METHODS DESIGNING AS SUPPORT OF LOGISTICS SYSTEMS ACTIVITY

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Abstract

The article deals with possibilities of creating system for support the activities of logistics systems. This system would serve as a means for decision support. In support of the activities of logistics systems is necessary to implement a large number of decisions. Decisions are realized on different management levels. Any decision on individual levels can cause improvement, respectively aggravation of system operation. The impacts of decisions can have local effect on the overall operation of logistics systems, but may also seriously affect the whole system, positively or negatively. Many experts and scientific literature define and argue that "logistics is only one" and is associated with ensuring of chain "purchase - production - sales", or “supply - production - distribution". All other activities are only for ensuring of activities of the main chain. Of course, that without the support activities should the main chain was unable to function effectively. For ensuring main and support activities for logistics needs is possible to use great number of methods from different branches. By joining of methods into one system, it is possible to create a universal program means for support decision and effective operation of logistics systems.

Keywords: Design, decision, logistics, system, methods

1. INTRODUCTION

The basic aim of each company is the creation of profit or its maximization from short-term point of view (1 year). There are long-term aims (more than 1 year) such as company growth, i.e. profit growth as well as production volume growth, company market position improvement etc.

The assumptions for achieving all these aims are effective operation of all processes and operations in the process of transformation, accumulation and transport that are optimally determined by plans in the operative as well as tactic and strategic level.

In the phase of dynamic development of information technology and logistics with more attention paid on effective company management there is effort to make the decision process more effective. The research and development of this topic is up-to-ate and various versions of systems are created for DSS (Decision Support System).

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2. DECISION SUPPORT SYSTEM

System for decision support (DSS - Decision support system) is a computer information system supporting organization and decision activities and processes in the field of business. DSS serves for managers, operational managers on various levels (usually on middle and higher level) with decision support in situations which can quickly change and are unpredictable (non-structured and semi-structured decision problems). The DSS can be fully automated, operated manually or operate in the combination of these 2 modes [6].

DSS can help managers on various levels [5]:

- Operational level - helping with daily executed routine decisions.
- Tactical level - helping with planning and management with the usage of analytical tools.
- Strategical level - helping with long-term decisions using internal and external information analysis.

The components of DSS [4]:

- Database (information, data, and knowledge).
- Model (system behavior, source code,…).
- User interface (hardware, software).

3. DESIGN OF SUPPORT SYSTEM

Many experts and scientific literature define and argue that "logistics is only one" and is associated with ensuring of chain "purchase - production - sales", or “supply - production - distribution" [1], [11]. All other activities are only for ensuring of activities of the main chain. Of course, that without the support activities should the main chain was unable to function effectively. For ensuring main and support activities for logistics needs is possible to use great number of methods from different branches. By joining of methods into one system, it is possible to create a universal program means for support decision and effective operation of logistics systems.

Support system as application project of Decision-making support system is designed for industry logistics [7], [9], [10]. The design describes the operation of web application based on cooperation of selected methods of multi-criterion decision and forecasting by synthesis of their results.

The structure of web application consists of areas of micro-logistical company model and each area contains a selected set of analytical methods of multi-criterion decision or forecasting methods to serve the user with useful and summary information from each company area. The results should help the user with decision making. On **Fig. 1** there is a structural cross micro-logistical model of the application.

