

Summary

The System Dynamics was developed in the late 1950s at the Sloan School of Management, Massachusetts Institute of Technology by Jay W. Forrester. The main goal is to think about feedback as a closed loops. The System Dynamics combines the theory, methods and some philosophical issues, in order to analyze management systems. Using computer simulations, it is possible to describe different systems as quantitative and qualitative variables. The System Dynamics is also applied in the warehouse management. It is possible to show the real indor process in virtual network, using different variables and algorithms. Before making a decision, connecting with optimization or automation, it is possible to simulate the reaction of the process in a different periods of time.

Changes in supply chains are often very unpredictable and dynamic. The reaction of each participant of supply chain must be immediate and effective. The lack of any appropriate reaction or information may cause many unexpected negative consequences. Each distribution center will react to many different changes which could affect the whole supply chain or even a small part of it.

Simulation is a process, that allows to reflect a specific real state in virtual conditions. It is possible to investigate different reactions when the environment will change. There are necessary three elements to make an appropriate simulation: a computer, a real system and a mathematical model. The model describes the real system in virtual conditions. A flexibility of warehouse processes could increase the possibilities of adapting to dynamic changes in the whole environment.

Using programs, such as *FlexSim*, to simulate internal processes of distribution center can be an invaluable analytical tool for changes, that could occur the whole supply chain. Simulation models allow decision-makers to verify improvements, such as automation or process reorganization. In that way, it is possible to reduce an unnecessary costs.

Optimization of warehouse processes is an essential element of distribution center management. Using the principles of System Dynamics in discrete process modeling, it is possible to describe real decision problems in a virtual environment. Computer simulation allows us to identify the maximum efficiency of warehouse processes in the distribution center.

Changes could appear throughout the supply chain due to the constantly evolving environmental conditions and the dynamic global economy. Optimization of warehouse processes must take into account the aspect of health and safety standards and procedures



relating to corporate social responsibility. The use of information technologies in the distribution center management supports the optimization of manual work in the warehouse. It is possible to control current processes, support human work with automatic solutions or robots in logistic and storage systems. The proper simulation program should also be an analytical tool supporting decision-making processes for warehouse management.



10.02.2018

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