

*This study considers the use of digitalization technologies in the management of marketing of a commercial company. As a result, the problem of bringing empirical knowledge about the importance of digitalization technologies in the company's marketing management to a theoretical model has been solved. Digitalization technologies for implementation in marketing activities were selected and the decomposition of marketing management in a commercial company was performed. On this basis, a theoretical model for assessing the impact of digitalization technologies on the marketing management of a commercial company has been developed. The results of an empirical study based on the developed theoretical model proved the truth of the hypothesis about the positive impact of the spread of the use of digitalization technologies on the marketing management components of commercial companies. The choice of specific digitalization technologies is explained by the essence of marketing as a management activity. Structural decomposition of the marketing management process is explained by traditional management functions and clarifies the criteria for choosing technologies. The results of calculations according to the formed theoretical model are explained by the development of the platform economy and ecosystems, which involve the studied big data technologies, cloud computing and social media, as well as blockchain. The methodical approach to substantiating the role of digitalization technologies proposed in this study is characterized by the use of fundamental provisions on cybernetic systems, management theory, and modern marketing concepts. The obtained results make it possible to find out the presence and direction of the effects of the spread of the use of digitalization technologies in the company's marketing management and make informed decisions about the business digitalization strategy*

**Keywords:** digitalization, marketing management, big data, cloud computing, social media, blockchain

# EXPLICATION OF THE ROLE OF DIGITAL TECHNOLOGIES IN MARKETING MANAGEMENT OF A MODERN COMPANY

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## 1. Introduction

Modern market conditions form a scientific interest in the problems of improving the efficiency of marketing activities, an integral part of which is the use of information resources. The unstable economic environment, unprecedented transformations in business, growing globalization, and the steady development of digital technologies determine the need for rapid changes in the marketing activities of commercial companies. At the same time, over the past decade, it is the introduction of digital technologies in everyday life that determines, on the one hand, new ways of consuming products and services, and on the other hand, new opportunities to attract consumers. In the context of the availability of almost any information about goods and services, consumers change the patterns of behavior and

choice. Currently, the purchase decision is made on the basis of rational justifications, group consumer experience, and cognitive acquisition of knowledge and skills. The same central phenomenon that forms the marketing activities of the company are technologies focused on data activation, personalization, building a digital culture [1].

Marketing management is a complex process, which involves achieving the goals of the company through the practical application of marketing approaches and the management of all marketing resources and activities. Strategic planning and management is considered the most developed area of research in the field of management and marketing. On the other hand, the subversive changes caused by digital technologies have led to the actualization of discussions about the place of the marketing strategy in the overall strategy of the company. Marketing is increasingly playing

the role of a business philosophy, forming its structure. At the same time, the penetration of digital technologies into the company's management system entails its marketing restructuring, implementing the principle of customer orientation.

Thus, a new stage of technological progress is associated with digitalization – the introduction of modern digital technologies in various sectors of the economy. The basis of marketing activities at the same time becomes the accumulation and processing of data on consumers, competitors, products. At the same time, new tasks are emerging in marketing management related to the use of new digital marketing tools.

Improving the efficiency of activities is beyond doubt because digital technologies make it possible to accumulate and process large amounts of data in a short time. However, such euphoria regarding undoubted effectiveness does not provide an objective understanding of the role of digitalization technologies in the management of the company's marketing. Thus, the relevance of the justification of the role of digital technologies in the management of the company's marketing is explained by the need to theoretically summarize the available empirical knowledge and create an appropriate conceptual basis.

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## 2. Literature review and problem statement

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Digitalization technologies have a positive impact on the productivity of companies. For example, study [2] shows that digitalization technologies play a potential role in the development of the resource-efficient base of industry. Their effective implementation can help reduce costs and improve the flexibility and sustainability of production systems. However, these positive benefits are not guaranteed. The way in which digital technologies are introducing changes to sustainable production systems has not yet been analyzed, so more conceptual and empirical research in this area is needed.

In [3], various criteria for the integration of Industry 4.0 and marketing practices according to each element of the marketing mix based on 7P are used. The results of the study showed that digitalization technologies have the greatest impact on product, process, and place by improving productivity and accuracy in working with large amounts of marketing data to profiling consumers. Thus, the main effects of the impact of digitalization technologies on products are their personalization. The concept of a place is transformed through a fundamental change in distribution channels. The processes that shape the consumer experience, taking into consideration digital technologies, are characterized by a shortening of the path between consumers and manufacturers, an increase in the efficiency of logistics services and the controllability of primary supply chains.

In general, work [3] emphasizes that marketing innovations through digitalization have brought operational benefits such as productivity growth, improvements in distribution channels, growing quality and improvements in long-term business plans. At the same time, empirical confirmations of the research hypotheses are based on expert surveys that carry subjective features. The reason for using expert surveys may be the lack of reliable information on the subject of the study. A possible way to overcome these difficulties is the choice of other methods based on the available

reliable information. Such methods are used in [4], which shows that the development of the digital economy by improving marketing tools and monitoring their effectiveness for business needs are not well understood. It is recognized that the expected positive results from the digitalization of the global economy lie in operational efficiency; reducing the number of staff; transformation time; gaining competitive advantages; standardization; improved analytics. However, questions remained unresolved about the mechanisms for the emergence of these positive results of digitalization.

