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# **Nutrition and health claims –2000-2020: a systematic literature review**

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## **Abstract**

Consumers are surrounded by unhealthy food, which impedes making good food choices (Hill et al., 2003). With a view to helping them, many countries have introduced legislation allowing producers to label food with nutrition claims and health claims. Consequently, claim-bearing products have been appearing in an increasing number of countries (Grunert et al., 2010). The author's aim was to determine the current state of knowledge related to the use of nutrition and health claims on food packaging. To this end, it reviews and classifies the available literature, identifying key trends and indicating directions for future research.

A Scopus database search enabled an examination of three groups of articles published between 2000 and 2021, formed according to the presence of two phrases in the titles, abstracts, or keywords: NC and HC – 100 articles, at least NC – 201 articles, and at least HC – 2204 articles. The study was based on methods used by Massaro (2016) and Paul & Criado (2020) and the analyses were carried out within VOSviewer and RStudio cloud software.

The study revealed two important groups of topics covered in the analyzed articles: factors influencing the perception of claims (health, taste, trust, education, demographic data), as well as the perception of claims by consumers – a particularly controversial topic due to inconclusive results.

The strength of this article lies not only in an in-depth analysis of articles containing the investigated keywords, but also in a broad description of topics covered therein. Hence, the article might aid in indicating potential directions for further research on claims, as well as contribute to their better understanding by consumers. This may lead to future improvement of consumers' eating habits and, consequently, to the reduction in civilization diseases, which were the intentions behind the introduction of NHC onto the global market. As such, this

article can be used both by business practitioners and, above all, by researchers analyzing academic papers on NHC-related topics.

**Keywords:** Nutrition claims, health claims, food claims, systematic review

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# Selected predictors of consumer knowledge about brand nationality on the food market

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## Abstract

The country-of-origin (COO) effect and consumer ethnocentrism play an important role on the food market, as manufacturers and retailers strive to differentiate their products on the highly saturated market. Their effectiveness depends on consumer perceptions of the brand nationality. In the literature of the subject, there is strong evidence that product country image of the consumer's perceived brand origin strongly affects brand attitudes, and this happens regardless of the perceptions' objective accuracy (Magnusson et al., 2011). This paper aims to identify selected characteristics of consumers which predict their knowledge about the origin of food brands. I take into account 3 measures of brand nationality: 1) the distinction between domestic and foreign brands based on the location of production, 2) the distinction between domestic and foreign brands based on company ownership, and 3) the ability to provide the correct COO of the brand owner.

An online survey was conducted in a nationwide, representative sample of 1000 respondents aged 15 and more. The representativeness criteria included: sex, the age structure in 10-year intervals, education level, the place of living (rural and urban areas), and region. Multiple regression models were used to test the simultaneous impact of a wide range of variables, and stepwise retrograde regressions were used to obtain more parsimonious models containing only statistically significant predictors. Validated scales were applied to measure value orientations (Schwartz, 2001), regulatory focus (Higgins et al., 2001), food attributes (Bryła, 2015, p. 299; Nestorowicz et al., 2016, p. 88), food choice motives (Steptoe et al., 1995; Onwezen, 2019), food related lifestyle (FRL) (Grunert et al., 1993; O'Sullivan et al., 2005; Balon et al., 2015), consumer ethnocentrism (Shimp and Sharma, 1987; Nestorowicz and Kaniewska-

Sęba, 2014), pride of being Polish, identification with various places, satisfaction with life, self-efficacy, and trust (European Values Survey, 2017). The perceived location and ownership were measured for 16 relatively well-known food brands, and indices were created to reflect the shares of correct identifications of the brand nationality in the three configurations mentioned above.

The level of consumer knowledge about brand nationality varies according to the measurement method. It is the best for the distinction between domestic and foreign production (on average, 14.7 out of 16 indications were correct), followed by the distinction between domestic and foreign origin of the brand owner (only 6.9 out of the 16 indications were correct on average), and the ability to provide the exact COO of the brand owner (only 3.8 correct indications for the 16 examined brands).

