BALANCED QUOTATION ANALYSIS IN IT PROJECTS

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1. Introduction

Large IT projects aimed at change of the basic Enterprise resource planning (ERP) system, infrastructure change and change of supporting software modules like Customer Relationship Management (CRM) are normally started after the Feasibility study has been approved by the top management or the decision based on the corporate strategy has been made by the mother company of a Subsidiary. In any case large IT projects normally start with the pre-contract phase during which a Request for Proposal (RFP) is sent to more potential suppliers. Prior to this stage, specification of the functionalities needed is formulated during internal workshops, specifying complete set of required features to be delivered.

However, the requirements and objectives of the company sending the RFP differ in a rather wide range. Some companies insist on functional requirements and price only, whereas other companies can put stress upon the quality of the project team; others have some pre-requisite targets to follow etc.

In these cases not only functional priorities are demanded. There are also some other criteria, like the number of consultants planed for the project by the delivering party, financial and business stability of the proposing company and its partners in case of Systems Integrator etc. which have to be met. These requirements can be measured by hard or soft assessment criteria in various companies. Therefore it is sometimes difficult to assess the answers to RFP. In case of three to five invited companies this process could be very complex, cause some mistakes and cost time.

A lot of tools and templates are offered to avoid assessment mistakes and to support the activities and criteria used during the quotation assessment e.g. [3], [5], [6]. Most of them use structured approach with up to several hundreds of assessment lines. They support mainly evaluation of individual proposals with a fixed number of criteria. For more proposals to be evaluated and compared, several templates must be fulfilled which makes the analysis time consuming. There is also greater need of editing afterwards in order to present the results to the top management.

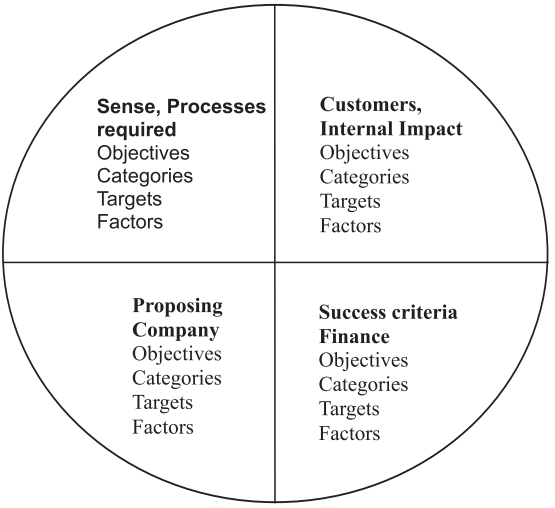
In order to implement more structure into strategic management decisions, balanced scorecard approach developed by Kaplan and Norton is now commonly used. The overall view of this approach has been transparently presented by many authors like Arveson [1] and others. In 2000 Saull [4] proposed a roadmap to effective IT governance using IT Balanced Scorecard by means of benchmarks to measure the efficiency of IT services. In the same time van Grembergen [7] proposed a cascade of Business Balanced Scorecard and IT Balanced Scorecards for the major IT processes as a support for IT governance and IT Business alignment processes. In 2003 Fürstberger [2] proposed similar approach for new business idea definitions with IT support using so called Project-circle.

We modified the approaches mentioned hereinabove and used it for quotation analysis, award decision and later project controlling of IT projects. In section 2 we propose structured Balanced Quotation Analysis approach and in section 3 we define steps and formulas used in the proposal. Section 4 presents example of this methodology based on a large IT project accomplished in one middle sized sales company.

2. Balanced Quotation Analysis

We propose a structured approach to solve challenges mentioned above combined by balancing several perspectives. Why do we prefer balanced approach? In order to give the true picture of the assessment, the parameters and their weights are to be balanced bearing the total picture in mind. The balance should include functional requirements and also other relevant

Fig.1: Balanced Quotation Analysis - perspectives



Source: Arveson and Fürstberger modified by author

perspectives and views. The result achieved shall depict the company preferences as a whole and should be flexible enough to allow for company specifics. The Balanced Quotation Analysis (BQA hereinafter) in this sense could be defined is a set of combined definitions and methods for balanced evaluation of individual criteria set by company sending the RFPs.