A scientific fact that relates to the results of digitalization is the mediated link between productivity and digital technologies. This is indicated, in particular, by the results of the study published in [5], which proved that digital capabilities have a positive effect on the performance of enterprises only through technological potential (indirect impact). It has also been empirically demonstrated that digital abilities in economies with a low human development index have a more significant indirect impact on the performance of firms than in countries with high levels of human development. However, the results of the study confirm only the presence of mediated ties, and the chains of effects are not clarified, which is explained by its purpose and objectives.

In [6], an attempt was made to overcome this limitation by determining the indirect impact of artificial intelligence and big data on the efficiency of the enterprise. The chain of influence is presented as follows: big data and artificial intelligence technologies shape the knowledge of customers, users, and foreign markets. Knowledge supports rational marketing decisions that lead to an increase in the company's productivity. According to the results of the study, it was found out that there is a positive indirect connection between all indicators of the above chain, that is, digitalization technologies increase the rationality of marketing decisions, which in turn increases productivity. Nevertheless, in [5], only interactions between firms (B2B-segment) are investigated, and the impact on the interaction of firms with end users was not considered.

The practice of using digital technologies in people's daily lives suggests that technology has a direct impact on consumers. For example, work [7] emphasizes the evolutionary role of technology in the development of four different sources of consumer power – demand, information, network, and crowd. Similar in method, but more detailed in content is work [8]. It reveals that new digitalization technologies are significantly transforming the consumer experience, indirectly affecting the cognitive, sensory-emotional and social dimensions of the experience and creating new empirical values. Marketing management in successful companies in this case involves the constant and careful formation of technological interactions in a client-oriented way. As a result, management focuses on structural organizational transformations, restructuring of incentives, and the constant introduction of new technologies. Nevertheless, the empirical verification of theoretical generalizations remained out of the discussion in works [7, 8].

Consideration of digital technologies as an important factor of innovative customer service is proposed in [9] where empirical analysis was carried out on the basis of a case study. The mechanism of influence is revealed through technological Affordans (that is, permissible risky decisions), which are realized by consumers in the process of social interactions and the exchange of user experience. Thus, digitalization technologies are presented as those that

provide opportunities for communication between the company and potential consumers. Unresolved in work [9] are the questions of finding tools other than influencers in social media, tools based on digital innovations that affect the user experience of the consumer.

In support of this, it is noted in [10] that technology is reforming a wide range of markets in the digital environment, with the role of marketing in these markets developing rapidly. Changes in the markets are due to technology-mediated connections between key market participants – consumers and firms. However, the direction of research is also promising where the object is the relationship between technologies in autonomous machine-machine systems, examples of which are smart cities and platforms. At the same time, the range of scientific tasks that need to be solved includes information security, ethics, legal and political aspects, economic and social transformations.

Digital platforms are actively used in retail. Thus, in work [11], based on the analysis of data from 114 questionnaires of visitors to hypermarkets, it is justified that the main direction of technological changes in the implementation of purchases is the management of customer attraction. Also among the effects of digitalization technologies is an increase in the convenience of shopping and a decrease in the price of goods, and decision-making on electronic purchase is most often made based on feedback from other consumers. In turn, study [12] deepens our understanding of the digital transformation of retail chains and its underlying impact on supply chain strategy and operational structure. The process of digital transformation here facilitates the instant exchange of operational information and the appropriate response to it. This ensures transparency of activities and flexibility in responding to environmental changes. However, papers [11, 12] show the directions of digitalization of retail only. The question of how the results obtained can be applied in other areas of business is not considered.

Digital technologies expand management capabilities in marketing companies. In support of this, study [13] describes the role of data and the speed of its receipt to ensure decision-making. It is emphasized that in marketing practice, the attraction of consumers is the area that is most filled with data. Information technology is changing the way companies operate, and information that becomes available through technology can provide a competitive advantage. Marketers were among the first to use data to improve marketing and sales practices, as evidenced by the early use of marketing databases, digital file cabinets, and IT customer relationship management systems. In this context, the company's marketing management involves changes in the organizational structures of management, establishing links between the departments responsible for data, analytics and legal formalities. According to a similar logic, study [14] emphasizes that it is generally accepted that investments in information technology lead to a reduction in costs and are generally effective. However, there is a problem of choosing technologies, and hence the company's ability to achieve an appropriate level of payback for such technologies. Most investments in technology are made on the basis of foreboding or intuition, on the assumption that payback is there. However, the approach used in articles [13, 14] is eclectic, it lacks consistency and orderliness. This is due to the fact that the cited works attempt to highlight as many facts as possible about the digitalization of business based on a literary review.

More systematic analysis results are presented in [15]. It is indicated there that Internet marketing technologies can reduce the time for searching for information, identify the target audience to increase market share, reduce the cost of product promotion, and cover a significant customer sector. It is also concluded that the use of digital technologies contributes to the consolidation of the company's products on the market and prolongation of maintaining the interest of consumers, improving the quality of feedback and the implementation of more accurate regulatory actions. Similar results are demonstrated in [16]. It states that information technology reduces the time and cost of performing marketing functions in the enterprise but the focus is shifted to the need to prove effectiveness. For this purpose, a cost method was chosen, taking into consideration the cost of the software, the number of specialists for the company's work, the manager's abilities to use digital technologies. However, papers [15, 16] consider only client software and Internet marketing tools, and the technologies of the fourth industrial revolution remained unattended.

