

This paper investigates tendencies in the development of information and communication technologies for studying consumer behavior in the process of brand management. Trends in consumer behavior have been identified – strengthening environmental awareness and ethics, spreading e-commerce, increasing mobile experience, strengthening the role of personalization, etc. The influence of changes in consumer behavior on the process of positioning and promotion of brands was substantiated. The expectations and actions of consumers and directions of the process of brand management as a result of transformation of consumption were characterized. Attention is focused on the role played by information and communication technologies in the study of consumer behavior in the process of brand management. The basic tools by types of information and communication technologies were systematized. It was determined that the main type of information and communication technologies, due to which a high degree of personalization is ensured, are social networks. In addition, technologies for analyzing web data, e-mail, mobile device data were used to study consumer behavior. A three-dimensional model of studying consumer behavior in the process of brand management has been proposed, which takes into account the components of consumer behavior, which needs to be investigated, the stage of the brand's life cycle, technologies for studying consumer behavior. A matrix of choice of appropriate information and communication technologies for studying consumer behavior at different stages of the brand life cycle has been formed. The practical use of the proposed methodological approach will provide more reliable information on various components of consumer behavior. This could create prerequisites for developing an effective strategy for positioning and brand promotion

Keywords: *information and communication technologies, consumer behavior, brand value, brand management, brand life cycle*

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DEVELOPMENT OF INFORMATION AND COMMUNICATION TECHNOLOGIES TO STUDY CONSUMER BEHAVIOR IN THE PROCESS OF BRAND MANAGEMENT

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1. Introduction

In the context of changing consumer needs and habits, consumer behavior research is extremely important for any business, as it makes it possible to understand their desires and model behavior. In this regard, the effectiveness of marketing strategies increases, and the quality of products and services improves. In the digital age, when information technology has become a necessary component of entrepreneurial activity, consumer research using information and communication technologies is becoming increasingly relevant and effective. The development of information and communication technologies contributes to the achievement of marketing goals and becomes a key factor of economic success for companies of all sizes.

In the face of fierce competition, those brands win that were able to build close relationships with consumers, fully satisfy the needs of the target audience, are well aware of all the needs and take into account all the requirements of consumers. This means that consumer behavior is an important aspect to investigate [1]. At the present stage of development, brands are increasingly using the latest

technological advances and introducing innovative tools to optimize internal processes, improve and facilitate communication. Thus, in 2021, the value of the global market for innovative marketing technologies was estimated at almost USD 345 billion [2].

Every year there is an increase in competition, especially in the consumer goods market, the struggle for attention and commitment of consumers is intensifying. Companies are increasingly beginning to pay attention to consumer preferences, to understand the importance of the brand for the target audience. In such an environment, carefully analyzing customer data and monitoring changes in their behavior is key to brand success.

Scientific research on information and communication technologies related to consumer behavior in the process of brand management is particularly important. Consumer research using information and communication technologies has many advantages. First, with the help of information and communication technologies, data are collected in real time. Secondly, the process of studying consumer behavior is significantly accelerated. Thirdly, the use of information and communication technologies,

such as social networks, online surveys, web analytics and others, provides an opportunity to collect and analyze large amounts of consumer data. As a result, the efficiency of the brand management process increases, and a reasonable choice of strategic alternatives for their development is provided.

2. Literature review and problem statement

Study [3] notes that the formation of close, trusting, and long-term relationships between consumers and brands is a key factor in the success of companies. Using separate digital marketing tools such as E-WOM and social media, the authors try to establish the relationship between brand love in the automotive market (Audi, BMW, and Mercedes-Benz) and consumer behavior. The study proves the hypothesis that brand commitment and satisfaction positively affect brand love and builds high brand loyalty. The limitations of this study are a greater focus on the emotions of consumers while other components of consumer behavior (cognitive and behavioral) are ignored.

