

UDC 658.821

JEL Classification M31

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ARTIFICIAL INTELLIGENCE IN MOBILE MARKETING: CONDITIONS, OBSTACLES AND PROSPECTS OF USING

The article considers the main problematic issues of application of artificial intelligence technologies in the practice of mobile marketing in Ukraine. The tendencies of development of the Internet environment in the world, growth of volumes of the accumulated information, trends of mobile traffic and their influence on digital transformations of marketing are analyzed. The advantages of mobile marketing as an effective channel of operative personalized interaction with consumers and a source of receiving statistical information on the results of marketing activities are revealed. Factors, preconditions and obstacles of practical application of modern digital analytics tools in mobile marketing are considered. A marketing study was conducted on consumer attitudes to the use of artificial intelligence technologies, the level of information about the benefits and risks of these technologies, understanding the categories of stakeholders for the development and implementation of artificial intelligence technologies in the practice of mobile marketing in Ukraine were done. The Ukrainian market of software products and services in the segment of artificial intelligence technologies is analyzed. Disparities between the level of technological development of society and the level of consumer confidence in their use are revealed. Stakeholders are invited to pay more attention to the analysis of informational and ethical issues of application of technological innovations in marketing by end users, increasing the transparency and controllability of this process.

Key words: digital marketing, mobile marketing, artificial intelligence, artificial intelligence technologies in marketing, level of trust in artificial intelligence.

DOI: 10.15276/mdt.4.2.2020.5

Statement of the problem in general form and it's connection with important scientific or practical tasks. The current stage of the development of the information society is characterized by powerful digital transformations of marketing approaches associated with dynamic changes in user preferences, traffic sources, content types, information processing

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methods and requires a review of the approaches and technological tools that are necessary taking into account the need to collect, store and process large amounts of data.

As of 2020, more than 55% of the total population of the World was Internet users (more than 4.4 billion people). The network has registered more than 2 billion websites; daily users post about 4 million messages. The largest search engine Google processes daily more than 7 billion search queries (of which 15% are unique) [5].

The growth of the number of users who not only consume, but also create and publish information leads to an avalanche-like growth of information volumes in the network. By 2025, the average connected consumer is projected to interact with digital data every 18 seconds (5000 interactions per day). The number of gigabytes per day per capita will increase by an average of 21% per year, reaching 175 petabytes. This trend requires a change in strategy for data management and analysis [22].

At the same time, more than 65% of Internet users have access from mobile devices. If in 2010 the use of mobile Internet was 2.9%, in 2012 it was already 10.7%, in 2014 - 27.1%, in 2016 - 43.6%, in 2018 – 52.2%. By 2021, mobile e-commerce is projected to account for over 67% of total e-commerce sales (\$2.3 trillion). Approximately 82% of people use smartphones to preview the purchases they intend to make in a store [23].

In 2020, 63% of all search ads will be mobile, and the total cost of this category of online advertising will be \$28.25 billion. However, studies show that more than 70% of users do not like to watch mobile advertising. More than 615 million devices around the world use an ad blocker [7].

The drivers for changing the traditional marketing model based on modern technologies are the actively developing digital analytics tools: Data Mining, Business Analysis, Business Discovery, Artificial Intelligence (AI).

According to the company Gartner, [10] already in 2020, more than 85% of marketing communications related to the selection of relevant advertising, predict the desires of consumers will carry out artificial intelligence. Until 2022, companies investing in AI will be able to get a 41% increase in revenue (compared to 2018) [6].

Raymond Kurzweil is confident that AI will outperform man by 2025, that AI will be able to help overcome the most dangerous diseases, improve food supplies, develop the economy and improve the environment [20]. However, global statistics show that more than 60% of marketers are not prepared to use AI tools in their work [5]. Today AI-technologies are actively developing, new possibilities appear, the functionality of systems extends. Therefore research of prospects of use, directions of introduction and forecasting of risks of AI becomes an important task within the limits of realization of marketing strategy.

Analysis of the latest research and publications, which initiated the solution of this problem and on which the author relies. The evolution of marketing concepts in the 21st century; the problems of digital marketing transformation; the place of digital marketing in modern conditions of development of society; features of digital marketing as a modern tool for managing communications with consumers; components and tools of digital marketing are deeply and comprehensively analyzed in the works of domestic and foreign scientists (Lengard I. [15], Kaplan A. [11], .Kotler M. [12], Oklander M. [17], Oklander T. [2], Romanenko A., Ruban V. [18]., etc.). The works of such researchers as Bugaev L., Danilenko M., Mazurenko V., Matvienko N., Shelestun A. [3] are devoted to the analysis of essence, prospects, methods, features and mobile marketing trends in the world and in Ukraine.

