how to ensure what exactly need to be changed, how much, and when? In the article, a methodologically extended Hammer's business process maturity model framework and its methodological implementation guidelines are presented. The developed framework serves as a diagnostic tool for the identification of organization process maturity level and to do reasoned optimal improvements which lead to a better overall organization performance.*

Key words: *process management, organizational performance, process management evaluation criteria, optimal process maturity level, Process and Enterprise Maturity Model (PEMM)*

Introduction

One of the newest and most promising ideas opening new ways to the development of the management thinking and science is a process-focused approach to the activities of an organization. Short (1990), Champy (1993), Zairi (1997), Davenport, Hammer (2007), and Porter (2008) state that organizations are managed much more efficiently when the process-focused approach is used.

Business process management (BPM) became an important theme in the 1990s as companies strived to increase their productivity, improve their relationship with customers and reduce the time of launching new products and processes. Therefore, numerous studies dealt with challenges and procedures concerning BPM (Grover et al., 1995) and were carried out not only in order to have a better definition of BPM (Ahmed and Simintiras, 1996) but also to explore the methodologies, techniques and tools that could be useful for BPM (Kettinger et al., 1997). As a common aspect, these studies emphasized the aspects of BPM in private companies and dealt with methodologies developed

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by recognized consultancies, usually in the context of developed countries and multinational companies.

Organizations operating on the basis of process-focused management principles are dominating in Western Europe and North America already for about two decades; all their the activities are based on the process-focused approach. Neverthless, in Lithuania, the management of most organizations of a functional type (Lodienė, 2007).

The process-focused approach is most often started to be mastered by the Lithuanian organizations that are implementing quality management systems complying with international standards. According to data of the Lithuanian standardization department for the 1st of April 2010, 1027 organizations operating in the industrial, services, and public sectors use a certified quality management system meeting the requirements of ISO 9001 standard in Lithuania.

Business processes in the organizations managed on the basis of process-focused principles reflect the main purpose of the organization since the organization is basically composed of the processes under implementation rather than of the sold products or provided services. In other words, the management of the processes (activities) is the core of the business management. However, in this case, the processes as well as the results obtained could lack maturity and stability.

The organizations applying process management methods understand business processes as objects and strategically important assets. In such a case, the processes require larger single investments and efforts for the development of their maturity, because the goal is to develop the whole business management system rather than a separate process.

However, decisions of the board should be based also on the principles dictated by the financial market; the organization managers should know what gross benefit and when will be obtained on the basis of the initiated changes in individual processes, which always require different additional resources. With the improvement of processes, when just a single process is being improved, the moment comes also when further improvement actions do not yield higher benefit, and the efficiency of the process, or even of the activities of the whole organization, increases insignificantly. It is important to find a rational way of the organizational improvement, i.e. the optimal maturity level of different processes, which would yield the possibly maximum benefit to the organization.

The main subject of this article is the practical application of the Hammer Organization and process maturity model (hereinafter – PEMM).

The scientific problem of the article is the methodological implementation guidelines of the business process maturity methodology for the needs of the balanced development of organizations.

The goal of the article is to present the application guidelines of an extended Hammer PEMM, defining the steps necessary for the practical application of the process-focused approach, in order to develop and improve the balanced and uniform activities in organizations.

The methodology of the article was prepared on the basis of systematical analysis of the scientific sources on the considered topic and the results of the research performed by the author on the improvement of the organization and on the process maturity model. The simulation method was used to determine the application guidelines of the PEMM model.

1. The concept of business process management and maturity

In the literature, various definitions of business process are presented, for instance (Ahmed, Simintras, 1996):

- a business process is a set of activities with one or more types of input which creates a valuable output for a customer (Hammer and Champy, 1994);
- a process is a lateral or horizontal organizational form that encapsulates the interdependence of tasks, roles, people, department and functions required to provide a customer with a product or service (Earl, 1994, p. 13);
- a process is a system which interlocks the cross-functional flows of resources and deals in an integrated way with the tasks that have been considered as isolated.

The main literature on the concept of business process management suggests both that organizations can enhance their overall performance by adopting a process view of business and that business-process orientation (BPO) has a positive impact on business performance (Davenport, 1993; Hammer and Champy, 1993; McCormack, 1999; Burlton, 2001; McCormack and Johnson, 2001; Seltsikas, 2001; Aysar and Johnson, 2003); Harmon, 2003, 2007.