Paper [4] examines the impact of digital technologies on consumer behavior in the furniture market in Singapore. The development of e-commerce has changed consumer behavior, and customer satisfaction increases the initiative to shop online. The findings suggest that consumers are motivated if they are engaged online, which helps change their behavior and attitudes. It has also been confirmed that immersive offline experiences are one way to meet consumer needs and improve consumer buying behavior. This research is crucial because the business community must attract and retain customers' attention, creating positive reinforcement through brand image. Since Internet use has become the norm for almost everyone, the main strategy for improving content marketing is to attract the target audience. The effectiveness of this process can be increased using information and communication technologies.

The aim of [5] is the overview of information and communication technology (ICT) as an exclusive factor influencing consumer behavior. The researchers emphasize that ICT has acquired a significant role in various fields, has become part of the daily life of most people. ICT is immersed in almost all stages of consumer decision-making. In such conditions, the consumer makes a purchase decision in the digital environment, processing the lion's arrays of information. The behavior of the "Old Consumer" no longer fits into the digital age. Sellers need to adapt consumer behavior research methodologies in order to understand consumer preferences, their intentions towards a particular brand. The use of digital technologies will provide reliable results in the processes of attention and consideration of consumer behavior as an opportunity for innovation. Despite the complexity and universality, the results of the study are more theoretical.

The authors of work [6] also believe that due to the development of information and communication technologies (ICT), all aspects of consumer life have evolved. ICT has become an important tool for creating customer value, primarily for the younger generation of consumers. The article cites similarities and differences between the two age groups of consumers (60– and 60+) depending on the

way ICT is approached and used as a source of customer value. Studies show that, despite the existing differences among younger and older ICT users, in the future, all consumers, without exception, will be involved in the digital environment.

A similar opinion to previous studies is expressed by the authors of [7] who emphasize that the advent of the Internet and social networks have radically changed consumer behavior and ways of doing business. Digital marketing creates tremendous opportunities for companies to improve brand awareness. The work combines the collective opinion of leading experts in digital marketing and social media marketing. The authors substantiate the role of artificial intelligence and virtual reality technologies, thereby increasing potential opportunities for marketers in the process of brand management. This research is a significant and timely contribution for both researchers and practitioners.

Using data from past ICT studies, paper [8] identified factors that may affect consumers' use of 5G technology in China, which occupies a leading position in the world in the mobile market. The study confirms the hypothesis that consumer intentions positively influence the behavior of using 5G technology. The results prove the ability of 5G technology products to create a market, as a result of which the relationship between intentions and consumer behavior increases. The study is valuable for managers studying the positive changes in the behavior of users of new technologies.

Study [9] draws attention to how information and communication technology (ICT) affect marketing activities in general. In particular, four main ways of mutual influence of these categories are given. First, ICT supports new forms of interaction between consumers and companies. Second, ICT provides new types of data that allow new analytical techniques to be used. Third, ICT creates marketing innovations. Fourth, ICT development requires the formation of new strategic marketing structures. The authors emphasize that different types of ICT can perform the declared functions both simultaneously and separately.

Work [10] considers how producers, by analyzing large data on customer reviews on the Internet, identify ways to improve their products. In particular, the design factors of washing machines are identified by analyzing customer reviews on the Internet. The study collected big data on customer experiences with front-loading washing machines, presented reviews and ratings on the BestBuy website, and used them to analyze the relationship between customer experiences and related satisfaction through text analytics. The volume of online consumer-generated content based on opinions, personal feelings, and design requirements is constantly growing. However, despite this, analyzing large amounts of available data is not systematic and customer opinions and requirements are not used properly in product development.

Study [11] closes the research gap on the quality of available marketing analytics tools. For example, Google Analytics data limitations can be eliminated by timely auditing existing digital analytics tools. Rapid changes in consumer behavior under the influence of digitalization of consumption require sellers to respond timely and balanced to growing needs. The increase in the volume of big data

creates the prerequisites for the introduction of innovative tools in the research process. This requires the use of more sophisticated analytics of consumer behavior. The authors used a complex research scheme, which is based on innovative technology. Eye tracking technology, used in parallel with Google Analytics to develop digital shopping for customers, can help identify a combination of variables and website elements that are important to ensure a satisfactory shopping experience. On this basis, brands can choose strategies for positioning and promoting products and services.

