STRUCTURING KNOWLEDGE MANAGEMENT – LEVELS, RESOURCES AND EFFICIENCY AREAS OF KNOWLEDGE MANAGEMENT (part II)

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Abstract: Part 1 of this article has been published in the article *Structuring Knowledge Management – Classical Theory, Strategic Initiation and Operational Knowledge Management* (DOI: 10.1515/fman-2015-0041). The previous article presented process cycles of knowledge management. This article proposes a layered model of knowledge management, and then shows how to organize knowledge management, both in terms of organizational structure management, and structuring knowledge resources.

Keywords: knowledge management, organization of knowledge management, resources of knowledge.

> "The irony of life lies in the fact that one lives it going forward and understands it looking back"
> Soren Kierkegaard: *On the concept of irony with continuous reference to Socrates*

1 The organization of knowledge management[1]

(The framework of the concept introduced follows organizational roles: *coordinator of knowledge management, manager of an area of knowledge, leader of an area of knowledge.*)

The process of knowledge management accompanies all other processes. It is realized in all organizational cells. It is intertwined with the substantive activity of those cells, is part of their activity and conditions their activity since knowledge constitutes the most sophisticated part of its information resources. It is not, thus, sensible to prepare actions that constitute knowledge management from the activity of individual organizational cells and grant the conducting of such knowledge management to a separate organizational structure. However, a mechanism is needed which will ensure that individual organizational cells will effectively act on behalf of:

- obtaining knowledge not only for one's own use, but for the needs of the rest of the organization, if that procurement naturally lies in the range of their abilities,

- searching for tacit knowledge,

- formulating knowledge in keeping with established rules, and

- introducing tools to collect and provide access to knowledge.

This mechanism must function on a current basis along with other substantive tasks of each organizational cell, which superficially can remain in conflict with the operational priorities of these cells. That is why supervision is needed to fulfil the obligations of knowledge management as well as an audit of the effectiveness of this management.

One should aim for the indication of a position as high up as possible in the hierarchy of the organization of a person that will supervise the entire process of knowledge management – its owner as a coordinator of knowledge management. The placing of this position in the organizational structure is of course possible in different variants – it is worthwhile considering the eventual joining of this role with tasks such as the coordination of systems of quality man-

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[1] Part I of this paper is article *Structuring Knowledge Management – Classical Theory, Strategic Initiation and Operational Knowledge Management* (DOI: 10.1515/fman-2015-0041). The article is a generalization of a project executed for a municipal heating company in a large city that was organizing, for the first time, systematic corporate knowledge management. In the framework of this project a dedicated solution of knowledge management was developed in a network organization with a large range of functionality. The project was implemented solution that enabled by knowledge management, the challenge of ordering experience and potential competences: R&D center, factories of heat, municipal distribution networks, service centers, customer billing center, specialized organizational units of business analytics. The specific aim of the project was to increase the value of the company in connection with the privatization prepared. This was treated as a starting point for consideration of the operationalization of the approach to building a knowledge management system.

agement. The coordinator of knowledge management is to concentrate all actions that make up or constitute knowledge management and its particular role is the designation of the principles and forms of auditing knowledge management in individual cells.

A deep knowledge of the essence of the needs and mechanisms of acting in knowledge management is not needed for this. Specialist actions in the process of coordinating as well as an audit can be performed by the coordinator of knowledge management through employees of the organization – specialists from various areas (appropriately selected for individual areas of expertise and trained in the field of knowledge management). This is analogous to the role of internal auditors of the ISO 9001 quality assurance system.

And in particular areas of knowledge, one should aim at indicating the position responsible for the administration of the process of knowledge management in a given area. In doing so, one should rather not aim at creating a special organizational structure dedicated to the issue of knowledge management. There are two basic reasons for this:

- knowledge management is a process that naturally exists (perhaps only tacit knowledge) in the conducting of business processes in organizations thus it is spread throughout the entire organization and concerns all organizational cells,

- the mechanisms of managing such a process are in keeping with the general principles of a pro-quality approach, which work in many organizations and is a form of progressing to matrix management, characteristic for a process-based approach.

