EFFICIENCY EVALUATION OF SYSTEMATIC SOLUTIONS IN PROCESS MANAGEMENT

Jacek Łuczak

Department of Standardized Management Systems, Faculty of Commodity Science, Poznań University of Economics, Niepodległości 10, 61-875 Poznań, Poland

Abstract: Process management is used in the organisation and aims at realizing given objectives. It may be meeting the key standard of ISO 9001 at the initial stage of implementing the QMS. However, the motivation is frequently more ambitious as it is related to achieving proper results. The processes ought to be mapped, modelled and optimized with the use of a renowned international notation – most frequently BPMF. Finally, we should achieve a comprehensive map in accordance with proper process architecture. The architecture should be based on 4-5 levels with the use of flow charts in the form of VACD (Value Added Chance Diagram) and EPC (Event-driven Process Change). In the frames of the project entitled "Designing optimal solutions in relation to IT resources, organisational structure and review of actions based on the process approach in the Police" UEP, as the project leader, prepared a comprehensive conception of optimizing the actions of IT processes activity in the Police. Finally, the required level of professionalism and safety was achieved in the project by dint of assuring conformity with ITIL, COBIT, ISO/IEC 27001 standards. The above mentioned actions were based on measures resulting in identification of internal and external clients as well as on research of customer satisfaction both in the area of IT services.

Key words: process, process management, process mapping, efficiency, quality management.

INTRODUCTION

Process management is still more popular in research than in the practice. There are few examples of complex usage of mapping, modeling and process improvement methodologies; more frequently partial usages may be observed.

Despite the increasing popularity of problems related to process management, or as may be named as a fashion in this regard, taylorian organisation based on division of labor and specialisation in the frames of functional areas [Gabryelczyk, 2000; Rummler and Brache, 2000; Grajewski, 2007; Gregorczyk and Ogonek, 2007; Kunasz, 2011]. Numerous titles devoted to process approach were not able to find appropriate manner of expression, which is hardly possible to link uniquely with tradition, conservatism or historic organisational solutions. It is noteworthy to emphasize the risk which is recognized by

managers during the implementation of process management conception, at least in its comprehensive, model form.

Process management is a conception, which, despite its significant depreciation of its original form (BPR), in some of its aspects plays a highly important role within numerous management conceptions, however frequently only to some limited extent. The aim of the present paper is to present the key results of research concerning process optimisation of IT services realized for the Polish National Police.

THE ESSENCE OF PROCESS MANAGEMENT

It is difficult to explicitly answer the question of the essence of process management. It depends on the criteria which will be defined as fundamental in relation to this discussion. In the classical understanding a process is "a group of logically interconnected actions, which transform inputs into outputs, which process given resources and lead to meeting an objective"; other definitions treat the understanding of a process similarly, yet emphasizing some nuisances [Davis and Brabander, 2007; Gabryelczyk, 2000; Gabryelczyk and Lasek, 1998]. It is noteworthy to heed the key features of a process:

- it has a deliberate character and is linked to creating value added in the understanding of an organisation,
- it is a system of sequences and not a set of actions which, despite the fact that they perhaps may be even considered as crucial and necessary, do not create a logical chain of events,
- it transforms inputs into outputs, i.e. in relation to each process we will be able to define the expected outcome of realizing the process as well as identify the basis for its realisation.

Authors note numerous aspects of process management. In the frames of the present conception it is necessary to conduct mapping, modeling and optimisation of processes. The key issue appears to be the process measurement which will allow organisational effectiveness and efficiency seen from the angle of realized processes [Grajewski, 2007; Bitkowska *et al.*, 2011].

KEY CONTENTIOUS ISSUES IN REALISATION OF PROCESS MANAGEMENT

Literature analysis in a relatively coherent manner sees the conception of process management. Authors occasionally differ in:

- functional and process orientation in management,
- division of roles as opposed to positions and functions of employees,
- standardisation,
- notations used in process description,
- methods and details of mapping,
- process architecture,
- implementation of process management,
- the key issue – functionality and understanding of process management.