Systematization of existing advancements regarding the introduction of information and communication technologies for the study of consumer behavior in the process of brand management allows us to draw the following conclusions:

- most ICT research on consumer behavior is related to the use of mobile communications and social networks. However, not enough attention is paid to investigating which ICT tools should be used to analyze certain components of consumer behavior;

- all, without exception, studies focus on the role of ICT in shaping the relationship between consumers and brands. However, there is almost no research aimed at identifying specific ICT tools at different stages of a brand's life cycle.

Thus, the question of choosing the most appropriate ICT tool remains unresolved, depending on the study of a certain component of consumer behavior in the process of brand management at different stages of its life cycle.

3. The aim and objectives of the study

The aim of this work is to determine the direction of development of information and communication technologies, the study of consumer behavior and their impact on the process of brand management. This will create prerequisites for ensuring sustainable brand value for consumers and increasing the effectiveness of brand management in the context of digitalization of the economy.

To accomplish the aim, the following tasks have been set:

- to determine the features of modern trends in consumer behavior in the process of positioning and promoting brands;

- to identify tools by types of information and communication technologies in the research of consumer behavior in the process of brand management;

- to explore the methodology for choosing appropriate information and communication technology, studying consumer behavior at different stages of the brand life cycle.

4. The study materials and methods

The object of our study is the mechanism of interaction between consumer behavior and brand value, the subject is the theoretical, methodological, and practical aspects of the development of information and communication technologies, the study of consumer behavior in the process of brand management. We hypothesize that consumer behavior, among other factors, is determined by brand values, which may change at different stages of its life cycle. In this re-

gard, it is advisable to choose the technology of its research depending on the conditions of consumer contact with the brand, the tasks of brand management, and the stage of its implementation.

Conducting a study of consumer behavior and justifying its impact on the process of brand management based on information and communication technologies involves the use of general scientific methods. To determine modern trends in consumer behavior in the process of positioning and promoting brands, the method of analysis and synthesis, deduction and induction were used in a dialectical combination. The influence of changes in consumer behavior on the process of positioning and promotion of brands is investigated using the method of content analysis. To generalize the tools of information and communication technologies, research of consumer behavior, methods of formalization and systematization were used. A three-dimensional model of studying consumer behavior in the process of brand management is built using a graphical method. Identification of components of three-dimensional model is carried out on the basis of the method of structural analysis. To determine the stages of the brand's life cycle, the Polly-Cook method is used, which is based on the statistical determination of indices, standard deviation, and determination of lower and upper boundaries of stabilization. The choice of tools for information and communication technologies for studying consumer behavior at different stages of the brand's life cycle is carried out on the basis of the matrix method. We wrote conclusions using the method of theoretical generalization.

5. Results of the analysis of trends in the development of information and communication technologies, the study of consumer behavior in the process of brand management

5.1. Studying the features of modern trends in consumer behavior in the process of positioning and promotion of brands

Due to the acceleration of technological development, broadband communication has expanded, wireless Internet and smart mobile devices have appeared. This has led to a transformation of consumption and its reorientation to marketplaces – successful sites where offers from thousands of sellers are presented. Online shopping is considered one of the most profitable business sectors. According to experts, by 2025, the total cost of online shopping in the world will exceed USD 7 trillion, which is almost a quarter (23.6 %) of world consumption. The most famous marketplaces include such giants as Amazon, eBay, Alibaba [12].

It is worth noting the fact that under the influence of such factors of the macroenvironment as technological development, sociocultural changes, economic conditions, the state of ecology, consumer behavior has evolved significantly. New trends that characterize consumer behavior at the beginning of the XXI century and their impact on the process of positioning and promotion of brands are summarized in Table 1.

