Experimental use of CIS model

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Abstract. The development of CIS model is significant both for the development of CIS from scratch and for the introduction of new functionality. It is also useful to have such a model for projects that replace one CIS with another. The lack of a correct CIS model can lead to an incorrect functional model of integrated solution, incorrect data model and the choice of incorrect integration method. It results in unsuccessful project.

1. Introduction
The CIS model has a very important function - it allows connecting different approaches - a technical, user, business approach, and being used as part of the process of “special training of users and system maintenance personnel” mentioned in the regulatory documentation [2]. The problem of the gap in understanding the object of integration is that there are technical specialists, users and business consultants, and all of them look only from their own point of view. This approach was justified several decades ago, when information systems required specialized knowledge and, after a technical examination, it was recommended to proceed immediately to the drafting of the terms of reference.

Nowadays such models that can convey the necessary information without requiring specialized knowledge from the recipient are required. In this regard, the basic CIS model is extremely useful. The comprehensiveness of the model is not so important [3]. Its adequacy is important. It is better to have one and simple model than many sophisticated, methodologically modern, but not very useful.

2. Purpose of the experiments
The experiments were carried out in projects at industrial enterprises. The purpose is to determine the ability not to create basic CIS model in system integration projects as well as determine the usefulness of CIS model and the practical value of CIS model development in system integration projects.

3. Results
IT specialists who were not involved in the projects were invited to create a CIS model (Fig. 01) and a solution concept based on data from a pre-project survey provided by the project teams. The experiment used data of 7 projects, 12 people participated with experience from 3 to 17 years in in projects of CIS development.
At the first stage, the participants were not informed what is meant by the CIS model. The result is a flow diagram or hardware-software architecture of a solution. Only one scheme out of 7 projects allowed the implementation of correct solution (Fig. 02).

At the second stage, the participants were explained what is meant by the CIS model. The result is a hardware-software architecture of a solution based on CIS models. In all projects, solutions were proposed to ensure the correct implementation.

At the third stage, the possible implementation risks were considered according to the results of the first stage (the most revealing examples are given below in Table 1-3). In general, they coincided with the real results of the projects.
At the final stage, the participants offered their own examples, and as a result, an opinion is developed that on projects with a small number of available systems, it is possible to immediately create a hardware-software architecture that will serve as the basis for the project. However, on projects with a large number of available components, the creation of a CIS model showed undoubted utility, which can even be counted in money.

Despite the apparent simplicity, the CIS model allows filling the gap between the technical approach to the project, when developers immediately go deep into the technical details and the customer’s approach, which takes into account such things as the distribution of functionality between existing systems and their correct allocation in the IT infrastructure as minor technical problems that can be easily eliminated. As practice shows, this is not that. Usually problems in such cases are identified when a lot of effort and time has already been spent.

Table 1. Example 1

| Project: | Integration of a process visualization system in MES |
|---------|-----------------------------------------------------|
| CIS model | Was not developed                                  |
| Losses | 112 people \ days, delay in start-up - 6 months |
| Associated problems | It was assumed that the data for the visualization of processes could be taken from MES, where aggregate traceability was organized. This assurance was based on the fact that the contract clearly stated that the Customer would provide data from MES. However, it turned out that there is no MES system as such; there is MES functionality implemented within the framework of monolithic CIS. The CIS developer refused to provide data for visualization. The receipt of data was organized from the level of the process control system, which required the agreement with the control system supplier, the refinement of the functionality and processing of the interfaces. |

Table 2. Example 2

| Project: | Integration of electronic document management system Humming Bird in CIS |
|---------|------------------------------------------------------------------------|
| CIS model | Was not developed                                                      |
| Losses | 400 people \ days, 4 million rubles, the project was cancelled |
| Associated problems | It was assumed that in order to determine the routes of documents, the electronic document management system will be integrated with the staffing module in the HRM system. During the implementation, it turned out that the HRM system is an inseparable module of a monolithic CIS and can not be modified to meet the requirements of the implemented EDMS. Humming Bird supplier informed that its product also can not be modified. Possible solutions were considered too costly and risky for CIS in general. The project is closed. |

Table 3. Example 3

| Project: | Integration of customer order tracking system in MES |
|---------|------------------------------------------------------|
| CIS model | Was not developed                                  |
| Losses | 734 people \ days, delay in start-up - 8 months |
| Associated problems | Initially, it was stated that MES has a system for tracking orders, it was demonstrated how to use it in the planning department (ERP level). In fact, it turned out that there is no order tracking system, there is just a PC interface through which data is entered into the CIS and displayed in the CIS. The correctness of the data was 37, 2%. |

4. Conclusion
The general conclusion is that the development of the right CIS model significantly reduces project risks. The disadvantages of the traditional “professional” approach to the development of CIS models
can be noticed in projects for the integration of the production and general managerial level of activity. It is expected that it is the combination of these two levels that increase the quality of work of enterprises. Some of the existing projects confirm this, as well as the increase in the number of similar projects. It also concerns the next qualitative transition in corporate governance, which will be possible on the basis of information technology. However so far, the old paradigm has not been fully exhausted and the number of failed projects is quite significant. This is due, to the fact that for many years the IT levels of production and enterprises have developed quite apart. This is not a random collection of facts

References
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