These issues among many others are essential for understanding the essence of process management and its functionality when applied in an organisation [Pacholski, Cempel, Pawlikowski, 2009].

PROCESS QUALITY MANAGEMENT IN LIGHT OF THE ISO 9000 SERIES STANDARDS

Process approach is one of the fundamental rules of quality management in accordance with ISO 9001 requirements. In chapter four of the abovementioned standard requirements related to process management are presented. Thus, organisations are obliged to explore the theory and practices of process approach as well as to select solutions in accordance with the norms' requirements in this regard.

Practice proves that frequently taken actions in this area, however accepted by certification bodies, are merely a semblance of solutions defined in the theory of Business Process Management [Kunasz, 2011].

Interest and popularity attached to process management becomes comprehensible in light of new requirements of the international norm. Unfortunately, practice frequently confirms that the interest often appears to be of limited range. The quality management conception focused on merely meeting the requirements of the standard defined in relevant parts of the norm should become outdated. At present the superior conception in reference to the system should be processes oriented towards creating value added for customers, i.e. towards the synergy of knowledge in various fields and of work done simultaneously in the whole enterprise and its surroundings (partners, clients, competition).

The fact that orientation towards processes is the basis for international quality management standards in practice means that it is not feasible to implement an effective quality management system in an organisation without the analysis of the given organisation

as a system of all processes and as well as without improvement in joining actions of different functional areas.

PROCESS IDENTIFICATION AND CLASSIFICATION

Process identification (process mapping), i.e. the selection of key processes in an enterprise, amounts to the first stage of process quality management. In the results of this stage so-called contextual model is created. Regarding the fact that at further stages it is obligatory to depict the correlation between processes, they frequently belong to two or more groups. [Grajewski, 2007; Bitkowska *et al.*, 2011]. The most popular; however, is the model which assumes two groups of processes. Processes are selected by the role they play in an organisation and by their mutual correlation. Hence:

- basic processes which result in a product or service in- or directly related to the enterprise's activity. Generally, these processes create value added in so-called value added chain. Among these processes the following may be included: market research, product design, product delivery, sales, marketing, customer service,
- support processes which are designed to ensure an effective functioning of an enterprise and to enable the realisation of basic processes. Support processes do not create value added for the customer in a direct manner. Among these processes the following may be included: strategic planning, human resources management, finances-accountancy, computer and logistic services.

Frequently the divisions differ as they are connected to functionality of process mapping. For instance, emergency processes, cost and business centers. Process map in each case should combine both the knowledge in process mapping and the specificity of the organisation itself.

Key processes identification amounts to the basis for developing process architecture of the management system. Process architecture may be seen as an arranged image of the structure of processes on account of the scale of the enterprise's activity. In relation to computer tools process architecture may include:

- cross-sectoral processes (megaprocesses),
- sectoral processes (main processes),
- basic processes (individual actions).

Creating the process architecture, thus, consists in gradual division of given key business processes into smaller and more basic elements. In reference to the responsibility for

the processes so-called process owners are in the leading roles. Process owners coordinate the operational flow of actions in the frames of processes as well as they manage the processes, i.e. set the goals and measures, analyze and improve processes (taking and verifying support and preventive actions).

STANDARDISATION IN PROCESS MANAGEMENT

The expected result of process identification are general and detailed process maps (diagrams) which create the so-called process architecture. Creating maps which depict the flow and mutual correlation between processes is another significant element of implementing process management. Hence, it is worth considering to use a renowned notation to illustrate processes, for example BPMN (Business Process Mapping Notation). This notation allows comparison of graphic presentations of processes which gains significance in the case of benchmark comparisons, both internal and external. Processes graphically depicted in such a manner allow verification of how undertaken actions are oriented towards internal and external customers and how they contribute to creating value added for the organisation.