Current trends in consumer behavior are quite diverse but they are all related to the use of technology and reflect the changing way consumers perceive and buy goods and services.

Table 1

The impact of changes in consumer behavior on the process of positioning and promotion of brands

Trends in changing consumer behavior	Consumer expectations and actions	Brand management process
1. Environmental awareness and ethics	Consumers are looking for ways to reduce their impact on the environment	Brands should pay attention to the environmental friendliness of their products and services, as well as take into account ethical and social issues when developing and selling them
2. E-commerce and Internet technologies	Most consumers choose to buy an online platform rather than physical stores	Brands should include detailed product and service information, reliable reviews from other customers, and comparison terms in online stores
3. Mobile experience	Consumers are increasingly using mobile devices when making purchases	Brands must work to improve their customers' mobile experience and provide convenience and speed
4. Brand extension	Consumers are becoming more interested in a fulfilling experience with the brand, not just with its products or services	Brands need to expand their capabilities to create additional offerings such as content, podcasts, games and other entertainment formats
5. Interactive experience with the brand	Consumers are becoming more interested in interactive experiences with the brand	Brands need to know their customers and use technologies that allow you to create interactive experiences with their products and services
6. Personalized experience	Consumers increasingly expect personalized experiences from brands	Brands need to know their customers and offer them personalized solutions that meet their individual needs
7. Openness and transparency	Consumers are becoming more interested in what's going on behind the scenes of companies	Brands should be open and transparent about their actions and activities

Note: compiled from [13–19]

5.2. Information and communication technology tools for studying consumer behavior in the process of brand management

Brand management involves, first of all, determining the needs of consumers, as well as predicting their future expectations. For this purpose, information and communication technologies (ICT) are used as the main tool for studying consumer behavior in the brand management process. With the help of ICT, it is possible to generate and analyze large amounts of information about customers, which creates prerequisites for effective influence on their choice, and also makes it possible to actively attract to the brand.

It is worth noting that the use of ICT makes it possible to study consumer behavior online, their attitude to the brand and its products, as well as track the response to marketing incentives. As a result, there is an acceleration of the decision-making process in the brand management system.

One of the main ICT studies of consumer behavior in the process of brand management is social networks, social media monitoring. The active involvement of social networks in the positioning and promotion of brands provides the ability to personalize marketing activities. This makes it possible to tailor the brand's offerings to the specific needs and interests of consumers. In addition to social networks in the process of studying consumer behavior, technologies for analyzing web data, email, and mobile devices have become widespread. The main tools by type of ICT, which are used to study consumer behavior, are systematized in Fig. 1.

Information and communication technology tools for researching consumer behavior should be used at all stages of the brand's life cycle. In this case, the choice of a particu-

lar tool depends on the conditions of contact of a particular consumer with the brand.

