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MONITORING THE EFFECTIVENESS OF MANAGEMENT – SAFETY AND CRISIS MANAGEMENT ASPECTS

Abstract: Measurement, understood as the process of acquiring information and analysis through the prism of assumptions related to a product or a service, is an integral element of management. Consequently, it affects decision-making – depending on the approach, whether it is a noncompliance or corrective action, or the process is approved of in a given form.

There are many measures, groups of measures and their characteristics. In all instances they are related to process effectiveness. Sometimes they amount to the essence of the management conception as in MBO, Lean Manufacturing; Human Performance Improvement as well is behavioral models. The measures may be divided, for example, in relation to the scope of appliance – productivity measurement, effectiveness measurement, technical exploitation, quality process, setup time, logistics.

Measures related to emergencies are becoming increasingly appreciated. They contribute to the management system and aim at presenting the readiness for potential emergencies. The measures consist in risk assessment on the basis of which actions related to unacceptable risk treatment are planned. The measurement of information security, and more widely: crisis management, is crucial for the clients' overall safety – it is a simple signal that in the case of possible threats the continuity of functioning at a given level is assured.

Relevant research has been conducted - in-depth interviews in the group of 7 enterprises, among experts. All enterprises were selected according to mature standardization. The aim of the research was the identification of methods and techniques used by the enterprises in order to define measures related to risk and crisis management, as well as to define their motivation, criteria and effectiveness assessment criteria.

The research resulted in identifying the management areas in which risk assessment is applied, indicating and classifying methods, evaluating the organizations' motives as well as their employees' attitudes to the relevant issues.

Key words: risk management, continuous management, crisis management, process management, process performance

INTRODUCTION

The questions of increasing the effectiveness in production and service organizations have become one of the determinants of research in management in 20th and 21st centuries. In professional literature effectiveness, efficiency and productivity are frequently subject to discussions in which they are defined in a contrastive and incoherent manner. It also affects the objectives set for realized processes, projects or in the other organization of management. Hence, it is important to define key terms within the aforementioned scope, i.e. expectations of the process effectiveness measurement system. The measurement of process effectiveness and efficiency in relation to risk assessment, safety and crisis management is often overlooked in this context.

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In the IT industry KPI (Key Performance Indicators) are established, whereas in the automotive industry special characteristics are distinguished; the indicators are not always measurable – it is important to be in search of them, define acceptance levels, realization criteria and assessment formulas.

Numerous groups of indicators of significant interest for clients in B2B relation may be distinguished. These indicators are frequently key elements of effectiveness management and measurement as well as process effectiveness.

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Management based on risk is mostly concerned with mature corporate enterprises. It is a more advanced stage of the management system development due to the fact that it requires investment in mostly intangible issues. The evaluation of these issues is more difficult and is often misunderstood in relation to other more real needs of an organization. Clients amount to the significant motivating force in this regard as their requirements encourage suppliers to develop the area of risk assessment and crisis management.

DEFINITIONS AND SYSTEMS RELATED TO EFFECTIVENESS AND EFFICIENCY MEASUREMENT

According to Kotarbiński an action can be described as effective if it leads to the intended result constituting its aim [Kotarbiński 2003, p. 74]; consequently, an aim is defined as an intention which is formally established and predicted to be achieved in the future while being rooted in social and economic needs of its environment [Stabryła, Trzecianiecka 1982, p. 316]. Effectiveness is most frequently described as the extent to which the aim is realized, whereas efficiency takes into account input. Authors often perceive the last two terms as synonymous.

A wide spectrum of terms have been included in the relevant scope, e.g. productivity, solvency, proficiency, usefulness. Moreover, it is extremely difficult to determine the relations between the aforementioned categories [Bielski 2004, p. 60]. On the other hand, efficiency is quite unambiguously defined as the relation between the output and input [Penc 1997, 99] [Pisieczny, Więckowski 1987, p. 14].



