



THE IMPORTANCE THE ANALYSIS OF DATA IN RISK MANAGEMENT

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Abstract:

The article presents the meaning of the data analysis in the context of risk management. Managers often do not notice the need of making deep analyses and they try to make decisions in a nonsystem way. The author pays attention to the process of risk management that is aimed at facilitating the functioning of the organization (by broadening one's knowledge about its functioning) and the significance of acquiring information from various sources.

Key words: quality management system, improvement, expert system

INTRODUCTION

In every moment of their life cycle enterprises need information on their functioning. On this basis they can draw conclusions and make plans for further activity, taking under consideration the uncertainty of their functioning. The mentioned uncertainty can be called threats; after determining the probability of its occurrence, as well as appearance of results of this uncertainty – it can be named a risk. The risk can be related to the human activity, the functioning of machines and to the nature [2, 8]. However, it has always influence on the system, in which it appears [13].

Risk management constitutes an important element of the aware enterprise management. It allows decision-makers making aware decisions that take under account priorities and available alternatives of actions. Systematic application of policies, procedures and practice solutions in management in areas of communication, consulting, establishing the context and identification, analysis, evaluation, dealing with the risk, monitoring and risk inspection, constitute the process of risk management [11, 13].

It is recommended that the input data for the process of the risk management comes from various sources: historical data, experiences, feedback information from stakeholders, observation, forecasts and the opinion of experts. The attention is also paid on the necessity of exchanging information between people making decision and taking under consideration limitations in data or in applied models. This approach allows obtaining the proper view on the analyzed risk factor and assigning potential results of this risk, with an accurately calculated probability. This way one can get a systemic (holistic) approach in the course of considering possible disruptions and eliminate irregularities in the transferred data (in obtained messages). Moreover, the constant control of the process and the collection of data enables dynamic and iterative reactions to changes [3, 7, 10].

Although the manufacturing process is an ordered sequence of operations that leads to the production of a

product, it can be subjected to many disruptions, which might delay the manufacture of the product (or force the increase of use of assets), or even make the production impossible [1, 13].

THE DATA ANALYSIS IN THE PROCESS OF RISK MANAGEMENT

The collected data serve for gathering information on potential disturbances, but also enable designing a frame structure of the risk management. The internal and external context of the organization and the understanding of its essence constitute a crucial element of the risk management present in processes. Collecting data can be made thanks to the assigned responsibility and established methods of reporting [11]. It should be adjusted to the form of activity of the organization and it should be naturally matched into its structure. The data analysis is often pushed into the margin of the functioning in Polish enterprises [9]. The necessity of additional periodical inspections that enable verifying whether plans and frame structure of the risk management are still up to date is still not noticed.

Following aspects should be analyzed [11]:

- the internal situation of the company, including:
 - the order in the organization, the structure of the organization and its culture,
 - roles in the organizations and responsibilities (and settling accounts on realized duties),
 - policies and strategies established for achieving targets of the enterprise,
 - assets in the company and their derivatives,
 - relations with business partners,
 - information systems enclosing information flows and processes of making decisions,
 - norms and guidelines in the organization,
 - relations in the organization.
- the company's environment:
 - key factors and trends affecting on objectives of the enterprise,

- relations with external partners and their view and values,
- the social and cultural, legal, and political, financial, technological, economic and natural environment, business partners and competitors.

This allows making a risk analysis, which is defines through the prism of [3, 11]:

- the character and types of causes of the occurrence of threats and disturbances that might result from them,
- the method of measurement of threats and assigning them to groups from the portfolio of identified risks,
- the probability of occurrence of disturbances,
- the time horizon of the probability of disturbances and threats ram,
- ways of establishing the risk level,
- views of business partners on examined issues,
- acceptable risk levels,
- the combination of various risks that might occur.

