

Information and Analytical Monitoring Support of Procurement for Public Control

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Abstract

The article is devoted to questions of using automation services for social control in the field of public procurement. For the purposes of information and analytical support to the procurement monitoring evaluated official site of the Russian procurement contract system for examination how the parameters of the site meet the objectives of social control. The article presents a model of such automation service and analytical support for monitoring public procurement control purposes. Areas of research include the implementation of measures of social control in the planning, procurement, placement of contracts.

Keywords: Information and analytical systems, automation of control processes, monitoring, procurement, public control.

INTRODUCTION

Services and applications of information and analytical support of social control are quite common in a world where society feels entitled to at least keep track of the news flow in the interests of social relations, and sometimes even to take part in government management. At the same time, the procurement is not transparent enough for public control's purposes. Procurement management is traditionally considered a sphere of interaction customers and suppliers in the control authorities. In this regard, most created services to provide information and analytical support of the procurement procedures, designed to meet interests of participants and

customers in procurement. The reason for this should be considered as non-profit public procurement monitoring activities.

However, admittedly social control aims at identifying corruption and corruption-factors, and the state should pursue the policy, which will contribute transparency and effective access to information [1, p. 13]. Public involvement in monitoring procurement can help improve mechanisms of state control, providing objective and at the same time professional monitoring [2]. In this context, efforts to develop services and applications aimed at the information and analytical support for monitoring procurement puts into practice the principles of openness, transparency and competitive procurement [3].

MATERIALS AND METHODS

Source of analytical information for monitoring procurement for the purposes of social control can be centralized and decentralized information resources and another one that provide official statistics, various classifications and standards. This research was conducted taking into account the specifics of the contract system in Russia. Due to Russian contract system was based on the methodology and experience of contract systems in the US, UK and France, the solutions proposed in the current study can be adapted to the characteristics of different monitoring systems procurement.

The research was conducted in two stages. At the first stage, parameters of the official website Union Information System (UIS) in the field of procurement were assessed to ensure state and municipal needs (<http://zakupki.gov.ru/>). There were 2 groups of evaluation criteria: evaluation of the site's information architecture and evaluation of site's functionality.. At the second stage, there were formed the model of information and analytical service for public procurement control purposes. To build the model used in ER-diagrams (Entity-Relationship) logical data models IDEF1X notation for the various phases of design services for procurement monitoring.

Weighted criteria values of UIS are given in Table 1. Evaluation of information architecture was carried out according to 25 criteria, assessment of functional capacity – to 20 criteria. Weighted values were established, depending on the extent to which the criteria meet the objectives of the activities of public control in the field of procurement (monitoring and public discussions). It takes into account that the site parameters can be fully or partially meet the evaluation criteria, and may not fully comply with them. Permissible to consider the average value at which the data is partially meet the criterion. This means that this site option is not fully meet the objectives of social control, however,

contributes to the function of informing about the ongoing procurement stakeholders.

Table 1: Weighted values of evaluation criteria of the official website in the field of public procurement

Group evaluation criteria	The minimum value (the data does not meet the criteria)	The average value (data partially meet the criteria)	The maximum value (data fully meet the criteria)
Criteria to assess the site's information architecture	0	1	2
Criteria for assessing the functionality of the site	0	2	3

The evaluation was conducted on the site parameters in 2014 and 2016, the dynamics of the values presented in Tables 2 and 3.

Table 2: Values of evaluating the information architecture of the official website of the ERC in procurement

№	Criteria to assess the site's information architecture	The value (2016)	The value (2014)	Maximum
1.	Full name of the site	2	2	2
2.	The abbreviated name of the site	2	0	2
3.	Availability tab "Home"	2	2	2
4.	An indication of the name of the body (organization) regulating the operation of the site	2	2	2
5.	The version number of the site	0	2	2
6.	Link to this page (coordinates, contact) Technical Support	2	2	2
7.	Survey responses are often guided appeals	2	2	2
8.	Site map	2	2	2
9.	Link to the legislative acts regulating the sphere of public procurement	2	2	2
10.	Link to technical regulations Site	2	2	2
11.	Links to the official websites of the regulatory and supervisory bodies	2	2	2
12.	The presence of the transition to the main page	2	2	2
13.	Available on every page of the site of the main navigation menu	2	2	2
14.	The presence Forum on the work (maintenance) Site	0	0	2
15.	Available version for the visually impaired	0	0	2
16.	The presence of the main sections in foreign languages	0	0	2
17.	The presence of contextual search function on all the information posted on the website	2	2	2
18.	The presence of contextual search function on all the information posted in the website section	2	2	2