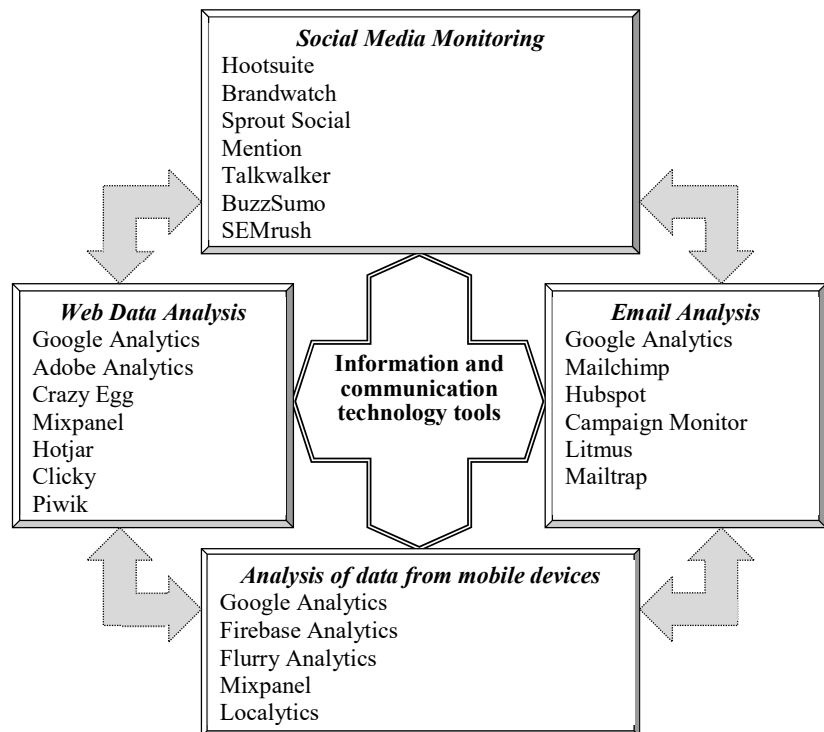


Fig. 1. Information and communication technology tools for consumer behavior research

Note: compiled from [20–26]

5.3. The choice of information and communication technologies research of consumer behavior at different stages of the brand life cycle

The methodology for choosing appropriate information and communication technologies (ICT) for studying consumer behavior at different stages of the brand's life cycle is based on a three-dimensional scheme (Fig. 2).

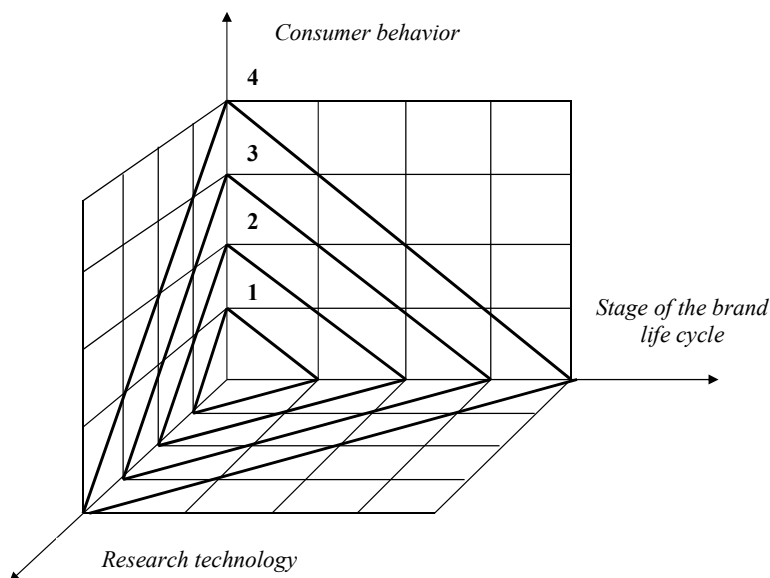


Fig. 2. Three-dimensional model of consumer behavior research in the process of brand management: 1 – cognitive component, brand launch stage; 2 – emotional (affective) component, stage of brand explosion; 3 – behavioral (suggestive) component, the stage of brand stabilization; 4 – inspired (suggestive) component, the stage of brand extinction
 Note: compiled from [27]

In this regard, the choice of a particular ICT tool depends on:

- 1) consumer behavior to be investigated (who?);
- 2) the stage of the brand life cycle (what?);
- 3) consumer behavior research technologies (how?).

In accordance with Fig. 2, each parameter of the three-dimensional model contains 4 components. Thus, consumer behavior is determined through such components of brand attitude as cognitive (cognitive), emotional (affective), behavioral (conative), and inspired (suggestive). The cognitive component is related to consumers' beliefs and knowledge about the characteristics of a product or service of a brand. The affective component includes the feelings that the product or service of the brand causes in consumers. The conative component characterizes the intentions and shows the probable behavior of consumers in relation to a particular product. The suggestive component is associated with consumer bias towards goods and characterizes the expediency of its use [28].