Described processes embrace a given sequence of actions which are directly interconnected (realisation of one action allows moving forward to another). Thus, the following elements should be considered significant in relation to process description:

- functions separately realized,
- responsibility for realizing individual functions (etc. position),
- input and output documents.

The documentation prepared in the frames of the quality management system should be process-oriented, which is in favour of a better reception of tasks assigned to employees. For instance, it is easier for a employee to refer to the process "Winning and servicing a client" rather than an element of the norm named „A review of requirements related to the product". The quality management system documentation joins the real actions of the organisation and solutions undertaken as a response to the norm's requirements. The basis for the preparation of the documentation are processes, as opposed to the standard's requirements. This conception is supported by the liberisation of requirements related to systematic documentation. Hence, each organisation decides individually about the need to prepare relevant operational procedures.

Modern quality management systems require adequate documentation in relation to understanding and using the process management theory. Thus, new documents are created.

For example, process cards or process book which are simply in the leading role in the area of identification of methods and criteria of process realisation.

The process card may be the leading document, for the fact that if created for every process it may contain both data characteristic of a given process as well as data related to its planning, monitoring and development. An exemplary structure of a process card, based on the assumption that every process will aim at three types of objectives, may include:

- basic – defined according to the definition of a process, understood as an intentional action (e.g. for the process Cards Management: assuring competent personnel for realisation of professional tasks in the organisation),
- monitoring – defined as indicators whose values should be read as possible early warning signals (e.g. for the process Cards Management: production workers absence higher than 2%),
- improving – defined as objectives, whose attaining will be seen as the proper direction of process modelling and development (e.g. for the process Cards Management: decreasing the rotation of executive managers within the first year of recruitment to 0).

ISO 9001 standard has certain requirements for the quality management system documentation, in particular in reference to the need to create documented procedures [ISO 9001:2008]. Furthermore, the intention of the requirements is the individualisation of the systematic documentation in the aspects of personnel competence, process complexity and the organisation's specificity. Finally, the procedure, defined as the established way of proceeding with the action or process. In light of the abovementioned considerations, a procedure may have various forms.

PROCESS PARAMETERISATION

Effectiveness measurement is a significant feature of both process approach and quality management systems in conformity with ISO 9001 standard. Therefore, there is a need to parameterize processes [Grajewski, 2007]. In practice it is linked to the need to define:

- main quality features,
- result and leading measures,
- target values of measures.

Parameterisation should be conducted for individual processes in the frames of the process map. Hence, objectives, measures and target values are defined in the quality management practice, at least for so-called megaprocesses. At the next stage objectives,

measures and target values for the basic processes are defined (sectors of lower level). Finally, these parameters are established for the lowest sectors – the operational level. As the result of these actions every employee is aware of objectives and tasks defined in the frames of a given process.

RESEARCH TASKS AND SUBJECT JUSTIFICATION

In the frames of documenting the project results a comprehensive report was issued. The report included all research results along with commentaries. The aim of the project was to analyze the present state – the realisation of research tasks and developing target solutions (project work) in the range of providing IT services for the Police [Łuczak and Sawicki, 2012].

The planned final result of the project is to introduce innovative application concerning the process organisation model which will embrace:

- the model of IT Services Organisational Structure for the Police,
- the target model of the Police IT resources architecture,
- the target model of processes realized for the Police,
- the model of costs calculation for the Police.

In the frames of the project the following tasks were realized:

- Task 1 – IT services internal client identification and categorisation,
- Task 2 – Internal client satisfaction studies of currently provided IT services,
- Task 3 – IT employee satisfaction studies,
- Task 4 – Development of provided IT services,
- Task 5 – Creating SLA,
- Task 6 – Identification of cost centers for services provided by IT department and estimating their level. Creating the application and documentation.

The Polish National Police employs currently 100 000 police officers and approximately 10 000 civil workers. Among all employees approximately 90% are interested in: information included in computer systems of the Police, equipment serviced by the IT Department.