19.	The presence features enhanced site search	2	2	2
20.	The presence search functions database of legislative and regulatory acts, posted on the website	2	2	2
21.	Access information objects for search by external search engines	2	2	2
22.	Dividing a site into sections in areas of procurement cycle	2	2	2
23.	The presence library (templates) public contracts	2	2	2
24.	The ability to transition from procurement cards to purchase documentation	2	2	2
25.	The ability to move from card purchases to the state contract for the purchase of	2	2	2
	TOTAL:	42	42	50

Based on the results presented in Table 2, it can be seen that the information architecture has practically not changed during the analyzed period. By the absolute advantages of information architecture of the site can be attributed advanced search and site navigation system. It makes possible to increase the efficiency of procurement activities and monitoring to reduce the time to process the data from the site. Accommodation and visualization of data on the site and do not create any obstacles to the implementation of social control function. As drawbacks site marked low level of site

service, which, while maintaining the basic function of informing, also creates the conditions for scaling audience of the site users and improve its image. It is about opportunities such as support for offline users, the development version for the visually impaired, the availability of the basic information in a foreign language. There is no reason to believe that in the next few years, the site will develop data service areas, currently the development of the site is in the direction of expanding its functionality. The results of evaluation according to the site parameters presented in Table 3.

Table 3: Values of evaluation features the official website of the UIS in procurement

No	Criteria for assessing the functionality of the site	The value (2016)	The value (2014)	Maximum
1.	Availability of documents public procurement planning (procurement plan for the calendar year, and (or) over a longer period)	3	3	3
2.	The presence public procurement registry	3	3	3
3.	The completeness of the procurement card information (purchase options - method of placement, price, terms of placement, information about the customer, providing information about the application and execution of the contract, the advantages and limitations for the participants and otherwise)	3	3	3
4.	Availability of documents for the procurement (technical documentation, the draft contract) in a format suitable for reading, copying, downloading	3	3	3
5.	Availability of documents to explain the procurement documents	3	3	3
6.	Availability of documents for procurement, as amended, and of non-editions (documents, make changes to the documentation)	3	3	3
7.	The presence information on the progress of the procurement procedures (event log)	3	3	3
8.	Availability of documents on the work of the Commission (minutes of opening, examination and evaluation of bids (offers) participants purchase)	3	3	3
9.	The presence information about the commission of the state customer (minutes of the commission)	3	3	3
10	The presence information on the use of cost and non-cost criteria for assessing applications (proposals) participants	3	3	3
11	The presence record public committee meeting customer	0	0	3
12	The presence a video meeting of the Commission of the state of the customer	0	0	3

13	The presence concluded the registry (executed, divorces) public contracts	3	3	3
14	The presence the registry of submitted applications (complaints, requests, protests) in the control bodies	3	3	3
15	The presence registry scheduled and unscheduled inspections of control bodies	3	3	3
16	The presence a registry of public clients report	3	3	3
17	The presence of unscrupulous vendors register	3	3	3
18	The presence of documents on the results of control measures (decision or determination of control bodies)	3	3	3
19	The presence information about the digital signature of procurement documents	3	3	3
20	The presence information about the conduct of the activities of public control (public comment)	2	0	3
	TOTAL:	53	51	60

Analyzing the results of the assessment site, it should be noted that the functionality is very large. You can get information about buying throughout the procurement cycle, to work with documents on the procurement and contracting. As the direction of the functional site, we would like to note the relevance of information about the connection with the procurement of the procurement plan and a list of budget expenditures. Now the user has to compare the data card purchases and procurement plan of the customer, and is not aware of the connection with the procurement of public expenditure. This functionality will provide visualization of data from the moment of placement of purchase information, and from the time when the state budget allocated for the implementation of public tasks.

