

NUTRITIVE BUSINESS MODELS OF CONSUMER BEHAVIOR WHEN PURCHASING FOOD STUFFS

(Preliminary communication)

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Abstract

The aim is to develop a nutrition based business model to obtain information on the extent of the impact of nutritional properties when buying food products and information related to significant new elements of the nutrition determinant, which ought to be included in food products. The paper discusses the application of an original concept of modeling for building a model of consumer behavior, when purchasing food products. The model is built on the basis of several principles by using modern technologies such as Geographic Information System (GIS) and data mining, and one of the most important principles is to provide greater clarity and full understanding of the process implemented in the model, and its integration with the feature of self-explanation. To determine the level of the impact of the nutrition determinant on the behavior in a separate group of consumers of food products - a total of 350 students from Faculty of Technological and Technical Sciences in Veles in all four years of the study program "Nutrition and food technology and biotechnology" were surveyed. The survey consists 12 questions. The output of the model is comprised from survey responses from consumers. Building a good nutrition model of consumer behavior when purchasing food will allow obtaining information on the impact and role of the nutrition determinant on consumer behavior and the need for improvement and production of healthy food products. Certainly, this kind of production is of a particular importance in satisfying personal needs of consumers in all social spheres, and accordingly, for improving kinesiology, that is physical, functional and health capacities of athletes, children and students treated in the physical education processes.

Keywords: *students, consumers of food products, Questionnaire, fats and saturated fats, proteins, carbohydrates, vitamins/minerals, nutritional properties of the product, nutrition and health claims, correlation*

INTRODUCTION

One of the main tasks of large companies is to learn the behavior of consumers. This task is not easy because you do not know exactly how the human brain makes the choice when buying, and often, the buyers themselves do not know what influenced their purchase. Therefore, companies use a variety of research methods with the main objective to identify all the key determinants that influence customers, and therefore, to determine the various marketing efforts the company should use and then determine how customers respond to them. Business models of consumer behavior can give a lot of answers.

Today, we live in a time of modern technologies, where there is continuous development of scientific methods and concepts in building various models, and all this is one of the main prerequisites in modeling and

building good business models of consumer behavior. All these benefits must be used in creating business models of consumer behavior. Good methodologies and concepts should include: the use of modern technology, such as Database Management Systems (DBMS); Geographic information system (GIS), which enables modeling and creating system models that can describe the current situation and to project future; advanced analysis of databases by using advanced methods of data mining as one of the concepts of building a business model that will allow getting good information on consumer behavior (Petra, (2006). The importance of databases for customers and their behavior is important, as is marketing research (exploratory, descriptive and causal research) - an important component in the creation of databases of consumer behavior. One of the frequently used methods

of descriptive research is with a survey, which allows collection of primary data that can be included in the business model.

The prevention of diseases in the developed countries are moving towards the direction of consumption of healthy food. Studies show that consumers of food products are thinking about nutritional properties of food products more and more (Pavlova, Damjanovski, Simovska, & Martinovski, 2011; [Martinovski, Simovska, Pavlova, Nikolovska - Nedelkoska, & Manceski, 2013; Simovska, et al., 2012). Therefore, the creation of business models will provide an understanding of consumers regarding the nutritional quality of the food, i.e. the nutritional business model will determine the extent of the impact of the determinant - nutritional properties (vitamins, minerals and other beneficial ingredients to the body) in the purchase of products (Steve, (2007). Also, parallel to the development in the area of planning in the health sector, nutritionism and prevention by using the so-called PSS (Planning Support System), is the development of the nutrition business models of consumer behavior (Brail, & Klosterman, 2001; Geertman, & Stillwell, 2003).

Building a good nutritional model of consumer behavior when purchasing food products is one of the most important objectives of companies whose business is food, in order for them to get answers to questions about their marketing strategy, as well as for the need to improve and produce healthy food products and determine the role of the nutritional properties in consumer behavior.

In this context, proper nutrition is necessary for achieving better effects in sports activities, and mass and top sports results accomplishment. Therefore, it requires examination, monitoring, dosing and determination of the energetic needs, vitamins, minerals and other components of the food consumed by athletes. Realization of these conclusions should particularly apply to athletes in different sports disciplines.