Studies of various determinants of AI, directions of development, prospects of application in modern marketing, assessment of legislative risks of its practical implementation were given attention in their works by Barrat James [2], Dmitrieva M. [8], Kuziomko V.,

Repnikova I. [13], Kwilinski A., Trushkina N. [14], Matveychuk A., Starostin V., Radutny O., Shikhov E., Spirin O., Plastun K. [21], Ponomarenko I., Vinnikova I., Grebnyov G. [19].

Highlighting the previously unresolved parts of the general problem to which the article is devoted. However, the willingness to use AI in mobile marketing is not well understood and requires additional research.

Formulation of the purpose of the article (statement of the problem). The aim of the study is to analyze the trends of mobile marketing development in Ukraine, to assess the conditions and prospects of artificial intelligence in mobile marketing, to identify the level of public trust in AI and the perception of the factors and stakeholders affecting the process of practical application of AI technology in mobile marketing in Ukraine.

Statement of the main material of the research with full justification of the scientific results obtained. One of the global modern trends in digital marketing is the steady growth of mobile traffic, which is associated with both the increase in the number of mobile users, mobile Internet connections, mobile connections, and the growth of data transmission speeds in mobile networks.

In 2019, the number of Ukrainians in the network was almost 23 million, or 71% of the population, compared to 63% in 2018. More than two thirds of Ukrainian Internet users use mobile devices. 76.2% of mobile Internet users enter the network through Android, 22.5% - through Apple devices [9].

The average annual growth rate of mobile traffic over the next five years will be 60-70%. Mobile devices will generate over 90 percent of traffic in 2020 [3, p.90]. Mobile applications are one of the most successful and promising marketing channels today. Therefore, the priority method of digital marketing becomes mobile marketing - a set of promotions, events and campaigns, is carried out with the help of mobile devices via SMS (Short Message Service) to promote products and services [18, p. 365].

Advantages of mobile marketing:

- efficiency of receiving feedback from the client;
- the possibility to obtain accurate statistical data on the results of marketing activities;
- maximum personalization of the appeal to the consumer;
- possibility to remotely trigger a desire to purchase a product or service.

Mobile marketing creates favorable conditions in order to keep the consumer in the area of their advertising exposure and improve market interactions by disseminating relevant information. Favorable factors are not only an increase in the number of mobile users, but also a relatively large degree of penetration of mobile advertising, and the high motivation of mobile operators.

The development of AI is fast enough, but in marketing at this moment, it performs only an auxiliary function. At the same time, companies' spending on AI solutions in the world is increasing, according to forecasts [21, p. 31], the AI market in Central and Eastern Europe will reach \$ 83.9 million by 2021, and company revenues will exceed \$ 247.2 million by the end of 2021.

Despite the fact that mobile marketing, Big Data, and AI implementation in the technology sector are a reality in Ukraine, the level of awareness of the prospects for using AI in marketing is quite low. The problem is concentrated mainly on technical and technological planes (choice of cloud storage technology) [4, p. 112].

The marketing research was conducted within reasonable limits. A survey questionnaire was developed and hypotheses were formulated. The questionnaire includes questions related to the level of knowledge, artificial intelligence, dangers and prospects related to the practical importance of AI, which has the greatest influence on decision-making on the development and

application of AI technology. The total population of the sample is all residents of Ukraine; from 17 to 65 years old. The sample size is 145 citizens of Ukraine.

Sampling method: a deterministic sampling method, which is a limited sample. The first stage involves the creation of control groups, or quotas, from elements of the population. In the second stage, the selection of elements is based on the convenience of selection or the opinion of the researcher.

The survey was attended by 145 respondents, 56.6% of whom were women, 43.4% were men; the majority were between 18 and 25 years old (69%) and 24% were under 18. Most of the respondents are studying at a university (77.2%), 20% work and have an income of 4000–6000 UAH (35.9%), 0–4000 UAH (23.4%), 6000–10000 UAH (17.2%).

53% of respondents have an average level of knowledge about artificial intelligence, 22.1% – low, 19.3% – above average, and only 4.8% high (Fig. 1.).

43.4% of respondents have a neutral attitude to artificial intelligence, 35.2% - good, 11% – very positive, 8.3% – bad and 2.1% – very bad (Fig. 2.).