Despite enough high site's functionality, it does not possible for large-scale monitoring of public control purposes. For example, the user has to accumulate information about individual customer purchases or purchasing a particular product manually. In this case, user has to open each purchase card, every contract and contract's details. Website adequately provide information and ensure the function of suppliers to participate in the purchase, but for the purposes of social control, which is required, this functionality is not enough.

By the way, all data of site are stored on FTP-server placed at: <ftp://ftp.zakupki.gov.ru>. The information format on FTP is not available for usual users, as it requires specific skills and knowledge of data analysis and SQL. FTP (short of File Transfer Protocol.) - one of the protocols on the Internet, which performs the following functions:

1. Files sharing.
2. Simplifying the exchange of data and indirect use of remote computers through software.
3. Eliminating differences in the provision of data between network nodes of different architectures.
4. Reliable and efficient data transmission.

All files are in XML format and they contain tags and attributes. FTP contains several data catalogues. All files in one catalogue have similar structure and contains similar identifications. Data from FTP can be consolidated in table

and diagram view. This data can be more informative for analysis in the purposes of social control. To work with such data additional information service is necessary.

Created information and analytical service for support procurement monitoring provides the following tasks:

- *monitoring the implementation of the separate purchase of parameters that includes:*
 - monitoring of the parameters of the proposed purchase before the official publication of a procurement notice;
 - monitoring parameters of placement of purchase until the conclusion of the contract;
 - monitoring parameters of the execution of the contract until its completion.
- *research of the monitoring results for the sample parameters for the consolidated list of purchases:*
 - analysis of procurement individual customer (sample parameters procurement) in the planning, procurement and placing of contracts;
 - comparative analysis of the procurement group of customers for the sample parameters (the subject of procurement, the maximum value, the cost of the contract, the purchase of the region and other);
 - analysis of the reasonableness of procurement (calculation of the cost of procurement, relevant planning documents).
- *conformity assessment of the customer's procurement principles of openness, transparency and competitiveness:*
 - analysis of the parameters of the procurement documentation to identify provisions restricting access of participants;
 - study of documents prepared by the Commission of the customer in the process of review and evaluation of bids;
 - analysis of the provisions of the contract documents and its implementation;
 - participation in the procedure of public discussion of procurement.

These monitoring tasks purchases are not comprehensive, but represent the most complex problems of public procurement control. To solve them we need access to information and work with analytical data from various resources. During the collection of information subject of social control (monitor) is faced with the problem of the availability and adequacy of data for monitoring. It explains the need for service that accumulates data from various resources; process them according to the user requests. As a result, the user has the ability to generate reporting data monitoring and dispose of them at its discretion.

In general, the service is designed to reduce monitoring, human, time, and information processing costs [4]. When subjects of public control are using such service, it increases efficiency of monitoring in all directions: the analysis of compliance with legislation, identifying corruption risks and assessing the effectiveness of procurement. Designed service collects data from a centralized procurement website and also contains data Classification of Economic Activities and classifier range of goods, works and services. This service has the following characteristics:

- ensuring the collection of data on the parameters defined by the user in the on-line via the Internet;
- support for different types of data collection forms to the user's choice: fixed forms, dynamic forms, forms for creating registries and other;
- support versioning of data selected by the user, allowing changes in the form and fill with the correct data centralized procurement site;
- ensuring the safety of your personal account settings, history and search results;
- the possibility of setting an arbitrary workflow fill in the request form;
- visualization of process control data collection and consolidation in the parameters defined by the user;
- visualization of data points on the parameters defined by the user in the form of tables, charts, electronic map;
- ability to implement any methods of analysis and evaluation on the basis of data collected;
- support plates to display the collected data upon request, the results of their consolidation and processing;
- the possibility of using the Report Designer to format the results;
- the ability to integrate with other information systems through the mechanism of web-services.

