Support service information model for information systems
enterprise management

Olga V Kondratieva, Andrey Yu Gulevitskij and Elena A Frolova
Saint Petersburg State University of Aerospace Instrumentation, SUAI, 67, Bolshaya
Morskaia str., Saint-Petersburg, 190000, RUSSIA

E-mail: kondratievao@mail.ru

Abstract. In the process of service support simulation of enterprise management information
systems, it is necessary to break the process into several components: a significant stage of the
enterprise management systems life cycle and service support as a main part of the overall
process, types of work, why do we need service and results of his work. The article discusses
connection between types of work with the stages of the service life cycle, as well as the
connections between "reasons - work - result", which gives a systematic view on the service
and allows you to model the structure of indicators of service quality and create risk catalogs,
taking into account the features of the support service.

1. Introduction
The object of research in this article is the Enterprise management information systems (ISUP) which
is one of the most striking examples of technologies rapidly developing in post-industrial society that
stands at the intersection of IT technologies and services. It is critical to create an adequate
information model of the service at different stages of the life cycle to assess the quality of the service.

The subject of the research is the procedures of the ISUP support service, their standardization and
evaluation in market conditions based on the principles of end-to-end integrated quality management
and the provisions of Total Quality Management (TQM). The main goal of the study is to develop a
state and dynamic information model of the ISUP support service.

The relevance of a detailed study of the ISUP service support quality is based on the need to build a
service information model to create a structure of quality parameters and risk assessment in the field of
quality [1]. That is the main problem of this article.

2. Interrelation of work types and service life cycle stages
ISUP maintenance is a service consisting in the installation and configuration of the ISUP system,
advising users of different levels to work with already implemented the ISUP system, user training,
registration of errors, suggestions for improvement, modification or adaptation of the ISUP system,
preparation of tasks to the programmers and their implementation to change specific ISUP, the
archives, copies of databases in ISUP, the services for protection of information in ISUP [2].

We can distinguish the following types of work to support ERP systems:
Table 1. Types of work of the ISUP support service.

| Stage number | Name   | Description                                                                 |
|--------------|--------|-----------------------------------------------------------------------------|
| 1            | Regulation | Training of support staff, writing and registering instructions for working with the system, internal and organizational work |
| 2            | Consulting | Consulting within a standard working system, without errors or the need for improvements |
| 3            | Training   | Users training, rendering of information services (new users or new features of the system training, problem of the changing sending in the new version) |
| 4            | Errors     | Errors registration; requests for improvement; modification; existing ERP-system adaptation |
| 5            | Changes    | Preparation of tasks for programmers and their implementation within the framework of support; |
| 6            | Transmission | Handling errors and improvement requests that are not part of support (for example, submitting a request to the business analysis Department to start a new project or replace an existing system with a new one) |
| 7            | Testing    | Testing of improvements, new schemes of work, system updates, including participation in projects that have not yet been transferred to support |
| 8            | Archives   | Archives and copies of ERP-systems databases work                            |
| 9            | Access     | Information security services, setting up access and user rights and working with licenses |

Like any service activity aimed at customer satisfaction, it has a number of features. Thus, the principle of validity is always significant, but not always dominant. As the standard of living and welfare increases, the demand for secondary services that cover social needs, based on the value system and worldview of the consumer increases [3]. For now, society has a need for better services, at image of the service company increase, at focus on specific key individuals increase, focus on their preferences and other secondary factors, which is fully consistent with the concept of post-industrial society.

Most modern enterprises use ISUP, which main element is ERP (Enterprise Resource Planning) systems. The life cycle of any ERP system has six main stages: selection, implementation, adaptation, operation, completion, archiving [4].
Implementation of the selected ERP System in enterprises. Formation of a single information field.

1. Choosing an ERP system
   Analysis and comparison of competing systems

2. Implementation
   Implementation of the selected ERP System in enterprises. Formation of a single information field.

3. Operation
   Commercial operation of ERP system

4. Adaptation
   Adapting ERP to changing conditions

5. Completion of operation
   Preparing data for migration to another system

6. Архивирование
   System data archiving. Organization of storage and access to the archive

Figure 1. The life cycle of an ERP system.

The main component of the stage of operation, adaptation and archiving affects the ISUP support service. For the purposes of modeling it is advisable to divide into stages of the life cycle [5], presented in table 2.

Table 2. The main stages of the life cycle of the ISUP support service.

| Name  | Description                              | ERP system life cycle stage |
|-------|------------------------------------------|----------------------------|
| A     | Integration                              | Transition from integration to operation stage | 2 |
| B     | Operation                                | Operation                  | 3 |
| C     | Modification                             | Adaptation and change      | 4 |
| D     | Improvements registration                | Improvement accept         | 3,4 |
| E     | Archives                                 | Archiving, working with archives; | 6 |
| F     | Changeover                               | Changeover to the new system | 5 |
Let’s take a look at connections between the types of support work and the life cycle stages of ERP systems [3].

