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METHODICAL FUNDAMENTALS OF PROJECT ENGINEERING OF STRATEGIC DEVELOPMENT OF AUTOTRANSPORTATION ENTERPRISE

Methodical approaches to creation of the design of strategic development of autotransportation enterprises are elaborated. Using of organization factor for determining of unused potential of enterprise at different strategies of development is offered. Flow-chart of analytical calculations preparation on which basis it is necessary to make decision about chose of strategies of enterprises development.

Keywords: strategy, autotransportation enterprises, development project, risk, criteria, organization factor, project documentation.

Initial preconditions and statement of the research problem

Transport is one of important components of production sphere and service in all branches of economy. Transport is involved at all stages of production process – from delivery of raw materials and accessories, to finished product transportation to destinations.

Autotransportation, as one of components of transport complex of Ukraine, inherits problems which complicate its further efficient development. These problems are aging rolling stock and technological base, reduction of haulage, performances nonconformity of available rolling stock to haulage necessities, low level of administrative, marketing and financial technologies or their total absence, insufficient scientific-methodical providing of transport branch and others [1]. One of the necessary preconditions of available problems solution – improvement of overall performances and cost-competitive of autotransportation companies is elaboration of their strategic development projects[2].

It is worth mentioning that the enterprises can operate without projects of their strategic development. Strategic development is sooner the vitamin, than obligatory component. However, in modern conditions the strategic development can be compared with strongly acting vitamin, which should be used very carefully to give organization more forces for normal functioning and development, but not to do much harm, since modern life pace differs greatly from that was 30, 20, and even 10 years ago. Application of «strategic development» vitamin should differ essentially from that was earlier. Modern strategies of industries should be based not on knowledge of external possibilities and dangers, development of strong sides as the fundamental of competitive advantages, but on knowledge and development of internal potential of organization and desire to change the external environment so that the internal potential would obtain the maximum expression. Those enterprises which will follow another way – by means of passive strategies realization or evolutionary development, risk soon to find themselves in organizational vacuum. In other words, it can appear that in external environment they will not find corresponding niche [3].

Main body of the paper

Methodical approaches to strategic development project elaboration of autotransportation enterprises are built on theoretical fundamentals and models which provide determining of weak and strong points of corporations' activity. Functioning process of autotransportation companies in real time scale and in such environment which has ability to vary all time is the base of this approach. According to parameters of functioning and environment changes, as well as market positions of enterprise, the problem of further development project formation and strategic decisions making is formally possible to present as follows:

$$\langle S_0, T, R / S_j, I, P, A, Q, F(f), L, K \rangle, \quad (1)$$

Where: S_0 – problem to be solved; T – time for strategic decision making; R – resources necessary for implementation of development strategy; S_j – problem situation, or symptoms which characterize the general problem; I – set of performances of external and internal environment state; $P = (P_1 \dots P_n)$ – aggregate of limitations and criteria of alternatives; $A = (A_1 \dots A_m)$ – aggregate of possible development strategies; Q – usefulness of concrete strategy of development; $F(f)$ – function of group advantage; f – aggregate of individual advantages; L – criterion of decisions matching; K – criterion of the most susceptible strategy of development.

Known elements are to the left of vertical, and on the right – unknown ones which are to be determined.

In most cases, strategic decisions making, concerning further development of the enterprise is based, as a rule, on intuitive level which is characterized by the lack of experience of the person who makes decision; enough high degree of ambiguity; presence of aggregate of development strategies; lack of time for making grounded decisions, etc. One of the important questions that appear at solution of this problem is determining of choice of criteria of strategies of enterprise development.

Choice and substantiation of strategies of autotransportation enterprise development are always connected with certain risk. Results of wrong choice of strategy or missing of any details of organizational or technical character, can lead to impossibility of reaching the set aim; losing position on the market of transport services; decline of financial state, transition into crisis condition, etc.

At taking of strategic decisions the choice of development strategy from the aggregate of alternative strategies of further development is the most risky. In conditions of uncertainty and risk causing the low level of probability of correct strategy choice and assurance in success, complex estimation at stage of preparation and creation of development project is necessary.

For determining of minimum risk at decision-making regarding the chosen strategy of development we will take advantage of mathematical apparatus of reliability theory. We use the following dependence:

$$P\{Z(t) \leq K_{org}\} \geq d, \quad (2)$$

Where $Z(t)$ – aim function; K_{org} – enterprise organization factor; P – probability; d – confidence interval.

The organization factor has the form

$$K_{org} = \sum_{i=1}^n a_i \cdot \alpha_i \rightarrow 1, \quad (3)$$

where a_i – significance factor of i^{th} function; α_i – fulfilment completeness factor of i^{th} function; n – amount of functions in the structure.