The predictors of each investigated type of consumer knowledge also differed. In a retrograde stepwise regression, correct identification of Polish or foreign location of production was positively associated with consumer age ( $\beta=0.092$ ,  $p=0.003$ ), higher education ( $\beta=0.076$ ,  $p=0.015$ ), attaching importance to food brand ( $\beta=0.091$ ,  $p=0.006$ ), sensory appeal as a food choice motive ( $\beta=0.091$ ,  $p=0.012$ ), price as a food choice motive ( $\beta=0.080$ ,  $p=0.018$ ), importance of product information as a FRL item ( $\beta=0.159$ ,  $p=0.000$ ), lack of food processing as a FRL item ( $\beta=0.094$ ,  $p=0.011$ ), and feeling connected with Poland ( $\beta=0.131$ ,  $p=0.002$ ). It was negatively related to attaching importance to organic certificates ( $\beta=-0.116$ ,  $p=0.001$ ), mood as a food choice motive ( $\beta=-0.076$ ,  $p=0.024$ ), self-rated diet healthiness ( $\beta=-0.089$ ,  $p=0.006$ ), and pride of being Polish ( $\beta=-0.099$ ,  $p=0.017$ ).

The correct identification of Polish or foreign brand owner was positively affected by being a man ( $\beta=0.122$ ,  $p=0.000$ ), age ( $\beta=0.075$ ,  $p=0.016$ ), higher education ( $\beta=0.101$ ,  $p=0.001$ ), attaching importance to product appearance ( $\beta=0.090$ ,  $p=0.004$ ), health as a food choice motive ( $\beta=0.108$ ,  $p=0.002$ ), lack of food processing as a FRL item ( $\beta=0.070$ ,  $p=0.041$ ), credibility of COO information on the packaging ( $\beta=0.103$ ,  $p=0.002$ ), universalism Schwartz value ( $\beta=0.107$ ,  $p=0.002$ ), and feeling connected with Europe ( $\beta=0.091$ ,  $p=0.017$ ). It was negatively associated with household size ( $\beta=-0.078$ ,  $p=0.010$ ), attaching importance to organic certificates ( $\beta=-0.125$ ,  $p=0.001$ ), environmental friendliness as a food choice motive ( $\beta=-0.121$ ,  $p=0.002$ ), confidence in advertising as a FRL item ( $\beta=-0.087$ ,  $p=0.006$ ), willingness to pay a price premium for domestic food products ( $\beta=-0.068$ ,  $p=0.033$ ), credibility of COO information

in the point of sale ( $\beta=-0.117$ ,  $p=0.001$ ), achievement Schwartz value ( $\beta=-0.071$ ,  $p=0.021$ ), and feeling connected with the world ( $\beta=-0.131$ ,  $p=0.001$ ).

The correct identification of the brand owner COO increased with being a man ( $\beta=0.075$ ,  $p=0.016$ ), higher education ( $\beta=0.087$ ,  $p=0.005$ ), attaching importance to food COO ( $\beta=0.087$ ,  $p=0.011$ ), familiarity as a food choice motive ( $\beta=0.106$ ,  $p=0.001$ ), lack of food processing as a FRL item ( $\beta=0.085$ ,  $p=0.014$ ), and universalism Schwartz value ( $\beta=0.086$ ,  $p=0.019$ ). It decreased with household size ( $\beta=-0.103$ ,  $p=0.001$ ), attaching importance to organic certificates ( $\beta=-0.074$ ,  $p=0.039$ ), and benevolence Schwartz value ( $\beta=-0.109$ ,  $p=0.002$ ).

Consumers are much better at distinguishing the domestic or foreign location of production than at distinguishing the domestic and foreign brand ownership. Their knowledge is even worse regarding the identification of the precise COO of the brand owner. Each type of consumer knowledge is shaped by a different set of predictors. The findings of this study improve our understanding of consumer characteristics affecting their knowledge levels in the area of food brand nationality. They are useful for companies aiming to target highly – or lowly – knowledgeable consumers.

