TOOLS FOR PROCESS MODELLING IN THE PUBLIC ADMINISTRATION

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Abstract: *Process modelling serves to present trend of the quality management. The quality management systems have their basis in standards and methods; they can be implemented through the quality certificates. The process definition in the form of process modelling is also the necessary basis for data modelling. But these two modelling approaches have various variants of realization. Implementation of these methods has aim – an increase in quality in processes as well as in data and generally quality in the institution. The question is how the tools and techniques of methods are used and utilized. This paper deals with process approach as the integral part of methods in the area of the Czech public administration.*

Key words: *process management, modelling, indicators, abstract programming*

1. Concepts of quality management systems

There are two basic conceptions for quality management systems – conception ISO and conception TQM. Conception ISO is based on application of demands which are characterized in system of standards ISO 9000 [1]. The ISO 9000 family of standards provides a framework around which a quality management system can effectively be implemented. It includes Quality Management System, Management Responsibility, Resource Management, Product Realization, Measurement Analysis and Improvement [2]. The second is conception Total Quality Management (TQM). It is implemented through various models – important is EFQM Excellence Model (European Foundation for Quality management) [3]. The principles of the both conceptions are very similar. For this paper it will be focused to same chosen principles: customer orientation, process orientation and process approach, results measurability, and permanent business process improvement. Customer orientation is important initial principle, because sense of institution activities is to satisfy the wants of customers. The maximization of satisfaction rate of customer is the fundamental function of management quality system [4].

Fundamental group of principles can be marked with the process approach, because it involves process orientation, process measurability and continual process improvement. It means that it is possible to achieve more effective outcomes, if sources and activities are managed as processes. Hammer defines process as ”a collection of activities that takes one or more kinds of input and creates an output that is of value to the customer” [5]. A business process is a structured, measured set of activities designed to produce a specified output (products, services) for a particular customer. Inputs are supplied by suppliers and are fully consumed in the process for outputs; the outputs are material outputs or information. Sources (technology, people) are conditions of process performance, but the sources are not fully consumed in the process. The process has to have its owner; he is responsible for process design and performance, he defines requirements and measures. It is necessary [4]:

- to define important processes fundamental for achievement of planned outputs,
- to determine who owns the process - their responsibilities and the range of power,
- to measure the qualification and productivity of process methodically,
- to focus to key process factors, to use suitable tools and methods.

The standards ISO 9001 and 9004 speak about, that system quality management system is perceived as system of sequential processes. The process model is described on the fig. 1.

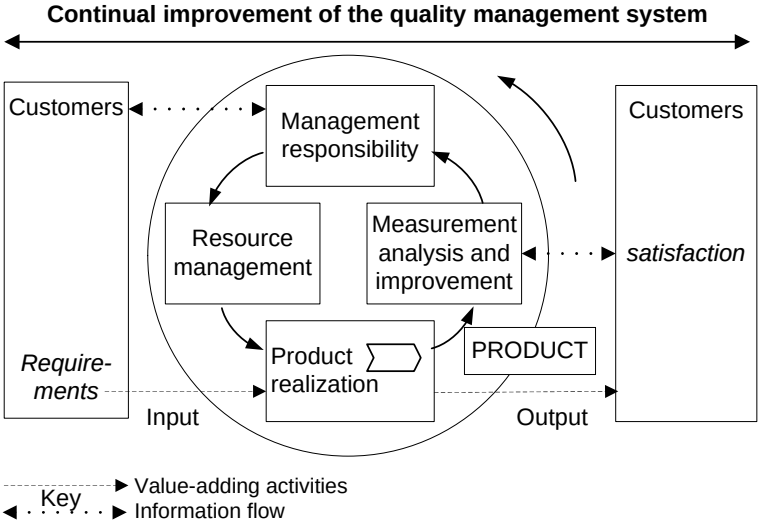

Fig. 1: Model of a process-base quality management system (source [6])

There is necessary to measure the rate of customers satisfaction for the process output, this measurement is fundamental. These kinds of measurements are background for analysis with the aim – to identify alternative for process improvement.

