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Стаття присвячена проблемі прогнозування розвитку автотранспортних підприємств. Рішення проблеми базується на моделюванні еволюції системи «людина – автомобіль – приземний простір»

Ключові слова: прогнозування, система, стан, еволюція, потреба

Статья посвящена проблеме прогнозирования развития автотранспортных предприятий. Решение проблемы базируется на моделировании эволюции системы «человек – автомобиль – приземное пространство»

Ключевые слова: прогнозирование, система, состояние, эволюция, потребность

The article is devoted to the problem of enterprise development prognostication. The problem solution is based on "man – automobile – land space" system evolution modeling

Keywords: prognostication, system, condition, evolution, requirement

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FORECASTING MOTOR TRANSPORT ENTERPRISE DEVELOPMENT

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1. Introduction

In the conditions of transitional period and economic crisis in Ukraine the primary aim of majority of enterprises is

an adaptation to the conditions of promoted dynamic of external and internal environment. Consequently, the enterprises need the proper strategy of development, what would become the basis of effective administrative decision-making.

The enterprise needs technological, economic and social prognostication to react on changing flexibly and timely, keeping here the course and competitive positions at the market.

That's why a forecast is basis of production strategy, which enables to choose directions of enterprise development.

A forecast is a foresight of future representation of reality, based on the laws of nature and society development and laws of mentality.

2. Publication analysis

The main activity of motor transport enterprise (MTE) is a complete and timely satisfaction of passenger needs in transportation, and the main indicator becomes the amount of public conveyance plan execution expressed in passengers. Under these conditions a proved theoretical description of transportation system functioning and vehicles takes a special significance both for transportation planning and MTE economic basis planning and analysis, as only a proper conception concerning transportation process progress allows to turn to public conveyance resource – saving technology designing and valid cost accounting on the level of job practices.

The solution of problem is possible by means of “man – automobile – highway – land space” (MAHLS) system development consideration and its components. Thus, it is not necessary to model functioning of the given system but its evolution.

While driving along the highway, the dominant driver's needs are determinacy and interaction activity with traffic environment.

These demands constitute the base of system steadiness and variability. As the satisfaction of these demands requires contradictory actions (deceleration or acceleration), their satisfaction is executed in a sliding mode. The man periodically changes over from one need to another. The same mode of person's demand satisfaction is preserved in the process of MAHLS system evolution.

3. Sistem relation

The regularities of MAHLS system development are supposed to be characteristic to the entire man - machine system.

These regularities can be applied when solving system component property task prognostication, and also motor transport enterprise development for the purpose of technical system administration

Diagrammatic image data of recurring process of dominant demand satisfaction is shown in fig. 1.

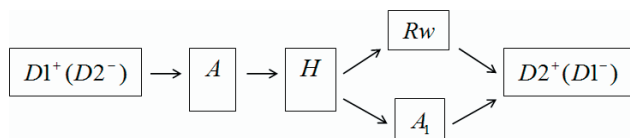


Fig. 1. The process of dominant demand satisfaction

D2⁻ – unsatisfied demand D2;
 D2⁺ – satisfied demand D2;

D1⁻ – unsatisfied demand D1;
 D1⁺ – satisfied demand D1;
 H – highway;
 A – automobile;
 A₁ – newly established aggregated labour instrument;
 Rw – labour result;
 → - action.

In accordance with the given diagram the process of demand satisfaction D2 leads to the growth of demand D1 and according to the law of “negation of negation” to the transition from position <<Eqn363.eps>> to position D1⁻.

Hence

$$\begin{aligned}
 &\rightarrow D1^+(D2^-) \rightarrow A \rightarrow H \rightarrow \\
 &\rightarrow D2^+(D1^-) \rightarrow A \rightarrow H \rightarrow \\
 &\rightarrow A_1^+(D2^-) \rightarrow A \rightarrow H \rightarrow \\
 &\rightarrow D2^+(D1^-) \rightarrow.
 \end{aligned}
 \tag{1}$$

Let us further consider cause-effect relations in MAHLS system. So far as the cause and effect are the main measuring instruments of concrete inward content, the evolution of these category parameters reflects the relation evolution between system components.

The language of set theory is used for formal description of these relations.