The concept of BPM or the broad adoption of process orientation within an organization derives from the understanding that processes have life cycles or developmental stages that can be clearly defined, managed, measured and controlled throughout time. In any business process, higher levels of maturity result in (Lockamy and McCormack, 2004; Poirier and Quinn, 2004; McCormack, 2007):

- better control of results;
- improved forecasting of goals, costs, and performance;
- greater effectiveness in reaching defined goals; and
- improving managements' ability to propose new and higher targets for performance.

As organizations increase their process maturity, institutionalization takes place via policies, standards, and organizational structures (Hammer, 1996). Continuous process improvement serves as the energy that maintains and advances process maturity to new maturity levels (McCormack and Johnson, 2001). The maturity level represents a threshold which, when reached, will institutionalize a total system's view necessary to achieve a set of process goals (Dorfman and Thayer, 1997).

2. Moving towards BPM

According to Goncalves, while companies attempt to replace a function-based organization by a business-process-based (BPB) one, they have to cope with some difficulties because they are not sure about what makes a process-based organization function satisfactorily, as they are not certain if their current organization configuration is adequate for BPM (Table I).

TABLE 1. **Stages towards business-process-based organization (BPBO)**

	Stages towards business-process-based organization				
	A	B	C	D	E
Where are we?	Processes, which processes?	We identified our processes, subprocesses and sub-subprocesses	We improved our core processes	We re-distributed our resources in our core processes and designed responsibility for a process owner	Our organization was designed according to the logic of our core processes
Comments	Companies do not understand what is happening. In general, companies only notice their manufacturing processes. The other processes are auxiliary	The focus of the effort is still on the functions. The processes are limited by the functional structure. The approach is too broad. The way of working is probably still outdated	Companies still have a mindset based on functions, even though they are really aware of their processes. The use of case managers may improve the contact with customers. Power still remains in the hands of vertical units	This organization is still disintegrated, built over an outdated structure. Companies start to attain results with emphasis on processes, however, with much discomfort in organizations. Implementation of a new organization	This is a form of organization recommended for business management. Functional areas practically do not exist. The goals and metrics are defined for the processes
Up to which point can we go in terms of business?	While the subject is only manufacturing, the possibilities of radical improvement are limited	Improvement of bottlenecks and the achievement of isolated efficiency improvements	Improvement of the core processes and elimination of activities and functions which do not add value	Management of some isolated process and their integration with auxiliary processes	Integrated management of core processes

Source: Goncalves, 2000, p. 14.

3. The Hammer organization and process maturity model

The American scientist M. Hammer noticed that many companies which tried to rejuvenate themselves by creating or redesigning business processes have made slow or little progress. All change projects are tough to pull off, but the process-based change is particularly difficult.

In 2001, Hammer started a research project to develop a process implementation road map which would help executives to comprehend, plan and assess process-based transformation efforts. In 2007, a framework was presented and originally called the Process and Enterprise Maturity Model (PEMM) shown in Figure 1. The PEMM centres on five characteristics that enable any process to perform well on a sustained basis, and on four enterprise capabilities that allow processes to take root (see Table 2).

