ADDED VALUE IN ALIGNMENT OF EQUIPMENT CHARACTERISTICS AND ORGANIZATIONAL GOALS

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Abstract

This paper examines added value in the alignment of equipment characteristics and strategic organizational goals as an important activity for the execution of organizational tasks. By applying the practical value model, negative consequences due to existing risk are smaller since equipment characteristics and strategical organizational goals are aligned according to stakeholders' values. During negotiations, the alignment of equipment characteristics and existing organizational resources also results in added value since parties negotiate using a "win-win" approach. From the beginning to the end of the alignment, positive risk is examined, creating additional value. The synthesis of value-focused approach, negotiation process based on analytical modeling, and positive risk management contributes to the developed methodology of aligning equipment characteristics and strategic organizational goals for the organization that acquires equipment, continuously creating additional value.

Key words: *practical value model, negotiation, positive risk, alignment methodology, added value*

1. INTRODUCTION

Added value is created via a three-step procedure called the alignment methodology of equipment characteristics and organizational goals (Peharda). Alignment consists of value creation using stakeholders' values. The foundation of the methodology is the practical value model (PVM), which is based on the stakeholders' values integrated in the model. Secondly, added value is created through analysis for negotiation in which parties negotiate based on the "win-win" approach (Sebenius).

Finally, applying a risk management process, positive risk is identified to create additional value while negative risk is minimized. The creation of value is built using decision analysis procedures and tools.

As a result of utilizing the alignment procedure and added value, equipment acquisition risks are decreased, and the most adequate equipment is acquired.

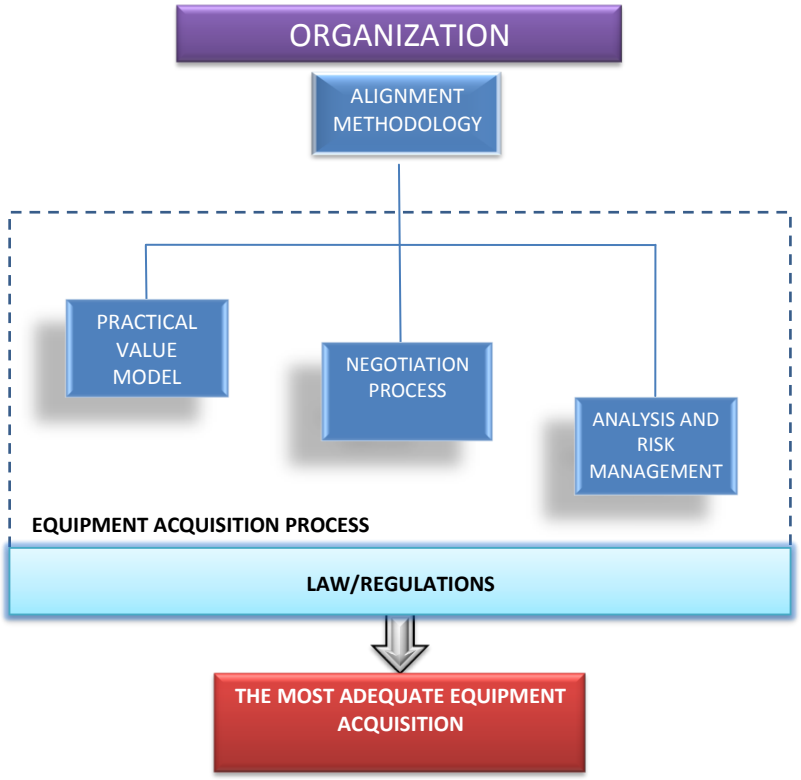

Figure 1: Alignment methodology scheme.

The practical application in this paper is based on the alignment of the armored vehicle characteristics and organizational goals of a military organization.

2. ALIGNMENT METHODOLOGY: ADDED VALUE

2.1. Practical Value Model: Bridging Alignment Procedure Steps

The foundation for the methodology of aligning the equipment characteristics and organizational goals is the practical value model PVM (Kenney). The PVM is a powerful tool for assessing values and uncertainties, providing a better analysis that results in an adequately defined equipment assortment. In the armored vehicle acquisition case study, the PVM is created based on the organizational objectives guiding the decision about equipment acquisition. The strategic organizational goals are the

reference points for building the PVM. The model addresses crucial value judgments, elicited from the experts, which influence the acquisition decision. In this research as well as other models for equipment assortment, the goals are modelled using utility functions with built-in uncertainties. Accordingly, attitudes towards risk are depicted using exponential functions. The PVM is the foundation for a well-defined equipment acquisition situation, in which the stakeholders include decision makers, experts, and users of the armoured vehicle.