Documenting processes for the purposes of the risk management is an important element of the entire system. Thanks to it, the organization can constantly learn and improve; registered recording facilitate making aware decisions and making inspections and reusing obtained information in managerial processes. However, one should remember that it is connected with certain costs and inputs, including for example the necessity of regulating notations and methods of access to the data (especially to sensitive data) and periods of its storage [11].

In the Figure 1 the risk management process is presented, specifying its basic stages and feedbacks.

Information comes from data gathered in the process of acquiring them and it constitutes a principal element of the risk management process. It is necessary to collect data on each stage; it allows enlarging the knowledge and enable a system approach to the identified risk.

Ways for collecting data in the risk management process is presented in the Table 1.

Monitoring and effected inspections are supposed to take the liberty of updating the state of the knowledge about the current risk in processes. It will be required to make constant monitoring and inspecting, in particular in enterprises producing for customers' orders, depending on the difficulty of the determined order. This stage also allows reporting disturbances that later can be use for updating the risk management, also thanks to the categorization of risk (creating the profile of the risk, i.e. the description of the set of risks) [10].

Thanks to the process of collecting data, the earlier in-certitude can be changed into an assessed risk that can be managed with use of the prior planning ways of performance in situations of risk. There are following solutions that should be noticed in this process [10]:

- avoiding risk by not-beginning or not continuing actions that would lead to the occurrence of the threat,
- initiating, or even increasing the risk in order to take the appearing chance,
- eliminating the source of the risk,
- affecting the probability,
- changing results of the threat,
- co-sharing the risk with other organizations (for example insurance).

Maintaining the risk on a defined level as a result of an aware decision.

A system, pro-active approach allows predicting disturbances and faster reaction to identified ones.

CASE STUDY

The examined organization is in a group of big enterprises situated in Greater Poland. It has customers, which are organizations representing over 25 countries in the entire world. The company is specialized in the assembly of very composite products. It is characterized with a very high level of customization and continuous product development and increase of the quantity of products [4, 5, 12]. The company did not implement any system of risk management. It is also noticeable that despite the fact of collecting data, obtained information is not being analyzed in order to use it for constant improvement of the organization.

The analyzed enterprise has determined its technological time periods, which allow it to plan the production. All other time periods are determined as "unplanned time" and they are reported to the Production Planning Section by employees from the production department. The Production Planning Unit has the obligation to analyze causes of the occurrence of this "unplanned time". Despite the established way of reporting, employees can freely write in note on causes. In result, the same unplanned time can obtain different names; the person, who analyzes, has often to check circa 900 records before they can be systemized. In addition, some situations are difficult for identifying because during the process of reporting employees do not know how to name causes of appearing disturbances. In result, they write various comments (like: "other", "lack", or they leave an empty space in the form).

