Cost-based approach for determining evaluation criteria weights of commercial offers based on the analysis of the total cost of ownership for the product

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Any procurement procedure has stage of commercial offers consideration and evaluation on compliance with the stated requirements. In case of sophisticated products procurement the customer can provide proposals assessment using a scoring system under existing regulations that govern this purchase. In this case prior to the procurement procedure the customer in the mandatory is obliged to determine the criteria that will be an evaluation of the proposed products as well as their weights.

According to the letter of the Ministry of Economy of the Russian Federation of June 2, 2000 №AS-751/4-605 "About "Methodological recommendations for assessment of the tenders placement effectiveness for goods supply for state needs" and " Methodological recommendations for scoring of tender bids and suppliers qualification participating in the orders placing contests for goods supply for state needs" weights indicators of commercial bids evaluation criteria are defined as follows :

Table № 1

№	The main criteria groups	Weighting coefficients
1	Bid price, payments terms, price fixing term taking into account inflation rate, payment means, etc.	0,65 - 0,85
2	Criteria characterizing the form, procedure and terms of goods delivery	0,10 - 0,20
3	The criteria characterizing the functional and performance goods properties	0,05 - 0,10
4	Other criteria	0,00 - 0,05
	Weighting coefficients sum	1,00

These weighting coefficients values are determined without additional evidence and standardized for all kinds of products what sometimes can lead to less efficient commercial bids evaluation. The cost approach is the most effective way to determine weighting coefficients of commercial bids evaluation. This way is based on the analysis of total ownership product cost.

What is «Total Cost of Ownership»? Total cost of ownership is the final costs amount incurred by the product owner after purchase, during the operation and until the end of ownership. Such value calculation is a difficult task because each product will have its own cost structure which definition is not always possible in an explicit form. These costs structure will also vary depending on the product lifecycle stage. Cost determining for some cost items can be made by calculation method. At the same for other items costing can only be predicted by taking into account probability of certain events occurrence. This can cause possible deviation of calculated costs from the actual ones.

Thus the cost approach of commercial bids weighting coefficients evaluation based on total ownership product cost analysis can be determined by the following algorithm:
1. The customer develops technical requirements for purchased products, including power consumption requirements.
2. The customer determines the cost structure of total ownership product cost (increasing or decreasing cost items values are defined in this case). These costs will be further defined as the commercial bids evaluation criteria. The customer also determines the costs directly to the each cost item using calculation method or forecast.
3. Cost percentage for each cost item is weighting coefficients of com-mercial bids evaluation criteria.

The most time-consuming step is the stage of cost items compilation and their cost calculation. All cost items can be divided into two categories - increasing and decreasing. Increasing cost items are the items that increase total ownership product cost. Decreasing cost items include items reducing this cost.

Increasing cost items generally include the following:
1.Product purchasing or renting cost including transportation costs.
2.Other necessary options purchasing costs such as software.
3.Costs of payment making depending on the payment form.
4.Delivery term (in case if it's possible to calculate daily costs incurred till the moment of products delivery).
5.Costs of personnel training to work with the products.
6.Costs of installation, pre-commissioning and commissioning.
7.Costs of purchased products integration into existing production systems, as well as the creation of maintenance facilities park in case if purchased product is not standardized.
8.Management, support and maintenance costs including the necessary staff.
9.Costs for energy consumption.
10.Costs of consumables and spare parts.

Decreasing cost items generally include the following:
1.Technical and operational characteristics reducing energy consumption.
2.Products unification with existing equipment.
3.Term of delivery (in case if economic effect calculating is possible when delivered at an earlier date).

You can most clearly consider this algorithm at the following simple example. The customer needs to expand the office equipment park and buys printers. According to the first stage the customer develops technical requirements for the procured products including the planned printing resource and power consumption requirements for this print resource providing. In most cases the basis is a certain production model in accordance with equipment unification principles. Technical requirements are developed on the basis of technical characteristics of this model. Next let's define the increasing costs items list of total ownership product cost which in this case are:
1.Cost of printers purchase.
2.Costs of creating the maintenance park in the case of not standardized production purchasing.
3.Costs for energy consumption.
4.Cost of consumables and spare parts.

Let's assume that the customer has the necessary staff and he will not hire new staff to manage, support and service purchased printers. He will make production installation and commissioning by himself. The customer will not require other necessary options procurement and personnel training. There is no economic need for delivery at certain time. Participants' offers will be considered in terms of payment upon products delivery. Next let's define the decreasing costs items list of total ownership product cost which in this case are:
1.Products unification with existing equipment in the field of maintenance facilities park.
2.Technical and operational characteristics reducing energy consumption.