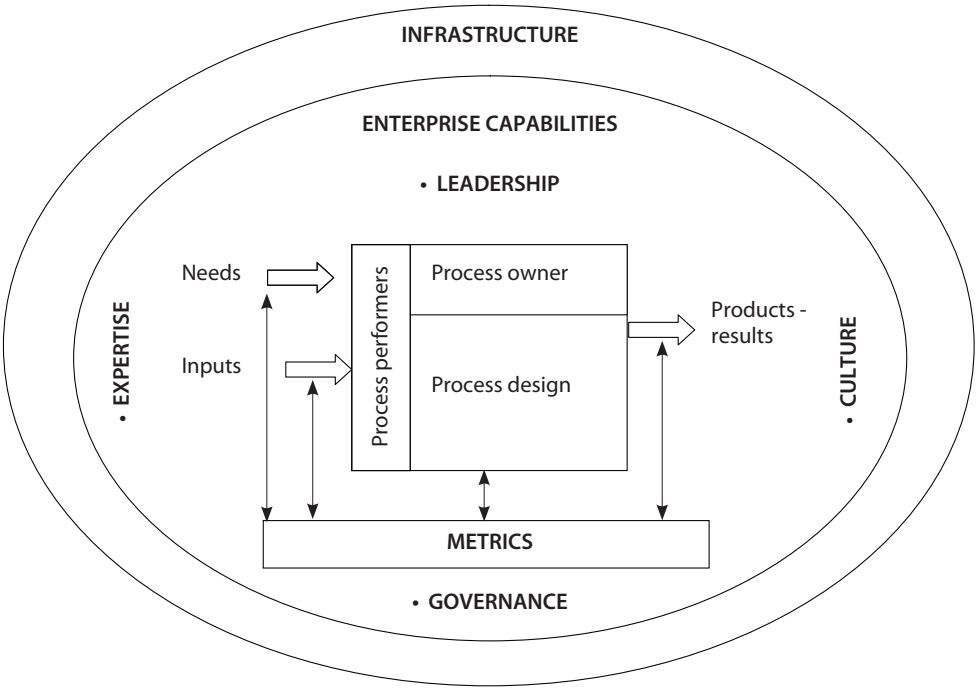

FIG. 1. **Process and Enterprise Maturity Model**

Source: author's own modification based on the Hammer PEMM.

Five essential characteristics that enable any process to perform well are:

1) a process must have a well-specified design;
2) the people who execute the process, the performers, must be skilled;
3) there has to be a process owner, a senior executive who has the responsibility and authority to ensure that the process delivers results; otherwise, it will fall between the cracks;

4) the company must align its infrastructure to support the process;
5) the company must develop and use the right metrics to assess the performance of the process over time, otherwise it won't deliver the right results.

These enablers give a process the potential to deliver high performance. Also, it is worth mentioning that the enablers are interdependent.

M. Hammer defined four levels of process strength (P-1, P-2, P-3, and P-4). The stronger the enablers, the better the results the process can deliver on a sustained basis. Enablers' strengths determine the extent of process maturity.

TABLE 2**. Process enablers and enterprise capabilities**

Five process enablers	
Design	The comprehensiveness of the specification of how the process is to be executed.
Performers	The people who execute the process, particularly in terms of their skills and knowledge.
Owner	A senior executive who has responsibility for the process and its results.
Infrastructure	Information and management systems that support the process.
Metrics	The measures that company uses to track the process's performance.
Four enterprise capabilities	
Leadership	Senior executives who support the creation of processes.
Culture	The values of customer focus, teamwork, personal accountability, and willingness to change.
Expertise	Skills in and methodology for process redesign.
Governance	Mechanisms for managing complex projects and change initiatives.

Source: Hammer 2007.

In order to develop high-performance processes, companies need to possess or develop organizational capabilities in four areas: leadership, culture, expertise and governance.

4. PEMM and stages towards business-process-based organization: practical application

The Hammer PEMM model is not based on the classical financial market management principles, as it is only a practical method to determine the maturity level. Using this model, it is possible to determine the actual organization's process maturity level and to determine the goals for each process maturity level. The PEMM model does not provide recommendations, methods and priorities to reach such goals. In order to ensure the development of rational and optimal maturity of the organization's processes and quality the level, the application of the model requires a broader adaptation of this model and its application guidelines, trying to link it with the financial and other assessment indicators of processes.

According to Goncalves, the proposed application guidelines of the companies' development towards BPM consist of five stages (see Table 1):

A. Processes, which processes?
B. We identified our processes, sub-processes and sub-sub-processes.
C. We improved our core processes.
D. We re-distributed our resources in our core processes and designed responsibility for a process owner.
E. Our organization was designed according to the logic of our core processes.

The proposed guidelines of the PEMM application consist of four blocks and eleven stages (see Fig. 2) with the following logical sequence:

I. Adoption of decision of development situation;
   - (1) Decision for company development towards BPM, Goncalves (2000).

II. Existing situation;
   - (2) Assessment of the maturity level of existing processes.
   - (3) Analysis of the process maturity, determination of the maturity level.

III. Possible situation:
   - (4) Selection of options to improve the possible processes.
   - (5) Modeling of the process(es).
   - (6) Determination and measurement of the process assessment criteria.
   - (7) Planning of the process maturity increase.
   - (8) Calculation of investments.
   - (9) Simulation of processes.
   - (10) Analysis of results.

IV. Aspired situation.
   - (11) Selection of optimal option.

A more detailed description of the application guidelines of the PEMM follows.

I. Adoption of decision of development situation

Aiming at providing companies with conditions needed for their development towards BPM, Goncalves (2000) presents five stages for the companies that are moving towards the business-process-based organization from a strictly functional model to a stage essentially based on business processes. A more detailed description of the application guidelines follows.