Designed service allows the user to handle data at all stages of the purchase: at the planning stage, placing the procurement and execution of concluded contracts.. The data resource is centralized state procurement website, which contains consolidated information from primary sources of data (data that fills the customer). The data is transmitted in the form of XML-documents in electronic form via telecommunication channels "Internet". When information interaction service

with centralized government procurement website scheme is used in the data format XSD (XML Schema Definition).

This approach is characterized by greater efficiency than when you create a separate database. As a result, of the hierarchical structure of the monitoring system allows the user to cut all resources spent on monitoring. Information on the service is consolidated based on the work of relational data in real time (ROLAP, Relational On-line Analytical Processing). This allows for a multivariate analysis using the technology of relationship data warehousing and semantic modeling.

At different stages of modeling service for monitoring procurement were created conceptual and logical data models, united by common principles methodology "entity-relationship", while the second level, each model specifies the model of the first level. Here are ER-diagrams (Entity-Relationship) logical data models in IDEF1X notation for the various phases of design services for procurement monitoring.

RESULTS AND DISCUSSION

Figure 1 shows the conceptual model of first level, which reflects the structure and content of the complete cycle of monitoring of purchase. The model illustrates the range of options available to the user. Sampling parameters depend on the arrangement of the user. Type of communication "many-to-many" normalized by introducing a model of the essence of "organization", the essence of the "electronic marketplace". The model reflects the order of interaction between entities by establishing identifying and identifying linkages in the planning, allocation and procurement contract.

Models of the second level were obtained by transforming the logical model of the first level of the hierarchy by aggregating data of the customer and the supplier in the planning, procurement and placing of contracts. Logic models illustrate the second level monitoring of procurement in the planning stages (Figure 2), placement (Figure 3) procurement and contract execution (Figure 4).

To describe a logical model for monitoring the planning phase and normalization of relations procurement "many-to-many" introduced additional entity - "organization", "base procurement", "qualifier".

In the description of the logical model for monitoring the placement of procurement introduced normalizing essence "electronic marketplace", it eliminates the need for identifying relationships between entities "supplier - trades" and "customer - Sales." The figure does not disclose the tendering process for all procurement processes for placement. This is explained by the fact that there are features of placing procurement, the national legislation that does not allow us to determine the universal characteristics of the model monitoring procedures. In this case, the documents (protocols), compiled by the Commission for procurement is the only source of information for monitoring to public scrutiny.

Description of the model monitoring phase of the contract is completed essence of the "results of execution of the contract", which normalizes the communication "many-to-many" and eliminates from the model parameters describing the actions of regulatory authorities to monitor and audit procurement. This effect is due to the fact that the subject of

public scrutiny is only summary data for the year generated by the supervisory bodies, and placed in the public domain. In this case, the query parameters are limited by the content of the report at runtime customer contracts.