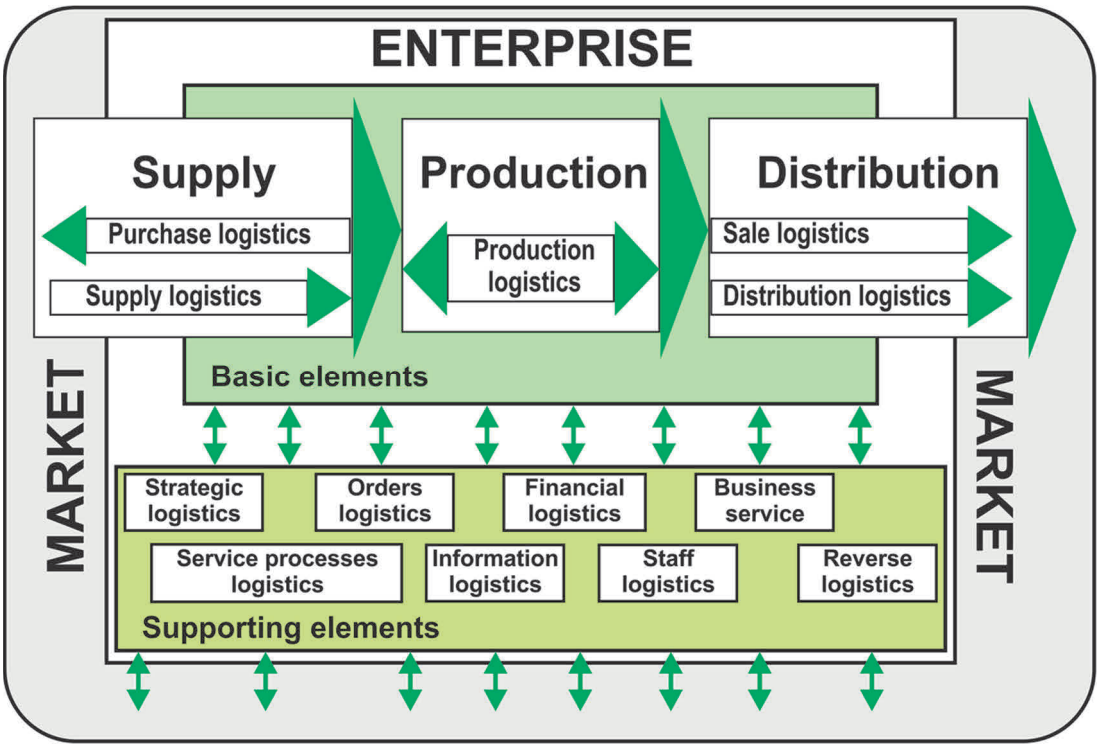

Fig. 1 Micrologistic model of a company [11]

In the field of custom-made management the application contains evidence and evaluation of orders and its technical-technological reviewing, that ensures the comparison of order with products made so far, evaluates the need of raw materials and components and if available, it evaluates the amount of them in stock. Information needed is stored in database and it is connected to web application [13].

Economical evaluation of order follows. It contains among others a method of breakthrough point based on fixed and variable costs, unit price and the amount of product evaluates the progress of profit in the dependence on production volume [12]. **Fig. 2** shows [3] an example of this method calculation.

Break even point

Quantity sold	Variabile cost	Fixed cost	TC	Total revenues	Profit / Loss
0	0	3000	3000	0	-3000
200	100	3000	3100	450	-2650
400	200	3000	3200	900	-2300
600	300	3000	3300	1350	-1950
800	400	3000	3400	1800	-1600
1000	500	3000	3500	2250	-1250
1200	600	3000	3600	2700	-900
1400	700	3000	3700	3150	-550
1600	800	3000	3800	3600	-200
1800	900	3000	3900	4050	150
2000	1000	3000	4000	4500	500
2200	1100	3000	4100	4950	850
2400	1200	3000	4200	5400	1200
2600	1300	3000	4300	5850	1550
2800	1400	3000	4400	6300	1900
3000	1500	3000	4500	6750	2250