(1) Decision for company development towards BPM, Goncalves (2000)

In addition, companies usually need the parameters of evaluating their transformations towards BPM.

In stage A, companies do not take decisive steps towards the business-process-based organization. Some of them question the validity of adopting a process-based organiza-

tion, others can only perceive their manufacturing processes. There are also the companies that, for several reasons, do not even take the idea of organizational restructuring into consideration. These companies still have to undergo the phase of awareness regarding this subject. For these companies, the possibility of a radical change is very limited.

In stage B, companies have already identified their processes and sub-processes. However, the focus of their effort is still centered on functions. Their processes are conceived with a functional logic and usually use very outdated working methods. These companies limit themselves to reducing bottlenecks and gaining more operational efficiency. Their biggest challenge is to identify and design the core processes that are the basis of the organization.

In stage C, despite the fact that companies have already identified and improved their core processes, they still have a functional mentality. Power still remains in the hands of the functional units, which strongly resist the idea of downsizing. In the most optimistic situation, they may attempt to improve their core processes by adding technology to them and eliminating the activities that do not add value to customers. In terms of the following steps, they may adopt new criteria to rearrange their resources, preferably based on their core processes, but not in their functional units, and to attribute each core process to a process owner.

In stage D, companies have already experienced the changes and measures of the previous stages. They generally distribute their resources in their core processes and attribute the responsibility of managing each core process to a process owner. There are still the outdated organizational structures that begin to attain satisfactory results; however, the emphasis on processes causes great discomfort to the organization. In terms of business, these companies may succeed in improving isolated processes, integrating them with the auxiliary processes. Their main task, from this point on, is to develop a new organizational model by ending the relationship with the main functions and reformulating the fundamentals and mechanisms of management, finally implementing a new organization.

In stage E, companies have already been designed based on the logic of core processes. They are generally recently created companies which do not have structural and organizational commitments with the past as they appear within new references of organization and business. These companies can carry out an integrated management of their core processes and gather the results of this integration. Their main task is to monitor the definition of their business continuously, and to adjust their processes to their business whenever this is necessary, adapting the organization at each moment as a living organism.

According to Goncalves (2000), the main contribution of this taxonomy of the stages of a business-process-based organization is identifying the stage a company is going through. It is possible to evaluate its performance in comparison with other companies

and to consider their managers' expectations. This model may suggest necessary changes a company has to make in order to move on to the next stage and also indicates the effort required for this transformation. It is also possible to use this model for evaluating the level of preparation of top management to the current stage of a company.

II. Existing situation

(2) Assessment of the maturity level of existing processes. The goal of the first stage is to collect reliable information about the existing situation. The following ways of the process maturity assessment are proposed: to interview the employees using the process maturity level assessment matrix proposed by Hammer, or compiling a simplified questionnaire according to the work specifics, to perform the process audit following the PEMM matrix.

The results concerning the maturity level of all organization's processes will be more reliable if all process owners, process performers, and organization's management will be interviewed.

After collecting information about the organization's brand, the process maturity analysis is performed, its goal being to determine the maturity level of the processes and their enablers.

The common maturity level of all processes is determined according to the process that has reached the lowest maturity level. If at least one process is on the lower level, the maturity assessment of all processes drops and does not allow reaching a higher maturity level.

(3) Analysis of the process maturity, determination of the maturity level. Data of the summary table are used for the analysis of the process maturity level. It can be analyzed by means of different targeted sections in accordance with several aspects:

- it is possible to determine the least and the most mature processes;
- weaknesses of each process are determined separately, authorizing in this way to improve and raise the maturity level of each individual process;
- it is possible to determine the least developed enablers of the process maturity level, which do not let the organization's processes to reach a higher maturity level.
- it is possible to determine the weakest organization's processes which do not let the common maturity level of the organization's processes to reach a higher level;
- it is possible to determine and compare the maturity of the main and auxiliary processes.

III. Possible situation

(***4) Selection of options to improve possible processes.*** It is possible to select several options of process improvement, but only one option is selected taking into account the

strategic goals of the organization and the expected benefit. The following main options are possible:

- increase of the maturity level of the main process;
- increase of the maturity level of several processes;
- increase of the maturity level of the weakest process or of the enablers of the least developed processes.

(5) Modeling of the process(es). It is necessary to model the processes or enablers of different maturity levels in order to plan the optimal maturity level process. For example, the process *x* is of the second maturity level; with modeling this process, it should appear on the third or fourth level.