In conjunction with this one should rather aim for a broadening of tasks of selected organizational cells on knowledge management in areas that are the subject of their specialization. It is necessary to assign the persons managing these cells to be the managers of knowledge areas responsible for administering the process of knowledge management in a given knowledge area. These roles become part of the task structure set upon the formal structure. In the extent of the process of knowledge management a dependency arises in relation to the coordinator of knowledge management. It might also be necessary to select more persons with broader responsi-

bilities related to actions on behalf of the procurement and formalization of knowledge in selected organizational cells. These will be the leaders of individual knowledge areas.

Advanced knowledge management requires information and communication technology (ICT) tools while a special role needs to be assigned to IT service cells before which are the tasks of procurement, introduction and exploitation of special IT systems, specialized databases and the IT management of their access.

Since there are no reasons to create new organizational cells specially dedicated to conducting the process of knowledge management, this means that upon all organizational cells and their managers should be lain tasks in the area of planning the development of knowledge, revealing tacit knowledge, codification of explicit knowledge, implementation of procurement solutions, formulation and provision of access to knowledge and establishing local (in the framework of a given organizational cell) principles of management.

2 The structure of the levels of knowledge and its management

There exist a number of approaches to knowledge management (see Table 1, column 2), which have significantly separate goals and principles [2; 3, p. 74]. The original proposition described further on is based on the concept of sustainable management and joins elements of several approaches on the basis of perceived levels by means of an analogy to network services in telecommunication (what is known as *Open Systems Interconnection* OSI). This is illustrated by Table 1.

Such a construction of an integrated knowledge management system enables, or relatively disengages – that is in a coordinated manner, but still in various orders, in other times and by separate groups of people – the solution of organizational matters or those related to processes, resources or personnel policy. The building of an integrated approach with levels occurs from the organizational level to the level of the intellect, that is, an agreed upon order of levels interpreted from the bottom to the top of the table.

Table 1. Layers and formal approaches to the sustainable management of knowledge
(*source:* [6, inspired 1 and 5])

Agreed level	Dominant approach
level of the intellect (relations of persons as well as the interpretation of content)	behavioral approach
level of content (area of knowledge)	resource-based approach
operational level (revealing knowledge and managing it)	process-based approach
organizational level (strategy, structure, audit)	systems approach

At the organizational level the matters of the organizational structure dedicated to knowledge management are defined – both formally separated (dedicated organizational cells) and for task taking (work, task, ad hoc, temporary and implementation groups, etc.) as well as the role (dependency), rights and responsibilities in the area of goals of knowledge management designated in this level.

Utilization is made here, first and foremost, of characteristics of a systemic approach, particularly the definition of the principles of the creating, codifying and transfer of knowledge, which serve to designate the goals of knowledge management. (In the research project this matter was taken into consideration in such a manner that changes were proposed in the organizational structure and in the formal documents, which such a structure describe. As a consequence the extent of tasks was proposed for the role of coordinator of knowledge management (as the owner of the process of knowledge management) and for the managers of areas in individual areas analyzed in the project).

At the operational level the structure and principles of the realization of the process of knowledge management is described. Utilization here is primarily made of characteristics of the process approach since that is the way to introduce the principle of continuous improvement and to grasp the element of the dynamic of phenomena that is characteristic to modern management. In addition, this approach assumes that knowledge management is measurable.

The decomposition of this process of management into three related spirals of perfection – each uniform in its character of action - serves this purpose. Their task is to collect knowledge in keeping with needs, formulating knowledge in a form friendly to the user and appropriate from the point of view of the organizational and operational utilization of knowledge resources already collected. The convention of the spirals of perfection ensures an ongoing compromise of needs and possibilities. (In the research project this matter was taken into consideration in such a manner, that the process of knowledge management was designed and the basic procedure and instructions of the realization of this process was proposed at an organization-wide level as well as in regards to individual analyzed areas of knowledge).

