

## THE PROBLEMS OF INFORMATION COMMUNICATION TECHNOLOGY'S SELECTION AND ASSESSMENT

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**Keywords:** cost assessment, return on investment, present value, alternative analysis.

The key problems which organizations face choosing the information communication technologies (ICT) discussed. The paper offers an approach to combine and use different methods of assessment and picking out the most acceptable ICT for the organization.

Today many Russian enterprises greatly raise their competitive ability introducing and using information-communication technologies (ICT). Using ICT means enterprise management with specialized software, and creation of general informational environment and area for data storage and exchange, flexible IT- infrastructure, supplying management communication processes.

Along with production technologies, ICT are intangible assets and ownership objects. So their introduction and use are to be preceded by expediency acquisition assessment.

In this situation, the main problem is picking out ICT, which, in general, are not used for the automation of the most important productive spheres, and secondly, are not recompensed enough, and cannot reduce costs and raise effectiveness. That's why the key problems are the problems of picking out necessary ICT among a variety, which are in the market and satisfy the requirements listed earlier.

Nowadays the world's management practice consider following assets assessment methods: Total cost of ownership (TCO), Return on investment (ROI), Net present value (NPV), method for analysis of hierarchies (MAH), and besides them applying them to software - Cost Constructive Model (COCOMO II).

The purpose of this article is to describe the system of one after another assessment method of picking out ICT. Let's examine further the main phases of assessment and acquiring ICT by enterprises:

- ◆ Comparison: suggested in the market product and own design product;
- ◆ Formulating optimal and necessary possession conditions;
- ◆ Assessment profitability and effectiveness of introduction and using.

### **1. Comparison:**

Having in enterprise disposal information about existent and developing ICT leads to a question of market choice among alternatives. In the enterprise selection process of acceptable technologies occurred ICT characteristics analysis, and analysis of characteristics of contragent-supplier (developer, dealer). O.A.Uldasheva noted that any ICT are to prove the market role and conform the market price and quality correlation. Production capacities of IT-companies, a wide range of completed projects of contragent-organization, interest in long-term cooperation and personnel qualification are taken into account. In is important that ICT improve after being put into operation.

So, the task of ICT choice among alternatives is multi-criterial. To optimize such tasks in planning people use method for analysis of hierarchies (MAH), developed by T.Saati , often applied.

In MAH an every task previously structured and viewed as hierarchy. In elementary view, hierarchy is built from a node (purpose), through intermediate levels-criteria (performance characteristics) to the lowest level that in general is a set of alternatives. Further we established criteria priorities and assess an every alternative by these criteria. After hierarchy building is done, we assess weighting coefficients for every parent node, defining degree of its dependence from other lower-level nodes, using pair comparison. The result of MAH comparison analysis would be discovering the most acceptable ICT for the enterprise. Certainly, we cannot assert the most acceptable ICT will be approaching almost all enterprise purposes and demands.

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## **2. Formulating optimal and necessary possession conditions**

Consideration of the fact of ICT acquisition and introducing as a project realization allows to determine and plan the highest possible costs, payback periods and profitability, for what in Russian practice are often used methods TCO, ROI, NPV.

TCO method is directed to assessment, which would reflect real costs, deals with software, communication and hardware acquisition, would assume all aspects of later using expended money. General TCO index is calculated for possible software obsolescence time, communication and hardware, that is 3-5 years. An essential defect of TCO method consists of only examining the costs on investment, but not examining and forecasting revenue. Moreover, in calculations as rule, standard enterprise budget items without possible project risks assessment are taken into account.

The one problem of ICT using connected with software revision. In this connection enterprise has two ways to decide this problem. The first way is - purchase, the second - development (by enterprise department or other organization). As rule, IT-project budget consists of several cost items, which have percent ratio:

- ◆ Requirement analysis, 4%; Product design, 12%;
- ◆ Programming, 44%; Test planning, 6%;
- ◆ Verification and attestation, 14%;
- ◆ Project chancellery, 7%;
- ◆ Configuration management and quality maintenance, 7%;
- ◆ Guide and regulation development, 6%.

Different methods are used to estimate real software creation cost. M.Newell divide them into two groups:

- ◆ Cost assessment methods in early project stages, when information about project is very limited.
- ◆ Cost assessment methods in lowest project levels, and then summarizing costs in higher synthesizing levels to get cost assessment (budget) of all project.

Modern de facto standard cost software development assessment - COCOMO II model belongs to the latest group. In general, in COCOMO II there is assessed value of project complexity in functional points, its complexity in

the code level, determination of costs for software development in man-hours.

ROI method is a logical addition to TCO method; it allows us to evaluate return on investment. The idea of method is ROI index calculating, that is relation of net profit to total costs.

In turn, using one after another methods TCO и ROI can have prolongation as net present value assessment - NPV index. In NPV method present value of every cashflow, input and output, is computed. At the same time all discounted values of cashflow elements are assumed and NPV criteria is calculated. The defect of NPV methods are assumptions about cashflow transfer to projected time end and rate invariability during all investment period.

Frequently in the net present value identification there is an unforeseen costs assessment problem. Imitation modeling allows us to calculate and assess the probability of occurrence of such costs. The Monte-Carlo stochastic modeling method is most widespread.

The annual cashflow, in generating random numbers, appears as certain random number, being under a certain distribution law. But in fact, it is an aggregate index, combining many components. Many casual scenarios are generated, and all of them correspond with cashflow values. Generated scenarios combined together and take place their statistical processing to ascertain scenario percent, which assumed as negative NPV value. These scenarios relation to total scenarios number give us risk investment value (project risk), which we need in TCO method.

So, on basis of allowed costs value, payback period and returned money value, received by using one after another methods TCO, ROI, NPV, COCOMO II, we establish restriction system, applied by enterprise as allowed and purposeful in ICT comparison.

## **3. Assessment profitability and effectiveness of introduction and using.**

To assess the effectiveness of ICT we suggest effectiveness introducing and using indexes, such as allowed downtime, allowed cost exceeding level, production plan execution, connected with these ICT. We set their allowed and optimal for the enterprise values. Real coefficient values are calculated in the case of ICT

acquisition and using decision, taking into account all costs and possible revision.

Assuming what we have considered, it is necessary to note, that using the complex of discussed method allow either greatly decrease the variety of ICT acquisition and (or) software revision, or reveal defects in enterprise IT-infrastructure, and point out the purposes to raise the enterprise management effectiveness.

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