The modeling helps to identify the problems, restrictions, obstacles for the development of the processes and to find optimal solutions in order to improve the operation of the whole system.

When improving the processes according to the PEMM, it is proposed to use the process flow diagrams and IDEF0 or IDEF3. The simulation result is the creation of the schemes of different maturity level processes.

(6) Determination and measurement of the process assessment criteria. It is proposed to determine the process assessment indicators following the activity measurement system model proposed by Zairi and Sinclair (1995). The advantages of this model are as follows: the activity measurement system will be coordinated with the process measurement system, the critical success factors and main activity indicators will be taken into account, and the whole system will be linked to the organization's strategy and goals, as well as to the action plans.

It is proposed to determine the following universal process assessment criteria: the process costs, process quality, process duration, and satisfaction of the process clients. These indicators are interdependent, so the priority should be determined according to the organization's strategy.

(7) Planning of the process maturity increase. After determining the missing factors, the plan of actions and measures is prepared in order to reach a higher maturity level, and the necessary investments are calculated.

(8) Calculation of investments. Calculation of investments is a very individual task depending upon many criteria. However, the standard project management steps should be used in principle for the calculation of investments. It is not recommended to restrict oneself in the PEMM model with any project management methodology or good practice. Any project management methodology can be used depending on the needs of an organization or provider of services. However, it is important that the main steps are performed during the pre-design and planning phases of many project management

methodologies. The main goal of this step in the end is to have a project plan with a calculated effort.

(*9) Simulation of processes and (10) analysis of results.* Assessment indicators of the existing processes are measured before the process simulation. This stage is necessary to ensure the possibility later to compare the indicators of the existing processes with the possible results of the indicators of the processes of higher maturity levels.

The stage of analytic simulation follows the simulation of processes and measurement of the indicators of the existing processes, the goal of which is to create a dynamic view of the process, and to record the effect upon the measurement indicators of the processes.-

The Analytical Hierarchy Process method (AHP) allows converting both quantity and quality results of indicators into a common single quantity process assessment. It is proposed to find the maximum value of the ratio between the determined process assessment results and required investments in order to determine the optimal process maturity level.

Namely, the proposed AHP method helps to evaluate the importance of each process assessment criterion, or its weight. Also, this method allows a systemic assessment of all process assessment criteria, since after evaluating the importance of each criterion it is possible to obtain the general expression, or a single figure, which could be compared with the process simulation options for each maturity level. In other words, this method allows transforming the quality evaluation of the process assessment criteria into a quantity evaluation. Also, with the assessment of several figures, it will be possible to decide which process improvement option is an optimal one according to determined assessment criteria.

IV. Aspired situation

(11) Selection of optimal option. The optimal maturity level of the processes can be determined by the return on investments and changes of the results of the process measurement indicators.

The application guidelines of the created PEMM method allow the organization to determine and select an optimal process maturity level and improvement option. The diagram of the application guidelines of the PEMM method is shown in Fig. 2.

The goal of the application guidelines of the proposed PEMM method is to find an optimal process improvement option. The optimal maturity level of the processes is determined by the highest value of the ratio between the process assessment results and the required investments. Generally speaking, the option of process improvement and maturity increase is selected according to the payback of investments and the greatest benefit.

