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STATISTICAL ANALYSIS OF FACTORS INFLUENCING THE BRAND OF MILK AND MILK PRODUCTS IN UZBEKISTAN

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Abstract. *This article analyzes the factors influencing the brand in the milk and dairy product market in Uzbekistan using statistical methods. The study examined the main factors influencing brand selection among consumers of milk and dairy products. Factors include product quality, price, advertising effectiveness, consumer trust in the brand, and product packaging. Correlation and regression analyses were conducted based on data collected from respondents during the study. Using these analyses, the degree of influence of each factor on the brand was determined. According to the results, the quality of the product and consumer trust in the brand are the most important factors in brand selection. In addition, recommendations are given for improving marketing strategies.*

Keywords: *Dairy products, Milk industry, Branding, Consumer behavior, Statistical analysis, Influencing factors, Marketing strategies, Product quality, Brand.*

1.Introduction

Consumer brand satisfaction, brand loyalty, product experience, and product quality are widely studied in the brand marketing system. The most studied relationships are factors of consumer satisfaction and brand predisposition. These factors have been widely studied in scientific research in recent times. However, most research focuses primarily on the service sector and some sectors of the manufacturing and construction industries. The authors are not aware of research conducted in the field of the food industry. The authors are also unaware that such research has been conducted in the Republic of Uzbekistan. Therefore, the dissertation aims to identify the key factors that should be considered when developing local brand strategies for food products, particularly milk and juice products.

2. Literature review

Another distinguishing feature of research conducted in foreign countries is the focus on repeated purchases of products, and it has been proven that one of the main research requirements is based on the consumer's personal experience with products purchased several times. As a result, it is advisable to calculate the interaction between the listed variables separately for each product

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type. Because the formation of food brands differs in the characteristics of each product, consumer perception of the brand and satisfaction with it will be different.

Therefore, in the study, it is advisable to focus on consumer satisfaction, consumer inclination, consumer experience, and competitiveness factors from the perspective of the food industry. This article aims to analyze the relationship between Consumer Satisfaction, Consumer Loyalty, Product Knowledge, Business Competitiveness, and other selected factors that influence Consumer Satisfaction. The factors we considered were selected and then identified based on previous research discussed in the "Theoretical Foundations" section.

Consumer expectations (the quality of the product expected by the consumer) play an important role in the evaluation of the consumer's food product. Many studies have also substantiated that the quality of food products is a key factor in brand formation - the level of satisfaction of consumer needs and expectations. Consumer expectations (expected quality) are closely linked to the perceived quality of the product.

3.Results

The consumer assesses quality (in relation to food products) from an emotional point of view (taste, vision, touch - related to tasting), from the point of view of health (nutritional and microbiological quality), from the point of view of comfort and from the point of view of process (environmental, organic, natural production, genetically modified and). The manufacturer strives to adapt the quality to international and local food product quality certificates, as well as hygienic and environmental requirements. [3]

Accepted quality should be considered from the point of view of the intended purpose of the consumer's product or service in relation to alternative options, as well as the perception of the general quality or advantage. Accepted quality (consumer's overall quality assessment) is the result of both expected quality and experienced quality. [5] Food quality refers to the quality of good nutritional and microbiological properties. At the same time, the quality of food products includes mechanical, tactile, visual, and auditory perceptible mechanical, geometric, and physical qualities. The quality identified in this way can also be considered emotional.

However, the perception of product quality by the consumer cannot be limited to emotional attributes. Safety, profitability, and costs, etc., should also be considered as the main factors. [4]

In the study, respondents are presented to consumers of brands of enterprises selected as objects. The questionnaire included twenty-eight questions of scale, twenty-four of which were used in the study. Specific questions, including the variables used, are listed in the appendices in the appendix.

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In questionnaire surveys based on quality studies, five-or seven-point scales are often used,[11] but 10-point scales are also used. [12] Studies have shown that the strength of the correlation is related to the width of the scale, meaning that the wider scale strengthens the discovered correlation. [13] Thus, a broader dimension allows for the identification of connections between variables that are not displayed on a narrower scale and is therefore much more useful for research purposes. However, considering that evaluation based on a 10-point scale creates inconvenience for consumers, as well as taking into account the large number of variables, it is advisable to use a 5-point scale.

All questions are designed as variables on a scale measured on a 5-point scale, where the value of 1 indicates the respondent's low score, i.e. low satisfaction, while the value of 5 indicates the respondent's high score, i.e. very satisfied. Thus, for each variable, the measure of satisfaction increases with an increase in the value of the integer from one to five. Since all questions are structured in the same direction (so a higher value always means a better valuation of brands), it is easy to interpret the results of statistical analysis.

