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QMS CONCEPT ON THE BASE OF PROCESS APROACH

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Abstract:*For a long time, issue of Management for the Process network occupies attention of research teams consisted of scientist and their assistants from " Center for Quality" of the Mechanical Engineering in Podgorica. Research of Process approach commenced on issues of automation information systems implementation in process management, and they have become especially actual when ISO 9000:2000 standards appeared and QMS concept. This work analyzes possibilities for improvement of quality process through the process network or should we say through definition of efficient process architecture using modified BSP method and HIPO+P method. Using already published approaches of the TQM as well as our own research the relation matrix has been defined the matrix of goal structure of process structure of team structure and of quality process structure that shows that concepts of improvement and management of processes are hard to set apart and that any business process can be improved through by management of those who implement them, there for by the owners of process.*

1. INTERPRETATION OF BASIC QUALITY CONCEPTS AND PROCESSES

Two significant attributes, among others mark management processes at the beginning of the third millennium. That attributes are: constant changes, and the process approach to management. Changes, constant improvement and process approach are attributes of the Total Quality Management concept and the characteristic of the new edition of the ISO 9000:2000 standard. The definition of the TQM concept and the process approach definition points that:

- **TQM** is a concept or a philosophy for management operations.
- **Quality** is a function of management, it is a way of how to manage processes in order to achieve success.
- **Quality** has become a movement, an approach, a religion of how to live.

TQM concept is in literature and it is widely and thoroughly considered as the unity of several approaches between which, twenty-four are extracted and systemized into six groups with four elements:

1. *Approaches that act on the removal of the burden created by the traditional way of work*
2. *Approaches that allow science method usage in working process.*
3. *Approaches that allow equal distribution of work functions*
4. *Approaches that provide the engineering of the process*
5. *Approaches that allow transparency of the organization*
6. *Group of approaches to TQM that enable competing ability.* .

Process engineering is consisted of four approaches to TQM that with other twenty-four approaches make a consistent model that gets on all parts of system and creates conditions for changes. Process engineering is the unity of

approaches that optimize from of activities and support transition to better forms of business process. These approaches are following:

- *process architecture - flow establishment*
- *process improvement - flow analysis*
- *Distribution automation, process implementation - flow transition*
- *Automation of process execution - flow automation.*

Two basic assumptions initiate Process engineering through TQM concept, and they are following: (1) ***Customer determines concept of the process*** and (2) ***Competition determines process possibilities***. These two assumptions make best balance between flow of activities and results.

ISO 9000:2000 standard defines process as the *"system of activities that uses resources to transform inputs into outputs"*. This definition has a strong point in two major rules: (1) Inputs of one process are mainly outputs of another and (2) processes are managed in order to create new values that correspond to requirements and expectations of customers.

So, cybernetic approach to management is at use today, an approach that establishes connection between inputs and outputs, during which process outputs must be verified according to input requirements in order to satisfy customer requirements and requirements of other interested sides. Also, process inputs must be defined and recorded in order to provide a base for demand formulation, that is to be used for output validation and verification. Input requirements that are crucial for product or process must be identified in order to assign proper responsibilities and resources (ISO 9000:2000)

Production process represents a flow that begins with external requirements of buyers and ends with the product that is used by buyers. Buyer makes judgment about realization or non-realization of his requirements. ISO 9000:2000 standards recommend that: *(1) desired results can be more efficiently achieved if proper resources and activities are managed as processes and (2) System approach to management: identification, understanding and system management of related processes to achieve goal that are set. make the efficient organization.*

2. PROCESS NETWORK - NETWORK ARCHITECTURE

Considering the definition that the process is " *a system of activities...*", then, every process can be structured as the unity of activities or chain of activities, and any activity can be structured as the chain of elementary tasks. For both definitions, for activities and tasks, the second part of the definition is the same *" ....that uses resources in order to transform inputs into outputs"*. ISO 9000:2000 standards explain the consistency of such structure as follows: "*Any activity that transforms inputs into outputs can be considered as the process "*. In order for it's efficient functioning the organization should identify and manage inter related process. Process model of the standard ISO 9000:2000 is shown in figure No 1. /1/

