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PROCESS MANAGEMENT AND SYSTEM THINKING

The paper contains reflections on the essence of process management, the relationship between system and process, process control and other related problem areas. The reasons for the above considerations are frequent differences of opinion on the concept of process management and its relation to systemic thinking, or relation of process and system.

Keywords: system, process, system approach, process approach, management of processes, process management.

SYSTEM APPROACH AND SYSTEM

When applying a systemic approach, as well as in the application of process approach in addressing problem areas in relation to the objects management differences of opinion are often seen about the relationship between systems and processes, the relationship between management of processes and process management.
Therefore we explain what we understand under these terms on basis of the work of Hanke, Jassinger, Linczeny, Lipták, Porvazník, Tuček and Závadzký.

- System approach according to *Porvazník:*

„System approach is a way of thinking - the way of cognizing, in which the phenomenons are comprehended complexly in their internal and external relations. Units consist of not isolated, but linked, and interacting parts."

- System approach according to *Lipták:*

"A system approach is a conception whose implementation can lead to representation of the objects or processes as a system for their study, description, explanation, prediction, design and so on."

- System approach according to *Jassinger:*

"A system approach is holistic way of thinking, problem-solving or procedure by which we understand phenomena as a complex in their internal and external connections."

- System according to *Porvazníka:*

"The system itself is an abstract concept. It is a way of thinking about the object, which exists specifically. The system thus is created on the object by defining its components (parts), the interaction between them (structure) and behavior (operation) of the object.

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The essence of system thinking is that despite the complexity we can see the basic structures, which operate in the background and are capable of causing change."

- System according to *Lipták:*

"The system is represented by elements that are in mutual relations. The structure of the system is given by the number of elements and their linkages. This means that if we know all elements of the system and all the links, we know its structure.

The system has an input (or multiple entry) and output (or multiple outputs). Inputs and outputs have a continuous or tinuous set of states characterized by the values of certain parameters. System in its action transforms the input state to some output state. The relations valid for its work we call the behavior of the system. If there exists a clear link between the input state and the output state the system has deterministic behavior, if there is not a clear link its behavior is stochastic."

- Business system according to *Závadský:*

"The business system is an open dynamic system, whose essential elements are activities. Subsystem consists of processes that arise from logical and the subsequent linking of particular activities. Ties and their level present the performance indicators linked to attributes of the process."

If we want the closer definition of system we use system characteristics.

Object and its system characteristics

- system has its **structure** (system elements and interactions between them),
- **elements** of system are elementary units, which are not divided on a given stage of decomposition.
- **interaction** or interactions between elements of the system and its surroundings have a quantitative side (formal), which is known as a **links** (an orderly transition between system components - direct and indirect) and qualitative side (content) - the expression of system activity, which we refer to as **relation**,
- system **objectives** are defined, i.e. what the system has to achieved by its functioning, the goals are potential in this understanding,
- **the functioning** of a system presents transformation in the system and its **ultrasystem**. It is a dynamic site of the system expression. It characterizes the expressions of the system in its entirety, i.e. also changes in the system structure. Operation of the system is activated by impulses, stimulations, **inputs** - the system is able to **transform** inputs to **outputs** by its operation. There can be more **functions** of the system. The system therefore achieves its objectives by its operation.

In the fulfilling of objectives the system is **behaving** according to impulses, stimulations, inputs, and its structure, resulting in outputs.

It is based on the fact, that the structure of the system gives the ability to meet its objectives. If the structure is able to meet set targets, stimulations, impulses and inputs are clear (in the sense of defined characters), then it meets the stated objectives.

The way of running of the process, thus transforming **inputs** to **outputs** is known as **the transformation process**. The point is, what is transformed and how transforming is running. Then we can talk about the technology of transformation process - the way the process is running, for example the mechanical-technological process.

According to mentioned facts, the inputs enter the system which is able to carry out their operation and their transformation to produce outputs. This also defines what belongs to the system, which is input into the system and what is the output

from the system. Structure of the system due to the input can be considered as relatively stable. This concept is supported by other system characteristics as system boundaries, neighbourhood of ultrasystem, subsystem, system organization, management of system.

These characteristics can be used to closer description of the system and also to clarify what is understood by the system.

For the object under investigation we introduce the system according to the definition of system and describe system characteristics. The structure of the system we can consider when examining as a relatively stable.

Input to the system is what enters the system in order to transformation to output. There can be more inputs and outputs.

This concept is important for understanding the structure of the system as well as self-transformation process of the system.

According to previously mentioned - in the system description of the object by system characteristics – as the process we understand the transformation process.