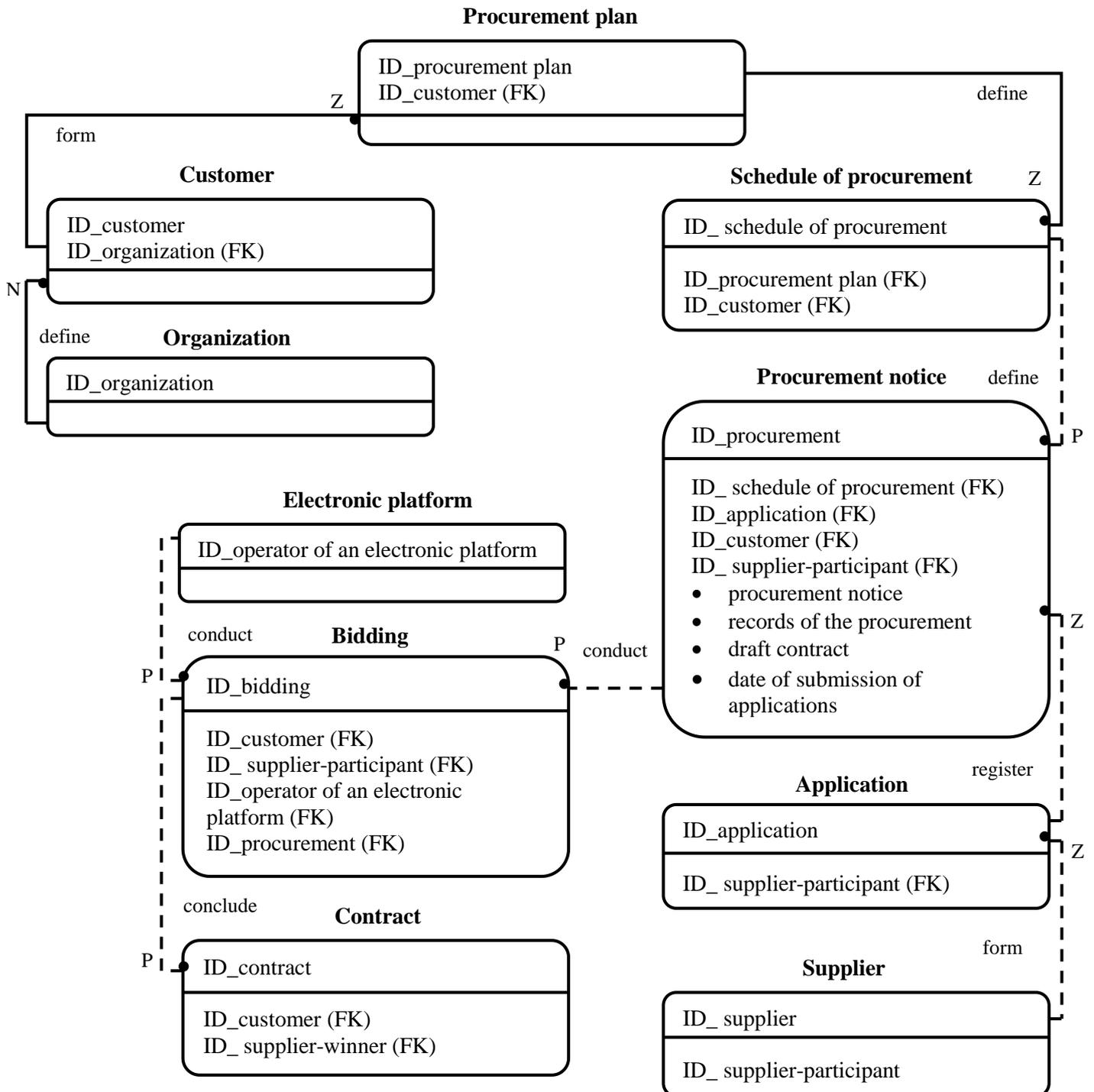


Figure 1: ER-diagram of the conceptual model in the notation IDEF1X "monitoring procurement"

