

MODEL OF PROCESS MANAGEMENT SYSTEM IN ENTERPRISES OF THE HARD COAL MINING INDUSTRY

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Abstract:

The primary objective of this paper is to present a model of a process management system developed to support the restructuring of Polish enterprises of the hard coal mining industry. The development of this model required research in three stages using several research methods. The stage I of the research was oriented towards the recognition of the existing state of knowledge in the scope of previously developed models of process management in enterprises. At this stage, a method of reviewing the literature, the analysis and synthesis of the results of considerations, was used. The stage II was oriented towards presenting of the current state of knowledge in the field of process management to the managerial staff of mines in order to identify their needs, capabilities and preferences. The research were attended by 24 managers from PGG SA and JSW SA. At this stage, the method of targeted free-form interview and discussions, was used. The stage III of the research was oriented towards the development of a process management system model in enterprises operating in the hard coal mining industry, based on the scientific achievements to date in the field of process management and consensus on the needs, preferences and capabilities of mine managerial staff with regard to its specific elements. At this stage, the method of analysis and synthesis was used. The results of the research presented in this publication are primarily addressed to the managerial staff of Polish hard mines, as they provide a synthesized response to the problem of the lack of consistent process management guidelines that could set a standard within a mining enterprise. The model presented in the publication is of a general nature, although it may provide a basis for the application of process management for mines.

Key words: *hard coal mines, model, process management system*

INTRODUCTION

Restructuring, defined in the context of profound changes aimed at adapting the enterprise or industry to changes taking place in the environment [17], is a demanding process which requires the use of modern management concepts. Process management is one of such concepts, which is nowadays considered as one of the most frequently chosen ways of restructuring industrial enterprises. The expected results of implementing this concept in enterprises include typical restructuring objectives related to controlling and eliminating the immediate symptoms of the crisis or maintaining strategic effectiveness, understood as sustaining profitability in the light of changing external conditions.

The implementation of this concept is also associated with opportunities to improve the efficiency and effectiveness of the operations of the restructuring enterprises in the hard coal mining industry [4]. This applies both to mines that have the potential to operate properly in a competitive environment, as well as those being liquidated [3]. However, despite the growing interest in implementing process management in hard coal mining practice, no comprehensive solutions in this area have been presented

so far, and the solutions developed and published concern only selected issues. This is crucial for the practical application of this concept. The preliminary research [4] has shown that process management is interpreted differently in the mines belonging to Polish mining enterprises. For instance, some of them referred exclusively to the solutions used in mines for modelling and process direction, especially those of a technological dimension, while others referred to the economic and financial dimension, pointing to solutions supporting Activity-Based Costing. In the course of the preliminary research, the managerial staff raised the problem of the lack of comprehensive, consistent process management guidelines that could set a standard for the mines belonging to the mining enterprise. This provided a premiss to undertake a reflection aimed at solving the research problem related to the development of a process management system model for mining enterprises, based on the previous scientific achievements in this area, as well as taking into account the needs, capabilities and preferences of the managerial staff of mines.

METHODOLOGY OF RESEARCH

The development of a process management system model for hard coal mining enterprises required research in three stages using various research methods (Table 1).

Table 1

Stages of the research and the research methods used in them

Stage	Stage description	
	Objective	Research methods used
I.	Recognition of the current state of knowledge on developed and described models of enterprise process management.	Method of literature review – literature study; Method of analysis and synthesis.
II.	Presentation of the current state of knowledge in the field of process management to the managerial staff of mines in order to identify their needs, capabilities and preferences.	Targeted free-form interviews method. Discussions.
III.	Development of a model of a process management system for selected enterprises in the hard coal mining industry.	Method of analysis and synthesis.

RESEARCH RESULTS

The stage I: Recognition of the current state of knowledge on process management models

The conducted literature study on process management allows to state that so far many model concepts have been presented, sometimes called directly a process management model in enterprises. This paper presents only the essence of a few selected descriptions published after the year 2000, omitting the earlier ones, which were related to, among others, the development in the 1990s of the concept of BPR - Business Process Reengineering [14], as well as TQM - Total Quality Management [27]. Although these concepts presented a different approach to achieving the effectiveness and efficiency of processes, they had common features connecting them with modern process management, namely, customer orientation and concentration on the value expected by the customer. Model approaches to process management related to BPR and TQM are therefore important, and the omission of these approaches in the considerations results only from the limitations of the publishing house related to the volume of publication.