Based on stakeholders' values, an aggregation model for armored vehicle is built using 35 attributes X_i, (i=1…35), corresponding to 35 goals, in the following additive utility function:

$$u(x_1,...,x_{35}) = k_c v_c(x_1, x_2, x_3,...,x_{13}, x_{14}) + k_{op} v_{op}(x_{15}, x_{16}, x_{17}, x_{18}) + k_{ttk} v_{ttk}(x_{19}, x_{20}, x_{21},...,x_{35}) \quad (1)$$

u - u_c, u_{op}, u_{ttk} overall value model (attribute utility functions) for fundamental goals;

k_c, k_{op}, k_{ttk} scaling constants according to given attribute levels (*min-max*);

v_i single attribute value functions for an attribute X_i;

x_i specific levels of attributes X_i.

The numerical values are elicited from experts, who validate the final version of PVM, which is sufficient to consider all important insights for an equipment acquisition decision. Value parameters are determined using value trade-off analysis assessing a range that the decision maker considers appropriate to bound the parameter levels. The combination of insight and analysis of the most important parameters for the equipment acquisition model provides the organization with added value because it defines the equipment assortment adequately.

Next to an appropriate equipment definition, the PVM is a tool that bridges the usage of stakeholders' values during the negotiation process and risk management, decreasing negative risks and creating more value for all of the negotiation parties.

2.2. Negotiation for Equipment Acquisition: Added Value

The analysis for negotiation is the second step in the alignment methodology, during which the analytical approach is expanded in the field of negotiation. It consists of four parts that include negotiating parties, their interests, best alternatives to negotiated agreement BATNA (Raiffa), and the zone of possible agreement (ZPA). ZPA is the result of analysis for negotiation with undefined boundaries, which enable additional value creation during acquisition process. The main assumption is that the "win-win" approach is considered, since this approach designs an environment for value creation by information exchange, clear communication, creativity, and productive canalization of

animosity. In a conflict situation, the parties' positions focus on differences rather than common values.

Using a two-party negotiation between a military organization and equipment manufacturers (in our research we considered two companies as an example), this practical application analytically demonstrates a creation of additional values during the analysis for negotiation.

Using values built in the PVM in the first step of the acquisition methodology, the first part in the analysis for negotiation involves defining the parties who negotiate. The conclusion of our research for negotiation preparation is that these parties differ from the stakeholders. The negotiation parties must have experience in negotiation, and their number must be similar to the number of parties on the manufacturer's side.

Next, the organizational interests are determined based on the built PVM. Interests stem from values, but in this case the other party's interests have to be specifies since the PVM for the manufacturer is not defined. The analysis of the opposing party values, during which the values of equipment manufacturers are assessed, is the crucial part of the preparation before the beginning of the actual negotiations.

Table 1: Equipment manufacturer interests.

Organizational goal (PVM)	**Manufacturer interest**
Minimum cost of the armored vehicle	- agreed price that will cover all production costs for armored vehicle as well as the possible profit - optimal model and payment dynamics - delivery date
Maximum offset program	- adequate value allotment of direct and indirect offset depending on the overall agreed price - optimal technology transfer - cooperation with national producer
Maximum tactical and technical characteristics	- specified vehicle configuration according to established timeline

The main assumption during negotiation is that the minimal requirements of the organization are not negotiable. Also, with regard to equipment, the following alternatives to negotiated agreement are identified:

- The total equipment cost allotted for acquisition given a limited budget.

- The percentage that the organization will attempt to cut from the overall bidding cost.
- The manufacturer's virtual equipment alternatives (offered bids).

Assuming that the values and value trade-offs are taken from the PVM, and the values from the bidder who sells military equipment are reasoned, the ZPA is structured. The frontier of the negotiation structure is not defines, its boundaries are imaginary and depend on a trade-off analysis of all parties' values during the negotiation.