1.1 Indicators for measurement of process performance

Controlled processes have to be analyzed and managed by help of measures. Acquired data have to be transformed to the suitably defined measures that are monitored and analyzed in the long term. Indicators serve the purpose of state observing and trend finding. The fundamental factor of business process improvement is the choice of suitable indicators for measurement of process performance. There are universal indicators, e.g. process time indicator (expressed in time units), effective exploitation of process time (expressed in percentage), total costs of process (expressed in financial units) etc. Process time indicator is an example; it is a time since inputs acceptations of process to outputs delivering of process. It is possible to calculate this indicator by help of expression [4]:

$$T_P = T_{ZPR} + T_{OV} + T_{MAN} + T_K \quad \text{[time units]} \quad (1)$$

Where T_P is total running time of process, T_{OV} is time of diverse activities of verifying within the process, T_{MAN} is time of manipulation within the process, T_K is time of rest, time when the products are not working with. T_K is total time of working up of incomes, where:

$$T_{ZPR} = T_{ZPR1} + T_{OPR} \quad \text{[time units]} \quad (2)$$

T_{ZPR1} is time of the first working up, T_{OPR} is time of working up of corrections.

More difficult situation is with institutions of public administration. The problem is how to measure satisfaction in these organizations. The satisfaction can be express as feelings of consumers (or inhabitants) how their expectations are executed.

1.2 Connection between process approach and information technologies

The process approaches of the institution and information technologies of the institution are close connected. It is clear that surface implementing of information technologies within the organization means wasting of financial instruments whereas it does not have direct

relation to the main aim – to the quality. Solution could be – to chart and to control the processes, the main standpoint is satisfying of consumer's requirements. These requirements can designate the importance or inconsequentiality of processes. Direct effect is – to give ICT investment only to these processes or activities that have priority influence to the satisfying of consumer's requirements.

2. Process management of public administration

The processes, procedural management and procedural oriented models could constitute significant source of escalation of efficiency of managing of organizations and the quality of their services. Procedural managing is the way how to achieve the managing of organization that it enables to respond to need of its consumers in sufficient quality and with minimum costs [7]. Public administration has his consumers it means citizens of the city or region. Individual activities that are implementing within public administration are processes that eject all definitions of characteristics of process actually. Public administration (generally or concretely as single institution) has to its achievement unreeled from meaning of his consumers (citizens or institutions or politicians in the role of inner consumers.

2.1 Methods

The process approach is thought of one of basic principle within the public administration. The universal aim of this approach is to serve some improvement by shape of recommended procedures and methods. The process approach is one part of the special model for public administration – the model CAF (Common Assessment Framework) [8] [9]. This model is free to share and it is easy tool for analysis and implementation of office evaluation. The basic principles of CAF model come from the EFQM model - orientation on results, set on consumer, managing according to bright goals, managing by means of processes and data, active engagement of employees, improving and innovations. The CAF model is primarily specialized on evaluation of efficiency and it is good tool to recognize its organizational reasons with a view to enable of improving of processes. The final aim of this model is so-called "genial governance" [8]. The CAF has primarily been designed as a self-evaluation tool for public sector organizations at both national and local levels.

Process approach is also integral part of method of Balanced Scoreboard (BS). It is the method of balanced indicators. In the point of view is a vision and strategy. There is one centre surrounded by four perspectives or applications of vision and strategy in the four main aspects of institution in this model: financial perspective, perspective of internal processes, teaching perspective and perspective of growth and perspective of consumers [10]. BSC method applies for organizations of public sector and method designates of consumers perspective as a civil perspective [11]. There is basic question for the standpoint of area of internal business processes: "What internal processes we have to improve to satisfy our citizens?" Process benchmarking is other way of the process analysis. It is confrontation of learned processes in organization with processes learned in the leadership companies of the concrete branch [10]. The benchmarking is the method of improvement by teaching from second objects. The sense of the method is to achieve better services in the organization. Application of this method in the public sector is shielded by the government of Czech Republic [12]. The savings in public sector are very important but it does not mean just costs reduction even improving of organization activities. Among measured indicators are - a satisfaction with the service, behaviour of officials, and accessibility of services [13]. Another method for public administration is Local Agenda 21 [14, 15]. It is a tool for using of principles of defensible development on local and regional level. It is used by improving of

quality of the public administration and improving of quality of life according to tenable development with emphasis on involvement on public.

Basic principle of every method for improving is the identification the main processes which influences the performance by fundamental way. It is important to obviously define responsibility of every official in the organization and to determine little efficient processes (activities) and then to correct the causes of this situation.