Among the numerous literature published after the year 2000, selected works [1, 7, 12, 16, 19, 20, 22, 23, 26, 28] were reviewed in the context of process management models. It was concluded on this basis that in the models described in the literature, various issues related to process management were emphasized, such as: phased approach, implementation of management functions, multidimensionality or supporting many concepts, methods and tools. The analysis and synthesis of the deliberations presented in the literature leads to the conclusion that the basis for a model approach to the concept of process management should be its phased approach. This implies that process

management in enterprises should be executed within a structure that covers many stages. There are no consistent solutions in this area to be found in the literature. Regardless, certain stages have been distinguished in the structure of process management:¹

- designing, modelling, executing, monitoring and optimizing [1],
- identification, modelling, implementation, controlling and process improvement [7],
- defining paramount goals, defining and characterizing processes (identification, classification, documentation), implementation and measurement of processes [12],
- discovering, modelling, analyzing, measuring, improving, optimizing and automating business processes [16],
- creation, modelling, preliminary analysis, final analysis, management, improvement [19],
- identification, modelling and implementation of processes and process management or assessment of their functioning [23],
- modelling, automation, execution, controlling, measurement and process optimization [26],
- process goals formulation, identification and description of processes, indication of responsibility and rights of process owners, assessment of process results and identification of undertaken improvements [28].

Many references in the literature strongly accentuate the connection between individual stages of the above-mentioned processes and the execution of the management function. As an example, the literature recognizes the necessity of planning, organizing, directing, controlling and improving [22] or planning, organizing and controlling processes, as well as motivating people engaged in particular processes [28].

For each particular stage, the literature indicates a variety of activities to be carried out in many dimensions. These dimensions include the following: organizational, social, IT, financial and knowledge [7] or organizational, infrastructural, financial, personal and process-related [9].

At the same time, the literature emphasizes the positive impact of many concepts, methods and tools that apply a process approach and therefore support the implementation and application of process management. These include Benchmarking, Lean Management, Outsourcing, Just In Time, Activity Based Costing - ABC, Balanced Score Card - BSC, Kaizen, Kanban, Management By Objectives - MBO, Controlling, Single Minute Exchange of Die - SMED, 5S or IT systems [2, 7, 11, 10, 15, 22, 24, 25, 28, 30].

It should also be noted that the literature points to the significance of the interaction between process management and the environment. Enterprise process management should be oriented towards the environment - in particular the requirements and needs of the customer, i.e. the value expected by the customer [7, 9, 28].

The analysis and synthesis of the presented results of the literature study has made it apparent that, in fact, process management has a systemic character because it includes

¹ It is worth noting that the above-mentioned stages do not represent the whole set of considerations in the field of process management structure.

many interrelated elements. However, it should be mentioned that in the publications to date, these elements are presented from different angles, with various levels of detail and covering a variety of solutions. Also, none of the presented approaches is dedicated to mining enterprises and does not take into account the needs, preferences and capabilities of the managerial staff to implement and apply them in practice.

The stage II: Identification of the needs, preferences and capabilities of the managerial staff of mining enterprises in the field of process management

In order to identify the needs, opportunities and preferences of the managerial staff of the hard coal mining enterprises in terms of process management, five targeted free-form interviews were conducted. The interviews were attended by 24 competent managers from hard coal mines undergoing restructuring, being part of PGG SA and JSW SA.