**Keywords:** brand nationality, country-of-origin effect (COOE), brand origin, food brands, consumer knowledge

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## Online and offline information-seeking behavior of university students in the case of subjective judgment of healthy nutrition

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### Abstract

The nutrition habits of university students have an important impact on the foundation of their lifelong lifestyles. Students can play an important mediating role towards other age groups. The main objective of the research is to use a conceptual model to identify the online and offline information-seeking behavior of university students related to healthy nutrition. We conducted a paper-based self-administered questionnaire survey in early 2020. Our sample consisted of 612 people. Both descriptive and multivariate statistical procedures were used in the analysis. In the conceptual model, the following components were analyzed and differentiated: variables of subjective judgment of healthy nutrition; the nature of information

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seeking by Internet Information Search Model (ISN); the transition to healthy nutrition by Transtheoretical Model of Change (TTM). In the research, we differentiated the 6-item online and 14-item offline information source categories. The concept was based on various online and offline information sources. We successfully identified the conceptual model with our results. Using the model, we were able to characterize relevantly the online and offline information-seeking behavior of university students related to healthy nutrition. Overall, the transition of students to healthy nutrition is accompanied by various sources of online and offline information. The different stages of behavior change can be identified in the level of getting information. Offline resources are most important in the initial stages (“precontemplation” and “contemplation”), while online resources are more important in the “maintenance” phase.

## **Understanding food losses and waste - the case of baking and confectionary sector**

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### **Abstract**

There is no common and approved system of monitoring of the actual quantity of losses and wastage of food in the agri-food sector in Poland that would provide sufficient information about the level and causes of this phenomenon in particular sectors and their links (among else processing, transport, warehousing, retail and households).

To fill the knowledge gap related to the inefficient production system in the baking and confectionery industry (BCI), research was conducted to estimate the scale of losses in BCI in Poland, determine their causes and assess the risk of their occurrence, identify retrieve points (RP) and ways of losses reduction. The reduction of food losses and wastage is an urgent challenge to increase the sustainability of food systems. The manufacturers of bread and bakery and confectionery products share responsibility for preventing food wastage.

The study is prepared based on quantitative and qualitative studies and experiences and own analyses of authors. Research was conducted as a part of the project "Opracowanie systemu

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monitorowania marnowanej żywności oraz skutecznego programu racjonalizacji strat żywności i ograniczenia marnotrawstwa żywności (Development of a System for Monitoring Wasted Food and an Efficient Programme of Rationalisation of Food Losses and Limiting Food Wastage)" (Polish acronym PROM) under a strategic programme of scientific research and development efforts financed by NCBiR (National Centre for Research and Development) [nr.Gospostrateg1/385753/1/NCBR/2018] (Goryńska-Goldmann et al. 2021a,b, Łaba i Goryńska-Goldmann, 2020).

This study, conducted in Poland, offers valuable results for developing programmes and strategies to prevent and manage food losses in BCI. According to the Ishikawa concept, 31 primary and 94 secondary reasons for food losses were identified. Using the probability of loss risk, a toolkit for loss prevention and mitigation across all departments within businesses and a set of horizontal tools were identified.

The total volume of losses in Polish BCI reached 2.39% (in 2017) and 2.63% (in 2018) of the weight of manufactured products. The companies' average daily losses ranged from 0.8 to 6.4 tons, representing 9.7 to 14.4% of production volume, including 10.4–13.4% of bread losses and 6.8–24.4% of fresh pastry losses. The highest losses were generated by transport departments and these were exclusively retail returns. Potential 6 retrieve points in the the production processes were indicated: making and handling intermediate products and dough; portioning and forming of dough, baking, customized packing, shipping (storage), transport by own fleet.

Our results are of key importance for pursuing further research and show premises for developing programmes and recommendations to prevent and manage food losses in the BCI, which is determined by environmental, economic and socio-ethical issues.