The range of the access to IT resources for the abovementioned clients currently depends on the superiors who apply for the equipment and define the authorisation level for the computer systems. The only criterion for the authorisation level is the access to secret data. For the fact of absence of coherent procedures in reference to abovementioned issues, it

was necessary to take relevant actions by categorizing the internal clients in both areas. In order to realize this task it was essential to identify clients interested in computer systems and equipment serviced by the IT Department.

Identification and categorisation of internal clients of the IT Department allowed us to conduct a hitherto unseen internal client satisfaction studies. The aim of the studies was to obtain data on the quality level of IT services from their users.

The proper model of the IT Department on the scale of nationwide Police required acquiring the opinions of employees (internal clients) (police officers and civil workers), in particular in reference to the department's development and broadening the range of its activity. The research in the frames of the project included: Main Police Headquarters, Capital Police Headquarters and sixteen Regional Police Headquarters. The organisational structure of the IT Department in the Polish National Police is highly diversified. The IT Department, which is a part of Communication and Information Technology Department, in each of the abovementioned subjects is internally organized in a different manner. The absence of coherent procedures and solutions may be observed not only in different numbers of subordinates, but also in various terminology (team, section, position). In the result of the absence of unified structures communication noise and problems with realizing basic tasks may be observed.

Despite the diversity among individual Police Headquarters described above there is an additional difficulty for the IT Department – multitude of systems used by the Police on a daily basis. Among the 22 systems which currently are in use, we can observe systems introduced many years ago as well as new ones related to Poland's accession to the Schengen Area. Hence, it was necessary to define a catalog of services which should be provided by the IT Department in all of the abovementioned institutions, with the use of proper systems. On this basis the Service Level Agreement was described, in particular in the range of service level as well as type and category of the equipment for the internal client.

The optimal catalog of tasks and processes was serve as the basis for developing the cost calculation for the Police along with locating costs centers. The Police as a budget unit functions according to an annual plan which includes in its component parts certain points in the range of equipment purchasing and costs related to leaseholder of connection lines. Designing the cost calculation allowed assuring the necessary control over costs as well as optimisation of financial management within the IT Department.

The suggested solution was unique nationwide as well as within the borders of the European Union. It is impossible to compare it with other institutions in Poland, because of

the exceptional character of the institution in addition to security and statute requirements. The benchmarking of solutions concerning organisational system and management in the range of IT in individual the European Union member countries, which is linked with aiming at compatibility and comparability of the structures and IT management systems in the frames of the European Union, was applied.

PROCESS MANAGEMENT IN THE IT DEPARTMENT IN THE POLICE

The actual state was slightly different than the one assumed at the stage of preparing the application. The following remarks should be considered noteworthy in this regard:

- the absence of basic description of posts, work cards,
- the absence of description of realized processes,
- the absence of formalized catalog of provided services,
- the absence of tools to model processes and the architecture of IT solutions,
- the absence of estimated knowledge of costs related to realized processes.

In this context the project appears to be extremely valuable in terms of research. Moreover, the research results was amount to an exceptionally important documenting material for the Headquarters which participated in the studies. [Scheer, 1998; Debevoise, 2005].

The project generated the product – in the form of process models, in the initial and target states. Furthermore, a plethora of documents were created, e.g. description of tasks in the frames of individual positions – position cards, processes comparison, organisational structures in three selected regional Police Headquarters, a list of processes supported by particular IT tools, suggestion of methodology of cost estimation in relation to IT services along with estimation of costs concerning an exemplary process, the way of using tools from the ARIS (Business Architect, IT Architect i Business Optimiser) platform, Internet websites which publish research and project results. [Gabryelczyk and Lasek, 1998; Scheer, 2002; Davis, 2003; Davis and Brabander, 2007].

