THE METHODOLOGY OF RESEARCH INTO THE EFFICIENCY OF ENTERPRISE INFORMATION PORTAL (EIP)

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In this article conceptual regulations of effective analysis of enterprise information portal (EIP) functioning as a whole and as a part are described. It also describes partition of new techniques and technologies (NTT) on different groups ordered by various characteristics. Efficiency rating of those groups exerts influence on overall efficiency of EIP and economic efficiency as a part.

In the time of high speeds and world globalization the question of data access begins to be important in the problem of information processing. The questions about the accuracy, integrity and completeness of data, and what is most important, about the efficiency of these processes, arise more and more often and demand urgent answers.

The entrepreneur that aims to stay competitive on the market and become a leader in his area needs to optimize the business processes and corporate systems in his firm. This is a permanent process. To make a decision either to keep the system as it is, to change it to another one, or to make some changes in its functions, you need first to perform comparable analysis and assess the efficiency of the system functioning.

The analysis of acquired quantitative indices will figure out the weak points in the whole enterprise information system and as a result become a guideline to raise effectiveness of its functioning.

The methodological prerequisites of efficient functioning of EIP are the following:

1. EIP is man-machine system (MMS). This statement also concerns its separate functional modules. Therefore, during the investigation of EIP functioning efficiency you need to take into account parameters and characteristics of both components: human (maintenance staff, management personnel, and users), machines (soft hardware and informational facilities of EIP) and production environment.

2. EIP is a complex man-machine system, and the process of its functioning is determined by many indices, parameters and factors. In this connection the assessment of efficiency of a system like this as a whole is not always appropriate and is often difficult to carry out. The evaluation can be made separately for the large functional modules of EIP, and then differential results will be used to get integral assessment of the whole system.

3. The evaluation of efficiency of EIP functioning should be carried out taking into consideration the influence produced by all the factors on functional processes.

Factors that determine the efficiency of EIP functioning can be classified in the following way:

a. EIP's characteristics:

♦ common: readiness, reliability, integrity, controllability;

By the index of computer system readiness (including EIP) we understand the ratio of the quality of system responses to the quality of requests made within the time periods defined by the working time of the system.

For example, when the working time of the system is from 9 to 14 p.m. (the typical example is the time of exchange auctions), the request sent in and any other time lapse and the responses to these requests which were or were not received are not taken into consideration while assessing the readiness index. On the other hand during round-the-clock work (typically, with the systems connected with credit or other types of cards, in dispatcher's and call offices etc.) any requests are included in the analysis of the degree of readiness.

If during its work the system has answered 16657 from the 16661 requests sent, the index of the system readiness will equal 99,97%. The example above shows the so called momentary readiness coefficient. The real coefficient is counted on the basis of the same ratio but within a longer period of time (not less than a calendar month) or as the ratio of the time during which the system was answering all the requests to the full time of the system work. In the last

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case, if within a month (20 days, from 9 to 14) the system had to be turned on for 10 minutes to resume its operating capability, the readiness coefficient will stay at 99,83%.

By the reliability of computer systems as a whole and EIP in particular we understand the system's ability to carry out commands within a certain time period and in accordance with the given technical characteristics.

As it is not possible to fully rule out the possibility of the equipment refusal the reliability of the equipment cannot make 100%.

One can measure the reliability of the system against the intensity of the refusals:

$$\lambda = \frac{n}{N_0 \cdot t},$$

where n - is the quantity of the refusing blocks within the period of time t; N_0 - is the given number of blocks.

Integrity mostly concerns the area of factual data representing the EIP product. That is why by this notion one means the integrity of the data.

By the integrity of data one understands the continuous compliance of data with the standards of data storage, and with certain rules put forward by the system's engineers and binding for it. These rules should reflect peculiarities of the subject matter chosen by the customer or his business logics. The example of this can be information with a quoting of some literary work without the indication of its author which does not comply with integrity conditions.

The integrity of the data is one of the most important characteristics of an information system. The provision of integrity is partly carried out by the designer of the data base management system (DBMS). The other part is the responsibility of the designer dealing with the information system. If DBMSs are standard systems that have long been in use it is worth paying attention to their way of solving the problem of integrity in various situations, e.g.:

♦ during simultaneous work of several users with common data;

♦ in case of an emergency stop of the work with data (because of the power cut or program error);

♦ in case of operators' error.

By the controllability of EIP one can understand the response of the system on any managed impact, the ability to influence the process and the outcome of EIP functioning.

♦ specific functioning possibilities of EIP as a whole and its ergatic and non-ergatic elements;

The following parameters may serve as an example:

♦ the integration degree of office and other supplements;

♦ structuring and storing the information;

♦ the search and output of requested data;

♦ the differentiation of the access right to various information;

♦ the confidentiality of the stored data.

b. The characteristics of additional resources:

♦ the quantity of resources of each type;

♦ the quality of additional resources.