The general approach represents slightly modified structure of a typical balanced scorecard. The perspectives used include (Fig.1):

a) Sense of the project -processes required in the new system where the Objectives are overall results expected by the change while the Categories define required functionalities. The Targets specify if the functionality required is a „MUST" (KO criterion), needed („IMPORTANT") or nice-to have („OPTIONAL").
b) Internal impact perspective shows general Objectives in the internal process to support customer needs, end user structure and objectives of the concern politics if they exist. The Categories include assessment views like fulfilling the concern templates, time planning, conditions of support, data migration and its impact on the daily business, education concept and other. The Targets define the expected quality of the Categories. This perspective represents the general IT-Business alignment view.
c) Success criteria in financial part is a typical view of target Objectives and Categories like project price, proposed maintenance costs, hardware and other costs measured by financial units compared to the Targets decided in previous project steps (Feasibility study).
d) The Proposing company perspective describes characteristics and expected properties of the proposing company as general Objectives, and Categories such as its attitude to the RFP (reaction on the RFP), availability of software modules for add-ons needed, team structure, necessity to invite subcontractors, references etc, whereas Targets define the requirements „MUST", „IMPORTANT" and „OPTIONAL" again.

The Factors in all perspectives represent assessment points (grades) and their weight in the assessment.

In order to realize the BQA procedure a software tool supporting multi-company evaluation at a time is needed. This tool could be a combination of known templates or custom made piece of software.

3. The Steps of BQA Procedure

Steps included in BQA are as follows:

In the stage of preparation:

a) Definition of functional requirements and their importance (MUST, IMPORTANT, OPTIONAL) and their evaluation values (grades).
b) Definition of other criteria for the assessment and their evaluation values (grades).

c) Definition of weights for functional requirements importance.
d) Definition of weights for other criteria importance.
e) Entering the criteria and their values into setup table of the assessment tool.

After the proposals have come in from the proposing parties:

f) Completeness and integrity check.
g) Evaluation of proposed functional solutions one by one using defined grades.
h) Evaluation of other criteria using defined grades.
i) Comparison of the proposals including graphical representation of the results.

Let us see the steps more in detail.

a) The functional requirements are grouped into blocks. In case of ERP such blocks could be General System Requirements, Finance, Controlling and other. Their importance is measured by points or percentage value assigned to the levels MUST, NEEDED and OPTIONAL. In case a requirement of MUST level is not fulfilled no points are to be assigned and the flag KO is to be set. The value of one requirement block is calculated by formula

$$FV_i = \sum_{j=1}^{n} F_j P_j \qquad (1)$$

where
F_j - value given to proposed functionality,
P_j - priority value of requirement level (in setup table),
n - number of requirements in one block.

Mean fulfillment value of functional requirements can be defined as

$$MF = \frac{1}{m} \sum_{i=1}^{m} FV_i \qquad (2)$$

where
m - number of functional requirements blocks.

The mean value of functional requirements is then multiplied by its weight in the whole balance and the assessment calculated by means of formula

$$AF = \frac{1}{w} MF \cdot WF, \qquad (3)$$

where
WF - weight of functional requirements in balance,
w - total value of all weights in balance.

b) The other criteria for the assessment represent the company value or importance for the topic of the assessment. The following criteria can be defined:

- Time plan proposed and its conformity with the Invitation
- Conditions of support after the deployment
- Number of consultants in project planned
- Clarity of data migration solution
- Soft criteria like Quality of reaction to the announcement etc.