At the content level the resources of explicit knowledge are designated as are something like clues leading to tacit knowledge. Utilized here are primarily characteristics of a resource-based approach, which is regarded as the most traditional approach in the theory of management; its main value is related to the fact that is directly responsible for tasks designated at the level of strategic marketing. In a resource-based approach knowledge is regarded as the most important resource of the firm. It is seen as constituting key competencies, key capabilities, ability to resolve problems through teamwork, capacity to procure knowledge from the surroundings, implement new tools, experiment etc. (In the research project this matter was taken into consideration in such a manner, that the basic character of the contents of knowledge in each analyzed area as well as the manner of its provision of access appropriate for each area were the subject of an evaluation. In keeping with the results of such an analysis the principles of procurement, codification and provision of access of knowledge were indicated in the procedures and instructions for each area).

At the level of the intellect a behavioral approach, which serves to socialize knowledge, that is, its start-

up, provoking, stimulation and support of the transfer of knowledge, is primarily applied, since pure knowledge arises in the minds of people and develops through relations between people. (In the research project this matter was taken into consideration in such a manner, that an evaluation was made of the need of making use of such a level of knowledge management in each of the analyzed areas. For selected areas an evaluation was made of the degree of advancement of the usage of intellectual knowledge and of indications concerning the preparation of this area to implement IT solutions which enable the intensifying of intellectual actions).

The practical differences in knowledge management between the various areas of knowledge become apparent with growing intensification together with the order of levels, primarily on the level of the intellect, which moreover, in certain areas of knowledge, does not have to occur. At the organizational level a mutual task organizational structure of knowledge management is built in the entire realization along with the relations in force within it.

At the process level a mechanism of the three spirals of perfection is built. The level of content in the case of certain areas of knowledge can be the last level. This is in regards to areas of professional knowledge having a very specified form. The level of the intellect takes on significance there where operational activity is naturally volatile, difficult to standardize, based upon mechanisms of accumulation of individual experiences/capabilities requiring a difficult syntheses that is also difficult to generally describe and still more difficult to codify. This is accompanied by the need of designating a model of the organization of knowledge management. This is made up of:

- defining the goals of knowledge management-strategic and operational,

- designating the organizational structure dedicated to knowledge management,

- assigning resources essential to conduct knowledge management (personal, financial, property and informational), and

- designating the principles of action in the classic cycle of management.

Only after starting up the functioning of such a model (organization, process) is it worthwhile beginning

attempts in the direction of its automation (the computerization of knowledge management).

3   Knowledge resources

(In the frame of concept are introduced follows constructs: *construction of knowledge - technology of the processing of knowledge - organization of knowledge management*)

(In the frame of concept are introduced following categories: *area of knowledge - knowledge resource - portion of knowledge – problem - question*)

The general resources of knowledge subject to management can generally be presented as in Table 2, while the practical examples of knowledge and resources are shown in Table 3.

Knowledge resources that exist in an organization have a designated form and are dealt with by designated cells and persons. If the organization hitherto did not consciously manage knowledge then usually the knowledge is dispersed, part of the knowledge is in the dispositions of "accidental" people and there is a lack of systematic information on the localization of knowledge.

For the purpose of a balanced control of the knowledge resources as a starting point in the research project an outline of the construction of knowledge resources was assumed that was based upon the fundamental model of management as a realization of strategic goals by manipulating resources of the organization during the realization of an organizational PDCA [Plan-Do-Check-Act] type cycle.

Knowledge and management of knowledge do not have to have a fully formalized form. In many organizations they function as a certain good operational practice and are part of the culture of these organizations. Let us remember that the formalization of elements of management is often a function of the size of the organization.

