

**Biletska Y.,
Pysarevskiy M.,
Sokolovska O.,
Grigороva-Berenda L.**

MARKETING RESEARCH AND DESIGN OF QUALITY FUNCTION IN THE PRODUCTION OF INNOVATIVE PRODUCT OF HEALTH PURPOSE

Об'єктом експерименту були 600 осіб, потенційні споживачі кисломолочних виробів. Із них 210 практично здорові та 390, які мають певні захворювання. Предметом дослідження були їх споживчі переваги відносно появи на ринку інноваційного продукту оздоровчого призначення. Однією із проблем сьогодення є незаповненість ринку продуктами харчування для осіб на спеціальному дієтичному харчуванні.

В ході дослідження встановлено, що 20 % із числа опитаних майже щоденно споживають йогурти питні класичні. 15, 13 та 12 % респондентів щоденно споживають творог, сметану та йогурти із злаковими наповнювачами (відповідно). 10 % опитаних віддають перевагу споживанню ацидофіліну та кефіру. 9 % респондентів віддають перевагу молочнокислому продукту – ряженка. По 8 % респондентів щоденно споживають простоквашу та аерін. 2 % від числа опитаних споживають біфілайф. Встановлено, що серед опитаних не користуються широким попитом йогурти із вмістом каротина, лецитина та виробу на основі соєвого молока (по 3 %). Споживач віддає перевагу йогурту із вмістом зародків пшениці та висівками (18 %). 17 % респондентів споживають йогурти із заміниками цукру. 13 % віддають перевагу виробам, у складі яких присутні вітаміни. 10 % споживають йогурти із вмістом мікроелементів. 7 та 6 % (відповідно) опитаних віддають перевагу йогурту із вмістом антиоксидантів та ентеросорбентів. По 5 % споживчих переваг отримали знежирені виробу та виробу із вмістом харчових волокон. Спроектуючи функцію якості QFD-моделі (Total Quality Management – QFD) встановлено, що споживач хоче бачити на полиці йогурт із вмістом біфідобактерій, звичними смаковими характеристиками, безпечний при споживанні та за невисокою ціною.

У порівнянні з аналогічними відомими способами виробництва йогурту, спроектований продукт може приносити максимальні прибутки підприємству-виробнику, за рахунок випуску нової продукції, яка буде максимально задовольняти вимоги споживачів.

Ключові слова: маркетингові дослідження, QFD-методологія, будинок якості, продукти оздоровчого призначення, споживчі переваги, кисломолочні виробу.

Received date: 03.02.2020

Accepted date: 14.03.2020

Published date: 30.06.2020

Copyright © 2020, Biletska Y., Pysarevskiy M., Sokolovska O., Grigороva-Berenda L.

This is an open access article under the CC BY license

(<http://creativecommons.org/licenses/by/4.0>)

1. Introduction

The success of an innovative product in the market depends on how much the manufacturer has previously taken into account the needs of the consumer [1, 2]. Due to the release of new products that will maximally satisfy the requirements of consumers, the manufacturer can receive maximum profits. The study of the characteristics of customers and the identification of their needs allows to design an innovative product that will be competitive in the market [3, 4]. That is, in terms of its consumer properties and economic indicators, it can satisfy customers without giving in, and even surpassing at the same time products of a similar purpose manufactured by other enterprises. One of the most important tasks of the food industry is to increase the production of consumer goods with health-improving properties [5–7]. Designing a new product should begin with conducting market research to identify consumer motivations and preferences of potential buyers [8–10]. Therefore, it

is relevant to conduct market research to study consumer preferences of customers and identify their needs, which will allow to design an innovative product and minimize quality adjustments after it appears on the market. It will also ensure high value and at the same time relatively low cost by minimizing the cost of correcting non-compliance. So, *the object of research* was 600 people, potential consumers of dairy products. Of these, 210 are practically healthy and 69 people with iodine-deficient conditions, 77 people with lactose intolerance, and 54 people with diabetes. *The aim of research* is to conduct market research and design a quality function in the production process of an innovative product for health purposes.