One should take into consideration the following factors:

♦ the required level of computer literacy by the operator for successful work with EIP;

♦ the required level of specific skills for administrating EIP;

♦ the required level of server components on the basis of which EIP functions;

♦ minimal technical requirements to the hardware of EIP final users;

c. characteristics of the EIP functioning conditions:

♦ force-majeure circumstances (environmental disasters, global failures);

♦ manageable circumstances (hardware, software connected with EIP);

4. While analyzing the effectiveness of EIP one should consider it as an integral property definition:

♦ the degree of EIP correspondence to its target - target efficiency;

♦ economic expediency - economic efficiency.

For qualitative evaluation of target and economic efficiency there should be two sets of indices: indices of target efficiency (ITE) and indices of economic efficiency (IEE).

Here arises the problem of the multiplicity of efficiency indices, the core of which can be boiled down to the following fact: the more assessment criteria we have, the deeper, fuller and more complex our evaluation is, the more exact understanding of EIP possibilities we have. But in the same time it leads to the complication of the evaluation process, the multiplication of time and efforts spent on it. Therefore a complex decision must be found.

5. On should include in the framework of the integrated research of the EIF effectiveness the assessment of the efficiency of new technical devices (hard- and software, media) and technologies that allow the optimization of EIP functioning.

New Techniques and Technologies implemented in EIP can be divided into three groups:

♦ NTT-1 directly participate in the production, i.e. in the carrying out of users' requests. Here belong new hard- and software, used in the transmission and procession of the information resulted from users' requests, new media used to satisfy these requests.

♦ NTT-2 used to manage production, administration and office activities of the organization the interest of which EIP serves. Here belong new means and technologies of information storage and exchange. They do not directly participate in the production.

♦ NTT-3 participate in ergonomic management of EIP and are meant for the efficiency upgrading with the operators administrators, users), man-machine systems functioning within EIP.

New Techniques and Technologies can be also divided depending on the place of the technical means:

♦ The first group contains server means and components which are situated in the place of EIP itself - data centre, hosting centre etc. This is not only software but also hardware and communication means represented by computer network.

♦ The second group is situated directly in the organization itself.

♦ The third group is situated in the organization (to administrate and operate EIP) as well as by the final user (for operation) who does not work in the company.

The necessity and the utility of the division of New Techniques and Technologies into 3 groups can be explained by the following factors:

♦ The difference of technique and technology of the designated groups in their targets (though the ultimate goal of their use is the same - the optimization of the volume and quality of submitted information) which influences the methodology of the efficiency assessment and particularly on efficiency requirements;

♦ Specific methodology of efficiency assessment with different groups of the New Techniques and Technologies.

Therefore the most proper and suitable approach consists in assessing the efficiency of New Techniques and Technologies taking into account specific features of each group.

6. Because of the specific evaluation of means and technologies composing the system of ergonomic management of EIP development and operation, this kind of assessment should be carried out autonomously. Ergonomic management has a strong influence on output technical, operational and economic characteristics of EIP, as well as on the quality of EIP production (the results of the requests made by EIP users). The optimization of EIP is a continuous process, following the change in the requirements and targets of the chiefs. Consequently the costs of EIP optimization should be reasonable as the sophistication of the requirements can lead to a cost hike.

7. The fullness and the depth of EIP functioning evaluation or the evaluation of efficiency of New Techniques and Technologies can be achieved by including:

a) Integral indices (for integral and full assessment) and specific indices (for the evaluation of specific effect of the EIP functioning or the implementation of new technologies and technical devices);

b) Indices for evaluation of the direct economic effect that straightly influences the costs and side effect assessed in terms of time, accuracy, reliability etc.

To assess the system and to count the indices the use of multifunctional system MathCAD is advisable.

Here are examples of some indices:

1. The coefficient of the raise in the volume of the output in unit time as the result of EIP implementation.

$$F_{V_t} = \frac{V_{nКИП_t} - V_{б_t}}{V_{б_t}} \cdot 100\%,$$

where $V_{nКИП_t}$ - is the volume of the production

by EIP within the period of time T; - is the volume of the production without EIP within the period of time T taken as basic.

2. The coefficient of the decrease in time spent on the fixed volume of work as the result of EIP implementation.

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where $T_{пКИП_V}$ - is the fulfillment time of the work volume V with the use of EIP; - is the fulfillment time of the work volume V without EIP.

3. The coefficient of the decrease in prime cost of a production unit thanks to the rise in output volumes within a certain period of time when EIP is being implemented.

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where $C_{сККИ_V}$ - prime cost of a production unit with the use of EIP; $C_{б_V}$ - prime cost of a production unit without EIP.

In conclusion we will note that the system of the indices for efficiency evaluation of EIP functioning, implementation of New Techniques and Technologies (NTT) and algorithms of definition of their values should provide the possibility to carry out assessment.

When there is a necessity to make the decision about the implementation of a new system not only aprioristic but also posteriori indices are taken into consideration. This allows us to make use of other companies' experience as well as to carry out one's own assessment relying on one's own specific data. The further comparison of the results of the two kinds of assessment will encourage further thinking and will help us to make the right conclusions.

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$$F_{C_V}^{T_{б_V}} = \frac{C_{б_V} - C_{сККИ_V}}{C_{б_V}} \cdot 100\%,$$