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DEVELOPMENT FEATURES OF COGNITIVE TECHNOLOGIES IN MASS MEDIA

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The article examines the use of cognitive technologies implemented in the media, which affect the entire complex of mass media. The need to predict the impact of their extensive use on society makes this issue relevant. The purpose of the article is to identify the main factors influencing the cognitive technologies implemented in the field of mass media and the effectiveness of their use. The research methodology consists in systematic and logical analysis, as well as methods of comparison, synthesis, deduction, and classification, which made it possible to consider in detail the object of research as a system, to identify the driving forces in the field of mass media and categories of various cognitive technologies, their key features. The scientific novelty is to reveal the implementation of cognitive technologies in the mass media, which have the potential for shaping not only consumer loyalty but also determining the preferences of the audience for a long period of time thanks to the self-learning system. Conclusions. It is determined that the integration of cognitive technologies into the professional spheres of mass media is capturing more and more of its branches, helping to create modern products and processes, taking over computing, recognition, reproduction, and other tasks that were previously done manually with a significant loss of time. It is proved that the use of modern information technologies in the media gives the opportunity to increase the loyalty of the target audience, expand the presence on the market through new placement platforms and social networks, provide customer support and some accompanying and supporting functions for employees, significantly reducing the cost of operating activities of the company, automating it, and perform many other tasks. It is noted that although cognitive technologies are a powerful business tool, the pace of innovation is accompanied by the risks they pose to their understanding, restraining, and controlling.

Keywords: artificial intelligence; mass media; data management; social networks; news

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Introduction

Today, the most promising mass media are seeking a new class of information technology (IT) innovations, known as cognitive computing, to advance their capabilities. Cognitive systems not only process information but can also mimic the human reasoning process. Rather than being hard-programmed, they are self-learning systems that interact with other systems and people. There are related concepts in this category that include machine learning, natural language processing, artificial intelligence (AI), behaviour/sentiment analysis, and speech recognition (Waxman, 2017). Cognitive science is the most important discipline that has integrated many important fields since its inception, including, but not limited to, neuroscience, psychology, computer science, systems science, and management. With the development of these related areas, cognitive science has achieved recognition and respect (Luo, 2021).

The use of cognitive technologies implemented in the media is important because they affect virtually the entire complex of mass media work — from modernisation to control of economic and marketing indicators. The need to predict and justify the possible effects on the economy and society emerging from the extensive use of cognitive technologies in the media, social media platforms, etc. makes this issue relevant.

Recent research and publications analysis. In the course of the study, a theoretical analysis of current scientific publications and reports was carried out. Researchers in the field of mass media, information technology, and marketing often consider and study issues related to the assessment of the state and prospects for the development of cognitive technologies in the media and social platforms. In particular, researchers have studied the issue of changing human cognition due to the influence of the internet, using the concept of the "Online brain" (Firth et al., 2019), and F. Luo (2021) studied cognitive technology to self-cognition. In recent years, there has been much research on the ways of improvement in the development of cognitive technologies in the mass media, cognitive computing in the telecommunications and media, entertainment industries (Thomas et al., 2016.) as well as their economic prospects and the impact of data environment and cognitive abilities on participants' attitudes to data management (Jiang et al., 2021).

Purpose of the article

The purpose of the article is to identify the main factors influencing the cognitive technologies implemented in the field of mass media and the effectiveness of their use. The research methodology consists in a systematic analysis that made it possible to consider in detail the object of research as a system with many interrelated and interacting elements and identify the driving forces in the field of mass media. The following methods were also used: the method of logical analysis to understand the essence of the mass media, the process of their formation and the need for their development, and the current state of the mass media; the method of comparison — to assess the dynamics of artificial intelligence marketing within the modern sphere of the mass media; the method of synthesis — to structure the information on the existence of touchpoints (digital and physical) of the mass media and its end-user; the method of deduction to

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describe professional areas that involve cognitive systems and technologies in their functioning, thereby accelerating their development and scaling their capabilities and classifications to highlight the category of various cognitive technologies and their key features. The scientific novelty is to reveal the implementation of cognitive technologies in the mass media, which have the potential for shaping not only consumer loyalty but also determining the preferences of the audience for a long period of time thanks to the self-learning system.

Main research material

The mass media consists of print and electronic media, representing a technology that provides the audience with access to information and is the main means of communication used to reach the majority of the population. They perform several functions: informational, organisational, communication, education, persuasion, and entertainment. The result of the mass media activity is significant for the society, as it contributes to its development and changes.