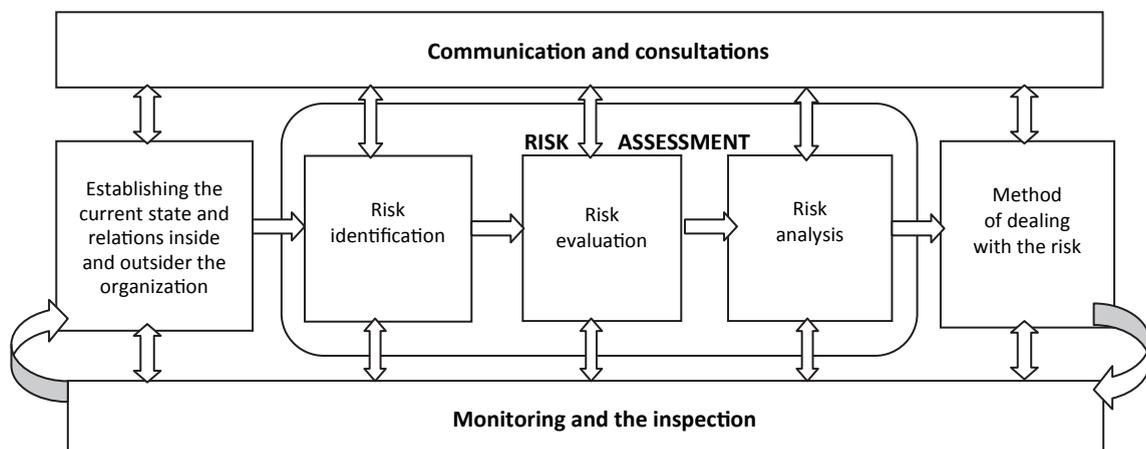


Fig. 2 Risk management process

Table 1
Ways for collecting data in the risk management process

STAGE	METHOD OF COLLECTING DATA	INFORMATION THAT CAN BE OBTAINED
Diagnosing the current state	Consultation (interviews, surveys)	- obtaining opinions of persons directly involved in the analyzed process - establishing whether there exists a personal responsibility for the realized process (formal or informal) - understanding flows (of assets and information) and identifying (looking at the thing from outside)
	Observations	- determining, whether there are leaders of processes and whether they are true owners of these processes - "hard" data constitutes a point of reference to the further deliberations regarding the risk assessment
	Measurements	- showing situations difficult to identify in the course of conducting observation comparing the course of the process with the real realization and establishing deviations in this area
	Documentation analysis	opinions of employees directly performing work concerning threats which they notice in the process
Risk identification	Consultations	Conclusions "from outside" on the occurrence of threats basing on achieved results, determining, what level is pointing at the approaching disturbances
	Observations	specifying possible threats in flows identifying earlier appearing disruptions
	Measurements	Deducting additional risks, which have never been identified before, with use of the analogy
	Documentation analysis	Opinions of employees that directly perform work concerning the transformation of the threat into the disruption, effects and probabilities of their occurrence
Risk analysis	Reports, statistical papers and other secondary sources of knowledge	conclusions "from outside" on the heaviness of results of disturbances - determining what disturbances occur and enabling the analysis on dependencies between threats and the occurrence of the risk, - establishing the heaviness for results of the occurred disturbance - determining the probability level for the occurrence of particular results of disruptions
	Consultations	Establishing, what disturbances take place and enabling the analysis on dependencies between threats and the appearance of the disruption, the heaviness of its results and its probability
	Observations	Basing on historical data, establishing what disturbances appear and enabling the analysis on dependencies between threats and the occurrence of the disruption, the heaviness of results and their probability
	Measurements	Using analogy, determining possible results of disturbances and probabilities
Risk evaluation	Reports, statistical papers and other secondary sources of knowledge	- determining the acceptance level for the risk in particular components of examined processes (also taking under consideration the realized order) establishing various levels of acceptable risk, using the method of drawing conclusions on employees and the level of their reaction to the risk
	Consultations	determining particular values (limits) in which the risk would be acceptable
	Observations	Determining values of parameters of the acceptable risk, basing on the available technological and process documentation
	Measurements	- establishing the way of managing with the acceptable risk - determining the way for reacting in situations generating risk that is not acceptable - assigning the responsibility for processes by determining an owner for each of them - establishing the way of reporting on the risk
Method of dealing with the risk	Documentation analysis	assigning owners to all processes and, if it is necessary, correction on this matter
	Consultations	Determining control points, in which the performed process should be measured from the point of view of fulfilling requirements and, if it is necessary, reporting on deviations
	Observations	Verifying, whether the documentation includes specified elements of the risk assessment and whether it has explicitly attributed responsibilities in order to facilitate the risk management

In the Table 2. data on three order that in February 2013 have generated the majority of hours called unplanned time are shown.

Table 2
Unplanned time in view to orders – percentage share of orders

ORDER	Percentage share of unplanned time in comparison to the total of realized orders in 02.2013
Order 1.	20%
Order 2.	15%
Order 3.	10%

The company analyzes unplanned time from the period of a determined month from the point of view of contracts and departments that generate it. However, it does not analyze, whether cause of disturbances repeat in particular contracts, or what is causing them. In result, the firm does not draw conclusions whether it is possible to avoid disruptions in analogical contracts.