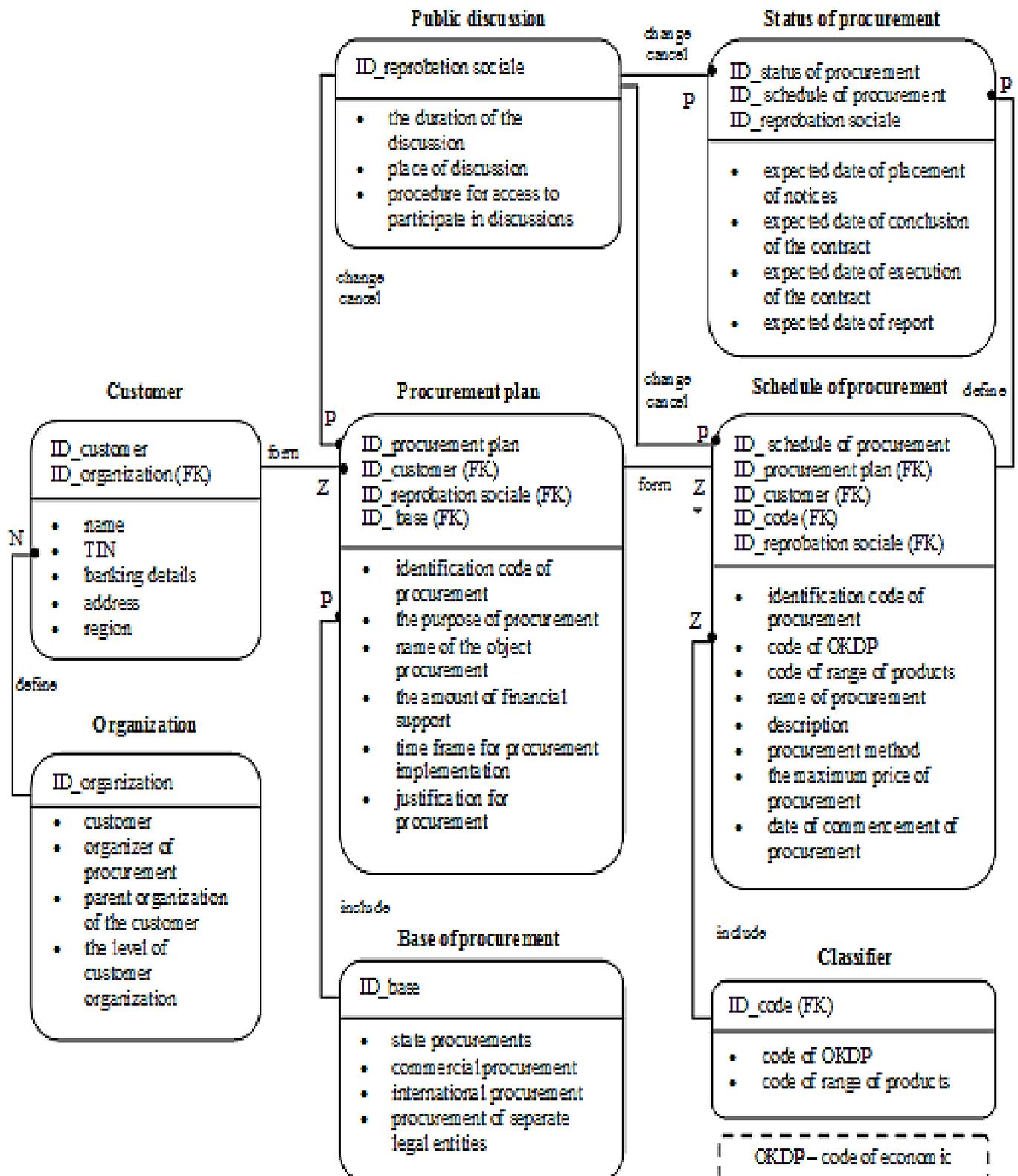


Figure 2: ER-diagram logic model notation IDEF1X "procurement planning"