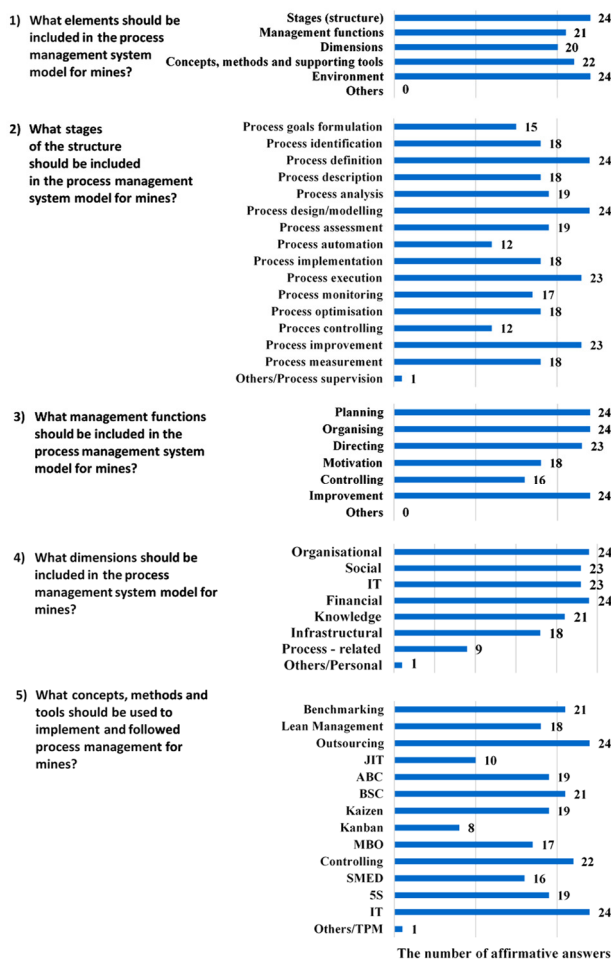


Fig. 1 The answers to questions asked during interviews

Before conducting the interviews, the basis of approaches, elements and solutions implemented in currently described process management models were analyzed. Then the focus was obtaining answers to the questions aimed at identifying the needs, opportunities and preferences of the managerial staff of the hard coal mining enterprises in terms of process management. Due to

the publisher's limitations, the answers to selected questions were briefly presented, which were unanimously answered by at least 80% of the respondents² (Figure 1). These answers were specified in the course of two discussions conducted by moderators, aimed at unifying the adopted solutions and terminology used. Well, to the questions:

- 1) What elements should be included in the process management system model for mines? The majority of respondents stated that the process management system should include internal elements, such as the process management structure, implementation of management functions, multidimensionality, supporting concepts, methods and tools, as well as an external element, which is the environment.
- 2) What stages of the structure should be included in the process management system model for mines? The majority of respondents stated that this structure should be arranged in four stages. In the course of further discussions, it was also agreed that these stages should be divided into appropriate steps. In particular:
 - Stage 1: Process definition
 - Step 1. Identification of processes executed in hard coal mines.
 - Step 2. Description of processes (their interconnections and general structure).
 - Step 3. Appointment of process managers.
 - Stage 2: Process design
 - Step 1. Mapping of processes.
 - Step 2. Selection of indicators for process measurement and assessment.
 - Stage 3: Process execution
 - Step 1. Ensuring the conditions for the proper process flow.
 - Step 2. Measurement and assessment of processes.
 - Step 3. Responding to deviations in the process flow.
 - Stage 4: Process improvement
 - Step 1. Continuous process improvement.
 - Step 2. Thorough process redesigning.
- 3) What management functions should be included in the process management system model for mines? The majority of respondents stated that the model should include planning, organizing, directing and controlling. In the course of further discussions, it was also agreed that stages 1 and 2 of process management are particularly connected with planning and organization, and stages 3 and 4 are linked with directing and control.
- 4) What dimensions should be included in the process management system model for mines? The majority of respondents stated that the model should cover the organizational, social, IT, financial and knowledge dimensions. In the course of further discussions, it was also agreed that the organizational and social dimensions should be combined.
- 5) What concepts, methods and tools should be used to implement and followed process management for