2.2 Measurements

Measures are very important both for processes and for data and information systems. There is effort to create internationally registered indicators as European set of common detectors which make it possible to compare different cities (for benchmarking). The indicators of ECI (European Common Indicators) are the results of project of European committee and it determine five basic indicators (e.g. satisfaction of citizens with local partnership etc.) [16]. International database of European Institute of Public Administration (EIPA) [9] is another example of comparing of positive results e.g. for CAF or benchmarking. The CAF method determines the system of punctual classification. Every criterion can be break up to sub criteria (nowadays totally of 28) and evaluation carries out by means of so-called board of numerical values. Benchmarking involves also the criteria of public sector achievement. They are structured into categories - criteria of influence, criteria of efficiency (result) and criteria of productivity [12]. It could be used general principle of SMART [17] (specific, measurable, agreed to, realistic, timely) for determination of indicators (it is similar with objective settings), or SMARTA principles ("aligned" with corporate strategy). Another set of recommended indicators is European set of indicators of sustainable development [11]. It consist of the basic indices (satisfaction of citizens with self-government, emissions etc.) and voluntary indicators (share of organizations that are asserting of methods of managing, share of consumption of ecological products etc.). The criteria serve to achievement of aims because its concern to the states accordance with is watched of realization and impletion of the goals. Formulation is relatively simple by force of financial entities or by physical specific entities. Information systems have acceptable data for long-term monitoring of these indicators. The problems are those indicators related with measurement of satisfaction or qualities of outcomes (satisfaction of consumers, satisfaction of employees, experience of employees, quality of provider of services etc.).

Fundamental problem for implementation of every methodology is the determination of acceptable metrics. Source for processes indicator it is possible to find also in the information systems of the institution. The data of information system have potential to become of acceptable indicators for processes measurement. Nevertheless it is necessary to define set of acceptable indicators even outside of informative environment thus the monitoring of criteria had the sense at all.

3. Modelling

Process mapping and following data modelling for information systems is made help of various tools. These tools are subordinated to particular method. There are various methods and techniques; however the common characteristic for them is using graphic means of expressions– diagrams. Formerly as the main reason for modelling diagrams was described the fact that it is the tool for understanding and communication between user (management or user of ICT system) and designer/programmer (creator of ICT system). Demands for process as well as data quality have to change modelling to new dimension – the user affects the quality of modelling, it is not "some drawing for better communication", but it is programming on abstraction level – we speak about abstract programming [18]. User-analyst

really programs in accordance with chosen method by help graphic and text tools, because he or she makes abstract scheme of information system. The result is technology independent program of information system that is after that implemented in lower levels of abstraction.

3.1 Abstract programming – method for public administration

Abstract programming of business processes and abstract programming of data is the difficult process, it is very demanding for personnel of public administration. The solution is to form the special method for public administration, this method will include essential list of means of expressions for abstract programming. Initial platform is of course the strategic vision and the global purposes of public administration institution. Lets us specify vision and aims of City authority of Pardubice [19]. City Strategic Vision by 2010 (choice):

- Economic prosperity of the city will be merged with development businesses in industry, business and service.
- Pardubice will concentrate on efficient utilization of its convenient geographical location, unexceptionable traffic accessibility and flexible labour power.

Global purposes:

- Economic development: Pardubice will create conditions for the development of business and endeavour to obtain investors at the same time.
- Environment: Pardubice will minimize negative effects especially production, transport and business on environment and improve permanently quality of living environment in town so that the city will become better for life.

The essential platform is the process model of institution, the maps of basic key processes. We can have for example the main process “the change in the traffic”. The process map can be developed by form of table.

input	**function**	**output**
applicant – request for a change in the traffic	1. officer records the request	record in the list of request
	2. officer – the request for the Policy	an official letter for the Policy
Policy delivers an official statement	3. officer records the statement	officer places the statement in files
	4. officer manages the request	the letter to the applicant – request for missing data
	5. the permission about change in traffic	the letter to the applicant - permission about traffic change
	6. officer completes file	completed file

Fig. 2: Process map for selected main process (source: author).

The essential platform is the process model of institution, the maps of basic key processes. We can have for example the main process “the change in the traffic”. The process map can be developed by form of table. It is better to developer the process map by form of graphic expression (fig. 3).

The process map is starting point for next data modelling. There are two approaches of data modelling. The standard approach to the data modelling makes relatively lower demands on the analyst the analyst concentrates on a description of company aspects and does not consider the context of technology. The object approach to the data modelling means higher demands on the analyst in the meaning that he must have a larger volume of knowledge – the syntax of diagrams used, knowledge of the technology used. On the other hand, this higher knowledge is balanced by a simpler course of the following work and above all by the result.