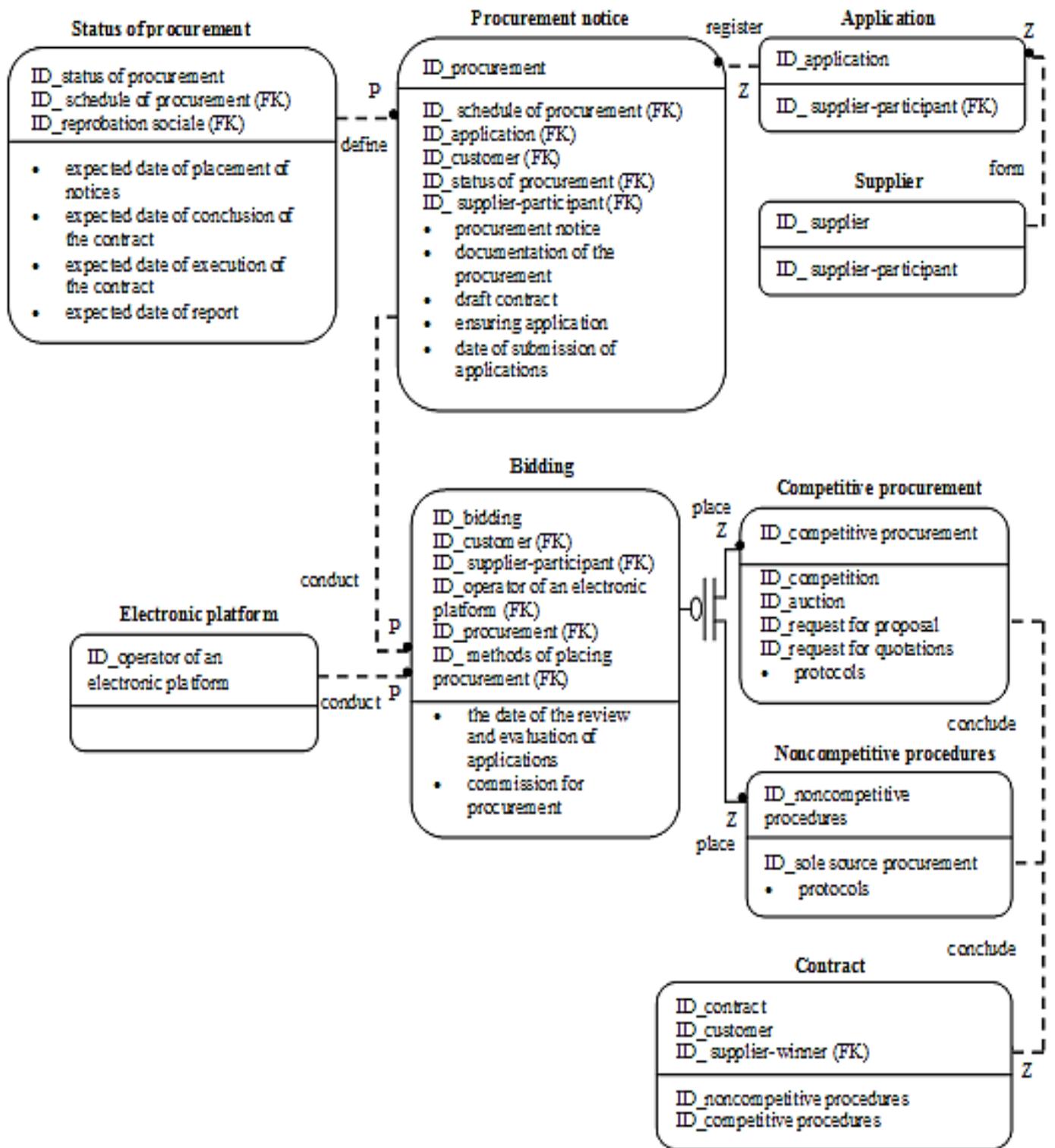


Figure 3: ER-diagram logic model notation IDEF1X "accommodation procurement"