**Keywords:** baking and confectionery industry (BCI), bread losses, causes of losses, losses prevention, measurement methods

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# **Opportunities of using virtual reality technology to shape the awareness and pro-ecological attitudes of food consumers**

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## **Abstract**

Industrial agriculture and environmental degradation contribute largely to the extinction of pollinating insects, whereas the number of pollinators affects the prices and availability of food products and the diversity of flora. A chance to stop this trend is to change the way of using natural resources in the direction consistent with the doctrine of sustainable development. Shaping pro-ecological awareness and attitudes can occur by taking actions in the field of social marketing. The concept of experience marketing is of particular importance in this area in line with the paradigm of experience economy, the tool of which can be virtual reality (VR, hence forth) technology. The analysis of VR technology, carried out on the example of the VR experience "Pollinator Park", produced in 2021 at the request of the European Commission, indicates that VR practically meets the assumptions of experience marketing and can potentially be an effective tool for shaping attitudes and behaviors that affect the shape of the market food and the environment. Nevertheless, due to the innovative nature of the tool, it does not currently ensure reaching the mass audience with the pro-ecological message. The opportunity to increase the range of impact lies in the potential increase in the popularity and affordability of VR systems in the foreseeable future.

# Financial and marketing conditions for the purchase of organic baby food

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## Abstract

In Poland, the organic food market has already developed enough to offer the youngest consumers products from certified farms and farms. You should take into account not only vegetables and fruits, but most of all ready meals and desserts available in Polish supermarkets in a very wide range and range of brands. There are many conditions for the purchase of organic food by Polish consumers. One of them is the financial aspect manifested in the high price of a certified organic food product. To a certain extent, the price of a product is also influenced by the value of tax on goods and services. The aim of this study is to present and evaluate the attitude of Polish parents towards the purchase of organic food for babies, with particular emphasis on the impact of VAT on their purchases.

The study used the method of survey research with the use of an online questionnaire. The results were statistically analyzed and subjected to the chi square test.

As a result of the conducted research, the most important conditions, shopping habits, motives and attitudes of parents towards ready-made baby products available in Polish stores were revealed.

The level of knowledge of Polish parents regarding the labeling of organic food was also revealed. The attitudes of Polish parents towards the purchase of organic food dedicated only to infants were presented and assessed. Parents expressed their views on the current and preferred VAT rate for baby food products.

**Keywords:** polish consumer behavior, value added tax, organic food

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# **Personalization of marketing communication on the food market in the context of personalization-privacy paradox**

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## **Abstract**

The article aims to show the specificity and ways of personalizing marketing communication via digital media in the food market. In addition, it was crucial to determine in which situations striving to understand consumers better and adapting the offer to their individual needs may improve the relationship between the customer and the company, and in which cases personalization of selected marketing activities may worsen them. The article is based on a systematic review of the literature and examples of personalization from the given market. It indicates how food companies should act in the spirit of one-to-one marketing to balance the personalization-privacy paradox.

# The perception and perspectives of new technologies in agriculture

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## Abstract

Food security and nutrition is the most pressing global issues today (Aamer, Al-Awlaqi, Affia, Arumsari, & Mandahawi, 2021). Drop damage has occurred due to climate change, problem with land and water availability and as well as the COVID-19 pandemic already affecting the food and agriculture sector (Jung, Maeda, Chang, Bhandari, Ashapure & Landivar-Bowles, 2021).

Recent estimates from the report of The State of Food Security and Nutrition in the World 2021, published by Food and Agriculture Organization of the United Nations (FAO), the International Fund for Agricultural Development (IFAD), the United Nations Children's Fund (UNICEF), the UN World Food Programme (WFP) and the World Health Organization (WHO) put the number of chronically undernourished people in the world between 720 and 811 million (FAO, IFAD, UNICEF WFP and WHO, 2021). As the number continued to rise, according to the authors of the report, it is essential to transform food systems to achieve food security, improve nutrition and put healthy diets. The policymakers should tackle poverty by boosting food value chains in poor communities through technology transfers. Pursuant to EY and the Syngenta Foundation for Sustainable Agriculture (SFSA) digital technology can help transform food security and lift millions of smallholder farmers out of poverty (Syngenta Foundation for Sustainable Agriculture. Can digital innovation help end hunger?, 2020).