This problem is partially solved in [17], where the goal is to determine the depth of application of artificial intelligence in marketing. This goal was achieved by searching for secondary information about marketing applications using artificial intelligence. Further, this information was validated using examples of commercial companies. Thus, it is confirmed that the elimination of time-consuming and labor-consuming actions by automating routine and repetitive tasks leads to a reduction in labor costs. As a result, marketing staff have more time to carry out creative and strategic activities, as well as new competencies of data scientists and an understanding of the possibilities of new technologies. However, the issue of other than reducing time, the results of the use of digitalization technologies in marketing activities remained unresolved in the cited work.

This issue is discussed in [18] where attention is focused on the importance of marketing analytics. The popularity of collecting a large amount of any data is explained here by trying to better understand all aspects of the marketing mix, namely current and potential consumers, competitors, products, services, new ways to measure marketing effectiveness. Marketing as a function within the enterprise is a wide multifaceted area of responsibility, each aspect of which is transformed under the influence of technology. Thus companies that master these technologies will undoubtedly have a competitive advantage, providing more personal and customized processes to meet consumer expectations.

At the same time, [19] emphasizes that the availability of primary data on customers and employees does not mean the availability of adequate information for decision-making. A person, or rather his mental and creative abilities, cannot be replaced by information technology. However, digitalization technologies are expanding and changing these opportunities. For example, there is no need to memorize large amounts of information but one needs to have the skills to effectively search for it. In addition, digitalization technologies significantly accelerate communication, making it possible to quickly exchange information and communicate without having to be physically present in one place. Other indirect effects of the penetration of digitalization technologies into people's lives are changes in their habits, distraction of attention, inability to understand new opportunities, terms, etc. Digitalization technologies do not make it possible to create

a truly automated control system because the final decision is made by a person. Fundamentally, the management process has not changed but the system of support for solutions that ensure the collection and preliminary processing of data has changed. Thus, digitalization technologies in the context of the company's management are expanders of human capabilities. However, as noted in work [20], in the scientific literature little attention is paid to how technology increases innovation in marketing techniques, tools, and strategies. That is, there is a need to develop a scientific paradigm that would explain the use of technology in marketing to develop competitive advantages. It also shows that new technologies affect marketing in such four ways:

- 1) they support new forms of interaction between consumers and companies;
- 2) they provide new types of data that require the use of new analytical methods;
- 3) they create marketing innovations;
- 4) they require new models of strategic marketing.

Continuing the analysis of questions regarding the explanation of the use of technology in marketing to develop competitive advantages, technologies and communications are presented in work [21] s enhancers of the effectiveness of companies. In this context, technology makes it possible for people to learn about each other and helps businesses grow and thrive. The importance of the communicative aspect of digital technologies in marketing is emphasized, as well as the problem of processing large amounts of unrelated data about consumers, competitors, the market environment, etc. It is important to conclude that digital technologies have not changed the role of marketing, which is to develop and manage consumer relationships. However, they significantly changed the dynamics of power in the relationship between the buyer and the seller, the corporate attitude to the marketing function and marketing approaches. As a result, marketing is woven into the strategy of the enterprise and acts as a connecting link for the structural components of the company. For example, sales marketing projects become the basis for determining production volumes and developing financial plans, and marketing research on consumer needs and trends helps find and develop new products. Thus, thanks to technology, marketing and management functions are integrated.

It should be noted that not every commercial company has its own resources for digitalization. Therefore, the issue of outsourcing in this area is also important. This is exactly what paper [22] addresses, which confirms the need to improve the skills and competencies of IT specialists in the face of the growing demand for outsourcing digitalization services. Moreover, it is shown in [22] that the largest share of companies in the market of information and communication technologies in Europe is made up of outsourcing enterprises. However, the paper did not sufficiently cover the role of IT outsourcing in the management processes of companies consuming these services.

The results of our review of literary sources [2–22] make it possible to conclude that digital technologies indirectly contribute to an increase in the company's productivity by launching a number of changes, the main conductor of which is marketing. On the other hand, the role of digitalization technologies in marketing management is revealed mainly through intuitive and empirical statements, which require additional theoretical generalizations and empirical justifications.

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### 3. The aim and objectives of the study

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The aim of this study is to bring empirical knowledge about the importance of digital technologies in the management of a company's marketing to a theoretical model. This will make it possible to find out the presence and direction of the effects of the spread of digital technologies in the company's marketing management and make informed decisions on business digitalization strategies.

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

- to choose promising digitalization technologies for implementation in marketing activities;
- to perform decomposition of marketing management of a conditional commercial company;
- to investigate the impact of the use of digitalization technologies on the components of marketing management of a conditional commercial company.

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### 4. The study materials and methods

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#### 4. 1. Materials

The object of this study is the use of digitalization technologies.

The main hypothesis of the study assumes that the spread of the use of digitalization technologies has a positive effect on the marketing management components of commercial companies.