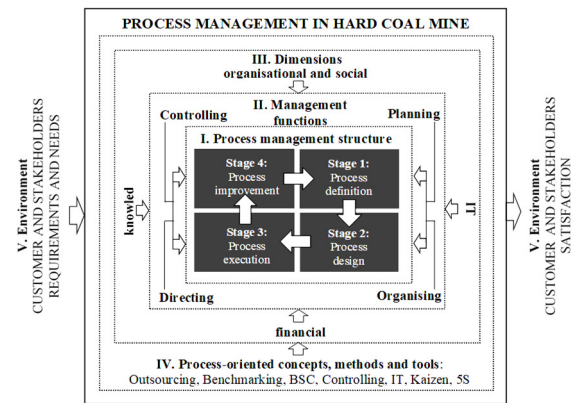
² Each respondent took part in one interview and two discussions, in the form of a free exchange of views.

mines? The majority of respondents stated that because of the usage and existing experience and knowledge in this field, as well as IT solutions supporting its gathering - Outsourcing, Benchmarking, BSC, Controlling, as well as IT: SZYK2, SAP, IFS ERP should be used. Moreover, in the course of further discussions, it was also agreed that conditions should be created for the future use of Kaizen and 5S methods.

The stage III: Development of a model of a process management system

The results of interviews and discussions conducted within the stage II of the research led to the development of a model of a process management system for hard coal mines (Figure 2). The model assumes that internal elements of the process management system are oriented towards the external element - the environment - in order to meet the requirements of customers and stakeholders which will result in their satisfaction and, eventually, translate into profits.

In order to use this model in practice, its individual elements have been described (Table 2).



Key: impact ↗, course of action →

Fig. 2 A model of a process management system in a hard coal mine

Table 2 Description of the elements of the process management model

I) PROCESS MANAGEMENT STRUCTURE

Stages	Steps	Description
1. Process definition	1. Identification of processes executed in a hard coal mine	Processes should be identified during the management workshops in which members of the top management should participate. Their task is to isolate processes while indicating a specific classification criterion. It is advisable to use the top-down approach, in which the criterion of participation in the creation of value is used to separate processes, dividing them into elementary (e.g. hard coal mining), including those of preparatory (e.g. preparation of hard coal seam for exploitation), auxiliary (e.g. transport) and accompanying processes (e.g. natural environment protection). It can be modelled after the proposal to divide processes presented for hard coal mines [4, 18, 20].
	2. Description of processes	The description should be based on the processes sequence mapping and correlation between them, taking into consideration the adopted classification criterion. The most adequate form of description is the preparation of a process map, which should reflect the process interconnections at the appropriate level of generalization. It is fundamental to define the role of the manager of each process. It is crucial that the appointed process manager:
	3. Appointment of process managers	<ol style="list-style-type: none"> 1) is the performer of at least one activity in the process, 2) has extensive knowledge of the process, 3) has a formally defined role, as well as being assigned a place in the organizational structure and has the indicated scope of responsibility, 4) is a genuine team leader, with specific traits and competences (pt III).
2. Process design	1. Mapping of processes	The description or graphic visualization of specific processes is of the essence here. It may include, among others: <ol style="list-style-type: none"> 1) presentation of the structure chart of particular processes - it can be modelled on the proposal, 2) preparation of block diagrams of individual processes, i.e. turtle diagrams, process maps, - it is possible to use the IT tools, e.g. iGrafx Flow Charter or other solutions presented in the literature, dedicated to hard coal mines e.g. [8].
	2. Selection of indicators for process measurement and assessment	It is recommended to specify indicators relating to: <ol style="list-style-type: none"> 1) effectiveness - understood as the level of achievement of an agreed target (e.g. percentage of on-time deliveries), 2) efficiency - the most economical (e.g. the cost of producing a product). Key Performance Indicators (KPIs) should be defined and should include individually selected financial and/or non-financial indicators to control and detect problems at an early stage. The KPIs should meet the following conditions: <ol style="list-style-type: none"> 1) they should address issues that are crucial and defined in the enterprise's strategy or directly serve its execution, 2) the number of indicators should not be too large, 3) each indicator must have a specific standard (level) and an acceptable deviation from that standard for the relevant test period. Only those indicators should be considered where employees have a real impact on the results. The definition of measurement and evaluation indicators supports the earlier use of controlling or BSC (pt IV).

Table 2 cont.