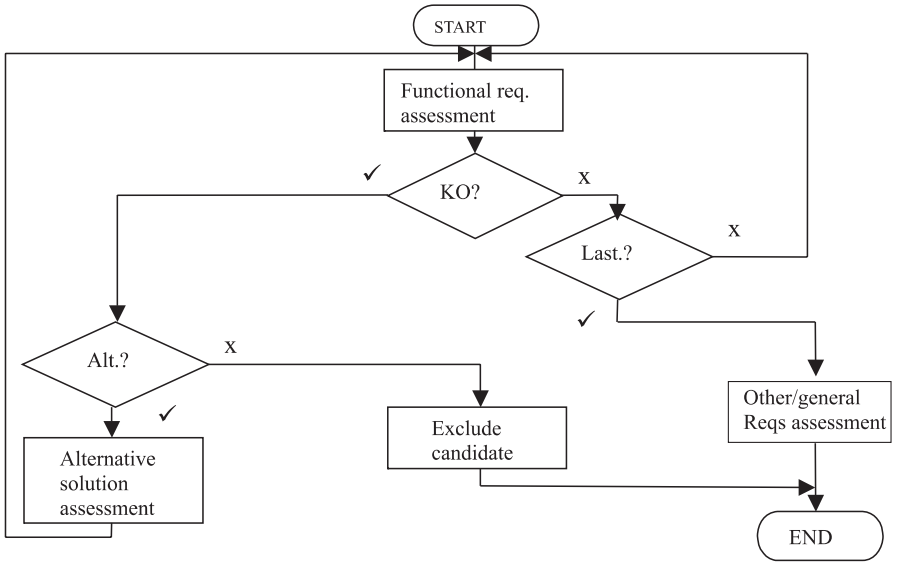
The assessment of other criteria is done by formula

$$AO_k = \frac{1}{w} OV_k \cdot WO_k \ , \qquad (4)$$

where
OV_k - value of k-th criterion,
WO_k - weight of k-th criterion in balance.

c) The weights of functional requirements must be defined before the assessment takes place. If this is not the case, a real danger of false interpretations, in the worst case even commercial and legal disputations cannot be avoided. The different weights of functional requirements parts depend on the strategy and the aim of the project. So for example if the project envisaged is to raise the IT security, the weight of the system safety requirements would be higher than the weight of user comfort.
d) The weights of other criteria mentioned in b) are one of the most sensitive parts of the whole procedure. These criteria depict the overall strategy and culture of the requesting company and also the importance of impacts of the announced project. Due to the risks mentioned in c) and in order to achieve realistic balanced result it is essential that they are defined before the assessment starts.
e) After the criteria have been defined, their values and weights are entered into the setup table of the tool.
f) The completeness and integrity check is carried out immediately after the proposal was delivered. The proposing party is given some

Fig. 2: Functional requirements assessment flowchart



Source: own

Here: Functional req: Functional requirement
KO: K.O. (MUST) criterion
Alt : Alternative
x: not fulfilled, ✓: fulfilled

short time for correction of possible mistakes or misunderstandings.

g) The assessment of proposed functionalities algorithm used is given in Fig.2. During this assessment the answers from the proposing parties are analyzed based on the table of functional requirements and categories of functionalities needed (MUST, IMPORTANT, OPTIONAL). If there are MUST requirements and no solution proposed, a secondary discussion is started. In case the requirement is really needed and no other solution found, the proposing party is excluded of further assessment process. In the same time assessment points are appointed to answers. If the solution is a part of standard delivery, full points are awarded. Should the proposed solution be delivered as a modification of existing functionality, lower point values are entered. In case there is new program code or major change in existing software needed, the value of the answer is marked with substantially lower point value.

h) After the functional requirements and proposals were compared and assigned value in the assessment table, fulfillment of other criteria is analyzed and measured by point value. The values for the proposing company are introduced into the assessment table and automatically weighed by factors defined during the setup. The total balanced assessment value of the proposal gives formula

$$ABA = AF + \sum_{k=1}^{l} AO_k \qquad (5)$$

where
l - Number of other criteria.

i) The linked formulas in the tool then enable the comparison of the proposals in tables and graphs.