**Table 3. Interrelation of the type of work and stages of the system life cycle.**

| №  | Type of work/Stage | a | b | c | d | e | f |
|----|--------------------|---|---|---|---|---|---|
| 1  | Regulation         | v | v | v | v | v |
| 2  | Consulting         | v |   | v |   |   |   |
| 3  | Training           | v | v |   | v |   |   |
| 4  | Errors             | v | v | v | v |   |   |
| 5  | Changes            |   | v |   | v |   |   |
| 6  | Transmission       | v |   | v |   |   |   |
| 7  | Testing            | v | v |   | v |   |   |
| 8  | Achieves           | v | v | v | v |   |   |
| 9  | Access             | v | v | v |   |   |   |

3. Interrelation of the reasons, types of works and the received results of service

To analyze and build a service model, it is necessary to understand the reasons why the service is needed and the results obtained by the service.

The main reasons for the need to support ERP systems [6] and the results of the service [7] are presented in the table.

**Table 4. Reasons and Results of ISUP service support**

| Reason code | Reasons                                                                 | Result code | Results                                      |
|-------------|-------------------------------------------------------------------------|-------------|---------------------------------------------|
| Π1          | The emergence of new users. They need to be registered in the system, it is necessary to configure the appropriate rights and accesses, train them | P1          | The need in new projects                     |
| Π2          | Changes in external requirements that require changes in functionality in all ERP systems, for example, changes in the tax legislation of the Russian Federation | P2          | The need to replace the system               |
| Π3          | Changes in internal local requirements. For example, changes in the accounting policy of the enterprise | P3          | Save on the support of organizations that have been implemented ERP-systems |
| Π4          | The emergence of new technologies, industries or equipment that affect the ERP system. For example, the ability to work with mobile devices, cloud technologies or purchase powerful servers | P4          | Effective pricing, the ratio of monthly fees and one-time work, economic feasibility |
| Π5          | The presence of “bottlenecks” in the system itself. For example, if the system does not support the correct operation of operations on raw materials and there is a need for manual adjustments | P5          | Image of the company support that engaged in the support and implementation of ERP systems |
| Π6          | The need to support standard operations. For example, rare or controversial, when the user does not understand what kind of standard function is better to use | P6          | The development of the ERP system in support |
| Π7          | ERP system support in working order. For |             |                                             |
example, routine work on archiving the working database, its convolution, work with database servers that require special skills.

It should be understood that the service’s main goal is satisfy the needs of the Customer [8] and is caused by a number of reasons. To meet the needs of the work performed, which can be grouped by type. After the execution of the service, the Customer receives the result.

The relationship of reasons, types of work and results is reflected in figure 2.

Figure 2. Causes and results of service by type of work.

Since ERP support is primarily a service, it cannot be accumulated, although it must be provided on time. Therefore, often the cornerstone is the quality of work in the peak, busy period, which often determines the structure and resources of the service as the service is required primarily stability and predictability.

4. Conclusion
In this paper, we propose an information model of the ISUP support service, which considers the types of work and stages of the life cycle that are critical for assessing the quality of the ISUP support service. The analysis of the reasons and results of the service that reflects the key features of the service.

It should be noted that the analyzed model has several assumptions, as the ISUP support service rather dynamic system, sensitive to external changes and changes of the ISUP systems themselves, that are specific to different industries characteristics. However, in general, the model adequately reflects the processes occurring within the service. The interrelation of the reasons, types of works and results of work of service is demonstrated.

All this makes it possible to form reliable, significant areas of quality assurance, model the structure of indicators and allows you to catalog the risks of loss of quality for support services ISUP.
References

[1] Stepanov A G, Smirnova M S, Kopychev V A 2010 Definition of the priority processes Questions of radio electronics 1 (1) 108-13

[2] Frolova E A 2011 Evaluation of the quality level of complex technical systems at the development stage Radio electronics issues 1 (3) 173-8

[3] Tushavin V A, Semenova E G, Smirnova M S, Frolova E A 2015 Comparisons of qualitative assessments of employees work by randomized indicators of employees work by randomized indicators ARPN Journal of Engineering and Applied Sciences 10(16) 7280-7

[4] Kondratyeva O V and Kondratyeva O A 2018 Reengineering of ISMS support service processes in the context of modern approaches to improving the quality of services Decision 1 151-3

[5] Kondrateva O V 2015 Qalimetric approach to calculating Quality indicator of ERP users support Modern informatization problems in economics and safety Proceedings of the XX-th International Open Science Conference (Yelm, WA, USA, January 2015). Editor in Chief Dr. Sci., Prof. O.Ja. Kravets. pp 93-8

[6] Yastrebov A P, Korshunov G I and Varzhapetyan A G 2018 Quality management of the processes of development and practical use of software systems Issues of radio electronics 10 93-6

[7] Balashova K V, Fomina A V, Batkovskiy A M, Kalachikhin P A, Semenova E G, Telnov Y F Formalization and elaboration of a company's business strategy 2018 Problems and Perspectives in Management 16(3) 80-91

[8] Tushavin V A Evaluation of the IT processes quality using randomized indicators 2015 Modern informatization problems in economics and safety Proceedings of the XX-th International Open Science Conference (Yelm, WA, USA, January 2015). Editor in Chief Dr. Sci., Prof. O.Ja. Kravets 127-34