In the strict understanding of the process just as the transformation process thus appears to be problematic introduction of a system to process. Strict adherence to the description of the object already referred to by the system characteristics would require to describe the transformation process of the process.

The process according to EN ISO 9004/2000:

"Activity using sources, which is managed to enable the transform inputs to outputs, can be understood as a process."

The process according to the application manual of CAF** is**:

"A set of activities that transforms inputs to outputs, adding them a value."

In this sense it is not just the identification of process and the transformation process of an object, but a broader understanding, the understanding of the process as a managed object, which consists of elements and interactions between elements, which actually forms the structure of the process - the structure of the examined object. In this sense, we can implement the system of process in terms of definition adopted, and describe it by other system characteristics.

There we need to add a process definition. STN EN ISO 9004/2000 explains process approach as:

"The process approach is application of the system of processes within the organization, the identification of processes and their interaction, as well as their management."

The advantage of the process approach is the continuous management of interactions between the various processes within the system processes and management of combinations and interactions provided by the process approach. The desired result is achieved more efficiently when activities and related resources are managed as a process.

Therefore the organization must:

a) identify the processes important for quality management system and their application within the organization,
b) determine the sequence and interaction of these processes.

It follows that the process approach is not inherently different from the systems approach and that processes understood according to the above characteristics, the system could be implemented even if in their definition, mentioned above, there is not direct

focus on the structure of the process (implicitly expressed) but on the transformation process.

From this point of view it can be further deduced:

UNDERSTANDING THE SYSTEM AND PROCESS

System is defined by the structure and behavior. The system can be described by system characteristics. One of them is the transformation process by which we mean "the way the process is running, it means transformation of inputs to outputs." Sometimes it is similar to what we understand as the process. Definition of Process according to ISO and CAF application handbook reads: "Activity using sources, which is managed to enable the transform inputs to outputs, can be understood as a process" and "a set of activities that transforms inputs to outputs, adding them a value." So it is not completely identical.

In the above mentioned definitions the understanding of the process as a system is implicitly expressed, not only its transformation process. Hence the process which is the object of management and is in accordance to STN EN ISO 9000 can be treated as objects, on which system can be applied.

The definition of the system as an object and its description by system characteristics is more transparent.

UNDERSTANDING OF PROCESS MANAGEMENT

• Understanding of the process management by Tuček:

"Process management is defined as a methodology for evaluating, analyzing and improving key business processes, based on the needs and desires of customers."

"The aim of optimization of business processes is especially the continuous improving of quality, accessibility and effectiveness of creating products with simultaneous reduction of associated costs."

"In the selection of indicators for measuring process performance is necessary to respect the need to optimize three basic parameters of the process: cost, time and quality."

• Understanding of the process management by Hanke:

"Process orientation requires a significant shift in the understanding of the organization and operation of the company. The whole operation is synchronized business horizontally via processes and not vertically via individual departments. Though these organizations usually continue to maintain the structure of departments.

Process managed organization is focused on the outcome of all company activities that are integrated and incorporated into the process, i.e. the added value brought to the customer (internal or external) and he is willing to pay for it. Process-oriented organization is sufficiently flexible and can respond quickly to market changes and customer preferences.

UNDERSTANDING OF PROCESS MANAGEMENT BY AUTHORS OF THIS CONTRIBUTION

Understanding of process management is explained in this simple form of reflection and hence with a high level of abstraction.

Each organization is a complex dynamic system (the organism). Addressing issues related to its effective functioning and also to increase its performance therefore asks for transparency of its structure.

Transparency (clarify) can be achieved in various ways, but our opinion is that the best way to achieve this objective is system approach, i.e. systemic decomposition of the system, which represents systemic definition of subsystems of the system, or sub-processes of the organization process.

This might serve the models that are available and their applications are confirmed by experience (quality management system models, logistic models, structural models, ...). Preferably, in this respect can used a model of quality management system (QMS) according to EN ISO 9001/2000, 2008, where an organization (company) as a system or business process decomposed into subsystems, or sub-processes i.e. management sub-processes, resource management sub-processes, product implementation sub-processes, measurement, evaluation and improvement sub-processes.

Obviously in terms of resources needed for the functioning and development of the organization the sale of its products is crucial because the organization obtains income, which is also used as a source for its development.

The amount of sales of organization depends on the characteristics of the product which address customer requirements. From the perspective of the customer the product quality, price and time to meet its ongoing requirements are the key features of the product. In the process management we consider the implementation process of product as crucial and other subprocesses are seen as supporting for this process, which delivers the result of the organization.

Mentioned product features are dependent on the process capability to achieve the desired level of quality, acceptable price in relation to the height of costs and time of product supply.