Simplified work is a result of patterns being used. The strength of the analysis result is given by the fact that the analyst actually writes the program in an abstract manner, i.e. already creates the information system and directly affects the result quality. Both approaches (shown above) represent current trends applied while an information system is being introduced or upgraded in a company.

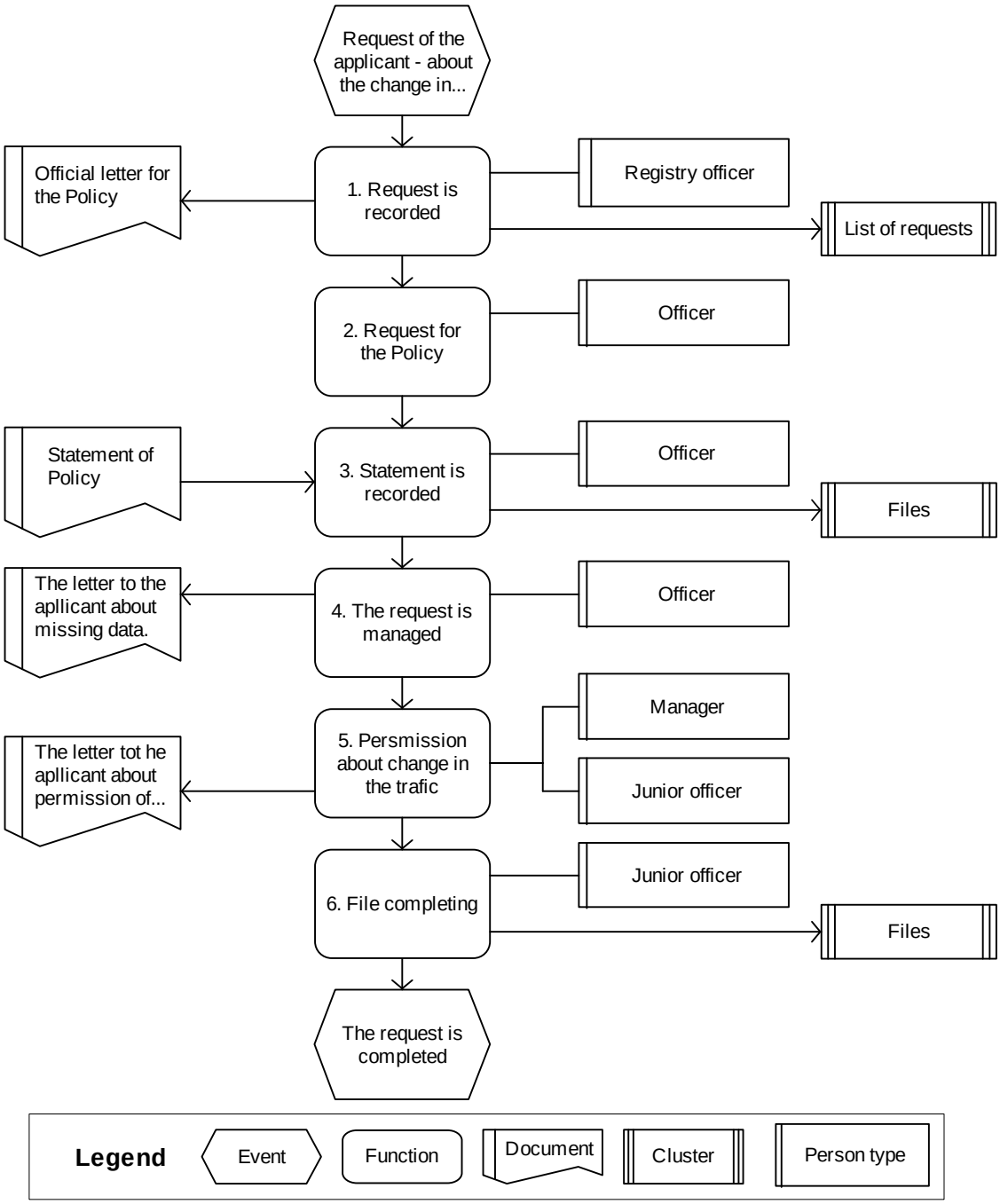

Fig. 3: Process map for selected main process (source: author)

Managers may select the suitable approach depending on the scope in which they want to ensure the quality of the institution – quality of processes as well as quality of data in information environment. It is necessary to determine the structure of diagrams that is essential for abstract programming. The solution is the development of methods for particular institution of public administration.