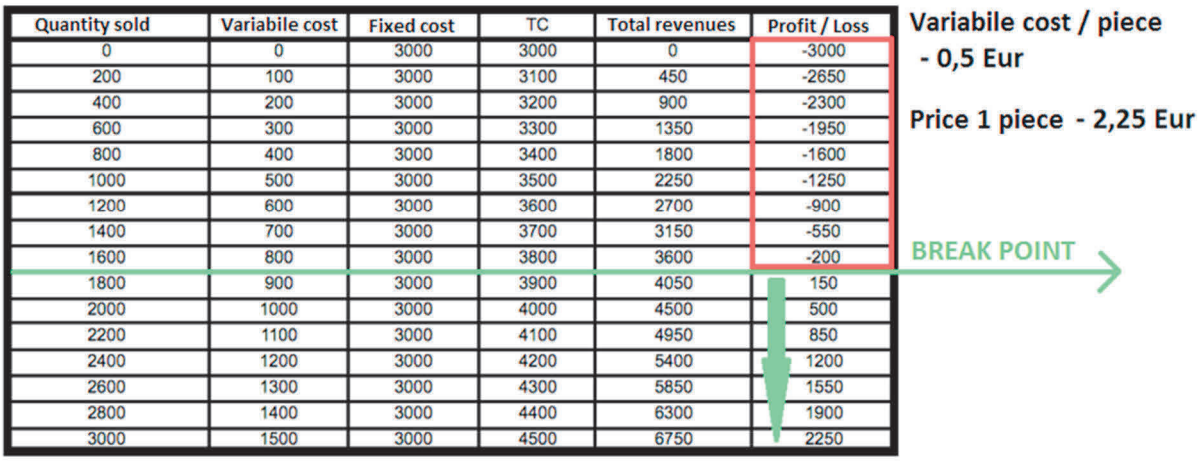

Fig. 2 Analysis computation break point

After economical evaluation of order the capacitive evaluation process follows focusing on capacity and time demands. The information about space dispositions of raw material stock house, semi-products and products with regard to release time or release time of certain stock area segment gives following graphical description of stock availability, see **Fig. 3** [3]. The graphical model of stock house copies the lay-out of real building situation. Coloured segments represent already occupied areas. Number indexes describe left days to release certain stock areas segment.

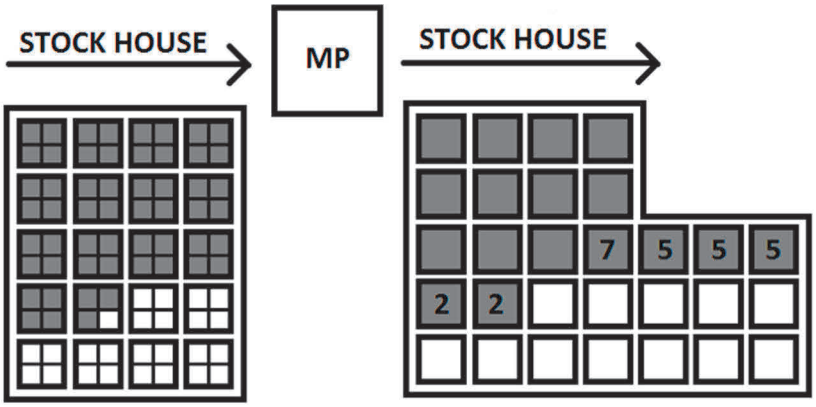

Fig. 3 Diagram of storage space

The application evaluates the suitability of supplier selection for strategically inputs of production process basing on multi-criterion decision. The inputs (raw materials, semi-products, energy) are analyzed by ABC method for appropriate supplier selection from a set of possible suppliers. The ABC method selects inputs that

have high portion on final product price [8]. This analysis contains the selection of the most appropriate supplier from price forecast of individual input, the reliability of supply, services of the supplier. The module design is depicted on **Fig. 4** [3].