Description of the elements of the process management model

3. Process execution	1. Ensuring the conditions for the proper process flow	A project to implement process management should be developed which should include a schedule indicating the next steps in the change process. The developed project must be comprehensive. It would be a mistake to present only the concept of the process flow. Continuous supervision of the implemented changes is very crucial, especially the consolidation of properly functioning solutions. It should be remembered that there will be some employees' concerns, which may lead to reluctance against changes related to the implementation of process management. This is linked to the social dimension (pt III).
	2. Measurement and assessment of processes	For the proper execution of processes, it is necessary to carry out controls, which should result in: <ol style="list-style-type: none"> 1) measurement of the processes development based on the adopted indicators (in stage 2, step 3), 2) comparison of the achieved level of indicators with the adopted target values (standards), and then evaluation of the processes development based on the established deviations.
	3. Responding to deviations in the process flow	During the process evaluation, the following deviations may occur: <ol style="list-style-type: none"> 1) normal - which are acceptable, 2) abnormal - that have not been anticipated. In case of occurrence of abnormal deviations it is essential for the process manager to act quickly. The process manager should formulate recommendations on actions to eliminate deviations or change the norm. The key aspect is to redefine the limit of normal deviations in the indicators of process measurement and evaluation because they were adopted at an incorrect level.
4. Process improvement	1. Continuous process improvement	It is an evolutionary way of process improvement, described by gradual introduction of changes and improvements, usually not requiring significant capital outlays. In this step, it is worth utilizing the approach to process improvement by identifying and eliminating waste sources, which is facilitated by the use of such methods as 5S, Kaizen (pt IV).
	2. Thorough process redesigning	It is a revolutionary way of process improvement, described by introducing radical changes (e.g. related to the purchase of new technical equipment which requires significant capital outlays, or resignation from the implementation of a given process and outsourcing it to an external company). In this step, it is worth utilizing, among others, the benchmarking or outsourcing concepts (pt IV). Taking this step may involve the need to implement the different stages of process management again, which means going back to step 1.

II) EXECUTION OF THE MANAGEMENT FUNCTION

Management functions	Description
Planning	It is of great importance for the execution of the stages 1 and 2 of process management. It involves conscious: <ol style="list-style-type: none"> 1) setting the processes' objectives, the achievement of which should contribute to the achievement of the main strategic goal (profit), 2) appointing process managers, 3) mapping the processes in terms of: <ul style="list-style-type: none"> – diagnostic: the starting point is to ask what the current situation is like?, – prognostic: the starting point is to ask, 'what would it be like if?' 4) adopting and defining the necessary information on key indicators for achieving KPI results.
Organizing	It is of great importance for the execution of the stages 1 and 2 of process management. It involves a conscious decision about the best grouping of activities and resources in the processes. A measurable indication of organizing is the adoption of an appropriate organizational structure, designing and grouping work positions, establishing hierarchical relationships, decision-making powers and responsibilities. The implementation of this function is related to organizational dimensions and knowledge in process management (pt III).
Directing	It is of great importance for the execution of the stages 3 and 4 of process management. It involves a conscious controlling people and exercising power through motivation. This function includes leadership actions that should activate employee motivation to influence people's behaviour - including knowledge of what will result in their behaviour. The adoption of an appropriate incentive scheme, connected with the implementation and functioning of process management, is very high on importance for motivation purposes. Moreover, it is also important to ensure proper communication on the line: top management - process managers - employees. This function is related to the knowledge dimension (pt III).
Controlling	It is of great importance for the execution of the stages 3 and 4 of process management. It involves comparing the results achieved with those planned, as well as taking corrective actions. The aim of the control is to eliminate all non-conformities - their causes and effects. Furthermore, it is possible to indicate improvement actions based on the control. The execution of this function is connected with social dimensions and knowledge in process management (pt III).

Table 2 cont.