The most common media platforms are newspapers, magazines, radio, television, and the Internet. The general public tends to rely on the media for information related to political and social issues, entertainment, and pop culture news.

The main advantages of the modern media are:

– it delivers a huge amount of news and entertainment content;
– it makes society better informed and provides an opportunity to keep abreast of the current state of affairs in all spheres of public life;
– it is able to quickly deliver information to the public;
– it can warn in a timely manner about dangerous situations in a city, region, or country;
– it has resources to show injustices, corruption, or abuse of power that the average citizen would never be able to expose;
– it keeps us updated on news, weather, cultural and sporting events.

The disadvantages of the media include:

– a risk of inaccurate reporting and loss of confidentiality;
– incorrect or inaccurate information;
– it can cause reputational damage due to wide publicity;
– to use the media to make false claims or claims that are only half true;
– it is hard to check the information;
– negative consequences of false statements in the media (Saravanakumar, 2019).

The Internet is the most common and rapidly growing technology used by the media. In just a few decades of using the Internet, humanity has completely changed the way it searches for information, consumes media, entertainment, and manages social networks and relationships. With the advent of smartphones, Internet access has become portable and ubiquitous (Firth et al., 2019). In this regard, there is a need for cognitive computing, which is designed to increase, accelerate and scale human knowledge, providing a new era of true human-machine collaboration. Cognitive computing systems can be defined as systems that can understand, reason, and learn. Such systems can define the meanings of data entry — structured and unstructured, textual, or

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sensory — by interpreting the context and classifying the data as information or knowledge. Finally, these systems are capable of continuous learning, data accumulation, and understanding through human interaction. Cognitive systems are not programmed, but rather learn by gaining knowledge through experience and improving over time (Thomas et al., 2016).

Media companies also actively use cognitive systems. To understand viewers' preferences over a long period of time (six months or more), they must manage the complexity of several touchpoints with a consumer, both physical and digital (Fig. 1). It is also important to gain the trust and loyalty of the consumer, especially if media groups are interested in obtaining personal information to provide the consumer with interesting content. Algorithms supported by cognitive technologies help determine what information might be of interest to the subscriber. Identity management software allows creating a preference profile and leads to greater personalisation and customer loyalty.

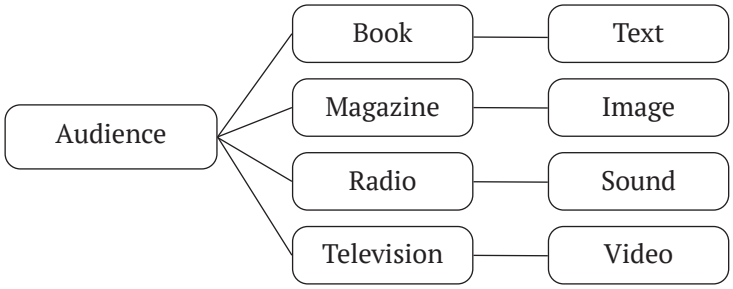

Figure 1. Structural diagram of digital and physical touchpoints of mass media with a consumer.

Media companies can also analyse information about their users' social activity to further increase the level of personalisation, and it makes sense to provide the user with a personal subscription offer and "sell" additional content based on video consumption and social media activity of a person. There are several factors that have been identified as driving forces in the media industry. These are the most common:

– exponential development of hardware and software computing capabilities;
– investments of large companies in the development of open-source artificial intelligence;
– the growth of social networks, which leads to a rapid increase in available data on society's moods in real time.

They are usually associated with the following aspects of modern service industry practice that are extremely relevant to understand the reasons why artificial intelligence marketing is moving towards automation, namely:

– companies' desire to reduce costs by imitating industrial automation practices in the service sector;
– businessmen strive for a ubiquitous brand presence;
– globalisation as a legislative factor that changes the requirements for the use of data for marketing.

In general, there are nine main cognitive technologies used in the mass media (Table 1).