The initial data of the study are:

- empirical knowledge reported in the results of scientific research of local and foreign scientists over the past decade;
- statistical information on the prevalence of the use of digital technologies by commercial companies, published by the State Statistics Service of Ukraine for the period from 2016 to 2020;
- indicators for evaluating the components of marketing management of commercial companies, formed by international and Ukrainian independent analytical organizations for the period from 2016 to 2020.

The initial data for empirical testing of the research hypothesis are preliminarily reduced to a comparable form.

Regression analysis was performed using Microsoft Excel (USA) software.

#### 4. 2. Methods

The structure of reporting the results of this study reproduces the principles of consideration of basic theoretical constructs in their logical sequence, methodological approaches to the description of individual economic concepts, and the use of general scientific methods of justification and systematization.

To select digitalization technologies, categorical phenomenology of specific technological innovations, as well as ontology of digitalization of marketing, were used. The main basis of systematization for analysis is the theoretical core of marketing, namely the structure of the conceptual apparatus of marketing, the main areas of marketing activities within a commercial company, and the basics of marketing management.

To determine the impact of the proliferation of digitalization technologies on the marketing management of companies, regression analysis is used. This led to the adoption in the study of relevant assumptions, including the following:

- 1) a regression model with a coefficient of determination greater than 0.5 is considered adequate;
- 2) the closeness of the connection is greater, the closer the correlation coefficient is to 1;
- 3) the direction of influence is determined by the sign of the model parameter (regression coefficient).

The simplifications adopted in this study are related to the use of secondary data to conduct empirical testing of the main hypothesis and led to a limited selection of explanatory and resulting variables.

## 5. The results of research on the role of digitalization technologies in the management of the company's marketing

### 5.1. Choosing digitalization technology in the context of marketing activities

Modern dynamic development of information and communication technologies leads to significant changes in the ways and methods of doing business. Such changes are taking place as part of the process of digital transformation or digitalization. Therefore, taking into consideration the purpose and objectives of this study, digitalization should be understood as the use of new digital technologies to enable key improvements in the formation of consumer experience, rationalization of operating activities or the creation of a new business model [23]. At the same time, in the main technologies of digitalization, researchers usually include technologies of Industry 4.0, based on additive (3D printing, robotization, advanced materials) and intelligent production (augmented reality, industrial Internet, and cyberphysical systems). Table 1 shows the digital technology sets depending on the context of the study.

Thus, the set of digitalization technologies is determined by a specific research task, and its boundaries are exclusively the subject of research. Then for the formation of the methodology, it is necessary to determine the essence of the company's marketing.

Taking into consideration the classic modern definitions of marketing provided by the American Marketing Association (AMA) [30], and work [31], marketing refers to the management activities of a company in order to obtain greater and more sustainable profits. The specificity of this activity consists in creating, positioning, reproducing, and communicating to the mass consumer the benefits of their products or services, which are accepted by the consumer as value and satisfy their needs.

Fig. 1 shows that (1) the subjects of marketing are consumers and the company; (2) the purpose of marketing is to build value for the consumer and meet the needs of the consumer; (3) marketing activ-

ities are the creation, positioning, reproduction of benefits and sale of a product(s).

That is, in a simplified form, the company monitors the market, as a result of which it receives data about the consumer. Based on these data, information is formed about the needs and values of the consumer, which forms the basis of the processes of creating, positioning, reproducing benefits, and selling a product or service. The information generated in these processes about the product or service is communicated to the consumer who makes the purchase decision. The results of this decision form the experience of the consumer, information about which also comes to the company in the form. Thus, the main resource to be transformed in the process of marketing activities is information. It follows that marketing is a management activity.

Digitalization technologies, as noted in the literary review, directly affect the consumer and indirectly – the company's productivity. At the same time, the impact on the consumer is a process that the company, as a business entity, cannot fully control, so this aspect will not be considered in this study.

The company's productivity is a target indicator, the growth of which is ensured in the process of marketing activities by best meeting the needs and creating consumer value. At this stage of the study, the approach to the choice of digitalization technologies is determined by the operational purpose of a particular technology to ensure the marketing function of the company. Accordingly, the results of the choice of digitalization technologies are given in Table 2.

Thus, given the managerial nature of marketing, the main criterion for choosing digitalization technologies within this work is their purpose for collecting, storing, processing, and transmitting information about consumers and products (services).