Nutritional business model for customer behaviour

There are several types of business models of consumer behavior that are found in theory and practice, and these include: deterministic or probabilistic, linear ODE model; continuous valued or discrete valued; continuous-time or discrete-time; lumped model or agent model; continuous product range or finite number of brands; identical consumers or different consumers; and etc. Models we encounter in theory and practice are models for specific cases, whereby in most there are psychological and sociological (Markov model) determinants included, but a very small number of these include the determinant – nutritive properties of food products. In these models, the modeling is done with analytics and statistics, by using binary comparison and networks (Bagozzi, Wong, Abe, & Bergami, 2000; Perugini, & Bagozzi, 2001; Solomon, 2006). In all these models the concept of modeling where very little or not at all is

done in terms of understanding of the model is used, i.e. it is reduced to help.

Our research has shown that it is necessary to raise modeling to a higher level. Further in the text we will show an original concept of modeling which will improve the business models of consumer behavior.

Geographic information system

The Geographic information system of today is a promising information technology integrated into a number of systems from several areas (Martinovski (Мартиновски), 2013). GIS is a complex computer technology that allows geo processing, graphic, database and modeling capabilities. GIS contains a range of tools including: economic and demographic analysis with predictions of the future; analysis of the environment; building models with GIS modeling; for transport planning; analysis of land use; *creation of health regions; for marketing needs, etc.*

There are many advantages to the general use of GIS, but also in terms of marketing and nutritionism including: representation of the real world through relationships and discrete objects; analysis tools in the business sector; analyzing the real world through spatial and non spatial data in a reference system (geospatial data); analysis and planning habits for healthy nutrition of the population by region, creating health regions, monitoring sources of disease to making plans and scenarios for their spread and prevention and more.

Modeling for creation of the nutritive business model of consumer behavior

The modeling stages we propose are represented as entities in a relational model (E-R model), including:

- Stage 1. Output - Methodology - Input
- Stage 2. Conceptual model
- Stage 3. Logical model
- Stage 4. Physical model
- Stage 5. Verification of the model with feedback

Stage 1: Output - Methodology - Input

What is specific for this stage is that first the model outputs are defined (for the nutrition business model of consumer behavior the shopper responses correlated with the nutrition determinant are specific), and then on the basis of the outputs the necessary methodology for obtaining them is defined and finally on the basis of the outputs, the input (data necessary to obtain outputs) of the model is defined and its data sources.

The output can be in the form of analytical data, in the form of reports with graphical representations contained in the GIS layers. In this stage, outputs and their form (analytical or graphical) are defined.

Outputs are in relation with the necessary methodology which will be used to obtain them, and that is why in this section it is necessary to define methodologies which will be used in the model. This is necessary in building a business model and an important step to get high quality outputs. By using advanced technology,

important methods in GIS and data mining are methods such as: basic concepts of mining of frequent forms, association and correlation; classification; decision trees;

Bayes classification method; models of evaluation and selection; methods of cluster analysis and evaluation of clustering (Jiawei, Micheline, & Jian, 2012).

Question 1: When you buy a product because of its nutritional properties, how much do the following sources of information on these properties affect your decision? (Multiple answers)

Scale	Degree	Labeling (label) of the product	Previous knowledge of nutritional properties of this group of products	The history of use of the product	Promotion (advertising) of the nutritional properties of the product	Recognition of the brand product
A little	1.					
	2.					
A lot	3.					
	4.					
	5.					

Question 2: How well do you understand (select the degree of how well you understand and interpret the meaning of) the section on the product where the nutrition facts are labeled? (Multiple answers)

Scale	Degree	Declared Energy Value	The amount of fats and saturated fats	The amount of sugars and proteins	The amount of fibers	Vitamins minerals as part of the recommended daily intake	Nutrition and health claims
A little	1						
	2						
A lot	3						
	4						
	5						

Question 3: Select the degree of influence of given nutritional properties when buying food products (Multiple answers).