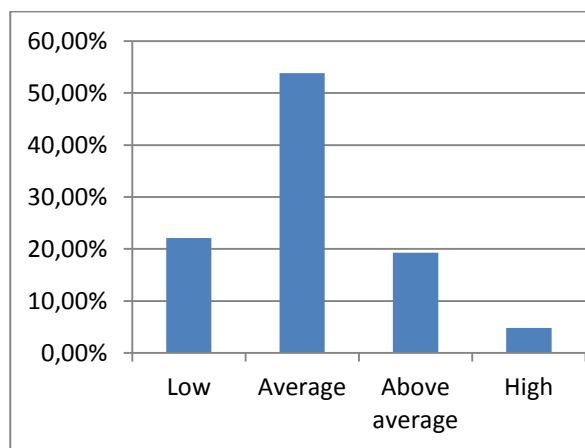


Figure 1 – Level of AI knowledge

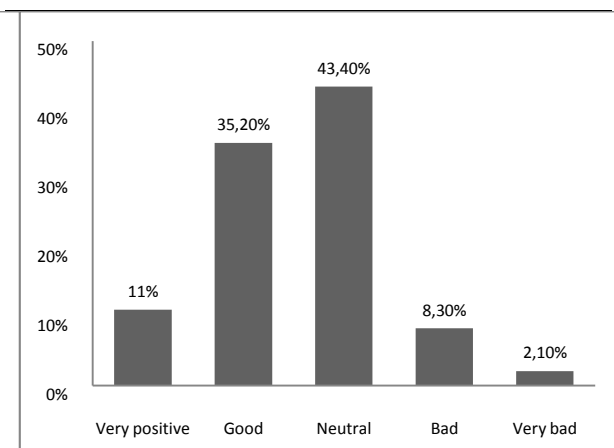


Figure 2 – Attitude to AI

Based on the analysis of the main issues, we can conclude that the level of knowledge about AI affects the attitude towards it (Table 1).

Table 1 – Level of AI knowledge

	SS	df	MS	F	p-value
Between groups	1,513	2	,756	1,252	,289
Inside groups	85,797	142	,604		
Total	87,310	144			

51.7% of respondents believe that AI will not be able to subjugate people, 25.5% think that this will someday happen, and 22.8% find it difficult to answer this question. 53.1% believe that AI will not be able to gain full awareness, while 27.6% are sure that this is quite possible, the rest is difficult to answer (19.3%).

Based on the responses of respondents about who should have the greatest influence on decision-making on the development and application of AI technologies, we can draw a conclusion based on an analysis from the frequency table (Table 2).

Table 2 – Making AI Implementation Decisions

Valid	Frequency	Interest	Valid percentage	Accrued interest
Private companies				
greatest impact	16	11,0	11,0	11,0
normal influence	24	16,6	16,6	27,6
medium impact	36	24,8	24,8	52,4
below the average	40	27,6	27,6	80,0
least impact	29	20,0	20,0	100,0
Total	145	100,0	100,0	
Government and government				
greatest impact	24	16,6	16,6	16,6
normal influence	29	20,0	20,0	36,6
medium impact	35	24,1	24,1	60,7
below the average	32	22,1	22,1	82,8
least impact	25	17,2	17,2	100,0
Total	145	100,0	100,0	
IT sector (IT specialists)				
greatest impact	36	24,8	24,8	24,8
normal influence	37	25,5	25,5	50,3
medium impact	24	16,6	16,6	66,9
below the average	19	13,1	13,1	80,0
least impact	29	20,0	20,0	100,0
Total	145	100,0	100,0	
Public				
greatest impact	50	34,5	34,5	34,5
normal influence	27	18,6	18,6	53,1
medium impact	26	17,9	17,9	71,0
below the average	22	15,2	15,2	86,2
least impact	20	13,8	13,8	100,0
Total	145	100,0	100,0	

Respondents largely believe that the public should have the greatest impact.

Factor analysis revealed a relationship between the personal characteristics of respondents and their relationship to AI (Table 3).

Table 3 – Factors in making decisions about the implementation of AI

Factor	Range	SS	df	MS	F	p-value
Age	Between groups	7,763	4	1,941	3,710	,007
	Inside groups	73,244	140	,523		
	Total	81,007	144			
Income	Between groups	17,814	4	4,453	2,203	,072
	Inside groups	282,986	140	2,021		
	Total	300,800	144			
Education	Between groups	1,327	4	,332	,325	,861
	Inside groups	142,908	140	1,021		
	Total	144,234	144			
Status	Between groups	4,061	4	1,015	1,947	,106
	Inside groups	73,001	140	,521		
	Total	77,062	144			

Based on the marketing research, it follows that while the Ukrainians are not ready for the large-scale process of introducing AI technologies. More than half of the sample have an average level of knowledge about this industry and a neutral attitude, obviously based on the practical level of development of this sphere in our country. Respondents cannot accurately and openly determine their attitude to a phenomenon that they have not personally encountered, but based on a deep analysis of the data, we can identify a rather negative attitude to artificial intelligence, which comes from an insufficient level of education in this industry.