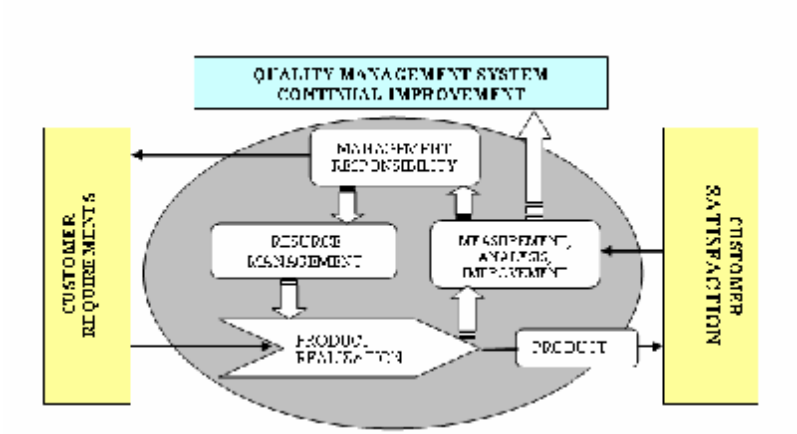

Figure 1. Process model of the standard ISO 9000:2000

Process model approach defines 3 groups of processes: (1) processes that directly affect satisfaction of requirements and needs of clients, (2) Processes that support the first group of processes in order allow their functioning and (3) processes of management /2/.

Process Network architecture defines topology-process structure with all it's objects, links and dynamics, as well as it's pretension to bond and motivate employees to find best ways for process creation, and process architecture. Process network architecture should serve customers needs and to process executors. It supplies harmony between possibilities productivity, demands, mobilization, training and other factors. /3/

Process network architecture is structured as:

- business process architecture
- architecture of process activities
- Architecture of basic operations and tasks that are inside process activities.

Processes can be decomposed into activities and activities in to operations. Process decomposition can be presented through visual diagram of hierarchy (figure No 2). Architecture of process activities is structure of activities and links between then: modeling, analysis, definition of inputs and outputs, documenting, etc. Architecture of operations inside activities is the structured unity of: operations order of the work method, roles, inputs, outputs, time of work etc./4/

Full success of this approach can be expected if every organization and every group inside it defines architecture for it's work process, or shall we say its part of the process. So that rational course of actions is established in organization or it shall be in the Process network (figure No 3).

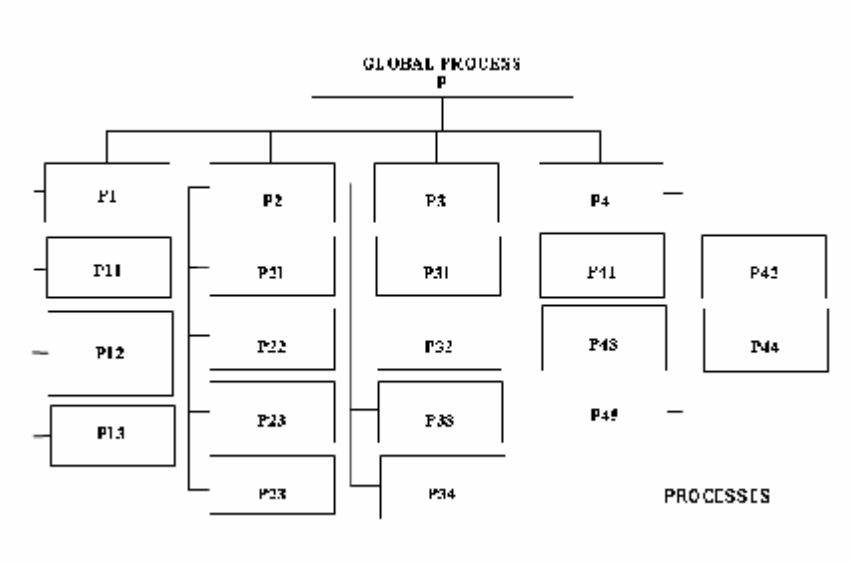

Figure 2. Visual diagram of process

Maybe, the best approach to process network is through the customer – supplier relationship, because it brings us to the simple process between external customer and external supplier (including them too), as well as between internal customers and internal suppliers.