Let us look into the procedure of criteria assessment and their weights. The proposed method leads definitely to multicriterial decision making using both quantitative and qualitative criteria types. First task is to define a competent expert

Tab. 1: General functional requirements - example

Category	Requirements/ topics	Details	Answer /Proposal
MUST	CRM Integration	The systems has to provide for direct integration of customers and prospects in the existing CRM with the new finance/ receivables	° YES it is a part of the system ° Yes can be done by program changes until... ° NO not possible Comment
IMPORTANT	Remote access	Functionalities and security for Home Office must be possible	° YES it is a part of the system ° Yes can be done by program changes until... ° NO not possible Comment
OPTIONAL	HELP	The system help provides for following functions: Contextuality in all input fields Contextuality for Menu and screens Possibility to extend the topics and details by IT staff	° YES it is a part of the system ° Yes can be done by program changes until ... ° NO not possible Comment

Source: own

group which will set up the criteria itself based on the project objectives and their weights. External expert participation is highly recommended in case of large IT projects to avoid some distortions due to internal preferences and/or company culture. Next task is to bring the assessments on one measurement platform; in the case proposed grades are recommended. Defining the weights of individual criteria in the balance can be based on ordinal information methods like pair comparison. In the example described here under the cardinal information method with 100 points

Tab. 2: Setup for Assessment of Functional Requirements

Category	Requirement	Details	Fulfillment F_j	Priority P_j	Assessment FV_i
				Parameter:	
MUST				1,00	
IMPORTANT				0,75	
OPTIONAL				0,25	
Legend:		Scale	100 % = optimally fulfilled		
			0 % = not fulfilled		
			All intermediate values possible!	Set based on project priorities	Product of Fulfillment and Priority

Source: own

Tab. 3: Setup of other criteria assessment

Category	Details	Weight	Category	Details	Weight
		1 = low			1 = low
		10 = important			10 = important
Fulfillment of functional Reqs.	Level of proposed functionality fulfillment	**10**	Proposed HW costs		**7**
Reaction on the Announcement	Reaction time, quality of communication	**5**	Integration to Web shop	Possibility of integration with software proposed	**5**
Time Plan	Acceptance of time-table assigned	**8**	Acceptance of Concern Templates	Acceptance of concern templates	**7**
Penalty accepted	Penalty would be accepted in case of postponement	**8**	Price		**10**
Conditions of Support	Conditions of support proposed are OK	**6**	Maintenance costs		**9**
Availability of SW modules	Relationship standard modules / programming	**6**	Quality of education		**2**
Number of consultants		**6**	Data migration concept		**3**
			References	Well known companies, scope of projects delivered,	**5**
			Total value of weights	W	**97**

Source: own

allocation done in two steps was used. In the first step each expert allocated points to individual criteria and the average sum was normalized in order to achieve the base coming near to one hundred. (See Table 3). Of course there are more sophisticated methods for criteria assessment at hand, but in the example described here, this was the method used.

4. Example

In this example we shortly present proposed methodology used in a middle sized company aiming at complete change of its IT infrastructure and ERP. Relatively simple Excel tool was prepared to support setting up and calculation of BQA criteria.

In this case the project started with the pre-feasibility and feasibility studies. The studies have been accomplished, defining a set of functional requirements and setting up further priorities. After these steps a Request for Proposal was sent to five potential suppliers. The company received four proposals. An example of several functional requirements table is shown in Table 1.

Prior to the RFP, the setups were prepared and the values of possible grades and their weights were entered in the tool. The setup part for the Functional requirements part is shown in Table 2. The fulfillment was evaluated in % and priority set by coefficient of priority. The product of fulfillment and priority gave Assessment. Each line of Functional requirement was evaluated in this way and summarized by proposals.

Tab. 4: Results of assessment - total

		Proposal #1	Proposal #2	Proposal #3	Proposal #4
Assessment Table					
Fulfillment of functional Reqs.	AF	10,07	9,95	10,00	9,97
Reaction on the Announcement	AO1	5,15	3,09	4,12	2,58
Time Plan	AO2	1,65	4,95	6,60	4,12
Penalty accepted	AO3	8,25	8,25	8,25	-
Conditions of Support	AO4	0,62	3,71	4,95	0,62
Availability of SW modules	AO5	0,31	3,71	4,95	0,62
Number of consultants in Project	AO6	4,95	3,71	4,95	0,62
Acceptance of Concern Templates	AO7	0,14	4,33	5,77	3,61
Price	AO8	5,15	6,19	8,25	5,15
Maintenance costs	AO9	5,57	5,57	7,42	4,64
Quality of education proposed	AO10	1,65	1,24	1,65	1,03
Data migration concept	AO11	2,78	1,86	2,47	1,55
References	AO12	3,09	2,06	2,58	2,06
Assessment total	**ABA**	**49,38**	**58,62**	**71,96**	**19,9**