2. Methods of research

Marketing research was carried out by the questionnaire method [8]. To design the quality function, the methodology of deploying the quality function (Total Quality

Management – QFD) was used [11–13]. The QFD methodology is a Japanese methodology for the systematic and structured transformation of consumer wishes into technical requirements for product quality. This methodology was developed in 1966 by the Japanese Yoyi Akao [14, 15]. The successive stages of the development of the methodology of the quality function are described in [16, 17].

The correlation coefficient (C_c) was determined as the number of bonds according to the technical parameter, which acquired the value: +1 or –1. The assessment of organizational complexity was carried out based on the experience of expert manufacturers with the help of estimates: 0...2 – it can be done, there are no technical (financial) difficulties; 3...6 – real and not very difficult; 7...9 – real, but difficulties will arise; 10 – nothing will be done. Comparison of technical and consumer characteristics was carried out by comparing the values of technical and consumer characteristics of the product with competitors, the difference was reflected in the form of parameters and graphs.

The significance of the relationship was determined by the formula:

$$\text{The significance of the relationship=} \\ = \text{strength of relationships} \cdot \text{significance, \%}.$$

Assessment of the absolute significance ($S_{a,b,c}$) was calculated by the formula:

$$(S_{a,b,c}) = \text{The importance of needs} \times \\ \times \text{Strength of communication} \cdot C_c$$

Using the methodology of the quality function deployment will normalize the procedure for determining the main characteristics of the product, it is developed taking into account the wishes of consumers. Minimize adjustments to product parameters after they appear on the market. To provide high value and at the same time relatively low cost of the product by minimizing non-production costs.

Based on the foregoing, the use of QFD-methodology is one of the main means of achieving and maintaining the competitiveness of the enterprise. Because in order to survive in a saturated market, an enterprise needs to offer new products and maintain the quality of its products at a high level.

3. Research results and discussion

Having examined % of consumption of various groups of fermented milk products from the total number of respondents, it was found that 20 % of the number of respondents consume classic drinking yogurts almost daily. Consumers explain their choice with a high protein and low carbohydrate content, and an «Instagram mode» for proper nutrition, along with physical activity for body shaping.

15, 13 and 12 % of respondents daily consume cottage cheese, sour cream and yoghurts with cereal toppings (respectively). 10 % of respondents prefer the consumption of acidophilus and kefir, the dominant advantage when choosing were the symbiotic properties of the product. 9 % of respondents prefer lactic acid products – fermented baked milk, through a pleasant taste that «re-

sembles childhood». 8 % of respondents consume yogurt and aerin daily, feeling a lack of probiotics in their diet. 2 % of the number of respondents consume bifilife, arguing that their purchase is interest in «a new product on the shelf». From the experiment, it is possible to conclude that such dairy products as yoghurts can be attributed to daily consumption products.

Defining % physiologically functional ingredients in yogurt, the lack of which is felt most by the consumer it is found that 18 % of respondents prefer yogurt with embryos and bran. 17 % of respondents consume yogurt with sugar substitutes. 13 % prefer products that contain vitamins. 10 % consume micronutrient yoghurts. 7 % and 6 % of respondents prefer yogurt with the content of antioxidants and enterosorbents (respectively). Fat-free products and products containing dietary fiber received 5 % of consumer preferences. It was established that among the respondents yoghurts containing carotene, lecithin and products based on soy milk (3 % each) are not in great demand.

The next stage of the study was the design of the quality function of the QFD model in the production process of an innovative product for health purposes. The results of marketing research are listed in the matrix of «quality house». The project of the quality function of the QFD-model for the production of recreational yogurt using the example of Kharkiv Dairy Plant – «KhDP» LLC (Ukraine) is shown in Fig. 1.