Table 2. Model structure of knowledge resources in an organization
(*source:* [7, p. 97])

Generational approach (knowledge about this….) / Organizational -resource approach	Construction of knowledge (how data resources are built)	Technology of knowledge processing (how data resources are used at the information level)	Organization of knowledge management (how information resources are steered)
Information concerning goals (strategy)	e.g., client register, register of products/services	e.g., strategic plans	e.g., CRM
Information concerning financial resources	e.g., account chart	e.g., financial records	e.g., financial analysis and controlling
Information concerning material resources	e.g., infrastructure construction documentation	e.g., infrastructure exploitation documentation	e.g., designing infrastructure
Information concerning personnel resources	e.g., personnel registry	e.g., records of competencies	e.g., career path techniques
Information resources	e.g., databases	e.g., data wholesalers	e.g., system for informing management
Information concerning organizational management	e.g., formal and organizational regulations	e.g., describing business processes	e.g., improving the organization

Table 3. Examples of knowledge resources in an organization
(*source:* preparation by author)

Area of knowledge	Knowledge resource	Source
Personal information	composition of the company's employees, formal competencies	human resources
Formal and organizational regulations	internal legal acts enforcing the company	office of the management board
	list of Polish norms	research department
	collection of patent descriptions and utility models	research department
Organizational improvement	making processes more efficient	development division
Infrastructure design	technical requirements concerning materials and purchased equipment	materials management department
	collection of the terms of reference of purchase orders	department of public procurement
	model contracts and contents of contracts	legal department
	design and operational guidelines	department of capital investment / department of production
Building and maintaining infrastructure	technical-motor parameters of technical systems	many sources
System for informing the management	resulting aggregated operating parameters of the heating system	
	investment costs of pipelines and connectors	
	repair costs of pipelines and connectors	
Finances (controlling)	data in a financial-accounting system	
	information a system of controlling	
Clients	client records	sales department
Interested parties	decision-makers	company management board
	collaborators, suppliers, service providers	purchasing department
	employees, unions	personnel department

Smaller organizations practice this in a limited degree and they are not less efficient for doing so and their organizational culture cannot be questioned. The introduction of mechanisms of knowledge management serves a large organization by making its actions more efficient which is only possible if there exists a foundation of achievements in this sphere of organizational culture and its level is high enough to support changes for improvement [4, pp. 223-230].

It is necessary to carefully define the areas, and in their framework, knowledge resources in order for the complete record taking of explicit knowledge to take place before actions occur in the direction of revealing tacit knowledge. At the same time one has to be aware that this type of classification should be open to the change of the scope of a given area or the addition of new areas.

At this time it is necessary to also clearly designate what does not constitute a subject of the system of knowledge management, for example decision-makers may decide that elements of data that fall under the regulation of the law on the protection of personal data can be excluded.

4   Activities in knowledge management

The model presented above, which is based on the spirals of perfecting the process of knowledge management were, in the research project, subject to what is known as mapping, which serves to prepare the scope of the procedures and instructions describing the principles of proceeding in knowledge management both in the entire organization and in individual areas of knowledge. Activities in the knowledge management process shown in Table 4.

Table 4. Types of activities in the process of knowledge management
(*source:* preparation by author)

Action	Concerns	Additional description
Procurement	need of knowledge	
	source of knowledge / types of knowledge	inflows (not necessarily located in an obvious place, its acceptance is required)
		ordered or sought (requires the use of methods of search and then acquisition)
		produced on request or demand
	methods of obtaining / generating	
Processing	segmentation	
	classification	
	standardization	
	establishing relationships	
	actualization	
	formulating answers to posed questions	simple forms
		complicated forms (e.g., requiring expanding on information from outside or that is created)
Storage	spaces of storing knowledge	
	forms of storage	
	principles of access (mainly questions of quickness and efficiency, particularly important during complicated operations,)	
	principles of archiving	
	principles of securing information	

Table 4. Types of activities in the process of knowledge management, cont.