Agriculture 4.0 evolved to produce crops in different manner by applying emerging technologies based on Industry 4.0. (Eashwar, & Chawla, 2021) The leading technology is Internet of things (IoT), which is the main building block of the concept of smart or precise farming. Due to using sensors, cameras and actuators farmers are able to regulate agricultural processes by remotely monitoring the crops and collecting data in the form of videos and

pictures. The researchers reported that productivity can potentially be increased by 70% by 2050 through the implementation of IoT in the agricultural sector (Aamer, Al-Awlaqi, Affia, Arumsari, & Mandahawi, 2021). In addition other technologies such as Artificial Intelligence, Machine Learning, Blockchain, UAVs (Unmanned Aerial Vehicles) or AFRs (Autonomous Field Robots), Big Data Analytics, Cloud Computing are having the capability to boost farming activities to new heights (Sinha & Dhanalakshmi, 2022). The finance sector has also a key role to play in allowing agriculture to contribute to economic growth and poverty reduction (McIntosh & Mansini, 2018). For example, the financial innovation FinTech offers farmers convenient ways of getting sources of funding through crowdfunding and digital payment system (Anshari, Almunawar, Mashri & Hamdan, 2019).

The aim of the paper is to measure knowledge and perception of consumers of new technologies in agriculture. This research contributes to the literature by exploring the perspectives of adopting emerging technologies in the food supply chain. In this study, after appropriate literature review, structured questionnaires were used. The sample comprised of consumers from the world. The results add to existing knowledge by identifying which technologies could become the driving factors in agriculture in the following years from the point of view of consumers.

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## **Consumer towards health and nutrition claims**

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### **Abstract**

The modern market of food products provides consumers with many opportunities to gain knowledge about the health properties and nutritional values of food. Health and nutrition claims are among the most affordable and at the same time the most questionable forms of disseminating information about healthy diets. Due to the fact that these messages are not only used to raise the nutritional awareness of buyers, but also play a promotional role, it is important to understand the mechanisms involved in the decision-making process of purchasing products on which they are placed. Identifying and understanding consumers' attitudes and behaviors towards food bearing claims is key to help them make health-enhancing food choices by taking appropriate legal, educational and promotional measures.

# Digital loyalty strategies during the pandemic that pay-off: empirical evidence from the Greek food market

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## Abstract

E-consumer Behaviour is a shifting fast as more and more consumers migrate from physical to digital stores to limit physical interaction. This research explores the effectiveness of digital loyalty strategies in consumer food markets under the light of the ongoing pandemic and the respective increase in terms of Digital Adoption (DA) within the industry. In addition, this study investigates the direct effects of perceived in-store infection threat (SIT). To collect data, online self-administered survey was utilized in Greece and 222 adult consumers participate. The findings revealed that SIT benefit Repurchase Intentions (RI) of digital retail brands, since it exerted positive direct effects in using digital stores. Moreover, DA moderated e-consumer behavior as DA strengthens the effectiveness of loyalty strategies. As a result, various marketing strategies and practices are proposed.

**Keywords:** Customer Equity Drivers, Repurchase Intentions, Digital Behaviour, pandemic, food markets

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# Consumers preferences on the food market in selected European countries

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## **Abstract**

Consumer preferences on the food market in selected European countries. Purchasing behaviors of consumers pose a phenomenon of significant dynamics, subject to significant changes, taking place along with changes in environmental factors, in particular, the rapidly evolving technology and the observed social changes. One of the key determinants shaping these behaviors are consumer preferences, also subject to significant modifications along with the trends observed in contemporary consumer societies. This phenomenon can be clearly observed, i.a. in the food market. The paper attempts to identify and compare the purchasing preferences of food consumers in selected European countries.

# Organic fruit and vegetables in the opinion and behavior of Polish consumers

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## Abstract

Consumer behavior research plays an important role in the development of the market for specific products. Currently, research on the consumption and popularization of organic food, the production of which is in line with the concept of sustainable development and the European Green Deal related to it, is of particular importance. The aim of the study was to analyze the attitudes and behaviors of consumers towards organic fruit and vegetables and the promotion of these products as a determinant of them.

The own research was carried out with the use of quantitative research methods, i.e. direct interviews with consumers - with the use of a standardized questionnaire, on a sample of 534 respondents, aged 18+. The scope of the research covered the opinions and attitudes of consumers towards organic fruit and vegetables as well as determining the factors determining the commencement of making or increasing the frequency of purchasing these products.