4. Conclusion

Processes, process management and process oriented models constitute significant source of efficiency escalation while managing of the organization. Basic principle of the process management is orientation on consumer and also public administration has its own consumers, citizens. Process control in connection to satisfying of requirements of the consumers has the fundamental role, because only it determines significance of processes and theirs activities. And only significant and important processes of the institution have to be supported and improved. It also means the ICT investments only into such processes that are significant and that have influence for satisfying of requirements of the consumers. The determination of acceptable metrics is the basic problem for implementation of every method. Demands on quality of processes as well as data cause that employee of institution as well as user of information system influence quality of modelling in a significant way. Modelling (by help of diagrams and text expression) is not just drawing of pictures but it is the abstract programming. User/analyst really creates program, but it is an abstract program by help of graphic and textual instruments by selected method. The development of suitable set of diagrams, set of textual instrument and set of indicators for measurement is the most decisive factor of quality processes as well as data of the public administration institution.

References:

[1] *ISO, International Organization for Standardization – ISO 9000* [online]. [cit. 2008-10-06]. Available from WWW: <http: //www.iso.org/>.

[2] *Management system – ISO 9000* [online]. [cit. 2008-10-08]. Available from WWW: < http://www.bsi-emea.com/Quality/Overview/WhatisISO9000.xalter/>.

[3] *European Foundation for Quality management. The EFQM Excellence Model* [online]. [cit. 2008-09-15]. Available from WWW: <http: //www.efqm.org/>.

[4] Nenadál, J. *Measurement in management quality systems*. Praha: Management Press, 2001. ISBN 80-7261-054-6.

[5] HAMMER M.: *Agenda 21. Co musí podnik udělat pro úspěch v 21. století*. Management Press, Praha 2002.

[6] Český normalizační institut. ČSN EN OSP 9001, Systémy managementu jakosti. Praha: ČNI, 2002.

[7] ŘEPA, V. *Procesní řízení ve veřejné správě*. In Processes in public administration. [cit. 2008-04-04]. Available from WWW: < http://www.cssi.cz/>.

[8] Národní informační středisko pro podporu jakosti. *Společný hodnotící rámec CAF 2006*. Praha: Národní informační středisko pro podporu jakosti. ISBN 978-80-02-01901-5, 110 s.

[9] *European Institute of Public Administration* [online]. [cit. 2008-08-30]. Available from WWW: <http://www.eipa.nl/>.

[10] VYSUŠIL, J. *Metoda Balanced Scorecard*. Praha: Profess Consulting, 2004. ISBN 80-7259-005-7.

[11] PŮČEK, M., a kol. *Řízení procesů výkonu státní správy*. Praha: Tiskárna MV, 2004. ISBN 80-239-4098-8.

[12] MV ČR. *Quality in Public Administration* [online]. [cit. 2008-10-15]. Available from WWW: <http://www.mvcr.cz/ verejna-sprava-podpora-zavadeni-kvality-ve-verejne-sprave>.

[13] ŠIROKÝ, J., a kol. *Benchmarking ve veřejné správě*. Praha: Tiskárna MV, 2006. ISBN 80-239-7326-6.

[14] REITSCHMIEDOVÁ, A., a kol. *Metodika pro místní Agendy 21 v České republice – strategie, postupy a techniky uplatnění MA21 na místní a regionální úrovni ČR*. Frýdek Místek: Tiskárna Kleinwachter, 2003.
[15] *UN Department of Economic and Social Affairs – Division for Sustainable Development. Agenda 21* [online]. [cit. 2008-02-11]. Available from WWW:<http://www.un.org/esa/sustdev/documents/agenda21>
[16] European Commision. European Common Indicators – Final Project Report. Italy: Ancora Arti Grafiche, 2003 [online]. [cit. 2008-10-16]. Available from WWW: <http: //www.gdrc.org/eci_final_report.pdf>.
[17] VEBER, J., a kol. *Management kvality, environmentu a bezpečnosti práce*. Praha: Management Press, 2006. ISBN 80-7261-146-1.
[18] ŠIMONOVÁ, S., PANUŠ, J. *Management's new role in designing the information system of the company*. Brasov: Romania Infomarket, Publishing House, 2006. ISBN (13) 973-8204-82-8, p. 301- 306.
[19] City authority of Pardubice. Strategic Plan [online]. [cit. 2008-10-16]. Available from WWW: <http://genesis.mmp.cz/en/administration2/strategic_plan2/?pod=administration2>.

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