Then we determine the cost of each cost item using calculating method or forecast. In addition, each of the decreasing cost items of total ownership product cost is matched certain increasing cost item and takes its value from the cost corresponding increasing cost item. We can draw the following scheme for clarity.

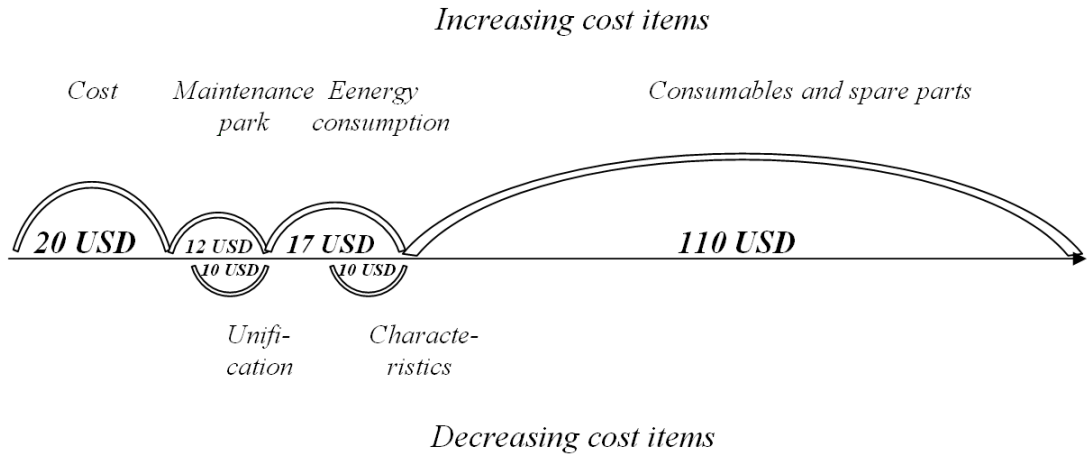

Figure 1: Increasing and decreasing cost items

It can be seen from the diagram that in case of not standardized products purchasing the customer will incur the costs of maintenance park creating equal to 12 USD. In the case of standardized production purchasing, i.e. the printer model that is already in use, these costs will be reduced by 10 USD. Maintenance park is already available for this standardized printer model and customer needs to purchase additionally maintenance means in the amount of 2 USD only for this new purchasing printers volume. The energy consumption costs for basic printer model will be 17 USD. However, there are models with advanced technical and operational characteristics in the market in this category that can reduce energy consumption by 10 USD and spend 7 USD for the necessary printing volume. Thus increasing cost items for maintenance park creating and power consumption are reduced by decreasing cost items corresponding values, i.e. up to 2 USD and 7 USD respectively. Let's tabulate the calculated values of increasing and decreasing cost items and find their percentage structure.

Table № 2

№	Cost items	Calculated items cost, USD.	Percentage structure, %
	Increasing cost items		
1	Cost of printers purchase	20	12,58
2	Costs of creating the maintenance park in the case of not standardized production purchasing	12 – 10 = 2	1,26
3	Costs for energy consumption	17 – 10 = 7	4,40
4	Cost of consumables and spare parts	110	69,18
	Decreasing cost items		
5	Products unification with existing equipment in the field of maintenance facilities park	10	6,29
6	Technical and operational characteristics reducing energy consumption	10	6,29

Next we make a table of commercial bids weighting coefficients evaluation criteria. In this case the cost percentages of each cost item in the cost structure are the weighting coefficients. And the cost items are commercial bids evaluation criteria.

Table № 3

№	Commercial bids evaluation criteria	Weighting coefficients evaluation criteria
1	Cost of printers purchase	0,1258
2	Costs of creating the maintenance park in the case of not standardized production purchasing	0,0126
3	Costs for energy consumption	0,0440
4	Cost of consumables and spare parts	0,6918
5	Products unification with existing equipment in the field of maintenance facilities park	0,0629
6	Technical and operational characteristics reducing energy consumption	0,0629

This table provides commercial bids evaluation criteria and their weighting coefficients calculated using the cost approach based on total ownership product cost analysis. Calculated indicators analysis shows that not initial product cost has the greatest weight in this example but the consumables and spare parts cost which required for scheduled printing resource.

Thus what does this method provide? Of course, this method enables the optimization of cost efficiency according to this costs accounting at all product ownership stages. This is the most rational approach in contrast to the currently available one that takes into account only the production cost at the purchasing stage. As we can see from the previous example where consumables and spare parts cost is significantly higher then the product price, the costs amount at further stages may significantly exceed the purchase cost. However this method has a negative feature. This is necessary calculations difficulty and in some cases not sufficient accuracy of projected costs. So we can use this method only at major cost procurement when it is possible to make accurate cost calculations for the each cost item.