System which operates on proper level and realizes the aims as much as possible has organization factor close to 1.

Each function as the property in system of set of functions which are in subdivision and enterprise, in the whole has performances which determine the significance of each i^{th} function and completeness of its implementation regarding the ideal (plan). Value of performances a_i and α_i can be calculated directly by means of mathematical processing of aggregates of parameters changes – P_i which are criteria of set of functions realization.

At calculation of significance factor a_i it is necessary to keep to some rules:

- Research of strategic complex of variables-indices of all functions of production system is necessary to perform for long enough period of time. It is determined, as a rule, by the sample of

statistical data.

- For each parameter it is necessary to determine the ideal (planned) value – P_i^{pl} .
- For each function the fulfillment completeness factors α_i which make an aggregate are determined:

$$\alpha_i = \frac{P_i^a}{P_i^{pl}} \quad (4)$$

Where P_i^a – actual value of certain function; P_i^{pl} – ideal (planned) value of certain function.

It is determined, that at $d = 0,95$ and with probability $P = 0,95$ the organization factor of the enterprise reach the value close to 1. It is a sign of reliability of enterprise function as industrial-economic system. Otherwise the enterprise will not realize completely the industrial potential at accepted strategy of development and functioning will be less reliable. Difference between actual value and planned ideal value of $K_{org}^n = 0,995$, represents the value of unused potential of the enterprise at considered strategy. It is that reserve which has an enterprise

$$\Delta P = 0,995 - K_{org}^a \quad (5)$$

Proceeding from this fact, it is possible to state, that enterprises which have the greatest value of ΔP , operate less reliably and have large enough industrial-economic reserves at realization of certain strategy of development. Using certain methodical approach, it is possible not only to determine unused potential at different strategies of development, but also to realize concrete engineering-proved planning of organizational-technical and other measures.

Each autotransportation company as the subject of economic activity undergoes considerable essential influence of external environment. This is change of tariffs and rates on transportations, price change for fuel-lubricants materials, spare parts and materials, demand and supply change, all these factors can change efficiency of enterprise activity that will necessarily influence organization factor P_{org}^a .

Account of these changes will give the chance via change of ΔP to find out the adaptation way of autotransportation enterprise to environment in which it operates.

On the basis of carried out experimental research, the block-scheme of preparation of analytical calculations on which basis it is necessary to make decision concerning the choice of strategy of enterprise development and elaboration of the project as well as its implementation was developed. The block-scheme is presented in Fig. 1.