The brand life cycle is an alternative to the product life cycle and includes the stages that the brand goes through from initial launch to disappearance from the market. In ac-

cordance with this, the brand life cycle consists of the following steps:

1. Launch – the stage of brand introduction in the market.
2. Explosion – a stage of growth at which a brand begins to increase its popularity, gaining the trust of consumers.
3. Stabilization – the stage at which the brand reaches the maximum level of popularity and influence in the market. At the same time, at this stage, the brand feels competition and begins to lose its uniqueness.
4. Fading – the last stage of the brand life cycle, which loses popularity [29, 30].

The lifecycle of a brand can vary for different brands, which is influenced by certain characteristics. Brands that are at the stage of extinction have the opportunity to restore their popularity and place in the market.

You can identify the brand life cycle using the Polly-Cook method, according to which the average brand sales index (\bar{I}) and standard deviation (σ) are determined [31]:

$$\sigma = \sqrt{\frac{1}{n} \sum_{i=1}^n I_i^2 - \left(\frac{1}{n} \sum_{i=1}^n I_i \right)^2} = \sqrt{(\overline{I^2}) - (\bar{I})^2}, \quad (1)$$

where n is the number of studied brands;

I – sales index.

After determining the standard deviation of brand sales indices, respectively, the lower and upper boundaries of the stabilization stage are determined:

$$LLS = \bar{I} - 0.5 * \sigma; \quad (2)$$

$$ULS = \bar{I} + 0.5 * \sigma. \quad (3)$$

If the brand sales index is within the calculated lower and upper values, then the brand is at the stage of stabilization. If less than the lower limit – at the stage of extinction, if more than the upper limit – at the stage of explosion. The limits for the launch stage are not defined, due to the fact that sales are considered to be less than 5 % of the market potential [32].

Table 2 gives a matrix for choosing appropriate tools for information and communication technologies for studying consumer behavior at different stages of the brand's life cycle.

Table 2

Matrix of choice of information and communication technology tools research of consumer behavior at different stages of the brand life cycle

Components of consumer attitude to the brand	Stages of the brand life cycle			
	Launch	Explosion	Stabilization	Fade
Cognitive (cognitive)	Advertising banners on websites, content marketing, mobile applications	Email Marketing	Websites, Social Media	Social networks, analytical tools
Emotional (affective)	Advertising banners on websites	Video content	Video marketing, social media	Internet advertising
Behavioral (conative)	Search advertising, email, mobile apps	Electronic commercial platforms	Websites, e-commerce	E-commerce
Suggestive (suggestive)	Content marketing	Messengers	CRM-systems	–

Note: compiled from [33–36]

At the launch stage, the brand has low consumer attention, which requires significant efforts to promote in the market. During the explosion stage, the brand usually receives more investment and advertising to increase its influence in the market. Brands at the stabilization stage, as a rule, are forced to implement various strategies to maintain their popularity among consumers. Brands at the fading stage are forced to lower their prices or change their products to maintain their place in the market.

6. Discussion of results of the development of information and communication technologies to study consumer behavior in the process of brand management

In a competitive environment, it is advisable for companies to pay more attention to customer satisfaction with the buying process. With the help of information and communication technologies, the procedure for studying consumer behavior is significantly accelerated and simplified. In addition to the emotional component of consumer behavior, which is investigated in [3], the authors consider other components, such as cognitive, behavioral, and inspired. The authors make the assumption that the choice of a particular tool of information and communication technologies depends on consumer behavior, which needs to be investigated, the stage of the brand life cycle, as well as technology, consumer behavior research (Fig. 2). In accordance with this thesis, it is proposed to use a matrix of selection of tools for information and communication technologies for studying consumer behavior at different stages of the brand's life cycle (Table 2).

In addition, the study summarizes trends in changes in consumer behavior. In contrast to [6, 7], where it is noted that the development of information and communication technologies has led to the evolution of all aspects of consumer life, the authors define how transformed consumer behavior affects the process of positioning and promotion of brands (Table 1).

