

## Achieving competitive advantages in the production of baby food.

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### **Abstract**

It is considered the possibilities of increasing the competitiveness of baby food products. Competitive advantages of baby food can be achieved by providing traceability, digital product labeling and "traffic light" labeling, and customer-oriented product design. Consumers perceive traceability not as an additional parameter of food product quality, but as a mandatory right to obtain reliable information about the sources of raw materials, the production technologies used and ensuring the safety of the final product, its prescription composition, storage methods and conditions, and shelf life. Voluntary "traffic light" labeling helps consumers understand how the product meets the principles of healthy nutrition. Digital product labeling can reduce and even prevent the turnover of illegal products. The food product design process was studied on the basis of factor analysis, taking into account consumer, technological and economic factors. Developing a product that is attractive to a child is very difficult. This is due to the fact that it must take into account the possible responses of the receptors of almost all human senses.

**Key words:** *traceability, labeling, baby food.*

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## **Introduction**

In the conditions of saturation of the food market with goods, it is still difficult for the consumer, especially in the field of baby food, to manage the advantages and disadvantages of the range of food products present in retail outlets. Today, the range of food products is evaluated by the consumer according to two sources of information available to them: labeling and organoleptic indicators. Therefore, to date, competitive advantages can be achieved by:

- Traceability;
- Labeling – "traffic light»;
- Digital product labeling;
- Customer-oriented product design.

Traceability requires establishing the integrity, reliability, and identification of the product at all production stages, including a quality and safety verification and certification system. Traceability helps the consumer to navigate when buying healthy food products, which should include, among other things, baby food. Requirements for the quality of life and health of a person at any age – from infancy to old age-are inextricably linked to a healthy diet [1].

Voluntary marking "traffic light" helps consumers understand how the product meets the principles of healthy nutrition. In accordance with the " traffic light» [7]:

- The red color indicates the content of more than 17.5 g of fat in the product (including 5 g of saturated fatty acids), 22.5 g of total sugar, 1.5 g of salt per 100 g of the product;
- The green color indicates that the product contains less than 3 g of fat (1.5 g of saturated fatty acids), 5 g of total sugar, and 0.3 g of salt per 100 g of product;
- Between the red and green zones, the content of critical food substances is indicated in yellow.

It should be noted that the term "total sugar" on this label consists of the sum of the sugars originally contained in the raw material and the added sugar added to the product formulation during its production.

The introduction of a digital labeling system is beneficial to the state (it can increase tax collection and make the market transparent), legal manufacturers will increase their revenue due to the growth of market share, and the consumer will be able to trust the quality and safety of the purchased product. At the same time, for each product group, digital labeling should include additional important information, such as expiration dates, the possible presence of allergens in the product (which is important for baby food, since children are more susceptible to allergies). If you compare the "traffic light" and "honest sign" labels, the latter is convenient because data on the nutritional value and safety of the product can be placed in a digital code [2].

As a priority, there is a need to mark many groups of food products in the assortment with a digital code – meat, dairy, fish, flavoring, baby food, etc. the Introduction of digital labeling will increase the cost of the final product, and it is still necessary to find a place on the packaging for its placement.

Another competitive advantage of baby food products is the use of customer-oriented design methodology. One of the most important tasks facing the food industry during the economic crisis is the introduction of new food products to the market that contribute to improving the financial position of the enterprise. The analysis showed that the reasons that determine the need for product development include: a decrease in the level of sales of the main products and market share, while the sales volumes of competitors remain the same; expansion of the product range by competing companies; reduction of the target audience for the main products of the company, despite the increase in advertising and marketing costs; the flow of target consumers from more expensive categories to cheaper ones; the appearance of new types of innovative products on the market. Research in the field of food design (food

product design (FPD)) allowed us to form five clusters of this process: defining goals and objectives and risk analysis; identifying the target segment of consumers and creating trial concepts; forming the final concept and creating a prototype; production of a pilot batch and trial marketing; launch of serial production and creation of a system for ensuring product safety and quality. The FPD process was studied on the basis of factor analysis, taking into account consumer, technological and economic factors. When designing new products, special emphasis is placed on risk assessment and management procedures. In the group of risks related to the loss of project management, the risks associated with the leakage of information about the design to competitors, the formation of a negative attitude to the product when entering the market are noted; with the possibility of significant changes in the composition of the FPD group. Economic risks primarily depend on underfunding the FPD process, increasing purchasing prices for raw materials, low product competitiveness, and not achieving the planned level of product quality. The FPD process is one of the most complex and time-consuming, but it can lead to a significant improvement in the financial and economic situation of the company if the new product is successful in the market [7].