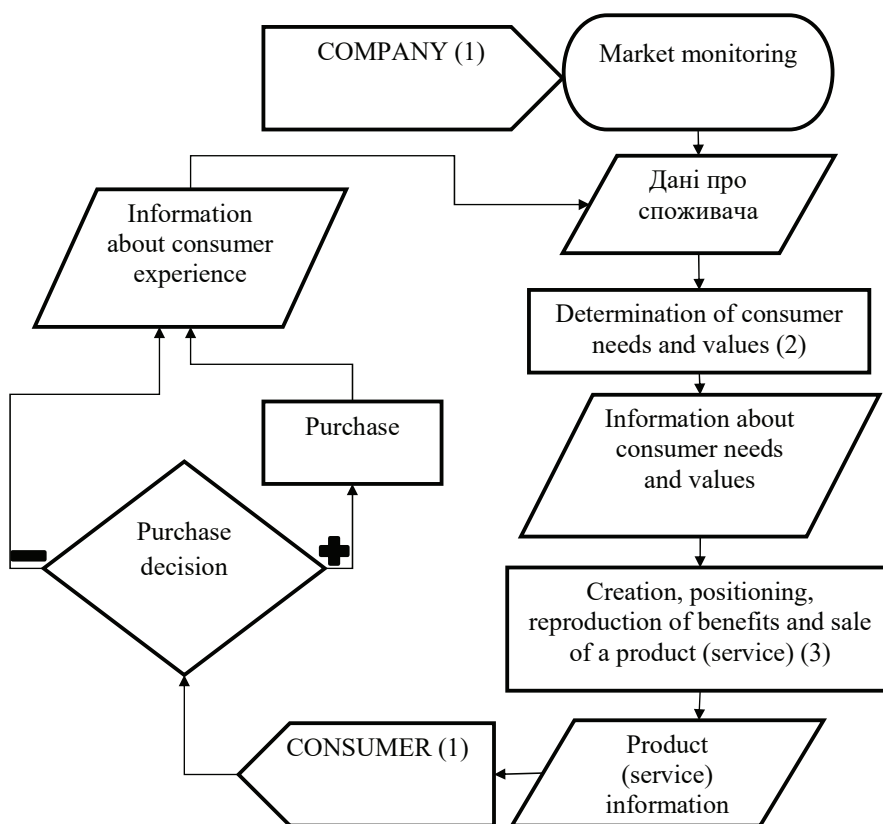


Fig. 1. The information cycle of marketing in a commercial company

**Table 1**  
**Formation of digitalization technology sets in scientific research**

Research context	Digitization technologies
Implementation of key business improvements [24]	Mobile technologies, artificial intelligence, cloud technologies, blockchain, Internet of things
Development of smart cities [24]	Internet of things, big data, mobile technologies, cloud technologies, machine-machine interactions
Changes in business processes of state corporations [25]	Blockchain, digital platforms
The impact of digital technologies on management efficiency [26]	Cloud technologies, social media, big data, 3D printing
Digital assets, decentralized management [27–29]	Blockchain, digital platforms

**Table 2**  
**Digitalization technologies in the context of marketing activities**

Digitization technology	Basic implementation	Characteristic
Big Data (BD)	Hardware and software	Collecting, combining, organizing and processing large volumes of diverse structured and unstructured data
Artificial Intelligence (AI)	Hardware and software	Imitation of human intellectual activity through training, which allows recognizing images, speech, answering questions, analyzing information and drawing conclusions
Cloud Computing (CC)	Software	Distributed network use of computing resources at the request of the user
Social Media (SM)	Software	Users create and share their own digital content online in real time through social engagement
Augmented Reality (AR)	Hardware	A software synthesized digital world that a person visualizes, manipulates and interacts with
Internet of Things (IoT)	Hardware and software	Interconnected physical devices that can transmit or exchange data, collect and process information
Blockchain (BC)	Hardware and software	New business models with minimization of market intermediaries, tokenization of economic relations, verification of any real objects or their parameters online
Digital Platforms (DP)	Software	Formation of digital ecosystems; formation and development of new business models of doing business on the basis of platforms with the transfer to platforms of traditional trade, payments and logistics

Note: compiled by Authors based on [32–39]

**5. 2. Highlighting the components of marketing management of a commercial company**

The concept of system-reflexive marketing as an ideology of company management [40] interprets it as a combination of the interests of the manufacturer and the consumer. Marketing management ensures that the company’s functioning adapts to dynamically changing environmental conditions, such as shortening the product life cycle, growing diver-

sity, and changing consumer expectations, through the realization of opportunities. Digitalization, acting as the technological basis of management, greatly expands these opportunities through the transformation of marketing into management activities of the entire company.

Management activity consists in streamlining the functioning of the company on the basis of the implementation of traditional management functions. The principal task of management, taking into consideration the cybernetic approach [41], is to combine human resources with tools and technologies, or to link the control subsystem (people and their groups) with a controlled subsystem (tools and technologies). At the same time, the controlled subsystem performs the role function of the company, and the control subsystem performs targeted control actions on the controlled subsystem to perform its function throughout the company. Linking occurs through communication channels that direct information, which ensures the achievement of the company’s goal.

The approaches and methods used in the management process are formed under the influence of various factors, such as the size and shape of the company, its type of activity, its structure, its purpose, its functions, etc. However, in the socio-economic systems to which the company actually belongs, a certain sequence of homogeneous processes is characteristic of management as a human activity. Consequently, the traditional management functions, which include planning, organization, leadership and control, during the study of marketing activities acquire a certain specificity, which is shown in Fig. 2.

Planning creates knowledge about the potential and long-term capabilities of the company, taking into consideration market experience and competencies. The marketing plan formulates the goal, objectives and direction of action, which is expressed in strategic knowledge about the target market, the value offered by the company, as well as tactical knowledge about the product or service, its promotion, sales, service. The planning is based on data on sales, markets, competitors, buyers [1].