Action	Concerns	Additional description
Distribution	promote technology diffusion, including dedicated dissemination	
	response to an order	
	principles of distribution	
	principles of protection and segmentation of access	
Administering the process (performing actions related to the management of tools and documents)		

It should be emphasized that the terminology of management of this process and the regulations resulting from it primarily refer to such information, which constitute an actual transmitter of knowledge. The process of knowledge management encompasses four types of substantive activity of processing knowledge and its administration.

5   Identification of areas of knowledge management

The area of knowledge should allow itself to be logically made distinct which means that it has a connection either with a designated range of action in the organization, for example, production, or it has a connection with the functionality of a designated organizational cell, for example, with personnel. In characterizing areas, it is most advantageous to establish ahead of time a certain collection of categories of characteristics or just characteristics themselves and then to undertake the assignment of appropriate characteristics to each of the areas, which is illustrated by Table 5.

Table 5. The principles of characterizing areas of knowledge management
(*source:* [7, p. 98])

Name of the knowledge management area, for example, designing infrastructure. Characterization (characteristics, in bold, assigned to a sample area of knowledge)							
In the context of strategy	In a systematic approach	In a functional approach	In a process-based approach	In a research-based approach	In a market-based approach	In an information based approach	In total
Mission, **goals,** audit	**Fundamental,** conditional, accessory	Sales, **production,** back office	**Basic,** support, managing	Financial. **Material,** personnel, informational	**Production,** services, trade, research	**Data,** information, intelligence	**Fundamental,** important, significant, secondary
Descriptive detailed characterization, including the selection of the above characteristics							

Table 6. Structure of the description of knowledge resources
(*source:* prepared by author)

Internal knowledge				External knowledge			
Explicit knowledge			Tacit knowledge	Explicit knowledge			Tacit knowledge
Codified	Processed	Reports, analyses	✕	Codified	Processed	Reports, analyses	✕
Description of Knowledge area A							
Description of Knowledge area B, etc.							

This enables the analysis of the importance of particular areas in relations to various ranges of managing the organization.

6   Description of knowledge resources

The description of knowledge resources classified preliminarily in Table 2 should be gradually characterized in an increasingly detailed manner. The degree of detail should result from the gradation of the needs of obtaining particular knowledge resources. The basic extent of the description is presented by Table 6.

The mapping of knowledge should hearken to the process of knowledge management as well as to basic mechanisms of obtaining and providing access to knowledge. In such an approach mapping occurs into aspects:

- Primary mapping which classifies and places knowledge and arrangements:
  - organizational cells / persons / systems – types of knowledge (map of the source of knowledge),
  - business processes / organizational cells – the naming of portions of knowledge (map of knowledge needs).
- Secondary mapping in the framework of a description of business processes in which knowledge is utilized, that is, what is known as the introduction of knowledge resources into the operational functioning of an organization.

Mapping is also referred to, this time more literally, in the context of systems that search for the sources of knowledge and the search for named portions of knowledge.

Primary mapping should be cyclically repeated and verified by a process of analytical actions based on the idea represented by Tables 7 and 8. They also illustrate the differentiation of the level of detail of such analysis, which should be in accordance with current tasks set forth before the system of knowledge management.

Mapping is to provide a full picture of expectations from the system of knowledge management conventionally answering questions such as these:

- What kind of knowledge is needed?
- Who needs such knowledge?
- What knowledge is already possessed? (and in light of this what is the gap of knowledge in the context of the answer to the earlier question),
- Where is this knowledge located ?
- To what degree is this tacit knowledge?
- Who possesses such knowledge? (and in relation to this what should relationship be between the source of knowledge and its beneficiary). The introduction of knowledge resources to the operational functioning of an organization can be undertaken in the context of a process-based approach in the managing of this activity. In the case of production activity and such service activity for which are defined processes one should undertake this in the following manner.

Each of the processes is described like a series of operations and the majority of operations based upon work positions are tasks associated with work positions is described in the form of a special operation work position card or position work card.