Taking into account previous studies into the importance of information and communication technologies in marketing activities [8–11], the authors summarize the tools of information and communication technologies for studying consumer behavior (Fig. 1). It is noted that it is social networks and social media monitoring that play a major role among information and communication technologies for studying consumer behavior in the process of brand management. This assumption is explained by the fact that the active involvement of social networks in the positioning and promotion of brands provides the possibility of personalizing marketing activities that meet modern trends in consumer behavior.

The results of the analysis of trends in the development of information and communication technologies to study consumer behavior in the process of brand management form the basis for obtaining more reliable information about the needs and requirements of the target audience. In this regard, the strategic choice regarding positioning and brand promotion is accelerating.

In practice, the results obtained can be used when choosing an appropriate tool for information and communication technologies to study consumer behavior at different stages of the brand's life cycle. This will create

prerequisites for obtaining more reliable information on various components of consumer behavior and developing an effective strategy for positioning and promoting the brand.

The limitation of the proposed methodological approach is the reliability of determining the stages of the brand's life cycle, since, in addition to sales indices, it would be advisable to take into account other indicators. This would significantly increase the expected theoretical and practical results of the study. The main disadvantage is the impossibility of establishing clear boundaries between different components of consumer behavior research.

Based on this, the prospect of further research in this direction is to eliminate the proposed limitations and shortcomings. In the future, it is advisable to develop a methodology that contains quantitative limits for determining the stages of the brand life cycle based on several indicators. It is also important to focus efforts on defining indicators, components, consumer behavior. Depending on these conditions, it is advisable to form a methodology for choosing the optimal information and communication technologies, studying consumer behavior at different stages of the brand's life cycle.

7. Conclusions

1. It is determined that the transformation of consumption and reorientation to marketplaces occurred as a result of technological development. It has been determined that consumer behavior is influenced by factors of marketing macroenvironment, in particular technological, economic, socio-cultural, and environmental. The influence of changes in consumer behavior on the process of positioning and promotion of brands is substantiated, which is connected, first of all, with the ways of perception and purchase of goods and services. Buyers become more demanding and pickier, seek to get positive emotions from the buying process. The main trends of consumer behavior, such as raising environmental awareness and ethics, active use of Internet technologies in buying, obtaining interactive experience, requirements for personification, openness and transparency, have been identified. In accordance with the peculiarities of modern trends of consumer behavior, their expectations and actions are characterized, and directions of the brand management process related to personalization and openness of marketing activities are proposed.

2. It has been determined that the choice of a tool for researching consumer behavior in the process of brand management depends on the type of information and communication technologies. It is noted that information and communication technologies create unlimited opportunities for collecting and processing large amounts of information, as a result of which the process of forming loyalty to brands is facilitated. The tools of information and communication technologies for studying consumer behavior by such types as social media monitoring, web data analysis, e-mail analysis, data analysis from mobile devices are systematized. It is determined that social networks have become the most widespread in the study of consumer behavior in the process of brand management.

3. It is substantiated that the tools of information and communication technologies for studying consumer behavior should be used at all stages of the brand life cycle. It is proposed to use a three-dimensional scheme as a methodology for selecting optimal information and communication technologies for studying consumer behavior at different stages of the brand's life cycle. It has been established that consumer behavior is determined through cognitive (cognitive), emotional (affective), behavioral (conative), and suggestive (suggestive) components. The stages of the brand's life cycle are defined – launch, explosion, stabilization, extinction. The stages of the brand life cycle are identified using the Polly-Cook method. A matrix of choice of appropriate information and communication technologies for studying consumer behavior at different stages of the brand life cycle has been formed.

Conflicts of interest

The authors declare that they have no conflicts of interest in relation to the current study, including financial, personal, authorship, or any other, that could affect the study and the results reported in this paper.

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Data availability

The data will be provided upon reasonable request.

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