The discussion concerning the terms amounts to the basis for touching upon a more important subject related to success criteria of an organization. In this regard the spectrum of terms is even wider as it is enriched with the following notions: solvency, fluctuations, absence, productivity and many others [Katz, Kahn 1979]. Professional literature includes numerous descriptive models connected to an organization's effectiveness, e.g. the model discussed by P.C. Light [Light 2005]. The author indicates the pillars of an effective organization:

- readiness and openness to future challenges,
- positive strengthening of an organization's participants and effective communication,
- flexibility by dint of learning and applying numerous indicators,
- unequivocal realization of the strategy, concentrating on key objectives.

A similar approach is presented by Peters and Waterman. According to them an organization's effectiveness may be defined as its capability to adjust the strategy, systems, leadership style, structure, abilities, leadership and work style [Peters, Waterman 1982].

We may indicate management systems which focus on the effectiveness of management. Such systems embrace popular and fashionable in the last decade lean methods and much more traditional conception of complex quality management as well as management by objectives developed by Drucker and Locke, including the HPI (Human Performance Improvement) model – a tool used in order to evaluate the effectiveness of employees. Behavioral conceptions, rooted in the analysis of behavior and undertaking actions aiming at changing it, should also be noted [Needham 2005].

P. Drucker in 1954 observed that in management we should mainly focus on the way objectives are defined and measured. Only measurable elements are significant, the remaining ones will not be taken into account [Drucker 2005, p. 111]. Professional literature includes a number of universal measures allowing monitoring and evaluation. The measurement system and exploitation measures (MTBF, MTTR), SMED, overall equipment effectiveness (OEE), process capability measures (Cp, Cpk) and TPM should primarily be noted.

MANAGEMENT BY OBJECTIVES

The conception of management based on objectives and effectiveness measurement system was initiated by P. Drucker [Drucker 2005]. The system has been developed by numerous theoreticians, and consists in defining and consulting an organization's objectives by managers as well as in measurement in order to provide information to support management decisions. Employees are entrusted with the realization of the task. Moreover, the measures for effectiveness evaluation are defined. The defined objectives are cascaded during which objective operationalization is the key element. The operationalization consists in materialization and measurement of functionality [Reinfusso 2009, p. 53]. The parameterization of objectives is excellently characterized by Armstrong who states that the essence is the result and not the effort related to its achievement, and that the executor should have influence on its achievement. Moreover, accessibility and proper structure along with objectivity during measurement are necessary. Consequently, the previous measurement methods should possibly be adjusted. [Armstrong 2000, p. 397].

The conception, however, has many opponents, including W.E. Deming who emphasized in his management principles the necessity to eliminate quantitative objectives in favor of quality objectives. Furthermore, Deming postulated the need to plan the rules of achieving them as an essential condition allowing achieving them. Deming also took notice of negative consequences of reducing the scheme to the objective-realization relation [Deming 2000]. In this regard not only does the conception concern understanding and implementation but also the essence and legitimacy of effect measurement.



Negative opinions in relation to management by objectives are quite popular. J. Stoner and Ch. Walker noted the need to change the behavior of top management to an extent depending on the leadership style (the more authoritarian the style is, the bigger change is required). The success of the implementation calls for real, genuine involvement and support of management at all levels. Effective communication between different levels of the organization is necessary, but it is conditioned by skills, abilities and training [Stoner, Wankel 1992, p. 86]. Furthermore, it should be stressed that even properly determined objectives relate to merely a fragment of the required professional activity of an employee. In some instances it is impossible and illegitimate to find some tasks more important than others; frequently actions conducted on the regular basis are significant for the organization. Finally, by determining objectives we focus exclusively on defined actions and do not take into account other activity. Not only is it difficult to set objectives but also it is troublesome to select proper measures which will allow presenting the actual degree of the realization of an objective in an adequate manner.

Management by objectives has been the subject of numerous researches realized in various forms since the beginning of the conception's development. Consequently, the advantages of applying this method have been defined which confirms its strong position in management:

- the unambiguity of expectations towards employees – it causes the sense of comfort for employees and managers;
- the possibility of more effective and unequivocal action planning and employee evaluation;
- a tool for successful communication between management levels;
- communicating expectations on the scale of the whole organization;
- limiting actions not related to the required activity of employees;
- the possibility of positioning themselves by employees at a given level of an organization [Caroll, Tosi 1970, p. 295-305].