According to the surveyed consumers, organic fruit and vegetables are rich in nutrients, are healthy and safe, and produced using environmentally friendly methods. The most important factors influencing the increase in purchases and consumption and thus the development of the market for organic products, were the increase in the availability of this product category in the places of everyday shopping and the reduction of their prices as the most important

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factors. The conducted research showed that for the respondents, promotional campaigns aimed at popularizing organic food, its values and impact on human health are not without significance. The preferred forms of promotion were participation in fairs and exhibitions, price promotions and tasting products at the point of sale.

**Key words:** organic fruit and vegetables, promotion, organic farming, Green Deal

# Building the authority of a food brand on the Internet in the social media era

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## Abstract

Brands play a significant role in the functioning of enterprises on the market. In the era of Internet development considerations should be supplemented with the important issue of co-creating brand authority by buyers. The role of consumers in marketing communication has changed over the decades, from passive recipients of the message to co-creators of values. This is important, especially in view of the growing popularity of social media - where the interaction of media users and potential buyers with brand content - becomes a key element of the company's online presence.

Online food brand observation thanks to social media brings the benefits of increasing its awareness. Engaged consumers contribute, turn into a co-creator of the brand, and co-create the brand's authority.

The aim of the paper is to explore the possible relationships between building the authority of a food brand and its activities on the Internet, based on the use of social media marketing tools. The concept of brand authority has been developed in marketing literature, but there are no studies showing the outcomes of building a food brand authority based on social media activity (e.g. in Instagram).

The paper is based on multiple case research. Multiple case design is more challenging than a single case, it enables the induction of more reliable solutions.

As a result, the author suggests that the specific market segment which is sensitive to the perception and assessment of brands in terms of their producer / seller authority is food market, and that this phenomenon has intensified during the COVID 19 pandemic.

# Perception of meat produced from stem cells *in vitro* by Polish consumers in the light of survey research

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## Abstract

Nowadays, society's awareness of the negative effects of eating meat is growing, including environmental impacts, ethical concerns about intensively reared animals, and the resource inefficiency of meat production. However, on the other hand, one can observe social resistance to giving up this product and a continuous increase in the global consumption of meat. A kind of "golden mean" between mitigating the negative effects of meat production and the constantly growing demand for meat seems to be meat from stem cells. Despite the dynamic development of technology related to the production of artificial meat, this product faces one more important challenge, which is consumer acceptance. What is important is not only the will to consume once, but also full acceptance and the will to buy. This problem is difficult to solve because a common trend in many countries is the naturalness of products and meat from the laboratory is associated as artificial. Therefore, *in vitro* meat consumption will depend on a value conflict at an individual or collective level. In the literature on the subject, there is limited research on the perception of meat *in vitro* by the society, therefore the knowledge about the possibility of its acceptance and the type of barriers is small.

The aim of the research was to assess the perception of meat produced from stem cells *in vitro* by Polish consumers. The study used a survey as a research method. The study was

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voluntary and was conducted on the basis of an internet survey addressed to people aged 12 to +60. The procedure of river sampling or convenience sampling of respondents was applied. The research sample consisted of 424 respondents with a diversified socio-demographic profile.

The results of the study showed a diversified interest in meat produced from stem cells *in vitro*. The respondents were not able to clearly define their preferences for this type of product. Young people showed the greatest positive interest in innovative *in vitro* meat. The greatest concerns of consumers were related to the lack of knowledge about this type of food, the lack of its inherent naturalness and potentially negative health effects.

**Keywords:** consumer perception, *in vitro* meat, innovative product

## IoT as a facilitator on the consumer journey to sustainable food behaviours<sup>6</sup>

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### Abstract

Degradation of the environment is one the biggest challenge to be faced by modern societies. Negative environmental effects of human activity are observed in the sphere of food production and consumption as well (Ritchie and Roser, 2020). There is a need to change unsustainable consumption practices into sustainable ones, so to make the functioning of the whole food system more environmentally friendly. Sustainable food consumption is characterized by nutritional practices based on sustainably-produced food, reduced consumption of meat and dairy products, and increased consumption of fruit and vegetables (Verain et al., 2015). Research shows that consumers need to be supported in changing their dietary patterns to facilitate and strengthen those changes.