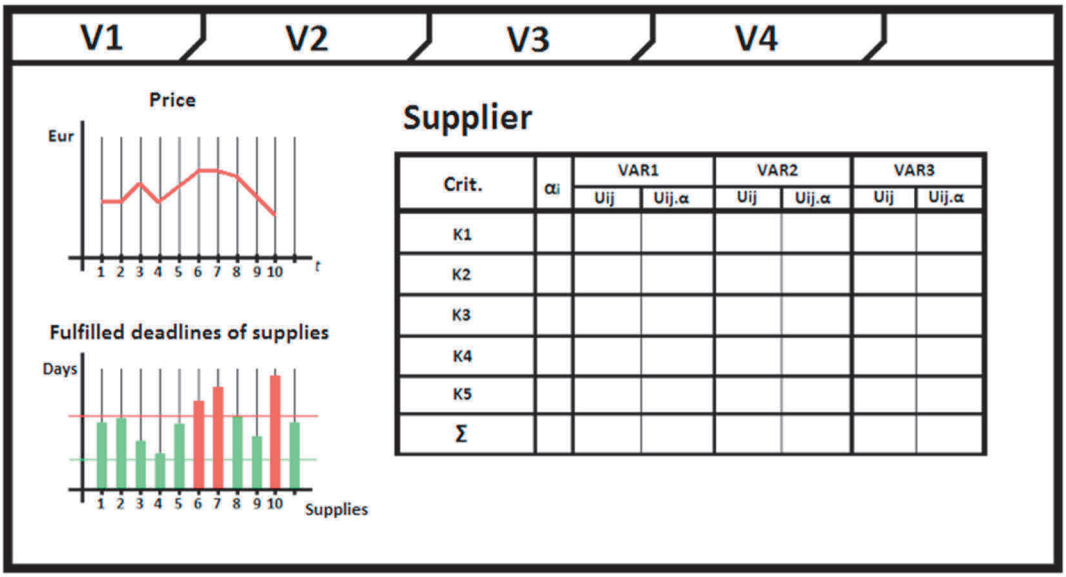

Fig. 4 Analysis of supplier

The application evaluates and determines current position in the curve of product life-cycle basing on data from database regarding sale amounts of products and the forecast of sale. Thus information for the need of company strategy change is provided in the field of innovations, product portfolio [14]. **Fig. 5** shows product life-cycle analysis [3].

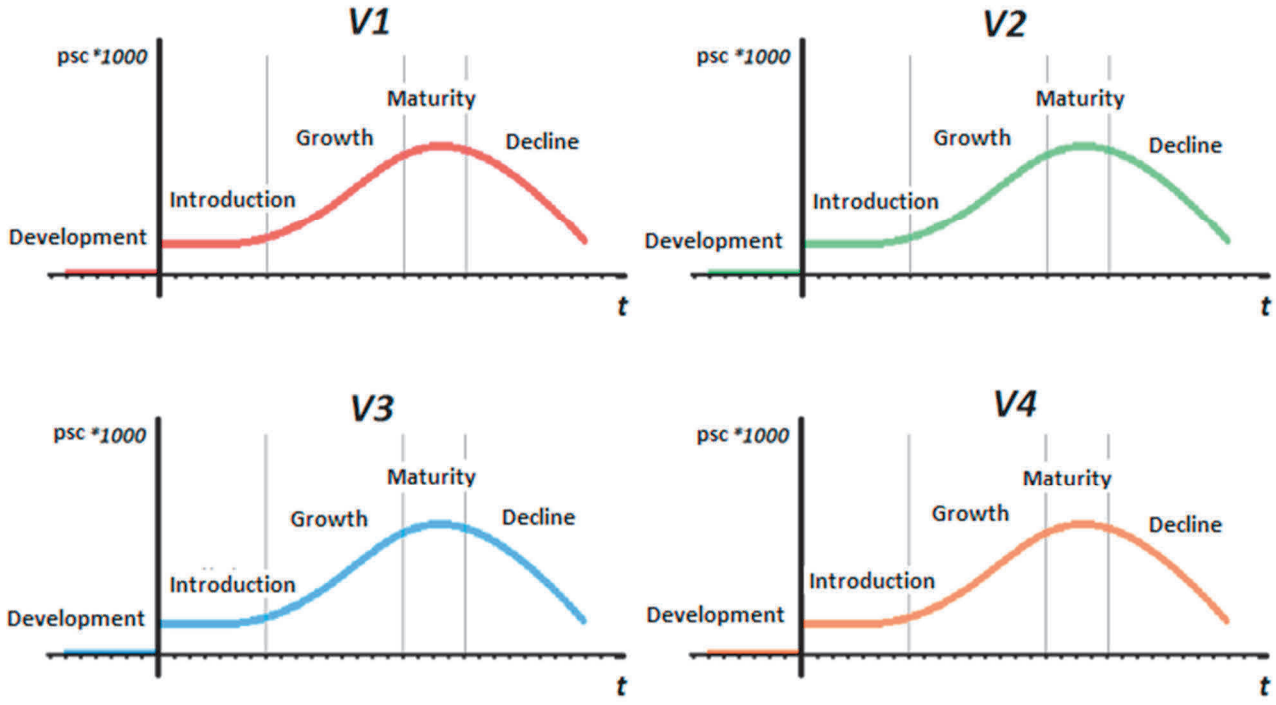

Fig. 5 Product life cycle analysis [3]

The forecast used in individual modules of application is made by multi-channel forecast method [2].

4. CONCLUSION

The application is designed to provide via user interface sufficient information for the user for decision support in all company areas based on inputs from appropriate data from database. Output information are in graphical form to be more summary and to have as much value as possible with the aim to achieve the status of user oriented application.

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