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SIMULATION MODELING: ANALYSIS OF THE ENTERPRISE 'S BUSINESS PROCESSES UNDER CONDITIONS OF UNCERTAINTY

T. Medinskay
Colledge of Economics and Trade, Ukraine

Simulation modeling is a widely used approach to tackling various problems and achieving goals under conditions of uncertainty and risks at all stages of production: from supplying raw materials to distributing finished products with available optimal solutions in operational conditions and long-term strategies of the enterprise. Conducting experiments applying the model eliminates the necessity for experiments in the reality and does not interfere with the production work flow.

There are two variants of the analysis: static and dynamic. Applying the static analysis enables to explore one business process resources of which are not related to other processes. Whereas applying the dynamic analysis allows you to simulate several processes that can be executed simultaneously.

Imitation models are undeniably irreplaceable in the dynamic study of business processes; they basically allow you to consider the intersection of independent events, their impact on operations that are interconnected, which is very difficult to calculate in a large flow of information.

The application of simulation is mainly viewed as an effective tool for such systems that are subject to the effects of random events. Consequently they include organizations and enterprises the activities of which are oriented to the conditions of the market economy, especially in view of inflation, unemployment, the state budget deficit, a lack of balance in foreign trade and the conduct of war. This method allows assessing the appropriateness and relevance of the decisions taken, calculating the risks, considering possible scenarios, predicting employees' behaviors and other indicators.

The simulation process includes:

1. creating this model of business process;
2. passing the model through processing in the right information system;
3. evaluating the expected result;
4. analyzing other possible variants of the process.

The collected data about the business processes that are to be investigated are transferred to the computer, the relevant software performs their pro-

cessing and publishes the simulation results, which are explained in the process of simulation. Evaluation of the results allows identifying the cost of the executable process, tracing the dynamics of execution, etc.

By analyzing the results of simulation modeling, it becomes quite possible to obtain the following parameters:

- efficiency in managing flows;
- duration of the process;
- implementation of regulatory requirements during the process of implementation;
- the presence of repetitions and unnecessary actions;
- efficiency of embedded systems.

Creating a simulation model allows performing a rigorous analysis and visualizing all possible ways of implementing the process.

In order to simulate the business processes of an enterprise, you can use the following software products:

- Arena (developed by Rockwell Automation Inc., Wexford, USA) - implies building simulation models, playing them out and analyzing results for a variety of industries – production and technological operations, warehousing, banking, customer service, etc .;
- AnyLogic (developed by The AnyLogic Company) – allows simulating any business systems and processes: from production lines and logistics to marketing campaigns and social change. This is the first and the only tool that offers the possibility of multi-threaded simulation - discrete-event, agent and system dynamics;
- AnLogistix ™ (ALX ™) offered by the company AnyLogic – is primarily aimed at analyzing supply networks, combining simulation and optimization techniques; analytics can explore the supply chain in detail and visualizes it as an unreachable level for traditional tools [3];
- Business Studio (developer of "Modern Technologies of Management", Russia) is aimed at simulating business processes and allows designing an effective organization;
- Actor Pilgrim (developers Yemelyanov A. A., Emelyanova N. Z., Moscow) – is for simulation of the temporal, spatial and financial dynamics of economic processes,
- AutoMod (developed by Brooks Automation, USA) -is designed to model logistics and production systems;
- AweSim (developed by Symix Systems Inc., USA) is a universal simulation system for a discrete or continuous interpretation network. This software can be applied in the following areas: business, industry, health and military affairs. Being compatible with Visual SLAM simulation language, the product includes the construction of an interactive model, simultaneous

and subsequent animation, statistical information in text and graphical views, interactive presentation and script selection;

• FlexSim (developed by FlexSim Software Products Inc. (FSP), Orem, Utah, USA) – is applied for modeling and visualizing business processes. With the help of the program it is quite possible to determine the company's throughput capacities and balance of production lines, identify bottlenecks, check new planning methods, optimize production figures and substantiate investments [4];

• ISSOP (developed by DUALIS® GmbH IT Solution, Dresden, Germany) – is mainly designed for simulation and optimization in manufacturing and logistics;

• Plant Simulation (developed by Siemens Industry Software, USA) - is a software product for modeling production, logistics, transport systems and business processes;

• ReThink (developer company Gensym, USA) – is applied for modeling business processes; it allows increasing the level of justifying the relevance of projects on restructuring and reengineering the enterprise's activities; researching and forecasting the organization's work according to various possible variants of behavior on the market, etc.

The implementation of simulation in analyses under uncertainty allows taking the interconnections of all business processes of the company into complete account and finding ways to optimize and predict the company's future work.

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