This paper aims at analyzing the potential of IoT as a facilitator on the consumer journey to sustainable food behaviours. Internet of Things (IoT) which consists of a range of technological

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devices, such as computers, smartphones, house equipment, vehicles, etc., can be seen as a facilitator in this process. Lots of data is collected and transmitted within the IoT system (Woodside and Sood, 2017), therefore it allows not only to identify users behavioural patterns, but also to design the choice architecture that will promote sustainable consumption. Additionally, it has great potential in terms of more effective communication with users of devices (Porter & Heppelmann, 2014).

IoT can be seen as a transmission channel for behavioural interventions directed at sustainable consumption. We adopt the COM-B theoretical model according to which behavior (B) is more likely to happen when the individual has the capability (C), opportunity (O), and motivation (M) to carry it out (Michie, van Stralen and West, 2011). This model sheds light on what and how should be changed. This knowledge can be used in designing behavioural interventions. However, to achieve the best results, those interventions should be adjusted to the touchpoints on a consumer journey to sustainable consumption so to improve the experiences and facilitate and/or strengthen changes (Elizarova and Kahn, 2018). Based on the above, we propose a concept of using IoT as a facilitator of changes on the consumer journey to sustainable food behaviors.

**Key words:** Internet of Things, food behaviours, sustainable consumption, COM-B

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# Success and failure rates of new food and non food products introduced on the market

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## Abstract

The aim of the paper is to present the real market effects of new products, success and failure rates, from the point of view of food and non food companies representing various industries. The research measures in the field of marketing and sales effects of new products are also proposed. The method used in this paper is a literature review, in the area of new product development and management. The author assumes, that the review and conceptual nature of this research is dominant.

Theoretical and empirical research reveals, that despite of implementing new product development and management best practices, many projects fail with new product strategies. But if failure rates as high as 90% are true? This would mean, that high costs of product innovation are incurred by many stakeholders, who create a specific network of relationships, not just the enterprise. The widespread belief, that the new product failure rate is 90% is not supported by empirical evidence.

The results provide a basis for improving efforts of businesses in the field of new product strategy. The limitations of the study include a complex character of considered theoretical constructs.

The values of the paper reflect the directions of enterprises conduct in new food and non food product development process. Failure and success rates are in fact difficult to quantify. The contribution of research to marketing sciences primarily includes the formulation of a set of real success and failure rates in food and non food industries.

**Keywords:** Food or non food products, New product, Marketing; Success and failure rates of new product, New products introduced on the market

# **Study of the influence of digitalization of the information flow on the process of monitoring the expiry dates of food products in convenience stores**

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## **Abstract**

Monitoring the expiry dates is a very important process from the shops' point of view. Currently, it is mainly done manually, which is time-consuming and with a high possibility of errors or omissions, which influence on lowering the level of customer service and food waste. Due to the current legal changes imposing on the stores the obligation to donate food to non-governmental organizations (before their expiry date) it is very important to improve the efficiency of this process. From the economic as well as the ecologic and corporate social responsibility point of view.

Creating and implementing a mobile application at the level of a given store could be a way to increase the efficiency of the process of monitoring the expiry dates of food products.

In this article, the authors present the method and possible effects of implementing such an application.

The study was conducted at a grocery store. The basic method was a process analysis aimed at diagnosing problems occurring at various stages of handling food products, with particular emphasis on the process of goods acceptance to the store and the process of monitoring the expiry dates of food products. The results of the study were used for a deeper analysis of individual phases of this process and helped to identify areas for improvement. The last stage

of the study was to develop a mobile application solution, with the usage of the no-code platform, which could improve the effectiveness of the analyzed process.

The conducted analysis showed that the implementation of a mobile application that allows digitalizing the data will increase the availability of information. It will lead to a significant reduction of the time needed to monitor the expiry dates of food products in the store and reduce the number of expired products which cannot be sold or transferred to charitable institutions

The research showed that, the development of mobile applications (e.g. using no-code platforms) seems to be justified. The relatively short time and low cost of implementing such solutions - which are developed taking into account the operation of a particular store, allow us to believe that this kind of solution may be more widely adopted in stores, allowing for its more efficient functioning.