PROPOSED MODEL OF COSTS CALCULATION FOR IT SERVICES – RESULTS OF THE PROJECT WORK

In the face of the difficulty acquiring reliable information in order to parameterize the proposed solutions, the Bottom-Up method was applied. According to this method the cost of service providing consists of individual components related to completing individual tasks

within the process. This way, thanks to the use of the logic of a process (order and duration of actions, occurrence possibility of given business situations) it was feasible to estimate the costs of the whole process – single occurrence or defined number of repetitions. In the presented case the evaluation of a single process was applied. [Gabryelczyk and Lasek, 1998; Scheer, 2002; Gabryelczyk, 2006]. Hence, the following steps were made for an exemplary process – Current service of MAN Network:

- component elements of the costs related to realisation of each action in the process were identified in detail,
- average duration of individual actions of the process was estimated; the duration was divided into preparation (related to aquiring data, documents etc.) and realisation periods,
- possibility of all decision paths, in which the XOR (the sum of all possibilities of decision paths equals 1) and OR (the sum of all possibilities of decision paths equals or may equal more than1) logic operators,
- costs of individual components were estimated,
- in the case of material purchasing an average purchase was described in relation to the analyzed process,
- in reference to depreciation an annual value of depreciation was established for all IT resources; in terms of the character of provided services the following rule was established: the key to the value of depreciation is the duration of actions,
- in reference to energy costs the total annual energy cost was defined and an action's contribution to it also depends on its duration – currently there is no measurement system used which would enable defining the actual amount of energy used on a given post,
- costs of work were attributed to individual posts, on the assumption that an average monthly salary on the executive and subordinate posts is known; thus, in this case it is possible to assess the process costs relatively precisely, because of the human resources used.

In the frames of the project a process model (EPC notation) was presented. The model depicts individual actions within the process as well as the resources along with other costs attributed to it. The following data presents the results of the calculation with the use of ARIS Business Optimiser: the total cost of the project realisation amounts to 1138,42 PLN. Five cost centers were defined:

- work costs: 157,14 PLN for executors, 2,80 PLN for executive positions (relatively insignificant participation of these positions in the process),

- energy costs: 257,88 PLN,
- depreciation of capital assets: 167,18 PLN,
- purchase of materials: 72,45 PLN,
- purchase of services: 480,96 PLN.

CONCLUSIONS

Although in both the literature on the subject and practice numerous descriptions of process management may be found, there is no explicit opinion indicating that meeting the minimal requirements will allow process management in an organisation. The thesis that a certified quality management system is an unequivocal piece of evidence for process management in the given organisation appears not to be valid in practice. It may be even stated that there is no direct link between certified management systems and process management.

Professional process management is still a rare practice, yet it is difficult to find the reason for it. Most probably this situation is caused by the fact that process management is seen as a risky conception in comparison with the traditional hierarchical organisation which creates a sense of stability and security.

Process improvement is realized through analysis of data related to the process, creating objectives and undertaking corrective actions. The result of process improvement may not only be quality improvement, but also reduction of costs related to the process. We may assume that the product is as good as the process is.

In order to conduct a complex evaluation of process measurement The Balanced Scorecard may be used. It allows to observe relations between individual areas of an organisation's functioning: finance, clients, processes and resources, and in particular to define the influence of the processes on the first two of the already mentioned areas. Hoshin Kanri method may be equally useful and is related to building the management strategy.

Similarly, assuring an effective data acquiring and analysis is possible only in the case of assuring computer support of process management. According to some authors it is the essential condition of professional process management.

Previously developed in the course of the project business process models along with the measurement system amount to the basis for undertaking optimizing actions. In the frames of process improvement generally two methods may be used:

- process facilitation,

– process reengineering.

Process facilitation leads to the modification of the present state, as the result of which the effectiveness and efficiency of the process are increased. Facilitation is applied in order to rationalize the process in the range of a small area of activity or to introduce changes in selected elements of the process.

Process reengineering leads to radical change of the realisation of the process which entails change of effectiveness. Hence, reengineering has a broader character and is frequently related to designing the course of the process from the beginning on the basis of the research assumptions and client's requirements. In conformity with the leading definition [Hammer and Champy 1993] reengineering is the fundamental rethinking and redesigning of processes in the enterprise, which leads to the crucial improvement - according to critical modern measures – of results, e.g. cost, service, speed.