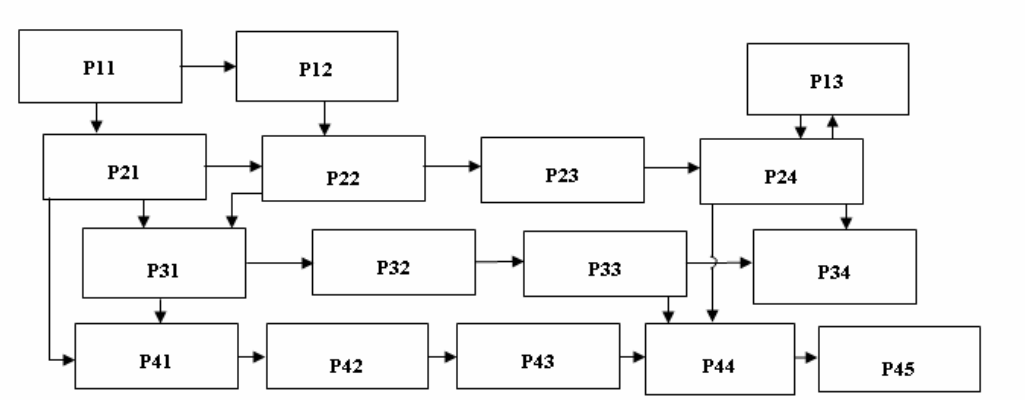

Figure 3. Process network

Those relationships are different for the different organizations, and that is the reason for the lack of the universal model witch describes them. Therefore, we may only talk about the methodological approach witch determines those relationships. " User determines concept of the process " approach is realized as it is shown in figure No 4 /5/.

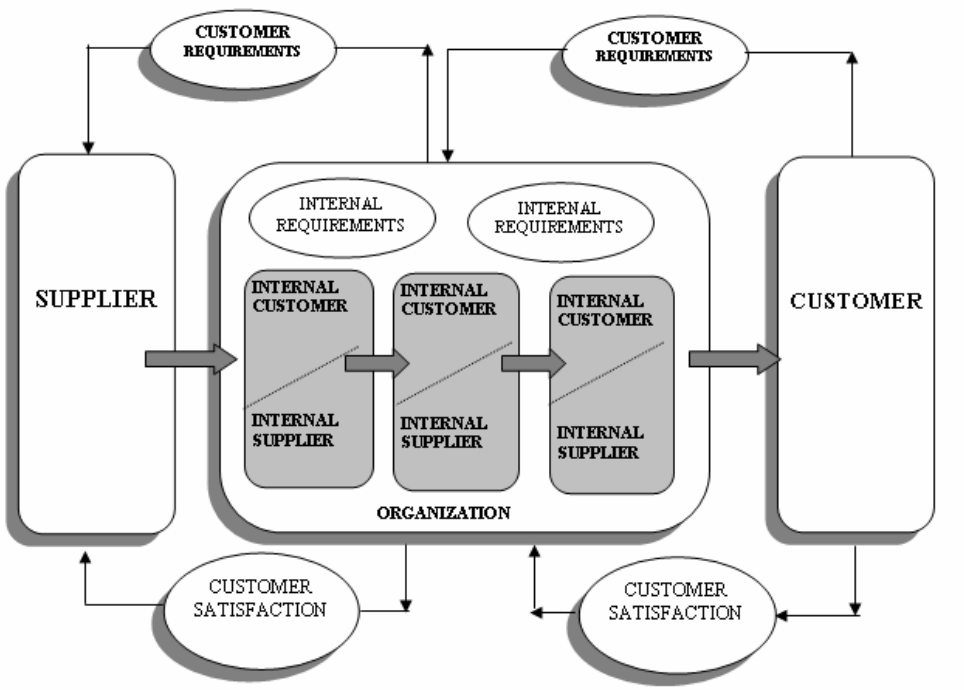

Figure 4. Customer – supplier relationship

3. PROCESS IMPROVEMENT AS THE ESSENCE OF MANAGEMENT

Starting points for process improvement are essential demands and basic premise that " *Customers define contents of the process*". That content can be presented structurally by decomposing as shown on the visual diagram flow chart. Through the decomposition of the process to it's activities and operation, and through defining each of these levels using, the process approach understanding of contents of the process is possible. Through input and output analysis connection of processes is defined as well as connection between activities, and operations, which makes relations of the architecture of the Process network.

Second aspect of the factor analysis that influence management, or should we say, process improvement are goals and their structure. Understanding of the process requires goals decomposing into tasks and establishments of the clear relations with in that network.

Third aspect of analysis includes employees-owners of processes, owners of activities and owners of operations. This aspect comes out of new premises that goes: "*Only intellects of employees can improve processes*", and that is the modification of Taylor's science management. Employees inclusion aspect can be analyzed through it is organizational parts and the structure of organization.