**Keywords:** logistics, process analysis, ecology, expiry dates, food waste, optimization, BPMN 2.0, mobile technologies.

Customers' perceptions of drivers and barriers for sustainable consumption.

## Literature review

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### **Abstract**

This presentation aims to provide insights into customers' perceived motivators for purchasing green products as well as into barriers discouraging them from doing so, as reported by the customers themselves. As the consumption patterns are now placing an unprecedented strain on the global resources, exceeding the Earth's capacities, these patterns need change – they need to become sustainable. Thus, it is now a major challenge how to make the consumers behave in a more sustainable way. To address this challenge, one needs to identify and systematise the key factors that influence and inhibit the consumers' attitudes, their intentions to purchase eco-friendly products as well as their actual behaviour.

# Personal, social and market determinants of limiting consumers' consumption of food from animal origin

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## Abstract

An increasing number of consumers are choosing to limit or stop consuming food from animals. This is a result of growing consumer awareness and concern for the environment, including animal welfare. The WHO guidelines on healthy eating also seem to be relevant. Consumers who decide to follow a vegetarian diet or its variants are influenced by social groups or try to influence them themselves, and they have to pay attention to the availability of alternative types of food in shops or try to induce producers to offer non-animal products. The aim of this article is to identify the personal (related to preferences, health, etc.), social and market (in terms of availability of products in shops, restaurants, prices and sources of information) determinants of the use of vegetarianism or its variations.

The research is conducted by the method of an online survey among people declaring the use of a vegetarian diet or its varieties. The research tool is a questionnaire, the link to which is given to respondents. The sample selection is purposive. This method does not ensure that the sample is representative, but it does allow for the illustration of the conditions of the described phenomenon among the surveyed consumers. The research was conducted at the Department of Marketing, University of Lodz in 2021.

The majority of the consumers surveyed practice vegetarianism and want to increase the scale of consumption restrictions. The most frequently indicated reason for switching to such a mode of nutrition is related to the belief in the importance of protecting the lives of animals. Respondents most often declare that their family perceives their dietary decisions rather positively or neutrally, as do their friends. At the same time, the vast majority of consumers surveyed have encountered attempts to persuade them to abandon their current eating style,

as well as negative comments regarding vegetarianism and its variations. For this reason, most respondents either do not attempt to persuade others to stop consuming meat or do so occasionally. While the majority of respondents note that the range of meat-free products in shops is widening, they also tend to emphasise the high prices of such varieties of products. The availability of vegetarian and similar products in restaurants is assessed more critically. The main source of information on meat-free diets and dishes is the Internet.

Reducing or stopping the consumption of animal products is becoming both a voluntary decision on the part of consumers, motivated primarily by concern for animals, and the result of recommendations for a healthy diet. Consumers look for meat-free alternatives and exert pressure on producers to offer acceptable products. As in the case of most life habits, also with regard to diet, social support is important, which, as far as the respondents are concerned, is most often moderate, although comments that are negative or encourage a return to meat consumption may be perceived as unfair. It therefore becomes necessary to educate consumers, their environment and food providers about the advantages of reducing meat consumption, or at least the acceptance of such eating decisions in others.

**Keywords:** vegetarianism, consumers, lifestyle, social environment, attitudes.

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# Prospects and challenges to co-creation in food industry – a case study of EIT Food RIS Consumer Engagement Labs project<sup>8</sup>

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## Abstract

The presentation aims at understanding barriers and opportunities in open innovation systems in the food industry orchestrated by a university. The relevant theory linked to open innovation and the quadruple helix model is described with a focus on the role of academic partners and their relationships with other stakeholders in the value creation network. In the empirical part, we present the case of the EIT Food RIS Consumer Engagement Labs project showing how the open innovation ecosystem was created and maintained.

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<sup>8</sup> The paper describes selected results of the EIT Food RIS Consumer Engagement Labs, a project that has received funding from the European Institute of Innovation and Technology (EIT), a body of the European Union, under the Horizon 2020 and Horizon Europe, the EU Framework Programme for Research and Innovation.

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