It was established that, first of all, when developing yogurt, it is necessary to ensure the healing effect (dietary properties) of products, depending on the direction and purpose. The taste characteristics of the new yogurt «it should be familiar, without extraneous sharp tastes and flavors inherent in this product» have a significant impact on consumers. The consumer prefers natural enrichment, which determines the safety of the new yogurt during its consumption. The impact on purchasing activity will be the price of a new yogurt. The consumer will give preference to products at a low price. Based on the results of calculating the absolute significance of the characteristics of the new yogurt, it is possible to draw conclusions about the appropriateness of its production. Setting goals and criteria for the successful activity of Kharkiv Dairy Plant – «KhDP» LLC in creating an innovative product, by which the company will minimize the quality adjustment of the innovative product (yogurt) after it appears on the market. It will also provide high consumer value and at the same time relatively low cost, which will occur due to minimizing the cost of correcting non-compliance.

4. Conclusions

A study of % consumption of various groups of fermented milk products found that 20 % of those surveyed consume classic drinking yogurts almost daily. 15, 13 and 12 % of respondents daily consume cottage cheese, sour cream and yoghurts with cereal toppings (respectively). 10 % of respondents prefer acidophilus and kefir. 9 % of respondents prefer lactic acid products – fermented baked milk. 8 % of respondents consume yogurt and aerin daily. 2 % of the number of respondents consume bifilife. From the experiment, it is possible to conclude that such dairy products, such as drinking yoghurts, can be attributed to daily consumption products.

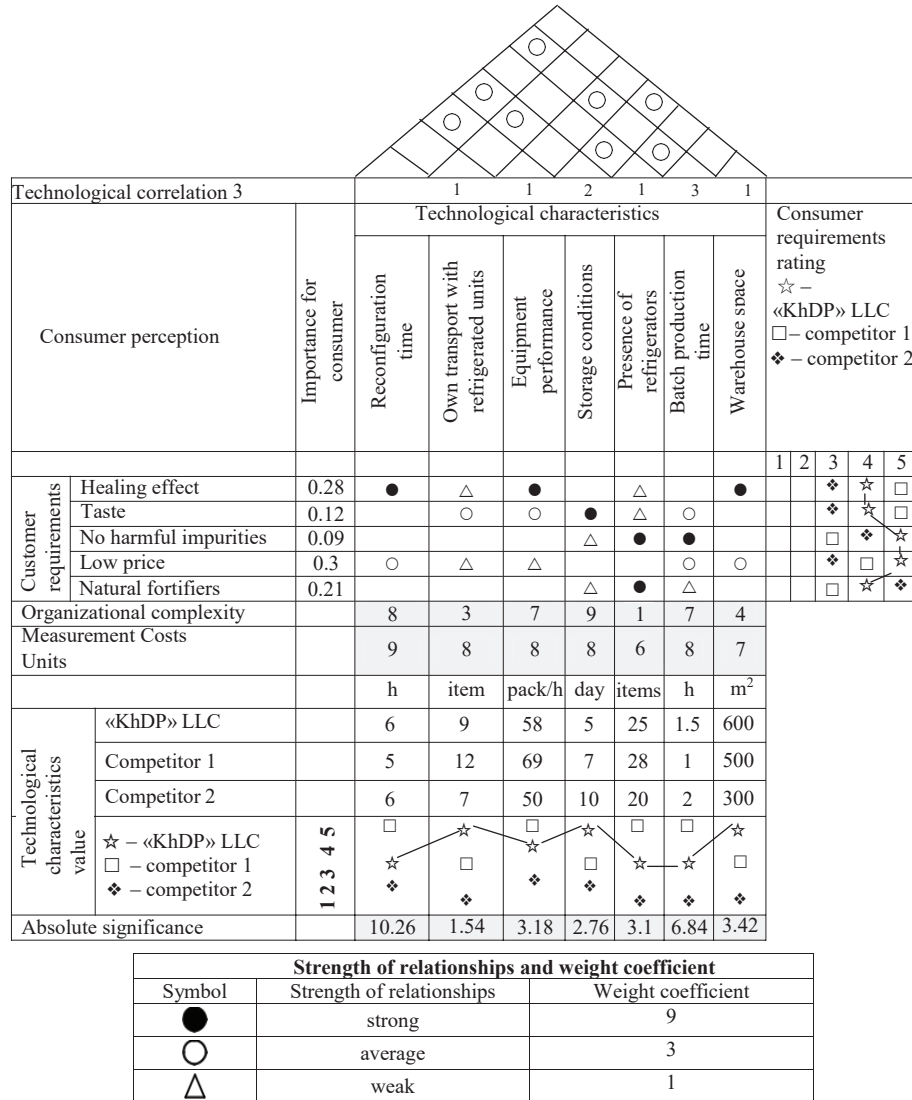


Fig. 1. The project of the quality function of the QFD-model for the recreational yogurt production using the example of Kharkiv Dairy Plant – «KhDP» LLC