It is hard to set apart contents and improvements of processes from problems of management. Each business process can be improved through management and by those who are owners of the process, those who execute the process. On this standing the teamwork , permanent training and roles of managers and leaders as same person are based.

For the purpose of analysis of relations between decomposed goals, decomposed processes into organizational structures modified BSP (Business Planning System) method can be used and it's segments are shown on the figure No 5. BSP method modifications that are recommended by this work are consisted of favoring processes against the organizational structure and in change of place in the UP-DOWN analysis and in using the approach of goal decomposition./6/

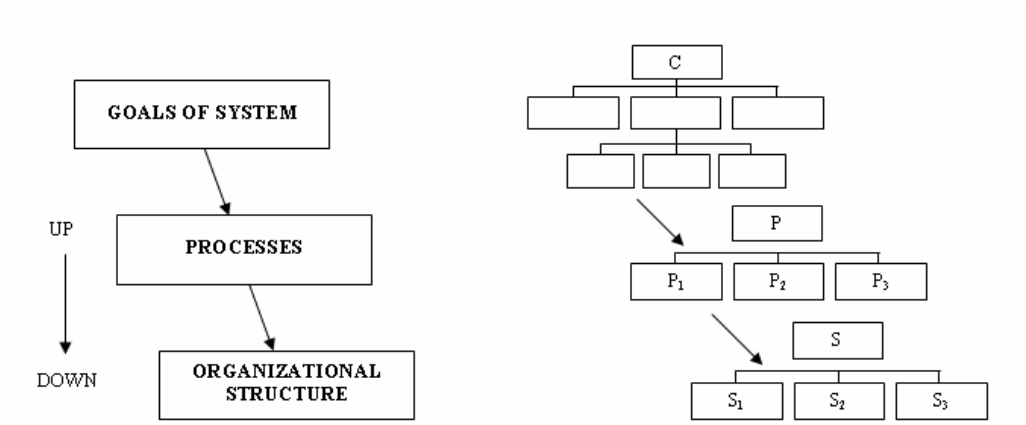

Figure 5. Modified BSP method

Giving advantage, or should we say giving the key role to process management instead of giving it to management of the organization parts is very important Principe and a radical change brought into quality approaches by the QMS./6/

Relation of goals processes and of organizational structure can be systemized in three basic levels:

- *Basic - macro level*
- *Middle - mezzo level*
- *Micro level*

Basic level defines global goals of organization, main processes in order to achieve global goals, and basic organizational structure and main owners of the process. In this level we should understand the process, comprehend requirements of customers and basic goals as well as the influence of process connection to improvement. Owners of main processes should be committed to improvements and they should formulate programs of quality improvement.

Quality improvement program shows the necessity of process connection at the inter organizational level, and also shows the necessity of seeing the influence of process network on improvements.

At the middle level, partial goals are defined under goals and tasks, as a structure of the Main goal. To these under goals and tasks, processes as decomposing elements of main process correspond, and further more to these processes segments of basic organizational structure correspond. Owners of the process are whether segments of organization or teams, and rarely individuals. At this level policy of quality and benchmarking concept are spreading, and steps of deployment of quality functions are defined.

At the micro level tasks and activities are defined, and operations through which those tasks are to be accomplished. At this level, teams and individuals, organizational segments and owners of operations are determined, to execute the process operation. At the micro level Q-tools, that are used by owners of operation for improvement of quality process, are defined. Connection of macro levels quality policy and benchmarking with middle levels deployment of quality functions and quality tools of the micro level, provides the improvement of the process.

Success of the system is accomplished through consistent process-activity-operation chain that functions on the input-transformation-output principle, and also through the consistent chain of quality process. It's links are quality policy and benchmarking, QFD and quality tools. Third important element of any success in the process of quality improvement can be found in engagement of employees at all levels of management. Especially important element of success of employees that work on quality improvement is knowledge and it's diffusion.