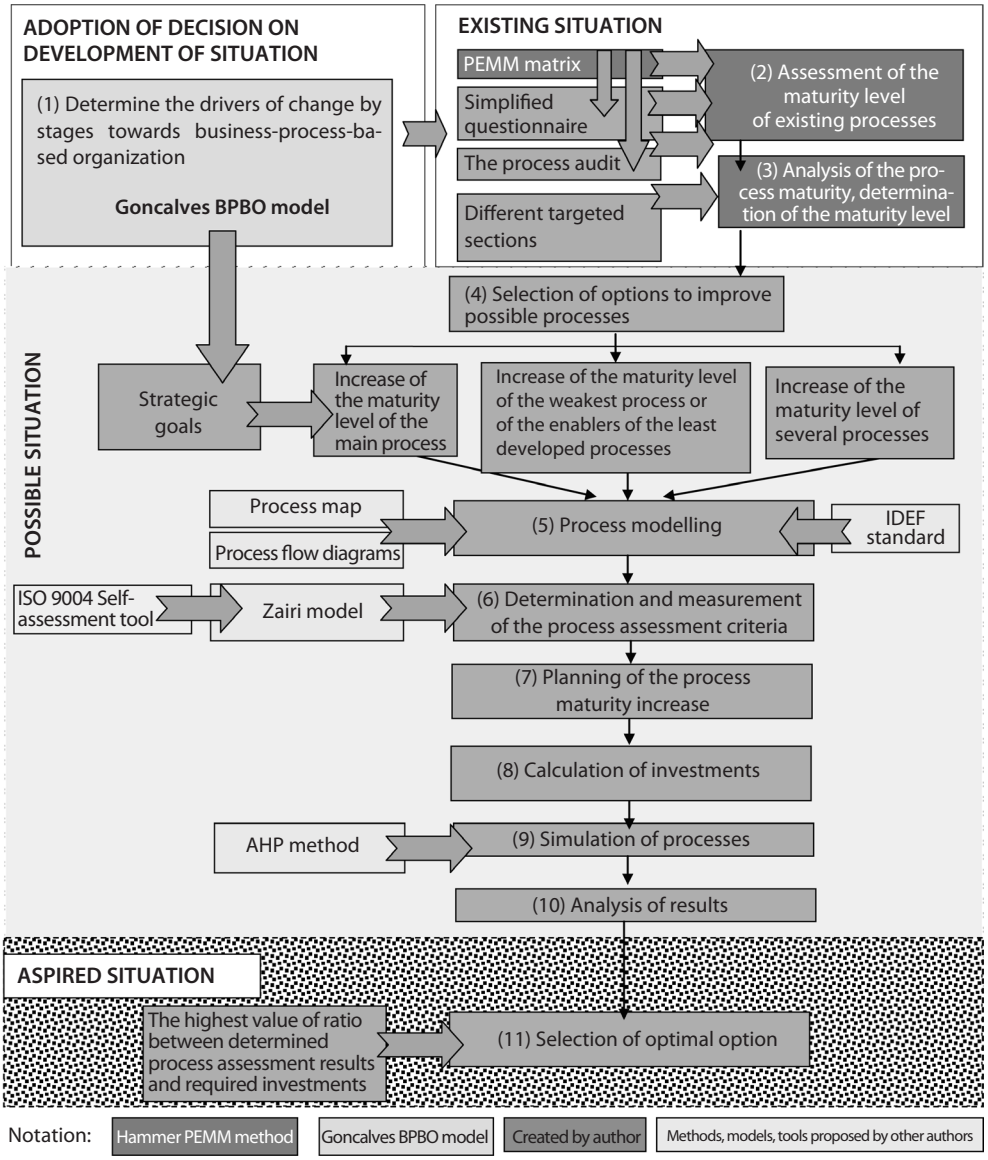

FIG. 2. **Application guidelines of the PEMM and BPBO method**

Source: author's own modification based on Hammer PEMM, Goncalves BPBO, etc.

Conclusions

1. The universal Hammer PEMM model was selected as a basic one for the assessment of the process maturity level, because it allows determining easily and accurately the maturity level of an organization and its processes. Besides, the PEMM does not require the process to contain any specific features.

2. The Hammer PEMM model was extended in order to ensure the development of rational and optimal processes and quality maturity level. Application guidelines for the extended model were developed to link the financial and other assessment indicators of the processes.
3. The extended Hammer PEMM model includes the Goncalves BPBO model, the Zairi and Sincliar models, total quality management principles; it is based on the activity measurement system model and is structurized according to the PDTV cycle, the ISO 9004:2009 standard, IDEF standard family of the simulation and functional representation of the processes, and the analytical hierarchy process method (AHP). Using the extended PEMM, it is possible to adjust the process assessment criteria with the organization's strategic goals and to ensure one of the main principles of the process-focused organization: the process assessment criteria should agree with the organization's strategy, its goals, mission, vision, and main indicators of the activities.
4. The expanded Hammer PEMM and the Goncalves BPBO models allow for the optimal development of an organization and the maturity of its processes. It is expected that an efficient and broad process assessment system can be developed following the PEMM model.
5. The defined application guidelines of the selected and extended PEMM (practical application of the extended organization and process maturity model) set all the steps necessary for the actual practical application of the extended PEMM within the organization, using the process-focused approach. The modified PEMM model allows determining and simulating the maturity level of each process according to selected criteria and determining the process maturity development level that is optimal for the organization and would bring the maximum benefit according to the required investments. One of the most important principles of good business practice is implemented in this way, meaning that correct decisions of the board should be based also on the principles dictated by the financial market.

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