The questionnaires will be conducted at retail outlets where the selected brands are available. The selection of products to be evaluated by individual respondents was carried out randomly, so that each product was evaluated by 200 respondents, and if the survey participants participate, they are encouraged by these types of products without prior notice.

First, the respondent was shown twenty randomly produced products. This random generation was drawn based on the number of previous respondents who evaluated the product and the number of previous respondents who were familiar with the product.

The products were presented to the respondents along with their photos and the manufacturer's logo. All existing weights were dynamically updated over time. The age and gender of the respondents are also taken into account. The reason is that this assessment is important for product positioning strategies based on identifying the characteristics of the consumer segment and corresponding marketing strategies.

The responses of the respondent who rated the same product were averaged, and this average score for the product indicated products for the respective enterprises across all questions of the questionnaire.

Along with the questionnaire for consumers of the enterprises under investigation, constructions were formed that express six factors of satisfaction described in the introduction, which are not directly observed. These hidden factors (structures) were supplemented by the variability of product knowledge, which can be observed directly from survey data. The hidden

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factors of consumer satisfaction are assessed using variables obtained from questionnaire questions.

A systemic equation model (SEM) was used to model the relationships between the factors under investigation. First, a factor analysis (CFA-confirmatory factor analysis) is used to assess the factor load of individual variables (questionnaire questions) related to consumer satisfaction, inclination, and competitiveness. In other words, this stage (measurement part) allows for the determination of the adequacy of the questionnaire's hidden satisfaction factors. The next step (component) is to check whether the relationships between factors correspond to the data in the questionnaire through "Model construction."

Due to the complexity of the systemic equation models, a general test is conducted that clearly confirms or rejects the model's correctness (for example, the basis of the p-value value). In addition, model results are checked based on the comparative fit index (CFI) or the Tucker-Lewis index (Tucker-Lewis index). Both indices take values from (0, 1), with a higher value indicating that the model is adjective. The recommended threshold for both indices is 0.65. Therefore, models with indices greater than 0.65 can be considered empirically confirmed.

The study was conducted in the spring of 2022 with the participation of 1,200 consumers from dairy and juice production enterprises in the Republic of Uzbekistan. Specifically, these were enterprises that produced (and are well known among consumers) food and beverages for daily consumption. Each enterprise is represented by one brand.

As for the relationship between the factors, it was decided to approach them somewhat differently than usual. When creating a consumer satisfaction model or index, researchers typically focus on identifying the level of consumer satisfaction and, as a result, the factors influencing predisposition [14] and competitiveness. We divide the factors into two groups based on the introduction of definitions: causal factors and consequence factors. [15]

We will consider the following as causative factors:

Perceived quality-**Q**

The value perceived by the consumer for the product **(PV)**

Consumer brand satisfaction **(Customer satisfaction-CS)**

Product knowledge level **(PK)**

The following shall be taken as consequence factors**:**

Consumer experience (customer expectation-**CE)**

Consumer loyalty-**CL**

Competitiveness-**C**

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Thus, the possibility of expressing the three main equations representing the three hypotheses in their mathematical form. They simultaneously allow for the formation of a model of relationships between variables related to meeting consumer needs:

$$CE = f(PQ, PV, CS, PK); (1)$$

$$CL = f(PQ, PV, CS, PK); (2)$$

$$C = f(PQ, PV, CS, PK); (3)$$

In the first equation, Consumer Expectations (CE) affect four factors: PQ,PV,CS,PK. The second and fourth questions of the consumer expectations questionnaire (T2 and T4) show that based on repeated purchases, the Consumer creates an opportunity to formulate a hypothesis that can be compared with reality when making the next purchase. Therefore, it can be assumed that the adopted quality (CE) and consumer satisfaction (CS) values should affect consumer expectations for subsequent (recurring) purchases.

This hypothesis is based on Agaminian's research, which has shown that knowledge of the product is part of the company's competitive advantage. The introductory model, consisting of three simultaneous regression equations modeling factors CL and C, was supplemented with the assumption that both causal factors (PQ, PV, CS) and impact factors (CE, CL, C) may be interconnected. [15]

Based on the presented mathematical expression, the model construction is reduced in a simplified version, and minor influences or correlations are removed from the introductory model. Therefore, the final model includes only statistically significant factors and correlations. On the other hand, the introductory model is reinforced by the fourth equation, which states that it is important to determine the factor by the level of consumer knowledge of the product through the consumer predisposition factor.