PERFORMANCE EFFECTIVENESS MEASUREMENT

In professional literature and practice a number of economic measures are applied. They reflect facts in relevant units within separate economic categories. Contemporary observation of processes entails applying appropriate measures producing the results on the basis of which management decisions are made [Twaróg 2005, p. 13].

J. Twaróg claims that the effect measurement of an organization should be conducted at three levels:

- the set of measures used in the measurement system;
- individual measures;
- relation between the measurement system and the environment in which it has been established.

Numerous authors have presented their definitions of performance effectiveness measurement. For example, B. Moseng and H. Bredrup noted that the measurement system integrates three measures: efficiency, effectiveness and the capability of an organization to adopt to changes [Moseng, Bredrup 1993, p. 198-206].

During the selection of effectiveness measures it is necessary to take notice of some methodological issues. According to B. Maskell they are as follows:

- measures must stem from an organization's strategy;
- financial measures should not be the only type of measures applied;
- the variety and adequacy of measures in relation to the specifics of the area;
- the verification and modification of measures, depending on changing conditions;
- the simplicity of application;
- the pace of achieving results;

- emphasis on growth [Maskell 1989, p. 33].

In addition to the abovementioned elements S. Globerson mentions the significance of data objectivity, benchmarks as well as the need to discuss and acceptance granted for the level of defined objectives [Globerson 1985, p. 640-645].

The research of R.S. Kaplan and D. Norton amounts to an important voice in the discussion. They indicate that financial measures must not be the only effectiveness measures. Hence, they promote perspectives and exemplary indicators:

- financial perspective (cash flow, ROI);
- customer perspective (customer satisfaction index, customer rating, market share);
- internal processes perspective (complaint level, JIT, new product index);
- learning and growth perspective (employee evaluation, trainings) [Kaplan, Norton 2001].

Other authors mention different proposals of measures, e.g. P. White defines more than 100 of them [White 1996, p. 45-55]. K.F. Cross, R.L. Lynch proposed the performance pyramid which indicates the correlation between effectiveness measures at different levels of an organization. A number of various measures have been presented by, among others, N. Slack, M. Lewis, S.C. Wheelright [Slack, Lewis 2008; Wheelright 1984, p. 77-80].

PROCESS PARAMETERIZATION AS A BASIC OF THE EFFICIENCY RESEARCH

Along with the popularity of the ISO 9000 series standards, as well as independently of the "ISO phenomenon", process approach has become a highly significant element of management. While realizing a project of process management in an organization it is necessary to conduct process mapping, modeling and measurement.

Effectiveness measurement is a significant feature of both process approach and quality management systems in conformity with ISO 9001. Therefore, there is a need to parameterize processes (Grajewski, 2007, p. 79-87). In practice it is linked to the need to define:

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

Parameterization should be conducted for individual processes within 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 worker is aware of objectives and tasks defined in the frames of a given process.

PROCESS MANAGEMENT IN SELECTED ORGANIZATIONS

The case study included deliberately selected 5 enterprises which have certified quality management systems (ISO 9001 or ISO/TS 16949). All the enterprises declare involvement in the realization of the process management conception. In this case certificates guarantee meeting at least the basic requirements concerning process management, independent of the veracity of the declaration. The organizations belong to the group of medium-sized enterprises; three of them amount to a part of bigger concerns; all of them are production enterprises.

The analysis of the enterprises has been focused on existence and functionality of key process management elements. In-depth interviews were conducted in head offices of the above-described enterprises in 2011 with plenipotentiaries for quality management, in one case with lean manager.

All the enterprises presented process maps, yet only in three cases they had been created according to the accepted methodology; in the remaining cases the maps had an intuitive character – they were frequently inconsistent or even did not meet basic definitions of processes.



Only in two cases the architecture used professional notations (BPMN), VACD and EPC diagrams, and included at least three levels. Hence, only in these two cases architecture was detailed enough in light of process optimization. In one organization supportive process management software was employed (Corporate modeler).

Three of the organizations analyzed in the research had at their disposal merely very general process maps which had been created at the stage of implementing the quality management system. Processes were divided into two groups – basic and support processes.