Below the author illustrates the analysis she has made, and which enables observing certain regularities.

The Table 3 shows qualitatively most important unplanned periods of time that have been noted in the Order no. 1.

Table 3
Main causes of unplanned time in the Order 1

No.	Reason of the occurrence of the unplanned time	Percentage share of unplanned periods of time in reference to all reasons in the Order 1.
1.	Lack of parts	23.23%
2.	New operation – lack of planned time	19.76%
3.	Correction of the installation	6.94%
4.	Incorrect assembly	6.21%

In the Order 1, the general reason of the unplanned time (over 1/5 $t_{unplanned\ t.}$) was the lack of parts necessary for the realization of the assembly process. Lack of planned time for a new operation was also an important problem. The realization of the correction of the installation was a significantly less important factor, as well as the incorrect assembly. Moreover, there are no further conclusions on the reason of the identified error – whether it was the fault of an inexperienced or absent-minded employee, mistake in documentation or also it could have another cause.

The Table 4 shows most important quantities of unplanned time that has been identified in the Order 2.

Table 4
Main causes of unplanned time in the Order 2

No.	Reason of the occurrence of the unplanned time	Percentage share of unplanned periods of time in reference to all reasons in the Order 2.
1.	Inexperienced employee	26.32%
2.	New operation – lack of planned time	15.72%
3.	Lack of data	9.57%
4.	Lack of parts	8.77%

In the Order 2 the main problem was the extension of time for the realization of the operation resulting from the fact that it was made by an inexperienced employee. Un-

fortunately, the organization did not establish any specific criteria in the process of collecting data that would determine, which employee is not experienced and when the low efficiency of the worker results from other causes. This way, there appears a possibility to assign this category to each employee with low efficiency of work.

The second important cause of the extension of the time of assembly is the lack of planned time for new operations. The category $t_{unplanned\ t.}$ that shows the lack of coherence in the system collecting data is the third main cause (almost 1/10 of the total registered unplanned time), it is determined here as “lack of data”. This term, because of its lack of precision, does not allow making further analysis of disturbances in the assembly process.

The Table 5 illustrates most important quantities for the unplanned time identified in the Order no. 3.

Table 5
Main causes of unplanned time in the Order 3

No.	Reason of the occurrence of the unplanned time	Percentage share of unplanned periods of time in reference to all reasons in the Order 3.
1.	Correction of the installation	40.06%
2.	New operation – lack of planned time	38.06%
3.	Repeated preparation of the product for the client	5.55%
4.	Other	4.27%

Almost a half of the unplanned time in the order 3 resulted from the necessity of making the correction of the installation. Along with the second reason, it constituted almost 80% of all disturbances identified in this order. The appearing next category that hampers making analyses is determining the reason $t_{unplanned\ t.}$ as “other”.

Considering the context of all orders, one can notice one important share of the unplanned time, which is called “new operation – lack of planned time”. In this context, the time determined as unplanned should not be a problem for the assembly (although it is a problem in the context of planning the manufacturing process and it extends the time of the realization of the order and of the use of planned assets). It is a disturbance of a different type than the problem of lack of parts or inexperienced employee.

CONCLUSIONS

Collecting data is supposed to be use in a company for analyzes that would facilitate planning its activity in the future (for example in maintaining the movement) [6]. The process of gaining information by concluding is worth developing, so that the collected data could be used in a way that improves the manufacturing process the best way possible, taking under consideration the system character of the enterprise.

The company collects information that could constitute the basis for a pro-active approach to the risk; however, it does not use its potential and it is losing two times. First, because time and other assets for the data collecting are being lost because of not making conclusions for further changes. Second, because of the extension of the time for making decisions resulting from lack of plan for the activity in the context of changes that could take place in the system.

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