## **Results and discussions**

From the position of the world health organization, healthy nutrition is associated with the state's policy in the field of food production, food security, and providing children and adults with vital nutrients. Healthy nutrition is a combination of food ingredients in products that ensure growth, full development and normal functioning of the individual with constant use, and contributes to the prevention of diseases, health promotion and active longevity. Healthy food products are obtained from raw materials where pesticides and other plant protection products, mineral fertilizers, growth stimulants were not used, and animals were not fattened using antibiotics or hormonal veterinary drugs. In healthy food products, the presence of GMOs should be completely excluded. It is most promising to produce healthy food products using nanotechnology, which allows you to preserve biologically active substances in the processing of food raw materials.

Consumers perceive traceability not as an additional parameter of food product quality, but as a mandatory right to obtain reliable information about the sources of raw materials, the production technologies used and ensuring the safety of the final product, its prescription composition, storage methods and conditions, and shelf life [1].

The concept of introducing "traceability" in the agro-industrial sector and moving it beyond the borders of a single production is not new. Both the government and business have realized its need. However, if manufacturers thought about this in the first place to gain competitive advantages and optimize their business processes, then over time, traceability issues have become of strategic importance as the main

tool for countering bio-terrorism. The main principles of traceability were laid down in the ISO and HACCP standards, developed for the control of biological, chemical and physical risks of production. [1] Further, the need for traceability has been developed in a number of standards: HFS International Food Standard, BRC Global Standard, SQF 1000 Code, Global Food Safety Standards, etc. At the same time, the implementation of these standards within individual industries and network enterprises does not allow to solve the problems of countries and cross-country trade processes in a comprehensive way, since there are no coordinated mechanisms for communication and exchange between all market participants along the entire product chain and information data. Research results demonstrate the importance of traceability for the end user. So for 8 out of 10 consumers, "ingredient traceability" is the most important factor affecting the purchase of food products [6]. More and more consumers perceive traceability not as an additional parameter of product quality, but as an integral and mandatory right to obtain reliable information about the sources of raw materials, the production and safety technologies used, the composition of the final product and logistics features during distribution. Consumers are increasingly aware of the importance of completeness of information when choosing food, and this explains the effect of increasing aggregate consumer demand for "greater transparency" and "better ingredients"[1].

Consumers want to buy and consume healthy, safe foods and pay more for them if they get reliable information about their quality and safety. Marking should help the consumer with this. Marking refers to the means of commodity information and it has the highest proportion of fundamental and consumer information, and the lowest – on commercial. The most important functions of marking are distinguished: informational, identifying, motivational, and functional. Among them, the information function is the main one. It is implemented to a greater extent with the help of fundamental and consumer information, to a lesser extent with the help of commercial information.

The consumer wants to get information on the label that the product is healthy and does not contain undesirable components (for example, GMOs), as well as excessive content of free sugars, sodium, saturated fatty acids, transisomers of fatty acids (after hydrogenation of vegetable fats) [5]. A clear understanding of the component composition and traceability of prescription ingredients can give the consumer such guarantees. And here it is effective to apply additional color markings on the packaging of food products. This marking called "traffic light" has already been widely used in European countries, the United States, Latin America, and China [8].

There was an obstacle to the widespread introduction of the "traffic light" label. Consumers perceive red as a danger. But the "traffic light" label is intended to provide the consumer with visual information about the content of certain critical substances in the product (added sugar, salt, saturated and trans-isomers of fatty acids) for an informed choice in favor of a healthy diet. And this is especially important if the consumer has health problems, when excessive content of such

substances in the purchased product can negatively affect health. Thus, the "traffic light" label contributes to the consumer's careful attitude to their health, and the manufacturer is simply forced to introduce new technologies to improve the quality and safety of its products [4].

