

## **DEVELOPMENT OF AN INTELLIGENT DECISION-MAKING SUPPORT SYSTEM FOR THE SELECTION OF RAW MATERIAL MANUFACTURERS TO BE SUPPLIERS IN HEALTHY FOOD PRODUCTION COMPANIES IN THE CONTEXT OF GLOBAL SUPPLY RISKS**

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### **Abstract**

Like the entire food production industry, the market for producing and trading healthy food products faces uncertainty. These days it has a direct relationship with global challenges such as instability of energy prices, breakdown of supply chains, lack of raw materials necessary for food production, climate change and its consequences, and other difficult-to-predict aspects, that have a considerable impact not only on the price of finished products but also on the possibilities of realization on the market. Consequently, to ensure at least the minimum stability of the market for the production of healthy products, companies need an academic support tool, the application of which can help absorb the challenges posed by global markets. This article analyzes the main risks arising for this market due to the unstable raw material supply market. Moreover, it analyzes possible alternatives when choosing supply channels and suppliers. Hence, it raises a dilemma: Is it indispensable to follow all the main principles of sustainable development to manage risks and ensure the production of healthy food products? The research aims to develop and practically test a methodological tool as an intelligent decision support system for healthy food production companies to help select the most suitable raw material suppliers in the context of global supply chain risks.

The authors of this article, using an expert assessment method and multi-criteria mathematical modeling SAW, provide a tool with the help of which companies can make decisions related to the choices of raw material suppliers to adapt to emerging global risks while minimally violating the principles of sustainable development. The novelty of this research stems from the fact that it is rare research that uses a comparative analysis of simple additive weighting to show the value and the cost of each alternative for the selection of raw material suppliers in healthy food production companies. Consequently, research fills a knowledge gap and presents a tool to help companies make informed decisions. To create a practical tool for the evaluation of the best suppliers under multicriteria evaluation, it must be possible to adapt that evaluation to specific conditions for risk management under changes in the global market.

In the research, the most important task solved was the selection of appropriate criteria for the assessment of raw materials suppliers. The SAW method for multicriteria evaluation is recognized as the most suitable method of evaluation of companies when you need to select the most suitable one to prevent the main risks in the context of global challenges. After systematizing the basic information about the process of raw materials supplier selection for the healthy food production industry and developing an evaluation tool, it was tested practically in a healthy food production company in Kaunas town (Lithuania). After performing an expert evaluation according to the criteria and after multi-criteria evaluation calculations, the priority list of the most suitable suppliers was created to prevent risk in the future if the situation in the global market changes in negative aspects.

The scientific potential of evaluating and selecting the most suitable raw materials suppliers for healthy food production companies is critical in the context of global risks that apply under situations of energy crisis, war, pandemic, economic risks, and other global challenges. Only by using an intelligent support system for the selection of the most suitable raw materials suppliers and having prepared a list of alternatives ones, healthy food production companies make sure to manage main risks and successfully compete in the global market. The proposed intelligent decision-making tool has been tested in real business conditions, and its suitability is fully justified.

**Key words:** *Risks, Supply Chain, Healthy Food Production, Decision Making, SAW.*