Scale	Degree	Energy value	Fats	Carbohydrates	Fibers	Vitamins /minerals	Nutrition and health claims
A little	1						
	2						
	3						
A lot	4						
	5						

Question 4: Choose the importance of the given attributes when buying food products (Multiple answers).

Scale	Degree	Sensory attributes (color, aroma, taste)	Price	Product safety	Brand	Certification (for example: organic, quality)
A little	1					
	2					
	3					
A lot	4					
	5					

Question 5: Select the level of receiving information about the importance of nutritional properties of food products for the human organism (Multiple answer).

Scale	Degree	Learning at the University	Books and scientific publications	The Internet	Mass Media	Experts	Scientific conferences - seminars	Other
A little	1							
	2							
	3							
A lot	4							
	5							

Question 6: Select the level of influence on your decision to purchase a product regarding th information obtained about the importance of the nutritional properties of food products for thehuman organism , presented in a given resource (Multiple answers).

Scale	Degree	Learning at the University	Books and scientific publications	Internet	Mass media	Experts	Scientific conferences - seminars
A little	1						
	2						
	3						
A lot	4						
	5						

Table 1. Correlation of the degree of how well the meaning of the section (label) on the product, whether the Nutrition Facts are labeled, is understood and interpreted and the influence on other consumers.

Scale	Degree	Energy Value	Fats	Carbohydrates	Fibers	Recommended daily intake of vitamins/minerals	Nutrition and health claims
A little	1	0,66	0,71	0,70	0,68	0,65	0,62
	2	0,69	0,70	0,65	0,66	0,68	0,69
	3	0,68	0,69	0,78	0,72	0,71	0,73
A lot	4	0,89	0,90	0,82	0,81	0,88	0,89
	5	0,92	0,93	0,89	0,88	0,91	0,85

Table 2. Correlation of the impact of nutritional properties when buying food products and the impact on other consumers

Scale	Degree	Sensory attributes (color, aroma, taste)	Price	Product safety	Brand	Certification (for example: organic, quality)
A little	1	0,62	0,61	0,66	0,59	0,60
	2	0,73	0,72	0,71	0,80	0,79
	3	0,82	0,81	0,83	0,80	0,88
A lot	4	0,92	0,88	0,90	0,82	0,92
	5	0,90	0,92	0,86	0,83	0,94

ily and friends, regarding the importance of nutritional properties when buying food products?" Results have been provided in Table 2.

The obtained results point to a great degree of influence of the surveyed students about degree of how well the meaning of the section (label) on the product, where the Nutrition Facts are labeled, is understood and interpreted and the influence on other consumers (family, friends, and other consumers of food products). Also, the degree of influence of surveyed students on other consumers of the importance of information on nutritional attributes of food products is very high.

CONCLUSION

Research shows that in many developed countries investments are made in educating the citizens on the significance of a healthy diet and nutritive attributes, through study programs at the high education institutions. This means that over time the impact of the nutritional attributes in the purchase of food products will be much greater. Therefore, the development of nutritional business models of consumer behavior is an important part in the business of companies which manufacture food products.

For building a good business model, it is necessary to use scientific methods, which should be developed on the basis of several principles: the business model should be conceptualized as to allow ease of use to companies; the business model should use modern technologies such as GIS and DBMS, and advanced data analysis with data mining; for the model to be self-explanatory, which is a very important element for perfect use of the model. All of this shall enable companies to obtain answers on consumer behavior and create the best strate-

gies for their business.

The modeling concept represented in five stages in a relational model will allow raising the consumer behavior business models a higher level. The model will be easy to use and further develop, it will use advanced methodologies and will have one very important feature – it will be self-explanatory, which shall enable for it to be completely understood and easily developed.

In this context, the model can find an efficient application in food products selection and consumption in the process of kinesiology and sports activities, as well as with preschool and school children included in physical education. Thereby, the efficacy improvement of their physical, functional and health capacities would be more expressed..

The benefits can be trifold: benefits for the companies for increasing their profits, benefits for the citizens in their consumption of healthy and safe products and benefits for the country.

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