The organization consists in the formation of control and controlled subsystems and consists in the implementation of planned actions using marketing methods and tools. A systematic idea of marketing tools is provided by the classic concept of “marketing mix”, within which the marketing tools are grouped into the following objects of management: product, promotion, place, and price [42]. Each of these objects is characterized by a certain set of attributes that in one way or another affect the value and satisfaction of the consumer. Taking into consideration the purpose of this study, the following were selected as a sufficient set of attributes:

- 1) product: assortment and consumer properties (quality, design, characteristics, name, packaging, dimensions, service, warranty, return);
- 2) promotion: marketing communications;
- 3) price: pricing, price differentiation, discounts, loans, payment terms;
- 4) place: distribution channels, market coverage, assortment, placement, inventory management, transportation.

Control is closely related to planning and builds knowledge about the effectiveness and effectiveness of marketing, providing flexibility in changing market conditions, which contributes to the improvement of operational activities in the future. Marketing as a purposeful activity to conquer the market transforms the control function of management

into a formalized system, the basis of which is customer satisfaction data, and market and financial indicators [43]. Leadership as a management function embodies influence on performers, motivation, and internal organizational communications. In marketing activities, these processes are elements of control and correspond to the concept of marketing orientation of the company [44].

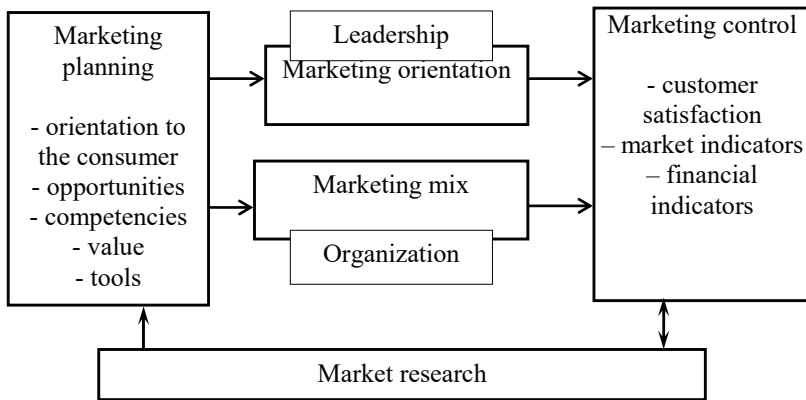


Fig. 2. Marketing management process of a commercial company

The results of the classification of the selected digitalization technologies based on the performed decomposition of the company’s marketing management are given in Table 3.

Table 3

Digitalization technologies in marketing management of a commercial company

Components of marketing management	Digitization technology	Digitization medium	Purpose of technology
Marketing researches	BD, IoT	Data	Increased opportunities to collect and accumulate marketing information
Planning and control	CC, AI, BD	Data	Increasing the effectiveness of formal procedures
Marketing mix	AI, SM, VR, IoT, BC, DP	Communication, automation of routine processes	Increasing customer satisfaction
Marketing orientation	CC, SM, DP	Communication	Simplification of communications within the company

Thus, the decomposition of marketing management of a commercial company clarifies the criteria for choosing digitalization technologies and forms a conceptual basis for building an appropriate theoretical model.

### 5.3. Determining the impact of the use of digitalization technologies on the marketing management components of commercial companies

The assessment of the impact of digitalization technologies was carried out in order to test the hypothesis of the positive role of their use in enterprises in the field of mar-

keting management in Ukraine. The theoretical assessment model is presented in Fig. 3.

The structure of the model is formed taking into consideration the following facts.

Firstly, the choice of regression analysis is caused by the fact that the marketing management system is complex, which means that the direction and strength of the connection between the role of digital technologies and the result of the functioning of the system require preliminary verification.

Regression analysis is one of the universal methods that determine its prevalence when establishing the presence and nature of the relationship between quantities.

Secondly, statistics published in open sources indicate that digitalization technologies are limitedly used by Ukrainian businesses. Thus, starting from 2016, relevant statistical observations [45–49] are carried out on the prevalence of technologies such as big data, cloud computing, social media and 3D printing. In 2020, the method of data collection changed, so since 2021, social media has not been studied, but separate data on artificial intelligence (chatbots) and robotization have been added.

Statistical observation is carried out only at legal entities with more than 10 employees, among which, during 2016–2020, on average, 14 % used big data technologies, 10 % used cloud computing technologies, and 25 % used social media.

Thirdly, data on the components of marketing management at the macro level are not studied by official statistics. Therefore, the choice of the resulting indicators is made based on the nature of the phenomena that they describe. Thus, as an indicator of marketing research, the volume of the marketing research market in Ukraine is selected, which is estimated by the Ukrainian Marketing Association [50].

Planning, control, and marketing orientation embody the internal interconnectivity of the company in achieving its goal of functioning. On the other hand, a generalizing indicator of business development and digital technologies is an indicator of the global competitiveness rating prepared by the Institute for Management Development [51]. The rating study covers 63 countries, each of which is evaluated in such areas as the state of the economy, government efficiency, business environment, and the state of infrastructure.

As an indicator of customer satisfaction, the consumer confidence index of Ukraine was used [52], which is calculated by InfoSapiens on the basis of a sample survey of Ukrainian households through a monthly survey of respondents on consumer sentiment. The index characterizes an integral assessment of consumer expectations regarding the general state of the economy, personal material condition and readiness to make large purchases.