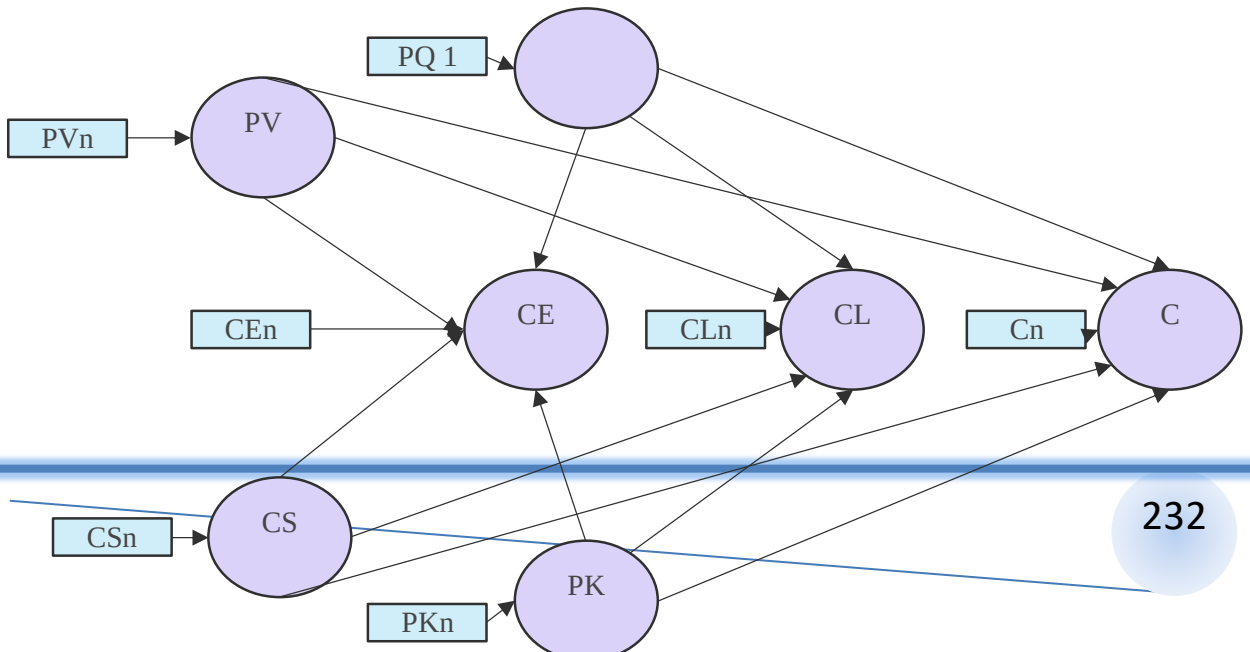

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Figure 1. The relationship between the investigated hidden factors

Based on the presented methodological approaches, we will create a graphical representation of the SEM model, which is presented in Figure 1. Our primary goal is to identify the influence of key factors that contribute to brand competitiveness.

Based on the SmartPLS 4.0 software package, it is advisable to create a PLS algorithm based on the SEM model based on the hidden variables that make up the main components. The reason is that consumer behavior characteristics vary by brand for each type of product.

The least squares regression model is called the path diagram (PLS) or structural equation modeling (PLS-SEM). This modeling method was developed by Vold[16] and further refined by Lohmuller. In fact, the PLS-SEM algorithm is a sequence of regressions along the load (weight) vectors of the variables. The weight vectors obtained by convergence satisfy the point equations of tangency. The basic PLS algorithm proposed by Lohmuller and implemented in SmartPLS 4.0 includes the following three steps:[17]

Step 1: The iterative evaluation of the hidden variable points consists of a 4-step iterative procedure, which is repeated until convergence is obtained (or the maximum number of iterations is reached):

(1) outer approximation of the latent variable scores,

(2) estimation of the inner weights,

(3) inner approximation of the latent variable scores, and

(4) estimation of the outer weights.

Stage 2: Assessment of external weights/loading and road coefficients.

Step 3: Assessment of location parameters.

SmartPLS allows the user to apply a three-system model drag scheme:[18]

(1) a centralized traction circuit,

The factor weighing scheme (2) and

(3) road drawing scheme (standard).

While the results vary insignificantly for alternative traction schemes, traction is the recommended approach. This traction scheme provides the highest R2 value for endogenous latent variables and is typically used for all types of specifications and assumptions of the PLS road model. Furthermore, if the road model includes high-order structures (often referred to as

secondary models), researchers should not typically use a centralized traction scheme. Maximum repetitions This parameter represents the maximum number of repetitions used to calculate the PLS results. This number should be large enough (e.g. 300 integration). When checking the PLS-SEM result, it is necessary to ensure that the algorithm does not stop due to the maximum number of repetitions achieved, but due to the stop criterion. Note: Selecting 0 for the maximum number of repetitions allows you to get the sum of the points approach results. The stop criterion The PLS algorithm stops when the change in external weights between two consecutive repetitions is less than the value of this stop criterion (or when the maximum number of repetitions is reached). This value should be small enough. Initial external weights By default (i.e., SmartPLS settings), the initial external weights are set to +1. However, there are the following options: Lohmuller proposed using +1 as the initial external weight for all indicators for each measurement model, except for the latter, the initial external weight is -1. Therefore, the PLS-SEM algorithm combines faster. However, such a launch can lead to intuitive signs of the approximate PLS path coefficients in the measurement models or in the structural model. Personal settings: to determine individual initial external weights for each indicator in the SmartPLS road model. For example, a particularly important indicator may take +1 (for example, when strong positive relationships with the latent variable are assumed beforehand), while other indicators of the same measurement model take 0.