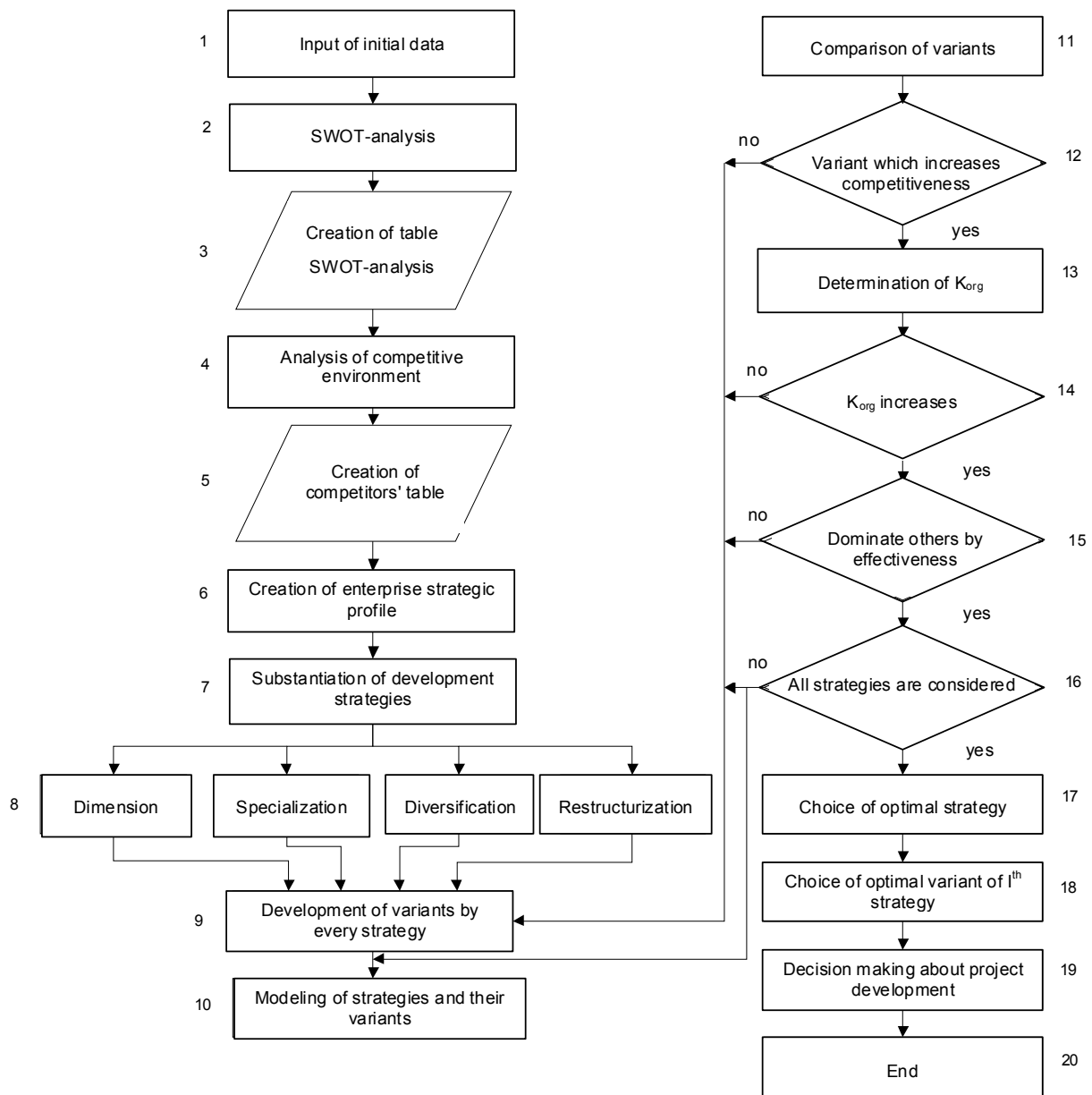


Fig. 1. Generalized block-scheme of preparation for project of enterprise development design

Blocks 1, 2, 3 determine a set of initial data, carrying out of analysis and building of analysis Table. This procedure is necessary for determining of both strong sides on the market of transport services, and weak places in factory economic activity. As it is known, it does not solve cost-competitive problem. Therefore blocks 4, 5 provide careful analysis of competitive environment and building of competitors Table and their advantages.

Blocks 6, 7 provide building of strategic profile of the enterprise and substantiation of possible strategies of development. Usually for each enterprise depending on its organizational-technical and financial state and depending on labialization level, development strategies can be different to what the block 8 testifies.

Though it does not exclude the possibility to model any of considered strategies at all. Usually each strategy has some alternatives of implementation. Block 9 carries out developing of possible alternatives, but further block 10 models, according to designed algorithms, strategies and their

possible alternatives. Block 11 compares alternatives by criterion of efficiency and by criterion of increasing cost-competitive and organization (blocks 12, 13, 14, 15). Check of results of alternatives modeling, if all chosen strategies have been modeled (block 16), is performed by block 17. In that case when some strategies are modeled the optimal strategy of block 18 is usually evaluated and chosen.

Block 19 makes decision on design project of strategic development of autotransportation company. At this stage the preparatory period of project design is over.

Decision-taking about chosen strategy or alternative is offered to perform by means of the reasonability factor K_r , which is expressed by such dependence:

$$K_r \rightarrow \sum_{i=1}^n 3_i + \sum_{i=1}^n 3_{ni} + \sum_{i=1}^n 3_{nt} \geq 3_i^i + 3_{ni}^1 + 3_{nc}, \quad (6)$$

where $\sum_{i=1}^n 3_i, \sum_{i=1}^n 3_{ni}, \sum_{i=1}^n 3_{nt}$ – sums of production, non-production, conditional-fixed and non-productive transaction charges of the enterprise accordingly; $i=1, n$ – changes (measures) which are to be carried out for implementation of this or that chosen strategy; $3_i^i, 3_{ni}^1, 3_{nc}$ – accordingly production, non-production conditional-fixed, non-productive transaction charges of organizational structure which are in the period, prior to project realization.

It is obvious, that project realization is reasonable when the left part is greater than the right one. The synergetic effect of chosen strategy realization is necessary to calculate applying the following dependence:

$$E_o = \sum \Delta E_i (1+r)_i, \quad (7)$$

where r – discount rate; ΔE_i – total saving obtained after implementation of i^{th} measure of project realization.

In its turn ΔE_i is determined as:

$$\Delta E_i = (\Delta RN_i + \Delta R_{ai} + \Delta C_{ei} + \Delta C_{ti} + \Delta C_{ni}) - (I_i + T_i + I_{oi}), \quad (8)$$

where ΔRN_i – calculated additional profit of expansion the scale of enterprise activity; ΔR_{ai} – calculated additional profit of implementation of i^{th} measure of development strategy realization; $C_{ei}, \Delta C_{ti}, \Delta C_{ni}$ – saving of current production costs, transactional charges, tax payments of implementation of i^{th} measure on strategy realization; I_i – charges on implementation of i^{th} measure; T_i – increase of tax payments; I_{oi} – investments for initial moment of project realization.