In some countries, such as the United States, all food producers with sales of \$ 100 million in 2020 will be able to do so. and more are required to switch to color-coded mandatory labeling introduced by the U.S. Food and drug administration. In addition, requirements have been introduced to indicate the percentage of daily value of such critical substances for human health as added sugar, saturated and trans-fats. In Russia, guidelines were also developed – MR 2.3.0122-18.2.3 "Food Hygiene. Color indication on food product labels for the purpose of informing consumers." Currently, on the territory of the Eurasian economic Union (EEU), the color indication on the packaging of food products at the first stage is voluntary and is carried out in accordance with the above guidelines (MP). The first product for color display was dairy products. The following indicators can be displayed on the packaging of dairy products: red, green or yellow [9]. Unilever and Danon began using the "traffic light" label for food products.

Labeling can reduce and even prevent the turnover of illegal products. To do this, many countries have established national systems for digital labeling and product traceability. In this case, labeling means attaching a special code to each item sold at retail, which will help you track who its manufacturer is and how this product moved on the way from the manufacturer to the store where it is sold [3]. Leading positions in the field of digital labeling are occupied by North America, Europe and China. Digital labeling is in demand in the production and sale of food products.

There are a lot of traceability technologies available, and among them, the marking associated with the 2D matrix has become very popular [1].

The economic impact of the introduction of digital labeling is significant: in countries where digital labeling has been introduced, the number of falsifications has decreased by 30-40%. There are no uniform standards for implementing digital labeling – different models are being implemented in different countries. In the EU, digital labeling has been implemented for 7 years, and a centralized model is used: the IT system belongs to the state, and services related to code generation are provided by the operator, which is also controlled by the state [3]. In the USA, there is a decentralized market where six companies provide traceability services on commercial terms, and the government does not control the database.

The most popular and developed model operating in other countries is based on the principles of public-private partnership (PPP), when the state and business cooperate using a single centralized database. In particular, China is actively using digital labeling based on PPP principles. Manufacturers on a voluntary basis are willing to use digital labeling of their products to confirm their quality and safety. In Russia, the system of digital marking and traceability of goods called "Honest mark" is also formed on the principles of PPP. An honest mark will be assigned to each unit of the product. This is a unique digital code protected by cryptography that cannot be

forged. The product code will consist of two parts-the identification code and the verification code [3]. The introduction of digital labeling will be based on two principles: the first is based on the exclusive right of the state to access aggregated data and software; the second provides non-discriminatory access to data stored in the system, free of charge.

Before introducing anything into baby food, it makes sense to check it on "adult" food products. The marking of product samples produced by Belarusian enterprises was analyzed:

- Products of JSC "dyatlovsky cheese factory" – "Dutch new" young cheese (#1), "Capresi elite" cheese (#2);
- Products of JSC "Savushkin product" – drinking yogurt enriched with bifidobacteria fat-free with fruit filling (#1), drinking yogurt enriched with bifidobacteria with a mass fraction of fat 2.0% with fruit filling "strawberry-raspberry" (#2), yogurt product with a mass fraction of fat 1.5% with fruit filling "cherry" (#3), yogurt product with a mass fraction of fat 1.5% with fruit filling "pineapple" (#4);
- Products of JSC "Minsk dairy plant #1" – cheese glazed with vanilla flavor and fat mass fraction of 23.0% (#1), cheese glazed with cocoa and vanilla flavor with fat mass fraction of 23.0% (#2), cheese glazed with fat mass fraction of 23.0% with vanilla flavor (#3), cheese glazed with fat mass fraction of 23.0% with cocoa (#4).

During the analysis, the information provided on the product label was determined to meet the requirements of CU TR 022/2011 and the standards of the "technical conditions" type for the analyzed products.