When the heterocyte-monothrite ratio (HTMT) values are high, there are problems with the validity of the discriminant. Henseler et al. [19] suggest a threshold value of 0.90 for systemic models with conceptually very similar constructions, such as cognitive satisfaction, impressive satisfaction, and inclination. Under such conditions, if the value of the STMT is above 0.90, then the validity of the discriminant does not exist. However, if the constructions are conceptually more accurate, a lower, conservative, threshold value is proposed, such as 0.85. The values accepted by the STC are as follows:

HTMT <0.90 for conceptually similar structures

HTMT <0.85 for conceptually different designs

The model we obtained is conceptually different constructions. Therefore, the values of the HTMT obtained according to the model are taken as the appropriate values (Table 3)

Table 3

Heterotrait-monothrite ratio (HTMT) tests

Hidden factors	C	CE	CL	CS	PK	PQ	
C							

CE	**0,689**						
CL	**0,558**	**0,542**					
CS	**0,646**	**0,805**	**0,848**				
PK	**0,300**	**0,303**	**0,244**	**0,279**			
PQ	**0,590**	**1,222**	**0,513**	**0,697**	**0,248**		
PV	**0,707**	**0,659**	**0,425**	**0,597**	**0,305**	**0,596**	

Based on the test results, we obtained the results of the general PLS-SEM model on the formation of local brands of milk and dairy products and their impact on competitiveness, which are presented in Table 4 below.

Table 4

Results of the PLS-SEM model

Connections	Road coefficients	All effects
CE -> C	**-0,265**	**-0,266**
CE -> CL	0,006	0,006
CL -> C	**-0,279**	**-0,279**
CS -> C		**-0,183**
CS -> CE	0,125	0,125
CS -> CL	0,537	0,538
PK -> C		**-0,030**
PK -> CE	0,040	0,040
PK -> CL	0,068	0,068
PQ -> C		**-0,198**
PQ -> CE	0,630	0,630
PQ -> CL	0,108	0,111
PV -> C		**-0,045**
PV -> CE	0,100	0,100
PV -> CL	0,066	0,067

The results of the PLS-SEM model show that enterprises producing milk and dairy products prioritize customer relationships, rather than enhancing competitiveness. The practice of brand building implemented by enterprises negatively affects the competitiveness of these brands.

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Negative effects on competitiveness are caused by the following behavioral characteristics of consumers:

CE1sut - The product does not adequately meet the needs and requirements of consumers;

CE2sut - The quality characteristics of the product, i.e., taste, appearance, composition, nutritional value, unchanged, etc., are lower than the consumer expected;

CE3sut - Product promises (product information, advertising, etc.) The consumer does not meet their needs and requirements.

CE4sut - After consuming the product, there are different aspects of the characteristics that you felt before you bought it;

CS2sut - Your overall satisfaction with the product does not meet the level expected by the consumer.

PP2sut - The composition of the product (raw materials, naturalness, components of the product, etc.) does not meet the requirements of the consumer;

PQ3sut - The consumer cannot evaluate the quality of the product based on its appearance;

The nutritional value of the product does not meet sufficient requirements and cannot be evaluated by the consumer without its consumption.

PV3sut - The price of the product does not adequately correspond to its functional quality characteristics.

PV4sut - The price of a product does not change depending on its consumption, disposal, storage and durability, shelf life, use, and novelty.

PV5sut - The overall quality of the product, that is, the cost of the product compared to the total cost.

Positive effects on competitiveness are caused by the following behavioral characteristics of consumers:

CL3milk - Consumers will continue to buy brands of dairy products, even if their price increases. Because milk is the main consumer good.

CL4sut - Consumers have a high desire to recommend the brands they consume to friends, family, or other consumers;

CS1sut - Consumer satisfaction with the product is high;

PK1sut - Consumers are familiar with brands of dairy products.

PQ5sut - How consumers evaluate products based primarily on their nutritional value.

PV1sut - Consumers consider the purchase price of products to be favorable.

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PV2sut - The price of the product corresponds to its taste, composition, appearance, and smell, i.e., the characteristics of the product.

Based on the results of the conducted research, it can be concluded that branded companies operating in the market of milk and dairy products have not reached the level of international brand competitiveness. It is advisable for enterprises aimed at forming brands of milk and dairy products to set strategic goals aimed at solving the main problems identified based on the analysis results.

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