Having determined the % physiologically functional ingredients in the composition of yogurt, the lack of which is felt by the consumer most of all, it was found that among the respondents yoghurts containing carotene, lecithin and products based on soy milk (3 % each) are not in great demand. The consumer prefers yogurt with the content of wheat germ and bran (18 %). 17% of respondents consume yogurt with sugar substitutes.

13 % prefer products that contain vitamins. 10 % consume micronutrient yoghurts. 7 and 6 % (respectively) of respondents prefer yogurt with the content of antioxidants and enterosorbents. Fat-free products and products containing dietary fiber received 5 % of consumer preferences. Having designed the quality function of the QFD-model in the production process of an innovative product for health-improving purposes using the example of yogurt by the Kharkiv Dairy Plant, it was found that it is necessary to provide new yogurt with health-improving, dietary properties depending on the direction and purpose. The consumer wants to see yogurt on the shelf with the usual taste characteristics, safe for consumption and at a low price.

According to the results of calculating the absolute significance of the characteristics of the new yogurt, the

feasibility of production was established to create a new product. The introduction of the QFD method in the activities of Kharkiv Dairy Plant will reduce the time needed to develop the product and bring it to the market by more than 2 times. Shorten the planning and decision-making processes. Reduce response time to new market opportunities. Also, the use of the QFD methodology in the future will allow to avoid or minimize the quality adjustment of yogurt after it appears on the market and ensure high value and at the same time relatively low cost by minimizing the cost of correcting inconsistencies.

The studies described in the work provide for their logical continuation in the direction of developing new competitive products in order to expand the range of health food products available for mass consumption in terms of price and quality characteristics.

References

- Mardar, M. R., Zhyhunov, D. O., Ustenko, I. A. (2015). Designing of a new cereal product in accordance with consumer preferences. *Technology Audit and Production Reserves*, 2 (6 (22)), 67–72. doi: <http://doi.org/10.15587/2312-8372.2015.41755>
- Rusanova, S. V., Sabina, O. O., Kovalenko, S. M. (2009). Doslidzhennia rynku yak osnovna skladova rozghortannia funktsii