Thus, the assessment of the impact of digitalization technologies on the marketing management components of commercial companies is based on the theoretical model shown in Fig. 3. The mathematical formalization of the theoretical model is represented by expressions (1).

$$MR = a_1 \cdot BD + b_1;$$

$$ICS = a_2 \cdot BD + b_2;$$

$$ICS = a_3 \cdot CC + b_3;$$

$$CE = a_4 \cdot SM + b_4; \tag{1}$$

where *MR* – market research market size, mln. USD. USA;  
*ICS* – competitiveness rating;  
*CE* – consumer sentiment index;  
*BD* – the number of enterprises that conducted the analysis of “big data”, units;  
*CC* – the number of enterprises that purchase cloud computing services, units;  
*SM* – the number of businesses that used social media, units;  
*a<sub>1</sub>, b<sub>1</sub>* – parameters of the model of the influence of big data on the research market;  
*a<sub>2</sub>, b<sub>2</sub>* – parameters of the model of the influence of big data on the competitiveness rating;  
*a<sub>3</sub>, b<sub>3</sub>* – parameters of the model of the impact of cloud computing on the competitiveness rating;  
*a<sub>4</sub>, b<sub>4</sub>* – parameters of the model of the influence of social media on customer satisfaction.

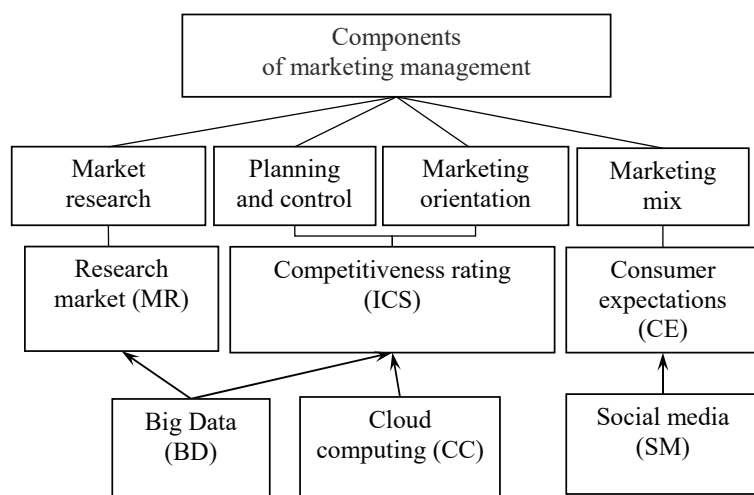


Fig. 3. A theoretical model for assessing the impact of digitalization technologies on the marketing management of a commercial company\*

The results of the assessment are given in Table 4.

Table 4

Results of the assessment of the impact of digitalization technologies on the marketing management of commercial companies

The studied influence	Model (direction of influence)	Coefficient of determination <i>R</i> <sup>2</sup> (adequacy of the model)	Correlation coefficient (tightness of connection)
Big data market research	$MR = 4.2 \cdot BD - 9.3$ (positive)	0.2 (inadequate)	0.4 (weak)
Big data competitiveness index	$ICS = 5.8 \cdot BD + 43.1$ (positive)	0.8 (adequate)	0.9 (strong)
Cloud computing competitiveness index	$ICS = 7.2 \cdot CC + 41.6$ (positive)	0.6 (rather adequate)	0.8 (strong)
Social media consumer satisfaction	$CE = 8.7 \cdot SM - 152.8$ (positive)	0.6 (rather adequate)	0.8 (strong)

Note: calculated by Authors according to data [45–52]

Thus, the results of assessing the impact of the use of digitalization technologies on marketing management components in Ukraine indicate that there is a close positive relationship between the use of big data, cloud computing, and the competitiveness index. Social media, as expected, have a positive impact on customer satisfaction. However, the use of big data has little effect on the market research market, and the built model itself did not turn out to be adequate.

### 6. Discussion of results of the explication of the role of digitalization technologies in marketing management of a commercial company

Given in Table 2 the list of digitalization technologies is formed taking into consideration the information cycle of marketing, schematically depicted in Fig. 1. The set of technologies is explained by the components of marketing that a particular technology can provide. Such components include the formation of value for the consumer, the creation, positioning, reproduction of benefits, and the sale of the product. The choice of digital technologies in this way is criterial. At the same time, the selection criterion is not only to ensure the solution of problems for the effective organization of work with marketing information but also for the formation of a positive consumer experience.

Decomposition of the marketing management process, shown in Fig. 2, reveals its logic. Based on Fig. 2, marketing research underlies the entire management process and is a kind of information chain between marketing planning and marketing control. At the same time, marketing orientation and marketing mix is a controlled subsystem and performs executive functions. The results of the structural decomposition of marketing management are established as criteria for the classification of selected digitalization technologies in Table 3 and form a framework of the theoretical model shown in Fig. 3. The formed theoretical model has three explanatory indicators and three resulting indicators. Setting in this form the task of analyzing the relationship between the prevalence of digitalization technologies and the components of

the company’s marketing management involves the use of regression analysis. The model allows it to be adapted to a larger number of technologies but in this work the latter is due to the presence of limited initial data and a short observation interval.

