## ABSTRACT

Master's thesis: 113 pp., 45 fig., 36 tab., 1 appendix, 22 sources.

**Topicality.** The basis for the successful supermarkets' activity is the study, the research, the analysis and the satisfaction of consumer needs. There are a lot of factors that affect on demand (purchasing ability of buyers, price, amount of goods, discounts etc.), so supermarket management needs to make demand forecasting for goods which are sold. Consumer demand forecasting is one of the most difficult economic problems and requires careful and comprehensive study. Researching and demand forecasting include the possibility to identify changing rate trend of demand, to determine the important impact factors in the researched period and to predict the supermarket economic condition in the future. Forecasting helps to increase future income, ensures the supermarket development and increasing, minimizes economic risks.

So the task of consumer demand forecasting for the range of supermarket goods is relevant, and will increase the economic efficiency and profitability of enterprises.

**Relationship with working with scientific programs, plans, themes.** The work was performed at the Department of Automated Information Processing and Management Systems of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" within the theme "Intelligent methods of programming, modeling and forecasting using probabilistic and linguistic approaches" (State registration number 0117U000926).

**The goal of the research** is to increase the efficiency of demand forecasting process for the range of goods.

To achieve this goal you should perform the following **tasks**:

- to analyze the known methods of solving the problem of demand forecasting;
- to choose one of considered methods and to adapt it to the task of demand forecasting for the range of supermarket goods;
- to create a list of the most important parameters that affect on the demand amount;
- to develop an algorithm for solving the demand forecasting problem for the range of goods;
- to determine the structure of the software;

– to determine the technology of data storage;

– to develop a software implementation of the algorithm;

– to test the software product and to analyze the results.

**The object of research** – demand forecasting process for the range of supermarket goods.

**The subject of research** – demand forecasting methods and tools for the range of supermarket goods.

**Research methods** used in this work: error backpropagation method, experimental method, heuristic method, algorithm of multifactor demand analysis, artificial intelligence methods (use of artificial neural networks), stochastic gradient descent algorithm.

**The scientific novelty of the obtained results** is the use of artificial neural networks to forecast demand, which will take into account a set of interrelating factors determined by both the specifics of production and consumption of goods of retail enterprises; and human behavior modeling in supermarket to improve the efficiency of management.

**Publications**. The materials of the work have been published in the International electronic scientific journal "Science Online" (issue no. 5, May, 2020) and at the V Ukrainian-wide scientific-practical conference of young scientists and students "Information systems and management technologies (ISTU-2020)".

DEMAND, FORECASTING, SIMULATION, EXPERIMENT, SUPERMARKET, PERSEPTRON, ARTIFICIAL NEURAL NETWORKS