The products of JSC "dyatlovsky cheese-making plant". Analysis of the product labeling of this company showed that it meets the requirements of regulatory documents. However, the packaging of these types of cheese does not contain recommendations for the use of the food product, and the sample number 1 "Dutch new cheese" does not specify the type of cheese. The analyzed samples have a small size of the marking font: the height and width are less than 1 mm. this significantly reduces the readability of the text and makes such marking of the product for the consumer low-competitive. The degree of contrast at this minimum font size still ensures the readability of the text, since the colors selected by the manufacturer for marking are polar and provide the desired contrast. In addition, it should be noted that there is a positive induction of colors, in which the selected white color has a favorable effect on the contrast color when compared with black, and the text becomes clearer, but still because of the small font, the text remains less readable.

Products of JSC "Savushkin product". In accordance with CU TR 022/2011, information about: name, product composition, food additives, flavorings, biologically active additives, ingredients of non-traditional composition, as well as the trademark, number of products, date of manufacture, shelf life, storage conditions, name and location of the manufacturer, recommendations for use, indicators of nutritional value, information about the presence of GMOs, mark of

product circulation on the market, information about the regulatory document according to which food products are produced and can be identified.

However, for yogurt samples # 1 and # 2, the font height and width are less than 1 mm, while for samples #3 and #4, the contrast Ratio does not exceed 2 mm with such a minimum font size (especially less than 1 mm). The colors selected by the manufacturer for marking are not polar and do not provide the maximum contrast.

Products of JSC "Minsk dairy plant # 1". The requirements of CU TR 022/2011 for labeling glazed cheeses are met in the same volumes as for drinking yoghurts, which is indicated above. The background color of the packaging for all cheese samples is white, the text is dark blue, and this contributes to the perception of product labeling information. However, the small font size of samples # 1 and # 2 (height and width 1 mm) and even smaller for samples # 3 and # 4 (height and width 0.5 mm) does not contribute to the readability of the marking. In addition, the production date of samples #3 and #4 was partially erased during transportation of the product, and this is the result of its placement on the seam of the package.

Digital labeling of food products is just beginning to develop in the EurAsEU market. no one in the Republic of Belarus does this, but it is a guarantee of the authenticity of the product and confirmation of its quality and safety for consumers.

It is well known that correctly executed product labeling contributes to the success of sales. Today, the consumer often encounters a situation where it is impossible to read the marking information on the product due to the font size, contrast of the main background and font color, and all this reduces the competitiveness of the product and does not satisfy the consumer's request for sufficient, reliable and accessible information. It is no accident that changes were made to CU TR 022/2011 "Food products in terms of their labeling" related to the font size, contrast of the main background and font color.

Developing a product that is attractive to a child is very difficult. This is due to the fact that it must take into account the possible responses of receptors in almost all human senses. In the first place, obviously, should be located the taste buds of the language. At the same time, according to modern scientific ideas, a bright and memorable taste of a food product can not be provided by using the simplest combinations of shades of sour, sweet, salty and bitter. This is because the taste of food is really formed due to the presence in their composition of tens and sometimes even hundreds of different compounds, the identification of which is difficult to carry out even with the most modern analytical methods. It should be recognized that at present, in the field of creation and practical application of new flavoring food ingredients, impressive progress has been made. experts in the field of flavor chemistry have learned to give food products with a very different initial food matrix such original tastes and flavors that they become attractive to a wide range of consumers. Similar judgments can also be made about the design of the flavor and color that the product should have. The visual organs in the process of hedonistic evaluation are responsible for the perception of the appearance of a food product. In modern conditions, this means making high aesthetic requirements for industrial food