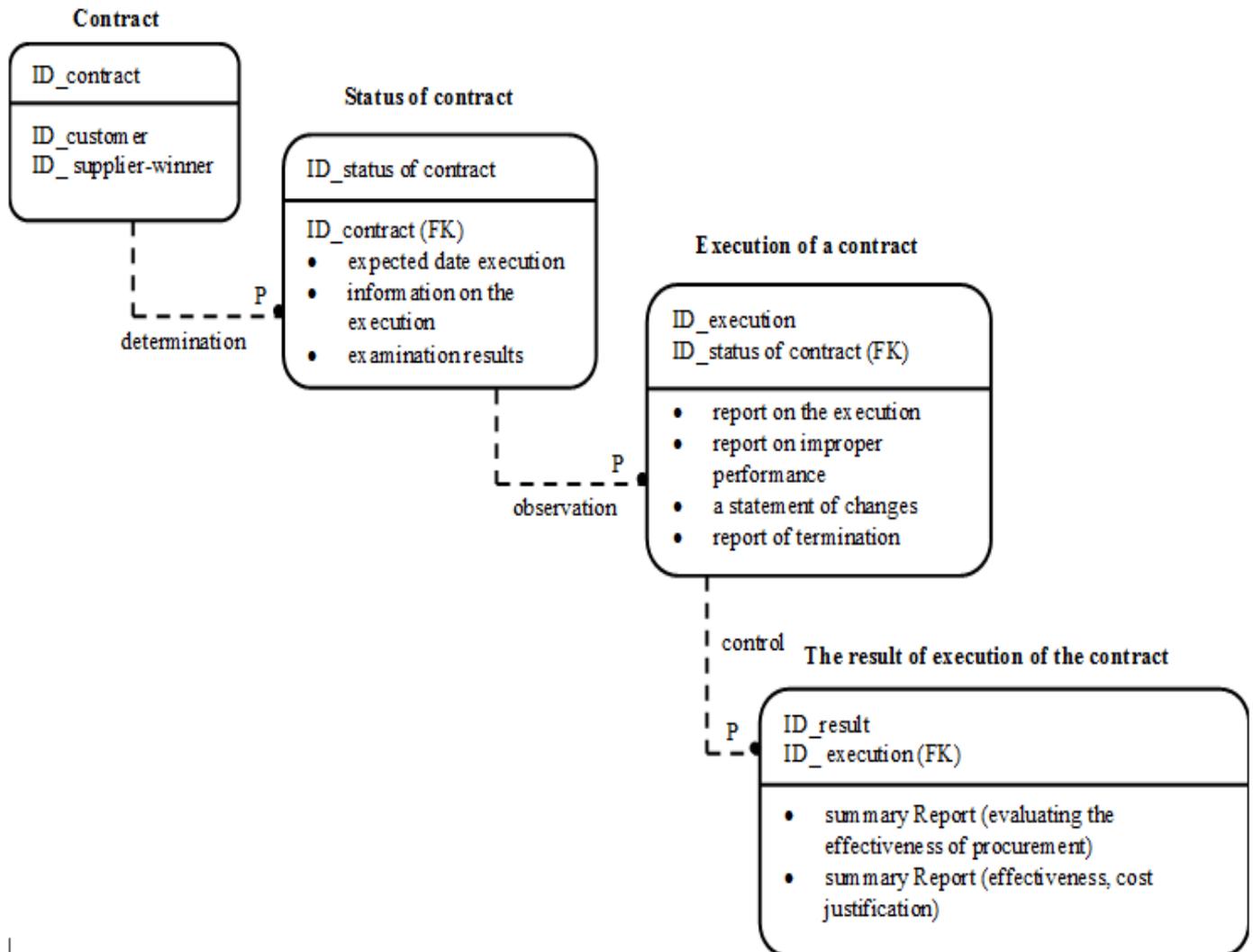


Figure 4: ER-diagram logic model notation IDEF1X "enforcement of contracts"

FINDINGS

Designed service for procurement monitoring support are the result of the research infrastructure of information and analytical system implementation methods of public control in procurement. The service was designed in accordance with the terms of reference for the design of information and analytical basis, which is based on data warehouse technology. The source of that data is centralized official site for providing procurement information.. This service will provide information support management in decision-making for the development and optimization of the public procurement system (including e-procurement) [5], as well as monitoring of procurement for the purposes of public control.

REFERENCES

- [1] "The United Nations Convention against Corruption" (adopted in New York 31.10.2003 Resolution 58/4 on the 51st plenary meeting of the 58th session of the UN General Assembly).
- [2] Integrity Pact in Public Procurement. An Implementation guide // Transparency International. URL: http://www.transparency.org/whatwedo/publication/integrity_pacts_in_public_procurement_an_implementation_guide (the date of appeal:17.12.2014).
- [3] Public Procurement. Topic Guide // Transparency International. URL: http://gateway.transparency.org/files/uploads/Public_Procurement_Topic_Guide.pdf (the date of appeal: 17.12.2014).
- [4] Hans de Bruijn, Performance Management in the Public Sector, Trans. from English, Institute for Complex Strategic Studies, 2005, 192 p.
- [5] Mamedova N.A, Baykova A.N., Practices and Perspectives of Functioning Electronic Trading System For State And Municipal Needs In Russia, International Journal of Economic Research (IJER), vol. 12(1), 2015, p. 131-143.