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Comprehensive approach to strategic management in the aviation industry

A new approach to strategy development and management is proposed in the aviation industry. The result of application of the comprehensive approach – is an improvement in the efficiency and overspending of financial resources.

The modern tempo of change and technology development in the aviation industry with high level of strategic activity needs development of new information technologies, which is be going to provide establishment of dual management system in current and strategic activity [1]. Now strategic management is an important segment of the development of the aviation industry. Knowledge of strategy gives an opportunity to develop optimal ways of action and is the basis for the decision. The strategy is characterized by clear goals, set of actions and decisions, clear distribution of resources, adaptation to the external environment and internal coordination. The strategy is going to be provided at a minimum risk. Comprehensive methods for developing a strategy are going to assure formulation of goals, tracking the dynamics of their achievement with minimum risk, to evaluate efficiency. Therefore, it is important to manage the strategy in the aviation industry, which will reduce the overspending of resources and losses and thus will improve efficiency.

Development of the promising and long-term strategy is based by the construction of a strategic scenario model:

$$S = \langle D, C, T, R, \mathrm{Risk}, P \rangle, \quad (1)$$

where

$C = \{c_i\}, i = 1, \ldots, \mathrm{n}$ - set of goals;

$D = \{d_i\}, i = 1, \ldots, \mathrm{q}$ -set of processes;

$T = \{t_i\}, i = 1, \ldots, k$ - set of transitions;

$R = \{r_i\}, i = 1, \ldots, \mathrm{l}$ - set of resources;

$Risk = \{risk_i\}, i = 1, \ldots, g$ - set of risks;

$P = \{p_i\}, \mathrm{i} = 1, \ldots, \mathrm{h}$ - set of efficiency indicators.

The strategic scenario represents a way to achieve the goal. Each strategic scenario is characterized by its efficiency E. The task of choosing the optimal strategic scenario is solved by the integrated application of methods of expert evaluations, decision trees, dynamic programming, and also heuristics.

The set S of all possible strategies is divided into subsets $S_1,...,S_n$, where each strategic scenario $S_j, j=\overline{1,n}$ is in line with the efficiency index E_j [2]. The efficiency index E_j for each strategic scenario $S_j, j=\overline{1,n}$ is determined:

$$E_j = \sum_{i=1,..,\mathrm{h}} w(p_i)\mu(p_i), \qquad (2)$$

where $w(p_i)$ - weight coefficients of efficiency indicators, $\mu(\mathrm{p}_i)$ - expert estimates of the values of efficiency indicators.

Then

$$f(S_1, S_2, ..., S_n) = \max E(p_1, p_2, ..., p_h) \qquad (3)$$

$$i = 1, 2, .., \mathrm{h};\ h = 1, ..., \mathrm{H};\quad j = 1,...,\mathrm{n};\ n = 1,...,\mathrm{N}$$

Each strategic scenario has a resource constraint:

$$\sum_{i=1}^{l} r_{ji} \le R_j, l = 1, .., L \qquad (4)$$

According to the principle of optimality of Belman:

$$f_m(S_{1m},...,\mathrm{S}_{nm}) = \max_{e_n \in E}\left\{f_{m-1}\left[E_{1m} - e_{1m}(p_m),...,E_{nm} - e_{nm}(p_m)\right]\right\} \qquad (5)$$

The following algorithm for choosing an optimal strategic scenario is proposed.

1. The efficiency index E_j is estimated by the current strategic scenario in the time interval τ_n.
2. The set of permissible strategic scenarios $S_j, j=\overline{1,n}$ is determined.
3. The functional equation (5) is solved in the time interval τ_n. Sequences $f_m(S_{nm})$, $n = 1,...,N$ appropriate dependencies $p_m(f_m)$, $m = 1,...,M$ are determined. Functions $S_{jm}(f_m)$ $j = 1,...,N$ are determined.
4. It is determined $E = \max_{w_n} f(S_{nm})$, when restrictions (4) are met.
5. Transition to an optimal strategy according to dependencies $f_m(S_{nm})$ and $p_m(f_m)$.
6. End of the algorithm.

The strategy is implemented under the influence of negative or, possibly, positive changes in the environment and circumstances. So the predicted efficiency of the strategy differs from the actual one. Strategic management is based on the construction and analysis of formal models of situations. Modeling the future gives

an opportunity to determine the dynamics of the achievement of goals, consumption of resources, changes in efficiency indicators under different external and internal conditions. The situation is a real condition of the strategic scenario. If the situation does not correspond to the desired state of affairs, then there is a problem. The elaboration of a plan of action for solving the problem is the essence of the decision of the decision-making problem.

The situation is investigated by constructing a situation diagram. Situation diagram is developed on the basis of situational analysis and expert methods [3]. For each situation, the following procedure is performed:

- experts discuss and analyze the situation on the basis of efficiency indicators;
- experts formulate situational goals that will provide an opportunity to increase the effectiveness of the strategy;
- experts develop alternative strategic scenario for the implementation of situational goals;
- experts put on the diagram and describe situations that reflect the results of the decisions;
- experts discuss situations-results and withdraw consciously inappropriate. The procedure is repeated for the remaining situations.

The set of strategic scenarios is established as a result of situational analysis. Developing a situation diagram provides the opportunity to get strategic alternatives and go to the procedure for choosing an optimal strategic scenario.

Comprehensive application of various methods provides the development of a long-term and flexible strategy in the aviation industry. This approach allows to provide representation of management processes with the necessary degree of detail, change the situation depending on the objectives of the strategy and the current effectiveness, adjust efficiency indicators.

References

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