packaging, since the vast majority of products are sold to consumers today in this form. Hearing and touch also contribute to the hedonistic quality of the food product. The exact placement of the identified hedonic preferences in relation to the sensory indicators registered by the consumer's sensory organs will largely determine the commercial success of the food product being developed in the future. In addition, the consumption of food that is hedonistically attractive, as shown by the research of physiologists, objectively improves the process of its digestion and assimilation by the body. The relationship between the hedonistic appeal of a food product and its scientifically based health benefits is not simple and straightforward. From the point of view of the mathematical foundations of optimization theory, the taste of a food product and its health benefits are two different target functions. In this regard, it is almost impossible to achieve their simultaneous maximum for a single object. This is well illustrated by real-life examples. The greatest satisfaction is often delivered by products with a high content of sugar and fat, for example, confectionery, frequent consumption of which in large quantities can cause significant harm to human health. It can only be noted in this connection that a win-win strategy for including sweet and fatty components in food products in many cases has an objective evolutionary basis. In this regard, it should be remembered that a person previously managed to eat to his full not every day, and therefore when a food source appeared, he tried to get enough as quickly as possible and create certain energy reserves in his body. The easiest way to do this was to consume fats with their high calorie content, which is more than twice the energy value of proteins and carbohydrates. The possibility of consuming foods with a sweet taste was extremely rare, only when getting access to wild honey or ripe fruit. The widespread use of sugar and sugar substitutes in food products currently based on the dopamine pleasure theory has a simple rationale. The human body in the process of eating to create a sense of food saturation requires not only providing energy and plastic needs of the body, but also the allocation of a certain amount of free dopamine to form a sense of food pleasure. In this case, to achieve this effect, the specific source of its origin, unlike the previous case, does not play a special role – the main thing is the correct loading of the receptors responsible for producing the corresponding signal sent to the brain. Because of the objective features of the diet of our ancestors, we are programmed from childhood to give preference to sweet and fatty components. Their combination for a person has a synergistic, i.e. mutually reinforcing effect, accompanied by a particularly strong release of dopamine. The apparent preference of many people for salty food remains a mystery to experts at the moment. Regarding low-calorie dietary fibers with the absence of pleasant taste substances in their composition, it can be noted that their number in the diet of our ancestors with their collection of food in the form of edible plants was so great that they were really considered as ballast substances. This trend has continued to this day.

## **Conclusion**



From this analysis, the following recommendations for improving the quality of food labeling for Belarusian manufacturers immediately arise:

1. Take note of the changes to CU TR 022/2011, especially for font sizes that should not be less than 8 pins.
2. Pay attention to the color of the main background of the label for the perception of the information text applied to it.
3. The shelf life, date of manufacture of the product, and net weight should be placed on the label in places that are easy for the consumer to read. For the analyzed products, the information on the net weight is marked in prominent places, in large font, and this is easily detected by the consumer when purchasing. However, there are examples of labeling products from other manufacturers, when it is not easy to find the net weight on the product label at once: it can be applied in a very small font (up to 0.5 mm) somewhere in the corner of the label, and this creates great inconvenience for consumers.
4. The time has come to use modern ways to improve the labeling of food products, and the manufacturer should start with the "traffic light" label. This marking will be especially useful for baby food, which is always legally subject to increased requirements for quality and safety.

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## **System of balanced indicators as the basis of the organizational effectiveness model**

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### **Abstract**

Based on the results of the study, the necessity of using modern methods for assessing the performance indicators of an organization is substantiated. From a variety of methods, a balanced KPI scorecard for poultry enterprises was selected. The process of strategic analysis in all case studies in various fields. It is a research procedure, very useful for experts in the field of data analysis from different points of view.

This system more fully reflects the strategic goals and objectives that any organization seeks.

Criteria for choosing a system of balanced indicators are determined taking into account the specifics of the industry sector of organizations.

A mechanism has been developed to form a system of balanced indicators for the development of organizations. This mechanism includes the stages of the formation of a system of balanced indicators and the characteristic features of the implementation of each stage.

Based on the analysis of the organizational structure and specialization of the organization, middle managers were selected who are responsible for the performance of KPI indicators. The basic functional tasks for each of the managers are proposed depending on the specific KPI indicator.

**Key words:** *balance, scorecard, poultry-farming, effectiveness.*

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## **Introduction**

One of the most important conditions for the competitive development of an organization is to take into account multifaceted influence factors, which can be implemented using the strategic analysis method, which allows a comprehensive assessment of industry factors and factors of macro- and microenvironment, as well as taking into account the degree of influence.