Source: own

The setup for other criteria is presented in Table 3. Naturally is the weight of functional requirements the highest. But we can see that the company was also giving high value to time planning, possible penalization in case of postponement and also to price and maintenance costs. The importance of data migration and education quality was evidently underestimated. This fact resulted later in double postponement of production start. The delivering company concentrated its proposal on other criteria than data migration and education whereas the project controlling manager using the criteria and their weights as defined did not realized the risks involved in the right time.

After the functional requirements had been evaluated, other criteria were analyzed and entered into the tool.

Table 4 presents final results of balanced analysis for all proposals. This table clearly shows the effect of balanced approach. As shown, the fulfillment of functional requirements was practically the same for all four proposals. The reaction on the announcement, which shows the flexibility and real interest of the potential supplier to deliver, differed substantially. The gap between time planning quality answers was enormous, especially as far as Proposal #1 is concerned. The expected conditions of support were not reached in Proposal #1 and Proposal #4. The same shortcomings have been found in the Availability of software modules part both for Proposal #1 and #4, too. Proposal #2 did not achieve the level of Proposal #3 concerning price, maintenance costs and time planning. The total assessment value ABA differed to a great extents shown in the Table 4. All proposals have shown substantial weakness in the Data migration concept, but in spite of this, the difference in balanced assessments resulted in relatively easily done decision to recommend Proposal #3 for award. This was later accepted by the top management of the company.

As we have already mentioned, insufficient stress put upon the data migration and end user education caused double postponement of the production start. The underestimation of data migration was probably caused by improper functionality alignment to basic business processes and corresponding new data structures, the end used

education plan was simply too optimistic. Using right balanced and business aligned criteria in the stage of RFP analysis could probably have helped to recognize the risks involved in time.

5. Conclusion

The quality of proposals in large IT projects is often seen as a matter of price, functionality and time only. There are a lot of simple tools available on line for relatively small price. However, IT functionality alignment to business processes often invokes needs for other important criteria. These criteria are still often neglected. A balanced structured approach taking such criteria into account can bring surprising results and help top management to decide which proposing party should get the award. In presented example this was exactly the case. During the project controlling of this project some neglected criteria weights caused delay in overall project time. Using right criteria, their weights and proper balancing could help to avoid such cases in future.

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ABSTRACT

BALANCED QUOTATION ANALYSIS IN IT PROJECTS

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In large IT projects aiming at ERP change, a lot of tools can be used, which are very often used in unstructured way. In spite of a lot of tools proposed for Request for Proposal (RFP), it often happens in the analysis of answers to RFP that secondary and soft evaluation techniques can be omitted and cause wrong award decision. In this paper we propose structured approach using modified balanced scorecard idea in analysis of RFPs to solve challenges mentioned using combination of several perspectives. These perspectives are: Sense of the project -processes required in the new system, Internal impact perspective, Success criteria and Proposing company perspective. The result achieved shall depict the company preferences as a whole and should be flexible enough to allow for company specifics. The Balanced Quotation Analysis in this sense could be defined is a set of combined definitions and methods for balanced evaluation of individual criteria set by company sending the RFPs. In part three steps and necessary formulas are described and explained. An example of proposed methodology is shortly presented based on case of a middle sized company aiming at complete change of its IT infrastructure and ERP in part four. Relatively simple Excel tool was prepared to support setting up and calculation of BQA criteria. It is shown that a balanced structured approach taking various such criteria into account can bring surprising results and help top management to decide which proposing party should get the award. In presented example this was the case. During the project controlling of the project discussed some underestimated criteria weights caused delay in overall project time later. Using right criteria, their weights and proper balancing could help to avoid such cases in future.

Key Words: *Request for Proposal assessment, balanced scorecard, IT project perspectives*

JEL Classification: *L15, M15, O22*