*Description of the elements of the process management model***III) DIMENSIONS OF PROCESS MANAGEMENT**

Dimensions	Description
Organisational and social	<p>The basis for this is a gradual implementation of the changes:</p> <ol style="list-style-type: none"> 1) in the organizational structure - the key aspect is to change the functional (vertical) structure into a process (horizontal) structure, which should take place in proper stages: <ul style="list-style-type: none"> – functional organization with task teams consisting of specialists from different fields of expertise whose competences should be used to solve problems that exceed one functional division, – functional organization with project teams consisting of seconded functional staff supervised by functional and project managers, – process and matrix organization in which processes are managed and functional areas become centers of skill improvement for employees, – process organization in which the functional structure disappears in favour of the process structure, 2) in the organizational culture that should: <ul style="list-style-type: none"> – take into account the creation of a sense of ownership and process awareness in the manager and process team, and promote an attitude towards process results rather than own (personal), – be based on pro-innovative solutions and support the activity and creativity of process managers in designing and introducing improvements, – accept the risk of making mistakes in order to learn and create organizational knowledge, – promote competences instead of formal authority and enable and stimulate competence development. <p>The organizational dimension is directly linked to the social dimension. Introducing changes in the organizational structure and culture helps to have employees with appropriate competences: knowledge, skills, experience in specific processes and involvement, openness to change, cooperation with people. Process managers play a key part in process management. They are expected to be an authentic process team leader.</p>
IT	<p>Process management support by IT systems may include the use of Microsoft Visio (Microsoft Office part), often used in mines, to create diagrams and process maps. Ultimately, you may consider purchasing technically advanced software, such as iGrafx Flow Charter or other solutions presented in the literature, dedicated to hard coal mines e.g. [8]. If a mine uses:</p> <ul style="list-style-type: none"> – controlling, then it is worth using its IT support to measure and evaluate the KPI, – SZYK2 or SAP, IFS ERP system, then the solutions offered in it should be used for process management.
Financial	<p>The concept of responsibility centres (as in controlling) can be applied to isolated processes. According to this concept, each process is a centre of:</p> <ul style="list-style-type: none"> – costs, where the manager is at liberty to make decisions that result in costs, for which he or she is responsible, – profits, where the manager is responsible for revenues and costs and has autonomy in terms of customer choice and price-setting. <p>In this approach, most processes in the mines are cost centres where the following are taken into account:</p> <ul style="list-style-type: none"> – resources, and in particular cash flow components related to resources used during process operations, – activities, and in particular cash flow components related to work performed during the process operations. <p>If there is SZYK2 system in the mine, it should be used. If there is not, iGrafx Flow Charter or ABC method can be used instead [10].</p>
Knowledge	<p>The condition for the efficient processes is:</p> <ol style="list-style-type: none"> 1) execution of activities based on knowledge resources; in order to properly perform activities in processes, employees need access to precise and up-to-date information - it is therefore essential to gather knowledge resources (objectives, measures, models, instructions, useful information, documentation), 2) cooperation and knowledge exchange: it is therefore essential to support communication, as well as to create conditions for the use of employees' competences, motivate them to cooperate and share knowledge in the process teams, 3) development of knowledge by supporting employees in acquiring new knowledge and applying it to develop and implement solutions to improve processes, 4) acceptance of the right to make mistakes.

Table 2 cont.

*Description of the elements of the process management model***IV) CONCEPTS, METHODS AND TOOLS SUPPORTING THE MANAGEMENT OF PROCESSES IN MINES**