- yakosti (QFD). *Upravlinnia, ekonomika ta zabezpechennia yakosti v farmatsii*, 6 (8), 51–58.
3. Matison, V. A., Demidova, N. A. (2012). Primenenie metoda razvertyvaniya funktsii kachestva dlya konstruirovaniya produkta v pishchevoi promyshlennosti. *Pishchevaya promyshlennost*, 4, 44–45.
 4. Mardar, M., Zhygunov, D., Znachek, R. (2016). QFD methodology to develop a new health-conducive grain product. *Eastern-European Journal of Enterprise Technologies*, 2 (11 (80)), 42–47. doi: <http://doi.org/10.15587/1729-4061.2016.65725>
 5. Biletska, Y., Plotnikova, R., Danko, N., Bakirov, M., Chuiko, M., Perepelytsia, A. (2019). Substantiation of the expediency to use iodine-enriched soya flour in the production of bread for special dietary consumption. *Eastern-European Journal of Enterprise Technologies*, 5 (11 (101)), 48–55. doi: <http://doi.org/10.15587/1729-4061.2019.179809>
 6. Biletska, Y., Plotnikova, R., Skyrda, O., Bakirov, M., Iurchenko, S., Botshtein, B. (2020). Devising a technology for making flour from chickpea enriched with selenium. *Eastern-European Journal of Enterprise Technologies*, 1 (11 (103)), 50–58. doi: <http://doi.org/10.15587/1729-4061.2020.193515>
 7. Ryzhkova, T., Bondarenko, T., Dyukareva, G., Biletskaya, Y. (2017). Development of a technology with an iodine-containing additive to produce kefir from goat milk. *Eastern-European Journal of Enterprise Technologies*, 3 (11 (87)), 37–44. doi: <http://doi.org/10.15587/1729-4061.2017.103824>
 8. Ponomarev, S. V., Mishchenko, S. V., Belobragin, V. Ya., Samorodov, V. A. et. al. (2005). *Upravlenie kachestvom produkcii. Instrumenty i metody menedzhmenta kachestva*. Moscow: RIA. «Standarty i kachestvo», 248.
 9. De Pelsmaecker, S., Gellynck, X., Delbaere, C., Declercq, N., Dewettinck, K. (2015). Consumer-driven product development and improvement combined with sensory analysis: A case-study for European filled chocolates. *Food Quality and Preference*, 41, 20–29. doi: <http://doi.org/10.1016/j.foodqual.2014.10.009>
 10. Cardoso, J. de F., Casarotto Filho, N., Cauchick Miguel, P. A. (2015). Application of Quality Function Deployment for the development of an organic product. *Food Quality and Preference*, 40, 180–190. doi: <http://doi.org/10.1016/j.foodqual.2014.09.012>
 11. Suvorova, L. A., Tsvirov, R. P. (2005). Primenenie metodologii QFD i statisticheskikh metodov v upravlenii kachestvom produktsii na promyshlennom predpriatii. *Kachestvo, innovatsii, obrazovanie*, 2, 72–78.
 12. Benner, M., Linnemann, A. R., Jongen, W. M. F., Folstar, P. (2003). Quality Function Deployment (QFD) – can it be used to develop food products? *Food Quality and Preference*, 14 (4), 327–339. doi: [http://doi.org/10.1016/s0950-3293\(02\)00129-5](http://doi.org/10.1016/s0950-3293(02)00129-5)
 13. Cohen, L. (1995). *Quality Function Deployment: How to Make QFD Work for You*. Addison Wesley Longman, 368.
 14. Akao, Y. (1990). *Quality Function Deployment (QFD). Integrating customer requirements into product design*. Portland: Productivity Press, 369.
 15. Misuno, S., Akao, Y. (1994). *QFD. The customer-driven approach to quality planning and deployment*. Tokyo: Asian Productivity Organization, 365.
 16. Biletska, Y., Bilovska, O., Zaitseva, A. (2019). Design of new food for diet purposes according to consumer preferences. *Technology Audit and Production Reserves*, 6 (4 (50)), 21–25. doi: <http://doi.org/10.15587/2312-8372.2019.185931>
 17. Biletska, Y., Perepelytsia, A., Bilovska, O. (2020). Determination of consumer preferences of different groups of food. *EUREKA: Social and Humanities*, 1, 23–26. doi: <http://doi.org/10.21303/2504-5571.2020.001136>
-
- Biletska Yana**, PhD, Associate Professor, Department of International Ecommerce and Hotel and Restaurant Business, V. N. Karazin Kharkiv National University, Ukraine, ORCID: <http://orcid.org/0000-0001-8060-6579>, e-mail: monika3384@ukr.net
-
- Pysarevskiy Mykola**, PhD, Associate Professor, Department of International Ecommerce and Hotel and Restaurant Business, V. N. Karazin Kharkiv National University, Ukraine, ORCID: <http://orcid.org/0000-0002-3981-5149>, e-mail: monika3384@ukr.net
-
- Sokolovska Olena**, PhD, Associate Professor, Department of International Ecommerce and Hotel and Restaurant Business, V. N. Karazin Kharkiv National University, Ukraine, ORCID: <http://orcid.org/0000-0002-6422-8915>, e-mail: lenasokolovska@karazin.ua
-
- Grigороva-Berenda Larisa**, PhD, Associate Professor, Department of International Economic Relations, V. N. Karazin Kharkiv National University, Ukraine, ORCID: <http://orcid.org/0000-0002-8091-4333>, e-mail: grygorova@karazin.ua