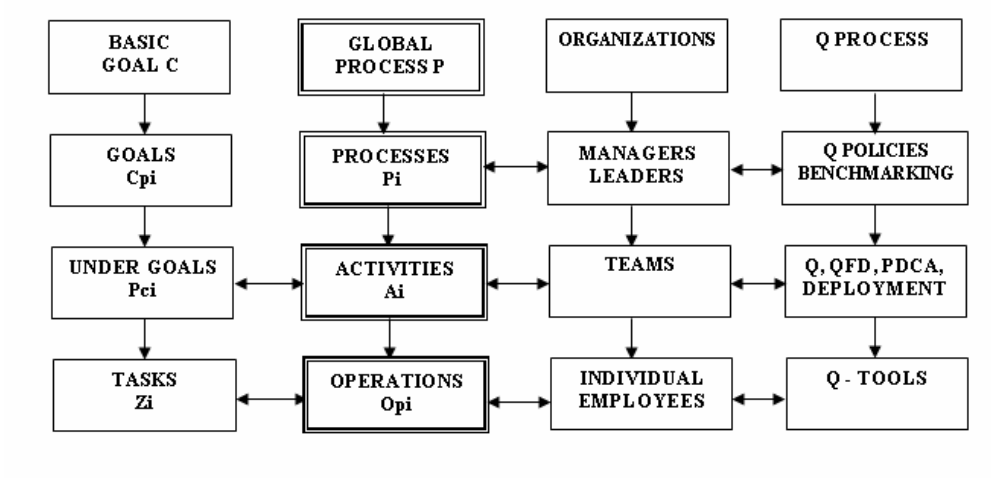

Figure 6. Connection between goals, processes and roles of employees on one side and quality process on the other side

Well studied connection between goals processes and roles of employees on one side, and quality process (figure No 6) on the other side should provide domination of organization or it's capabilities over capabilities of competition. Functioning of network architecture at all levels can be demonstrated on that connection between processes, activities and operations and on the application of HIPO+P method(figure No 7).

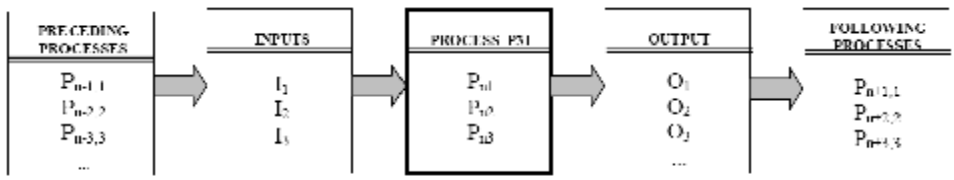

Figure 7. HIPO+P method

The connection between activities in the process is defined by the detailed diagram shown at the figure No 8 witch has the same structure as at figure No 7, but the activities and operations are taken under the consideration.

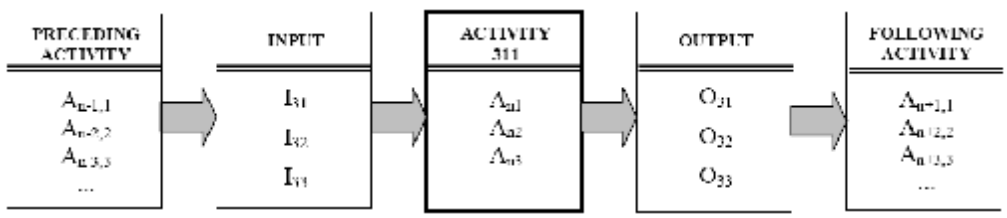

Figure 8. Detailed diagram +A

This kind of approach enables the corrections witch are the necessities of the dynamic business systems, witch means that operations, activities as well as processes could be modified, canceled or added due to the customer requirements and employee capabilities to organize the process at the adequate way. The presented process network analyze could be further developed through the following realization matrices :process-process, process-information, process-roles (organizational functions) etc. /7, 8/

Beside these relations given on figure No 6, measurement analysis and new plans of improvement PDCA at all levels of process functioning affect strongly on the quality of process./9, 10/

The approach described above was tested in the organization "Žitopromet"-Spuž (2002), the winner of the OSCAR OF QUALITY national award in 2002 for the small and medium firms.

4. CONCLUSION

This work offers some basic approaches that are relevant in the process of quality improvement. That approaches are following: (1) Goal structure through which requirements of customers are expressed; (2) network of the process through which the contents of fulfillment of customers requirements are presented; (3) Roles and connections between employees as the organizational structure which manages processes; (4) Network of quality processes that improves the process; (5) Knowledge deployment and team work as the basis for improvement of process of management by those who execute the process; (6) Equal distribution of automation, informational technology and any other new technology for the execution of the process which are all in the function of efficient knowledge employment,

methods and quality tools implementation and efficiency of network functioning.

Relations established in this work can be enriched further more through inclusion of other approaches of TQM from the group of 24 that is mentioned at the beginning of the work, but that is a topic of another research and their work.

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