Despite the fact that all of the abovementioned organizations met requirements included in ISO 9001 standard, it is difficult to agree with the thesis that they employ process management (except for one case). Processes were defined, the relations between them were described, system documentation embraced methods and criteria of their realization. Process architecture; however, was limited to only one, occasionally two, levels consisting of processes presented uniquely in the form of VACD diagram. Thus, it is impossible to undertake actions which optimize processes on the basis of analyzing measures which make up a given process. Processes were described only in general and with no reference to particular actions. Furthermore, processes did not constitute a basis for planning, system documentation, and they did not define duties and entitlements of workers. The description level of processes did not allow measurement and factual analysis based on data.

In one case of an enterprise which acts on an extremely demanding market of auto industry and medical equipment the process map was the genuine basis for management. Process architecture had been modeled on four levels, the lowest of which was presented in the form of EPC algorithms. Quality management documentation was generated automatically on the basis of EPC algorithms. Planning and simulating activity in the frames of VSM, Lean and also TPM originated in processes.

RISK MANAGEMENT AS THE BASIS FOR DEFINING CRUCIAL ELEMENTS OF CRISIS MANAGEMENT

Risk management is a requirement increasingly often posed by standards or clients. However, a key practical question is whether the chosen method of assessment and risk management are useful for ensuring quality and safety of products and processes in practice. Ensure effective in this respect is difficult, especially in cases of the transfer of technology or technical changes to processes and products. Each of these and many other situations that should result in the revision of estimated risk, and actions based on the result.

By applying the aforementioned approach to risk assessment we may define a methodical approach to determining the necessary procedures in the context of crisis management related to maintaining business continuity.

CHARACTERISTICS OF SAFETY RISK ASSESSMENT METHODS

In theory and in practice several dozens of methods for risk assessment and evaluation are utilized. These methods can be divided into 3 following groups:

- quantitative methods;
- qualitative methods;
- hybrid methods [Sułkowski 2004].

Qualitative risk assessment is most often a subjective evaluation which is based on best practices and experience. The outcome of such an assessment is a list of threats ranked by their risk level (low, medium, high). Qualitative methods are very flexible and open to various kinds of modifications. Owing to their flexibility and modifiability they provide the organization with fast and cost-effective results when identifying threats and deploying security measures is concerned. However, the flexibility the scope and cost of risk assessment in different organizations can vary to a significant extent. That is why, depending on the available financial resources allotted for this purpose in the budget the scope of risk assessment may change in the course of time.



In qualitative risk analysis all risks and potential effects of their occurrence are presented in a descriptive way. It entails using risk scenarios and determining the effects of potential realization of risk. The scenarios should include numerous details which are helpful in taking specific actions and choosing proper security measures. In widespread use, there are various scales to describe specific situations and incidents.

In quantitative risk assessment it is essential to determine two basic parameters - the value of effect and the probability of occurrence of a specific risk.

The potential effects may be determined by evaluating the effects of risk occurrence or extrapolated on the basis of data from the past. The consequences of risk events may be expressed by means of different categories (e.g. financial, technical, operational, human resources).

The overall quality of the analysis depends on the accuracy of indicated values and statistical validation of the deployed model.

Both quantitative and qualitative methods have some disadvantages. First of all, they are too general. Second, they do not identify all the needs with regard to safety in a precise way. Apart from that, they do not provide the organization with sufficient information concerning the cost analysis when deploying new security measure. Hence, the majority of companies make use of the combination of the two approaches. On the one hand, qualitative analysis founded on scenario-based methods is used to identify all risk areas and potential effects of specific risks. By contrast, quantitative analysis is used to determine the costs associated with the effects of risk occurrence. This also leads to significant increase in knowledge related to processes realized in an organization, and raises awareness on the potential risks.

The Failure Mode and Effect Analysis (FMEA) is mainly a method to support quality management, however, the concept and rules of risk assessment (organizational and technological) may also be applied in the case of safety product risk assessment.

The Operationally Critical Threat, Asset, and Vulnerability Evaluation (OCTAVE) is a set of guidelines developed at Carnegie-Mellon University in 2001. This method is used, for instance, by the US army, and is getting more and more popular in other, mainly large, organizations.