Quality process management defines a new approach towards the quality management system. This approach is equivalent to the full conception of Total Quality Management. Constant process improvement, including the executive personnel and all employees at all levels of the enterprise's process orientation, leads to continuous improvement of quality of provided services and products. Eventually, it enables the correlation between the attention to quality along with customer satisfaction and the pragmatic approach to running an enterprise.

(The present paper presents selected results of the research project in the frames of the National Centre of Research and Development's grant entitled: "Optimal solutions and organisational structure design in the range of IT resources management in the Police. Outcome calculation on the basis of process management"; OR 00013211; 2010-2012; NCBIR).

REFERENCES

Bitkowska A., Kolterman K., Wójcik G., Wójcik K., 2011, *Zarządzanie procesami w przedsiębiorstwie*, Difin, Warszawa.

Chrissis M.B., Konrad M., Shrum S., 2003, *CMMI: Guidelines for Process Integration and Product Improvement*, Addison-Wesley Professional.

Debevoise T., 2005, *Business process management with a business rules approach*, Business Knowledge Architects.

Davenport T.H., Short J.E., 1990, *The New Industrial Engineering: Information Technology and Business Process Redesign*, Sloan Management Review.

Davis R., 2003, *Business Process Modelling with ARIS. A Practical Guide*, Springer Verlag, London.

Davis R., Brabander E., 2007, *ARIS Design Platform. Getting Started with BPM*, Springer Verlag, London.

Gabryelczyk R., 2000, *Reengineering. Restrukturyzacja procesowa przedsiębiorstwa*, Katedra Informatyki Gospodarczej i Analiz Ekonomicznych, Warszawa.

Gabryelczyk R., Lasek M., 1998, *Modelowanie procesów gospodarczych za pomocą ARIS Toolset*, Katedra Cybernetyki i Badań Operacyjnych, Wydział u Nauk Ekonomicznych UW, Warszawa.

Gabryelczyk R., 2006, *ARIS w modelowaniu procesów biznesu*, Wydawnictwo DIFIN, Warszawa.

Grajewski P., 2007, *Organizacja procesowa*, Polskie Wydawnictwo Ekonomiczne, Warszawa

Gregorczyk S., Ogonek K., 2007, *Uwarunkowania strategiczne zarządzania procesowego*, Studia i Prace Kolegium Zarządzania i Finansów.

Hammer M., Champy J., 1993, *Reengineering in Corporation. A manifesto for Business Revolution*, Harper Business, a division of HarperCollins Publishers, Inc., New York.

Hammer M., Champy J., 1996, *Reengineering w przedsiębiorstwie*, Neumann Management Institute, Warszawa.

Kunasz M., 2011, *Zarządzanie procesami*, Economicus, Szczecin.

Łuczak J., Sawicki P., 2012, RAPORT. *Zaprojektowanie optymalnych rozwiązań w zakresie zarządzania zasobami IT Policji, struktury organizacyjnej pionu IT oraz rozliczenia działań w oparciu o podejście procesowe*, UEP – F5 Konsulting, Poznań.

Pacholski L., Cempel W., Pawlewski P., 2009, *Reengineering. Reformowanie procesów biznesowych i produkcyjnych w przedsiębiorstwie*, Wydawnictwo Politechniki Poznańskiej, Poznań.

Rummler G.A., Brache A.P., 2000, *Podnoszenie efektywności organizacji*, PWE, Warszawa.

Scheer A.W., 2002, *Business Process Excellence. ARIS in Practice*. Springer Verlag, Berlin Heidelberg.

Scheer A.W., 1998, *ARIS - Business Process Frameworks*, Springer Verlag, Berlin.

Scheer A.W., Jost W., Hess H., Kronz A., 2006, *Corporate performance management. ARIS in practice*, Springer-Verlag Berlin Hiedelberg.