Table 7. Map of knowledge sources
(*source:* preparation by author)

	Area of knowledge	Range of knowledge	Portion of knowledge	Problem	Question
Organizational cell, e.g., production planning department	production	production planning	limits material	availability of materials	Is there a cover material change to the current production?
Person, e.g., dispatcher	production	current production planning	cover material limits	availability of materials	How to acquire the missing material?
Records system, e.g., production orders system	production	current production planning	cover material limits	availability of materials, sources of supply, procurement mode	How to order an ad hoc missing material?
Information system, e.g., planning and production accounting system	production	production planning	cover material limits	availability of materials, sources of supply, procurement mode	How to order an ad hoc missing material?
Other source, e.g., production worker	production	current production planning	current balance of material requirements	acquisition of missing material	Is it enough material?

Table 8. Map of knowledge needs
(*source:* preparation by author)

	Area of knowledge	Range of knowledge	Portion of knowledge	Problem	Question
Process, e.g., HR	HR	assessment of competence	certificates of competence	features formal of certificates	about the credibility of credentials
Operation in the process, e.g., the assessment of competence employed manager	HR	assessment of competence	completing certificates	checking credentials	about a set of credentials
Organizational cell, e.g., HR Department	HR	assessment of competence	completing certificates	checking credentials	about a set of credentials
Work position, e.g., HR specialist	HR	assessment of competence	completing certificates	checking credentials	about a set of credentials
Information system, e.g., HR IT system	HR	assessment of competence	search certificates	statement of credentials	credential evaluation by Business Intelligence tools
Person, e.g., HR specialist for executives	HR	assessment of competence	verification of certificates	examination of credentials	preliminary assessment of the hiring process for the decision maker
Other beneficiary, e.g., Board Member	HR	assessment of competence	set certifications	credential evaluation	if the certificate is proof of the skills?

Such a description in its most general approach is made up of the following descriptions:

- entry of the subject of the operation, that is, of the product or service being created or provided which is a result of this work position,

- function of the work position of this operation, that is, the extent of the activity that makes up this process,

- exit of the subject of operation, that is, the parameters of the product or service being created or provided which as a result of the operation obtained a designated added value,

- essential resources at the work position to realize the function of the position in this operation.

One should aim for the goal that in the descriptions of the operation, the parts designating essential resources, there will be information about knowledge resources and the manner of their procurement and application.

In relation to accessory cells for which a detailed description of processes with their division into work positions is not practiced, as well as in relations to research and development, design, repair and other cells where work cannot be standardized, one should utilize database techniques characterized by lists, files, registries or guidebooks and, in further order, IT systems that fulfil that role.

And a reservation should also be made that the system of knowledge management, including that in the process of mapping, should be made applicable to the limitations related to company secrets as well as to the requirements of regulations such as the law protection of personal data.

7   Measurements of the effectiveness and efficiency of the process of knowledge management

The process of knowledge management, as with each management process, should be observed, audited and evaluated from the point of view of the effectiveness (realization of goals) and efficiency (costs, quality of actions). Additional evaluations concern changes in time since the goal of the organization should be a continuous trend of improving management processes.

In the case of knowledge management two hindrances appear. Firstly, knowledge itself is not fully measurable since rather the amount of data is measured and not the value of the information (interpreted as something subjective on account of the individual lessening of uncertainty, lack of information and lack of knowledge of the recipient) which only then is the basis to build knowledge as a product of the sublimation of information and the conclusions drawn from it. That is why the quality of the 'husbandry' of knowledge is evaluated. Secondly, the general task of the process of knowledge management is a codification of knowledge already possessed and the revealing of tacit knowledge. In particular tacit knowledge is not known (not yet measured) and thus at the moment of being revealed the amount and extent of possessed knowledge changes and at the same time changes the overall picture of knowledge resources. This causes the indicators of knowledge resources as well as the indicators of the evaluation of the process of knowledge management to be subject to volatile changes and thus cannot be used for simple comparisons, for example between successive periods of analysis and reporting.