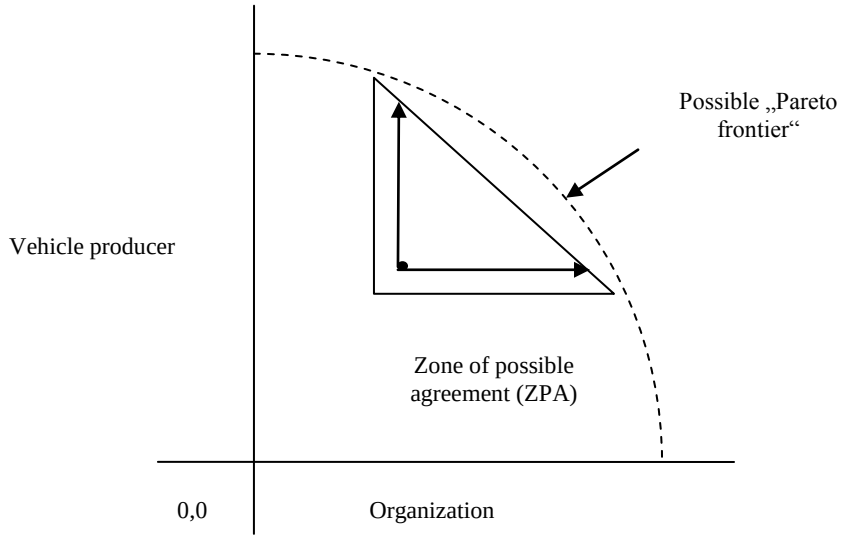

Figure 2: Zone of possible agreement for a manufacturer.

In addition, the PVM enables the usage of the sequence of alternatives by performing a sensitivity analysis of the model during the negotiation process. The sensitivity analysis considers the limited resources and enables a comparison of the supplier's equipment assortments. The comparison of different alternatives leads to the creation of an adequate alternative, whose utility for both parties is in the ZPA. All values for specific attributes are collected during the negotiation.

Research has shown that the most sensitive issue during the negotiations is the total cost evaluation, which is underevaluated in most cases (Gray). Nevertheless, during negotiation all other limited resources must be considered. In our case of combat vehicle acquisition, added value was the offset program that was the result of the negotiations using a "win-win" approach. The production of armored vehicles in Croatia benefits the military organization and the country while at the same time expands the production of armored vehicles of the equipment manufacturer.

The analysis for the negotiation is closely connected with the risk management process, which begins when building the PVM. The procedure is presented in the next chapter.

2.3. Risk Management: Positive Risk and Added Value

Risk management, as a part of the alignment methodology, starts with modelling the PVM and concludes at the very end of the organizational acquisition procedure, but it is described as the third part of the alignment of equipment characteristics and organizational goals. It is an interactive and iterative process.

In general, three organizational strategic goals considering risk management are established:

- Minimize total short-term equipment costs.
- Minimize total long-term equipment costs.
- Maximize the usable lifespan of equipment.

In our research, the risk is identified using the hierarchical holographic modelling (Haimes) conducting numerous interviews with experts as well as using available requirements documents and other program acquisition materials, which generally result in two main sources of risk:

- Users' risk: technical and tactical characteristics of an armored vehicle.
- Organizational risk: decision-making structure, both vertical and horizontal, in the organization.

Risk exists when there is possibility that uncertainty influences set goals. On the other hand, positive risk is an uncertain event or state, which, if it occurs, can have a positive impact on the goal of a certain event (in our case, equipment acquisition). In order to create the added value, in addition to the risk management of acquiring armored vehicles (Peharda), we closely examined the positive risk and its consequences: new designs of military equipment and an increase of equipment quality.

It is important to emphasize that before converting positive risk into added value, this risk has to be accepted, because there is still a possibility of negative consequences. To accept the positive risk, an analyst must make sure that decision makers understand the level of risk possibility, what can happen, and what the consequences might be.

In order to employ the positive aspects of the users' risk, the negotiating parties must exploit the concept of the armored vehicle and create new and improved vehicle characteristics. To minimize the negative consequences, a crucial step is to implement risk management during the testing phase of an armored vehicle, in which the parties perform a trade-off analysis of the new characteristics compared to the criteria defined in the PVM.

3. CONCLUSIONS

The alignment methodology provides maximum utilization of resources by using added value and represents the risk-based decision-making approach. The creation of value begins in the process of modelling the PVM and continues through the negotiation process and risk management. The final consideration of methodology is as a practical tool that contributes to the overall society and adds value due to the rationalization of limited resources. In our research, the PVM is also considered for selection of the criteria for the economically most advantageous proposal.

Further research towards improving the alignment methodology is to focus on the time dynamic as a crucial factor in decision making and explore how added value could contribute in defining time restraints in equipment acquisition.

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