Concepts	Description
Outsourcing	<p>Outsourcing is often used in mines. Its nature is to outsource activities/processes to specialized third parties provided that they are carried out better than would be possible on one's own. The use of this concept can support the implementation of process management and contribute to increasing its effectiveness and efficiency if the use of outsourcing reduces costs and improves concentration on key processes. Information on the outsourcing dedicated to hard coal mines, is presented in [13, 29].</p> <p>This concept is characterized by:</p> <ul style="list-style-type: none"> – continuity, understood as a constant, endless and ongoing search for new and better solutions, – process thinking, understood as including activities related to improvement in the structure of the enterprises,
Benchmarking	<ul style="list-style-type: none"> – acquiring knowledge, understood as learning from the experience of others and then applying this knowledge in practice, – measuring results, which is necessary to draw appropriate conclusions from the benchmarking analysis. <p>The use of this concept can support the implementation of process management and contribute to its effectiveness and efficiency by identifying and pointing out opportunities to improve process management based on successful solutions from other mines. Information on the benchmarking is presented in [2].</p>
Methods	Description
BSC	<p>It is used in some mines. BSC allows the strategy to be translated into objectives, measures of their achievement, tasks and initiatives that allow the strategy to be implemented. BSC enables to measure the effectiveness of achieving strategic goals, helps to identify mistakes made, suggests solutions for synchronising the activities of all employees in order to achieve strategic goals. BSC can therefore support the implementation of process management by using existing objectives, measures, etc. and their reference to processes, as well as the application of its solutions in the course of individual stages of process management. Information on BSC, dedicated to hard coal mines, is presented in [21, 25].</p>
Controlling	<p>It is used in some mines. Controlling encompasses strategic objectives and processes. It is a coordinated and integrated system that is computer-assisted. Its aim is to focus on the coordination of the functions of:</p> <ul style="list-style-type: none"> – planning: for the determined objectives of the processes, key indicators and their target values are defined by means of which the results of the process or processes can be measured – controlling: specific key measures of the process results are measured and then their values are controlled, – directing: control results are the basis for the determination of appropriate corrective actions, which implementation is essential to achieve the agreed process objectives. <p>Information on controlling, dedicated to coal mines, is presented in [11].</p>
Kaizen	<p>It is not used in mines. Its introduction should be considered as it is beneficial for the management of processes. Its main principles are:</p> <ul style="list-style-type: none"> – process thinking: oriented towards improving existing processes in order to enhance performance (this approach gives sustainable positive results by solving problems that are key to the process, – operation in the PDCA cycle, – work in accordance with the philosophy of continuous improvement including the waste elimination, – creation of improvement and development teams that will identify ways to further improve activities and processes. <p>Information on Kaizen is presented in [15].</p>
5S	<p>It is not used in mines. Its introduction should be considered as it is beneficial for the management of processes. Information on 5S is presented in [24, 30].</p>

IV) CONCEPTS, METHODS AND TOOLS SUPPORTING THE MANAGEMENT OF PROCESSES IN MINES

Tools	Description
SZYK2 or SAP or IFS ERP	They are used in some mines. They can include a set of applications that effectively supporting key processes.

V) ENVIRONMENT**Description**

Broadly speaking, it may be stated that the main strategic objective of hard coal mines is the increase in value, which means in measurable terms, "the highest possible return on invested capital at an acceptable level of risk". The implementation and usage of process management allows to achieve this goal by breaking it down into process objectives, aimed at maximizing added value for the enterprise by creating value for the customers and stakeholders. In order to create this added value, it is critical to perform a strategic analysis of the environment, which should be focused on gathering information about the current and predicted development of external factors resulting from the macro- and microenvironment and identifying the opportunities and threats resulting from them which are relevant for the creation of value for the customer. Information on the scope of analysis of environmental factors relevant to mining enterprises is presented in the literature, e.g. [6].

CONCLUSIONS

The implementation of modern management concepts aimed at proper functioning in modern economic conditions is of vital importance for the restructuring of the Polish hard coal mining industry. The introduction of process management, presently recognised as such a concept, may be the most desirable direction of changes that should take place in hard coal mines. It has to be emphasised that many scientific reflections on process management have been published to date. However, the variety of approaches and solutions adopted made it difficult to implement them in Polish mining enterprises, and especially in the mines belonging to mining enterprises. The results of the research presented in this publication are primarily addressed to the managerial staff of these mines, as they provide a synthesised response to the problem of the lack of consistent process management guidelines that could set a standard within a mining enterprise. The model presented in the publication has been developed based on the scientific achievements to date in the field of process management and consensus on the needs, preferences and capabilities of mine managerial staff with regard to its specific elements. The model is of a general nature, although it may provide a basis for the implementation and application of process management for mines. This is because it constitutes guidelines with reference to selected five elements of the process management system accepted by the mines' managerial staff. It also allows to combine the existing scientific achievements in the field of process management in the Polish mining industry by specifying where to use the formulated solutions, e.g. in terms of process classification, modelling or concepts, methods and tools supporting the process approach.

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