For these reasons it is necessary to be careful in approaching attempts of the very formal building of a set of evaluations of the system of knowledge management and one should not refrain from more intuitive evaluations of the effectiveness and efficiency of the process of knowledge management. The matter of benefits from the introducing of the process of knowledge management is similar since such benefits are very difficult to measure and yet they are usually, particularly in periodic comparisons (for example, every few months) easily noticeable. That is why a good solution is a cyclical repetition of undertaking questionnaires of the beneficiaries of the system of knowledge management.

For example it is worthwhile researching the degree of satisfaction of the users of the systems providing access to knowledge and to descriptively comment on the KPI (*key performance indicators*) indicators as well as to rectify its indicators in the past so as to ensure comparability by taking into consideration changes that occurred between the compared periods. Examples of measurement are shown in Table 9.

Table 9. Examples of KPI indicators
(*source:* prepared by the author)

General indicators			
Indicator (KPI)	Indicator of use categories classification of knowledge resource	Amount of persons involved in the process of knowledge management (manager and leaders of knowledge areas) in reference to the amount of distinct knowledge areas	Indicator of the areas in which the system of knowledge management was introduced	The amount of introduced IT systems that utilize automation in the usage of knowledge
Formula	Percent of used categories of classification in relation to all the categories of knowledge management	The average amount of persons administering the knowledge area	Percent of areas in which a system of knowledge management has been introduced in relation to the amount all the areas	The amount of systems, and perhaps the amount of those that have the right to utilize them
Unit of measurement	%	amount	%	amount
Frequency of measurement	annual	annual	annual	annual
Source of data	Information from the Managers of knowledge areas	Information from the Proxy for Knowledge Management Matters	Information from the Proxy for Knowledge Management Matters	Information from the IT Department
Desired direction of change of KPI value	Maximize the amount of uses	Expected direction of change should be indicated in the annual plan	Maximize	Expected direction of change should be indicated in the annual plan
Indicators for areas			
Area	Technical exploitation parameters	Analytical reports	Employee competencies	Process improvement
Indicator (KPI)	The amount of types of reports	Proportion in relation to the possessed reports	Number of person days of training received by employees	Number of formally approved changes to the description of the processes
Formula:	The amount of reports available to management	The amount of codified reports in reference to the amount of all current reports	The total number of person days of training	The total amount of changes which were formerly introduced into the description of the processes
Unit of measurement	amount	%	amount	amount
Frequency of measurement	annual	annual	annual	annual
Source of data	Information/ reports from the Controlling Department	Information/ report from the Department of Analysis	Information/ report from the Personnel Department	Information/ report from the Development Department
Desired direction of change of KPI value	Descriptive evaluation referring to the change in relations to the previous period	Maximization	Descriptive evaluation referring to the change in relations to the previous period	Descriptive evaluation referring to the change in relations to the previous period

KPI indicators, the general ones and those related to individual areas of knowledge, will be an effective tool to evaluate the process of knowledge management if the obligation of preparing data to be drawn up be formally placed upon on individual organizational cells. The design of indicators have first and foremost to serve the bringing forth the qualitative and quantitative elements of this process in the beginning of its functioning.

After its consolidation, and particularly after the introduction of IT solutions that automate the procurement, storage and provision of access of knowledge in its individual areas one should verify the need of such form of indicators. It is possible that at the moment of application of IT techniques there will appear the possibility of introducing other more detailed but however easier to count indicators such as: the time of answers for questions posed to the IT system, the number of inputs to the portal of knowledge, the volume of data of knowledge resources, the amount of beneficiaries, etc.

8   Summation

In the presented model of knowledge management the contribution to science are: a four level model of knowledge management which integrates various approaches to this management that were hitherto treated as competitive to each other, as well as three spiral processes for perfecting knowledge management. This model was equipped with supportive proposals of actions, having the character of the operationalization of the theory, leading to a pragmatic system of knowledge management of which an important element is the introduction of the principle of the gradual perfection of such a system. The tempo of perfection is an individual question of the organization, its needs, possibilities and culture.

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