Following development cycles of project documentation for realization of substantiated strategy of development of autotransportation enterprise (Fig. 2) are offered.

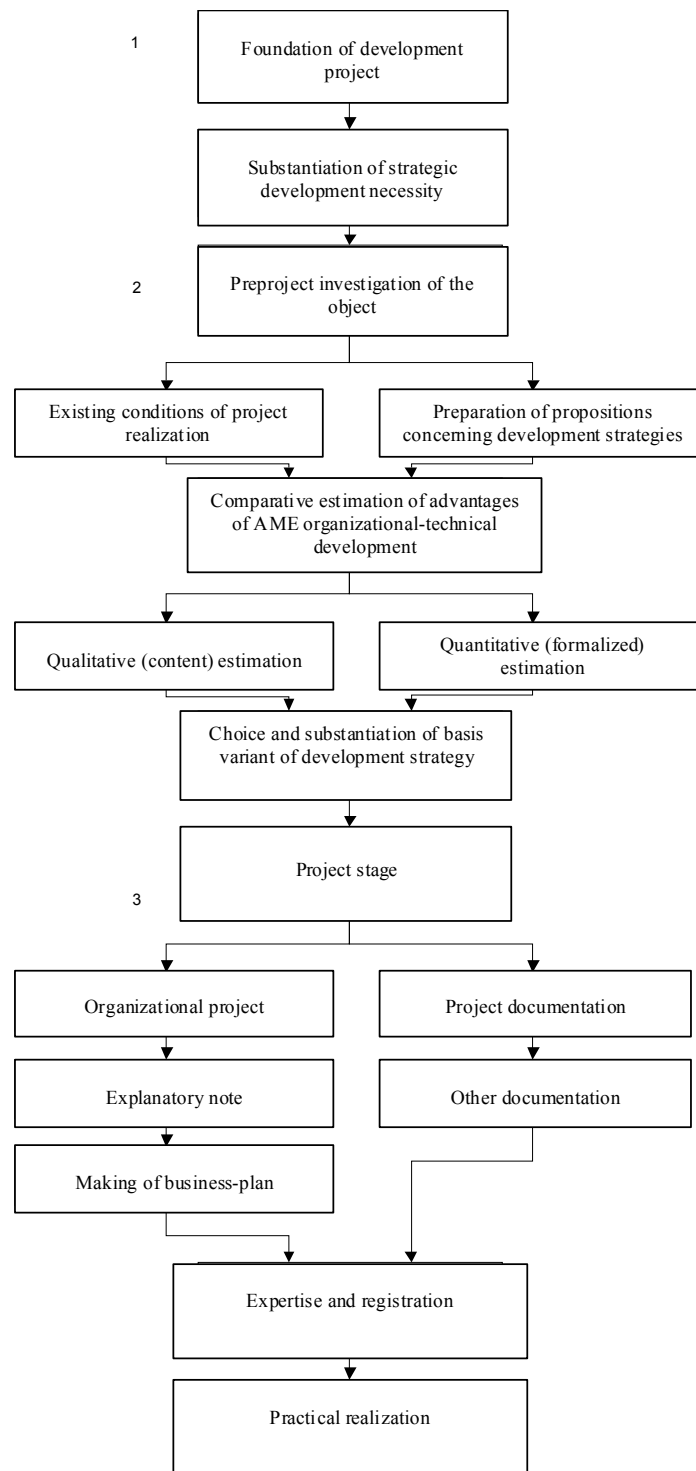


Fig. 2. Basic stages of strategic development project design

It is necessary to take into account, that organizational-technical changes throughout all life cycle of the enterprise require continuous strategic changes, as a rule, caused by overall transformations of market conditions, and which are carried out in reorganization direction. This process is connected with creation, correction and support of mechanism of development in enterprise control systems, which are directed on reaching of the set aims.

Conclusions

The offered methodical approaches on designing and realization of project of strategic development of autotransportation enterprises enable to determine weak and strong points of enterprise activity in the environment they are in. Reliability of enterprises functioning at choosing and substantiation of development strategies is evaluated by means of organization factor of enterprises that allows to determine the way of enterprise adaptation to environment in which it operates.

Decision concerning modeling of development strategies and designing the project of strategic development is taken by basis calculations using the offered block-scheme. Sequence of designing and project realization of strategic development of organizational-technical industrial systems of auto transportation is offered.

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