The results of the calculations are given in Table 4; they testify to the following. The obtained linear regression models explain 80 % of the variation in the competitiveness index due to the variation in the share of enterprises that used big data analysis. At the same time, 60 % of the variation in the competitiveness index is explained by the variation in the share of enterprises that used cloud computing technologies. Accordingly, the link between the competitiveness index and the use of big data technologies and cloud computing is positive and close, which makes it possible to assert that these technologies fulfill their role. As for customer satisfaction, here 60 % of the variation in the consumer expectations index is explained by the variation in the share of enterprises that use social media in their activities. The relationship between these indicators is positive and close.

The results of the analysis of the impact of the use of big data technologies on the market research market, in turn, showed a weak positive connection and inadequacy of the chosen model.



This can be explained by the fact that the volume of the market research characterizes their execution on request, therefore, the use of digitalization technologies by those companies that are the direct executors of these studies will play a role.

The result is explained by the development of the platform economy and ecosystems where big data technologies, cloud computing, and social media, as well as blockchain, are necessarily involved. Online trading platforms give small and medium-sized enterprises a way to reach a large number of buyers via the Internet, removing geographical restrictions for the development of their business.

It should be noted that the resulting studied indicators (consumer expectations index and competitiveness index) in Ukraine as a whole demonstrate the low performance of marketing activities. Therefore, Ukrainian enterprises should pay more attention to the marketing philosophy and the corresponding intensification of the use of digitalization technologies.

The results of the analysis of scientific papers [2–21] showed that the main motives for using digitalization technologies in companies are to reduce working hours and improve performance. However, digitalization technologies, being essentially information and communication technologies, have an indirect impact on performance and certain chains of effects that are not related to their immediate purpose. Among them, one should particularly note new tools and ways of conducting marketing activities, which are fundamentally impossible without these technologies. A feature of this study is the emphasis that the marketing product is information. According to this, it is proved that the role of digitalization technologies in marketing management is to transform the latter into the basis of the company's existence.

The methodical approach to substantiating the role of digitalization technologies proposed in this study is characterized by the use of fundamental provisions on cybernetic systems, management theory, and modern marketing concepts. This made it possible to structure and summarize existing knowledge, to single out digitalization technologies and components of marketing management.

In the end, a theoretical model of the influence of digitalization technologies on the components of the company's marketing management was synthesized. Based on the results of the regression analysis of the synthesized model, the hypothesis of the positive impact of the spread of the use of digitalization technologies on the marketing management components of commercial companies was confirmed.

The limitation of the study is the use of secondary data in the experimental part, which leads to a decrease in its representativeness. It is possible to narrow this limitation by conducting own statistical observations, which may be the subject of further research.

The disadvantages of the study are determined by its pilot nature. The purpose of this work was not to determine the features of the development of constructs that were studied, depending on the type of activity, region, type, or size of the company. However, these factors, as recent studies show, are quite significant in determining the role of digitalization technologies in marketing management.

The prospects for further research, in addition to those already mentioned, should concern the methodology for determining the chains of effects from digital technologies both in the field of marketing management and in the field of changing the lifestyle of consumers. It is also advisable to improve the developed theoretical model by studying various aspects of marketing.

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## 7. Conclusions

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1. The categorical phenomenologization of technological innovations made it possible to establish that the main technologies of digitalization include technologies of the so-called Industry 4.0, and their choice is determined by the research task. At the same time, marketing is defined as the management activity of the company in order to obtain greater and more sustainable profits. The specificity of this activity consists in creating, positioning, reproducing and communicating to the mass consumer the benefits of their products or services, which are accepted by the consumer as value and satisfy their needs. The main resource of marketing activities is information. On this basis, the choice of digitalization technologies has been made.

2. Another important aspect in this study is the concept of system-reflexive marketing as an ideology of managing a conditional commercial company. From this point of view, digitalization is recognized as the basis of management, which expands the capabilities of the company through the transformation of marketing into a formalized management activity. The use of cybernetic approach and marketing management predetermined the scheme of the company's marketing management process, which is built on the basis of a combination of traditional management functions and the theoretical core of marketing. Further unification of the isolated components of marketing management of a conditional commercial company and selected digitalization technologies made it possible to create a conceptual basis for the study.

3. The theoretical model for assessing the impact of digitalization technologies on marketing management in commercial companies consists of three explanatory variables and three resulting indicators. The model allows it to be adapted to a larger number of technologies but in this work the latter is due to the presence of limited initial data and a short observation interval. The results of the regression analysis, carried out on the basis of a theoretical model, proved the existence of a positive close relationship between the use of big data technologies and cloud computing and the competitiveness index. In addition, the link between social media use and the consumer expectations index has proven to be positive and close. The results of the analysis of the impact of the use of big data technologies on the market research market showed a weak positive connection and inadequacy of the chosen model. The result is explained by the development of the platform economy and ecosystems, where the technologies under study are involved, as well as blockchain. Online trading platforms enable commercial companies to interact with a large number of buyers, removing geographical restrictions for the development of their business. According to the results of the study, low performance of marketing activities in Ukraine as a whole was recorded. Therefore, Ukrainian enterprises are advised to pay more attention to the marketing philosophy and the corresponding intensification of the use of digitalization technologies.

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## Conflict of interest

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The authors declare that they have no conflict of interest in relation to this research, whether financial, personal, authorship or otherwise, that could affect the research and its results presented in this paper.

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