At the same time, the AI software development market in Ukraine is developing rapidly and makes up about 10% of the global companies in this segment [7]. Well-known Ukrainian startups use AI, food companies create software products and services based on various AI technologies (table 4).

Table 4 – Mobile services using AI technology

Company / Startup	Technology	Product Functionality
Grammarly	language processing technology	tool for improving writing, spelling, analysis of the activity of the vocabulary thesaurus
Petcube	Machine Learning, AI	mobile application for monitoring, control, pet entertainment, home monitoring
Scorto	Machine Learning	mobile application for managing decisions and risks, as well as scoring systems for banks, insurance and telecommunication companies
Viewdle	face and object recognition technology in photographs	The mobile application instantly recognizes people, automatically adds a name to the image and transfers the received photos via Facebook, MMS, Flickr or by email to selected people.
People.ai	automation of manual processes in sales and marketing b2b	An AI service that collects and analyzes the data that the “sales” generate to give them recommendations and, as a result, help close the deal faster and more efficiently.
Restream	user behavior analysis	streaming services for broadcasting content on more than 30 platforms simultaneously

Thus, there is a contradiction between the level of development of AI technologies and their perception by society. It is important to focus the attention of the state and society not only on the issues of stimulating the development of the AI segment of the IT market of Ukraine, but also on the ethical and informational aspects in order to increase confidence in the practical use of AI technologies in Ukrainian marketing. It is critical that people of all specialties and age categories are knowledgeable about modern technology. AI must be perceived as a tool to improve one's life, not being afraid of losing one's own significance. The use of AI should be as transparent as possible. Only a person is responsible for any action generated by artificial intelligence.

Conclusions from this research and prospects for further developments in this area. An increase in the importance of mobile traffic, an exponential increase in the amount of available data, and a change in consumer attitudes towards intrusive advertising require a change in the approach to organizing interaction with customers, the search for new methods and tools with an emphasis on increasing the level of personalization of content and client orientation in real time.

Processing a large amount of information requires a more advanced and modern technological base. Marketing is changing, trying to communicate with potential buyers and

customers in such a way that it does not annoy them, is personalized and appropriate. This transformation should be based on Big Data Analysis and AI technologies.

The use of AI in marketing will allow for deeper personalization of interaction in real time. Personalized and relevant advertising content that meets all the needs of a particular consumer, allows you to get the right response and stimulate the purchase. The use of AI will allow you to better study the tastes and preferences of customers, adapt as much as possible to their individual needs, and unobtrusively quickly influence their client experience in real time. However, the ethical problems of using AI in mobile marketing are important and their analysis may be the direction of further research in this area.

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Штучний інтелект в мобільному маркетингу: умови, перешкоди та перспективи використання.

У статті розглянуто основні проблемні питання застосування технологій штучного інтелекту в практиці мобільного маркетингу в Україні. Проаналізовано тенденції розвитку Інтернет-середовища в світі, зростання обсягів накопичуваної інформації, тренди мобільного трафіку та їх вплив на цифрові трансформації маркетингу. Виявлено переваги мобільного маркетингу, як ефективного каналу оперативної персоніфікованої взаємодії з споживачами та джерела отримання статистичної інформації за результатами маркетингових заходів. Розглянуто фактори, передумови та перешкоди практичного застосування сучасних цифрових інструментів аналітики в мобільному маркетингу. Проведено маркетингове дослідження щодо відношення споживачів до використання технологій штучного інтелекту, рівня інформування про переваги та ризики цих технологій, розуміння категорій стейкхолдерів щодо розробки та впровадження технологій штучного інтелекту в практиці мобільного маркетингу в Україні. Проаналізовано український ринок програмних продуктів та сервісів сегменту технологій штучного інтелекту. Виявлено диспропорції між рівнем технологічного розвитку суспільства та рівнем довіри споживачів до їх використання. Запропоновано стейкхолдерам більше уваги приділяти аналізу інформаційних та етичних проблем застосування технологічних новацій маркетингу кінцевими споживачами, підвищенню прозорості та керованості цього процесу.

Ключові слова: цифровий маркетинг, мобільний маркетинг, штучний інтелект, технології штучного інтелекту в маркетингу, рівень довіри до штучного інтелекту.

Надійшло до редакції 3 березня 2020