Applying binary relations P (the cause of anything) and C (the effect of anything), we can put down for the first cycle of demand satisfaction:

1. D1⁺(D2⁻)P A_c, that is D1⁺(D2⁻) the cause of action A_c.
2. D2⁺(D1⁻)C A_c, that is D2⁺(D1⁻) the cause of action A_c.

Applying Trell theorem the composition of relations can be presented in the following form

$$D1^+(D2^-)PC D2^+(D1^-),
 \tag{2}$$

That is in the presence of agent Δe the value D2⁺(D1⁻) is the result of D1⁺(D2⁻).

The given formula is true only in the presence of agent Ac, as only the aggregation D1⁺(D2⁻) and Ac can form D2⁺(D1⁻).

Similarly for the second cycle of demand satisfaction

1. D2⁺(D1⁻)P A_c, that is D2⁺(D1⁻) is the cause of action A_c.
2. D1⁺(D2⁻)C A_c, that is D1⁺(D2⁻) is the result of action A_c.

That's why

$$D2^+(D1^-)PC D1^+(D2^-),
 \tag{3}$$

That is in the presence of agent Δe the value D1⁺(D2⁻) is the result of D2⁺(D1⁻).

The relations of (2) and (3) are not contradictory, as overlapping sets of demands and objects of their satisfaction (one and the same object can satisfy different demands) are considered.

So far as in the process of work joint labour instrument is created, including the outcome in the form of the main component, the notion of overlapping sets can be applied with regard to automobile and highway. Here and further

the subsystem “automobile – highway” is understood as a joint labour instrument whose elements are joined with rigid automation and administration.

$$\begin{aligned} (A,H)PC(A_1,H_1), \\ (A_1,H_1)PC(A,H). \end{aligned} \tag{4}$$

Formula $(A,H)PC(A_1,H_1)$ is characteristic for the process of demand satisfaction D2, but formula $(A_1,H_1)PC(A,H)$ - for the process of demand satisfaction D1.

In the process of demand satisfaction D1, internal determinism, that insures its stability, is formed in the system.

During this period the system is closed in organizational respect, organizational standards established remain without change.

In the process of demand satisfaction D2 system variability property is formed that implies adaptive standard substitution. During this period the system is open in organizational respect.

All the above mentioned facts allow to describe the evolution of the cause – effect relation in MAHLS system.

Let’s introduce the following formulae

$$\begin{aligned} D1^+(D2^-) = P \\ D2^+(D1^-) = C \\ (A,H) = a \end{aligned} \tag{5}$$

Besides, let us express relation formula PC with the help of R and introduce new relations G – effect a, S – effect C. System closing in the first cycle of demand satisfaction D1 leads to the formation of cause – effect relation

1. C G a,
2. P S C,
3. a R P.

In the second cycle demand D2 is satisfied. During this period at the expense of activity means transformation

new relations are formed that in accordance with Trell theorem can be presented in the following way.

1. a RS C, as a R P and C G a take place
2. C GR P, as a R P and P S C take place,
3. P GS a, as C G a and a R p take place.

In the third cycle, demand satisfaction D1 takes place and relations are formed

1. a RGGS P, as C RG P and a RS C take place,
2. a RGSS a, as a RS c and c RG P take place,
3. C GSRR C, as C RG P and P GS a take place.

Thus, by the beginning of the third cycle of relation transportation, the system comes to a state, in which the cause activity and effect are in very complex relations with their own essence. Such a state is characteristic for the radical transportation of the system, forming new means of human activity.

The formation of new means of activity denies the existence of the outcome. The given denial is equivalent to joint demand substitution $D2^+(D1^-)$ into $D1^+(D2^-)$.

The moment of relation formation is the outcome for their decomposing in the following cycles of demand satisfaction. Relation decomposing in the old system is a necessary condition for the creation of the new system of human activity in accordance with the principle of old determinism necessary disintegration.

Among the set of relations, participating in composition decomposing, these is a one – to – one correspondence. That’s why the process of decomposing in the system follows an order reverse to that one in which relation composition was realized.

4. Conclusions

Consider regularities of MAHLS system development are characteristic to the entire man- machine system. These regularities can be applied when solving system component property task prognostication, and also motor transport enterprise development for the purpose of technical system administration.

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