System creation and improvement is the basic condition for establishing suitable and rational functioning of processes. It means, that in system which has to produce the outputs will be incorporated in all the factors (elements) in such quantity and quality as necessary, in regard to produced outputs (product) and that interactions between them will be rational. Nothing more, nothing less.

If we declare the sub-process of product realization as a process, we can further decompose this systemically, i.e. sub-processes, for example: negotiation with the customer on delivery of a product - product technical preparation - manufacture the product - the supply of product - product service. That decomposition can be, of course, different and more detailed. We obtain a sequence of sub-processes of product realization process by this decomposition and other stages of decomposition. The output of the first sub-process is input to the second sub-process, which clearly defines inputs into sub-processes and their outputs, in regard to object in view. There can be, of course, more inputs and outputs.

If we create processes according to above mentioned system creation, we will achieve a basic condition for their ability to meet the desired objectives, which fulfillthe customer´s requirements.

The process is like a flowing river. If we want to reduce costs and shorten time of process running, we must remove obstacles to the flow (smooth and desirably rapid). We have to apply methods and techniques to meet this aim, respectively we have to apply them.

Considering the facts previously mentioned, it is necessary to comment the functions of other sub-processes of the organization process. These sub-processes in the interaction

create system of the organization, but each one contributes – by the performance of its functions – to the rational functioning of the organization as a whole.

Managerial processes

The task of these processes is to prepare an organization´s future, provide the necessary resources for achieving its objectives and address the most pressing operational issues. The fulfillment of long- and short-term objectives of the organization is provided by their stratification into implementation plans and processes within the organization.

The process of resources supply

It is the responsibility of the management of organization to provide resources for achieving its both short and long term objectives.

The processes of measurement, evaluation and improvement

Measurement, evaluation and improvement is incorporated directly into the implementation plans, system documentation and documentation setting the running of processes (organizational guidelines, rules).

Process management of the company is therefore, according to our understanding, management of the company as a system, whose elements are processes, which follows above mentioned ideas as well as the standard STN EN ISO 9004/2000, 2008. Emphasis is put on:

- The resulting performance of the company as a result of all operations,
- Creation of added value and comparative advantages,
- Shortening the intermediate times of preparation and product realization,
- Ensuring product quality desired by customer,
- Reduce costs for all business activities.

In a concentrated form, our understanding of process management can be defined as follows:

Process management is understood as a systemic management of activities transforming inputs to outputs, while the focus is on selected attributes of output, or the process of chosen activities.

Where:

a) The controlled sequence of activities is viewed as an object for which it is possible to implement a system, having its own structure and its targeted performance. It means that this object can also be described by the system characteristics. It also allows us to systemically improve this object (systems analysis) and project the system (system synthesis), while in the system, according to its targeted performance, all elements and all the interactions between them must be on necessary quantity and quality, according to targeted system performance.

b) Activities in the broadest sense are understood as activities of every kind and at every level of management - action, operation, the entire production process, or workplace, workroom, plant operations, enterprise...

c) The attributes of activities presenting requested output - output parameter, the cost of output, time of production and so on. If e.g. time of preparation and realization of output is determining for us, activities related to the process will be set according to defined output - their inputs, process, and output. Certain conditions and restrictions can be part of it as well. But it is crucial to what we give emphasis to define output parameters.

d) The basic approach here is system thinking, systemic comprehension of managed object. This approach is, in our view, the prerequisite for an understanding of process management.

UNDERSTANDING OF PROCESS MANAGEMENT

As a process management we understand the process of managing the process as an object. Authors of the article agree with Linczeny on the nature of process management.

"If the processes are managed in terms of quality, then the focus should be on outputs realized in these processes. There are useful outputs as well as virtual, redundant and false outputs. And we must be able to manage processes so that the usefulness of the process is the highest."

CONCLUSION

Authors of article, through continuing analysis of basis of process management and system thinking, induct their system relations. Identification of relations leads to their application in common interoperation, and as consequence it creates a synergy effect. It is a great contribution for knowledge development not only in given area, but also for applications in practice. It is dealing with process improvement to reach declared quality level of products, production cost reduction and shortening of customer needs satisfaction times.

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ZARZĄDZANIE PROCESAMI A MYŚLENIE SYSTEMOWE

Artykuł zawiera refleksje na temat istoty zarządzania procesami, relacja między systemem a kontrolą procesu oraz innych powiązanych obszarów problemowych. Przyczynami powyższych rozważań są częste różnice zdań na temat koncepcji zarządzania procesami i jego relacji co do systemowego myślenia, lub stosunku procesu i systemu.