The Control Objectives for Risk Analysis (COBRA) is a complete risk analysis method designed for the board and management of an organization to thoroughly evaluate the profile of risks related to the conducted activity. Particular attention is paid to the security of the image, conformity with applicable legal regulations and laws and to internal control mechanisms.

The CCTA Risk Analysis and Management Method (CRAMM) is a risk analysis method developed by the British Central Communication and Telecommunication Agency (CCTA) whose name was changed to Office of Government Commerce (OGC). The integral part of this method is a special IT tool for risk assessment (CRAMM). Using the method without the CRAMM software tool can be difficult.

The method MARION (Methodology of Analysis of Computer Risks Directed by Levels) was developed by the CLUSIF (Club de la Sécurité de l'Information Français), and the last update was performed in 1998. Nowadays, CLUSIF does not longer finance nor promote the method as the financial resources were reallocated to another, newly developed, method, i.e. MEHARI. However, this method is still used by many organizations.

It is possible for the organization to use its own methods which are developed on the basis of industry knowledge and experience. This approach, however, is only appropriate for large organizations which have proper organizational structures to develop and validate such a method. The biggest advantage of it is being fully aware of the method as well as the whole risk assessment process by all people involved in the processes related to it. Obviously, there is a danger that the developed method may turn out to be ineffective and that the organization shall not be granted a recommendation during the certification audit. In consequence, it may also not be awarded a



certificate. For this reason, small businesses do not decide to develop their own methods and prefer to choose one of the methods which are already available. Such ways of proceeding are usually approved of auditors during certification audits. Finally, small businesses do not usually have sufficient human resources to develop their own methods.

THE EVALUATION OF THE EFFECTIVENESS OF CRISIS MANAGEMENT AND BUSINESS CONTINUITY PROCEDURES

Seven organizations, which function in Poland and declared significant maturity within the scope of management systems, were subjected to the research. Not all of them had certified systems (4 of them - ISO 16949, 4 of them ISO/IEC 27001, 3 of them ISO 14001, 2 of them ISO 20000-1). It was a preparatory research and aimed at determining the scope of future research in functioning of the business continuity management processes, the structure of documentation and, last but not least, the way monitoring is conducted.

The research was carried out in the form of in-depth direct interviews of representatives of top management (information security administrators, IT security administrators, representatives of top management for the management system issues, IT directors). The research was conducted in the course of 6 months (03-09.2015).

In 5 organizations some processes, or at least procedures, directly concerned with business continuity assurance were identified. They were coherent and documented. However, only in 3 instances the processes/procedures were correlated with the process of risk management. In the remaining cases there was no such a correlation and risk assessment was conducted only as fulfilling requirements – the standard amounting to the basis – or within corporate guidelines.

Each of the organizations performed risk assessment, only 4 of them in relation to information security. In the cases of 3 organizations the MEHARI method was applied, 3 other organizations had their original methods of risk assessment.

None of the organizations had business continuity management procedures at the same priority level as other procedures which could also be seen in the lack of any mechanism allowing the evaluation of performance effectiveness. The research showed that the organizations carried out backup in an operational manner. However, scenarios going beyond monitored processes and business continuity maintenance are not tested. The interviews confirmed that some more advanced processes, e.g. launching services in different locations, relocating production lines etc., function only formally.

CONCLUSIONS

Professional literature provides us with numerous conceptions relating to the measurement of effectiveness of economic processes. For many other conceptions it is a key assumption, e.g. LM, management by objectives, process management. The need to conduct measurements is indisputable, however, there is no agreement at the level of defining some key questions, e.g. connected to effectiveness, efficiency, productivity etc. There are many views on the understanding and legitimacy of setting objectives as well as the way and legitimacy of measurement. In this regard authors agree only in the area of financial results and the view that measuring only financial results is by far not sufficient.

The conducted research was a preparation for a more comprehensive evaluation of monitoring the effectiveness of business continuity plans and crisis management. In-depth interviews provided knowledge of weak coherence and lack of correlation of such processes in the context of the key process of risk assessment.

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