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Table 1

Cognitive technologies

Technology	Key features
Artificial intelligence	Technology that is programmed to reproduce human behaviour, such as engaging in seemingly natural dialogue, decision-making, understanding the complexity of content, and replacing people in tasks. It can be used around the clock and quickly process large amounts of information.
Algorithm	A series of instructions to carry out a task. Algorithms can be created either explicitly by humans or by other computer processes, or developed through trial-and-error processes such as machine learning.
Cognitive capture solution	A programme that applies rules to a set of data taken from text images and uses natural language processing and machine learning to replicate human "reading" by recognising the context of the document.
Machine learning	The ability of a computational device to learn from large amounts of training data and improve a specific task without having been explicitly programmed to do so.
Neural networks	A system of artificial neurons, the effectiveness of which is inspired by the brain's biological networks and which recognises that information can be classified according to specifications.
Natural language generation	Natural language generation refers to systems that generate human-seeming speech or written language.
Natural language processing	Natural language processing is an analysis of speech patterns and writing language using a computer to extract information.
Optical character recognition	Reading handwritten or typed text electronically to create machine-encoded text that can be used in a different format (for example, text captured from a photograph).
Robotic Process Automation	A business process replication solution designed to perform a task that would otherwise be performed manually. It is programmed to follow "if this, then that" instructions. It works with other programmes rather than replacing them.

Source: ("What is cognitive technology", n.d.).

Regarding the process of mass media platformisation, the following aspects can be distinguished:

– platformisation complicates media issues, as platform corporations integrate highly diverse businesses, not only hosting and managing media content, but also functioning as advertising networks, intermediaries, social networking and identification services, content production companies, and software and hardware manufacturers;

– platformisation also significantly complicates the regulation of media content. Digital platforms transmit a huge amount of fundamentally heterogeneous content,

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from personal updates to news and from games to fashion photography. This content is shared by a wide range of users, including mass media, public organisations and institutions, a wide range of companies, and billions of end-users;

– the growing dominance of platform corporations over the cultural sphere means that it is vital to develop and support online media and alternative non-profit platforms.

Given the crucial role of the mass media in a democratic society, journalists and media workers must demonstrate greater social responsibility when covering the media content and understand its significant impact on public opinion. Media role models can influence audience behaviour just as strongly as real and proximal role models. However, as media improves, it becomes easier to combine media incentives with real-world incentives, thus creating a unique experience (Stever, 2020). Data literacy self-efficacy has the effect of suppressing data quality through data governance, and has the same effect between website design and attitude towards data governance. Platform interactivity plays an intermediary role, and cognitive technologies will be the hallmark of the digital age (Harrington, 2016). Data policy also has a positive effect on data literacy self-efficacy, but no significant effect on the interactivity of the platform (Jiang et al., 2021).

Assessing the development of the mass media from the point of view of cognitive technologies used in the media business, it is worth saying that some of these technologies are used in the process of collecting, selecting, and editing media content, while the other part is used in the process of dissemination and promotion of the media content to the mass audience, as well as in the feedback function. The technological revolution began with mp3, jpg, and avi files, and continues with Internet broadcasting, social networks, cloud technologies, and new digital platforms that are now used by the media to distribute media content (Tomic, 2017). Digital platforms have become central to the production, distribution, and monetisation of cultural content. At the same time, the news industry was one of the first to be deeply affected by platformisation. This is due to the fact that the advent of search engines and social media has dramatically reduced ad revenue and allowed Internet users to directly access and share individual news items. Increasingly, various commercial and public broadcasters distribute content through YouTube and other digital platforms. Finally, the platforms gave rise to completely new industrial formations. For example, social media entertainment and social games have become mainstream industries in less than a decade (Poell, 2020).

A society that is constantly connected through the Internet and mobile technologies should be well-versed in this environment. Users must also adapt to the new dynamics imposed by mobile technologies. Therefore, scientists have developed technologies to assess the practical impact of the Internet and mobile media on the production, distribution and consumption of the mass media and information from other sources. Journalism is now less valued for the news it provides and more for the production process. Many proclaim the death of radio as a traditional broadcast format, however, thanks to increased hardware mobility and bandwidth speed, podcasts and music streaming services continue to attract listeners (Artman et al., 2020). Digital technologies have proven to be not only attractive, but some of them are even addictive. And while screen technology can offer some cognitive benefits, there is ample evidence in the literature on cognitive neuroscience that digital technologies are restructuring the way we read and think, and not necessarily for the better. Research on the intensive

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use of digital devices suggests something similar to the Faustian flaw: certain cognitive skills are acquired, while other "deep thinking" abilities are atrophied as a result of changes in the nervous system of the brain, which may have implications for learning and management.

At the same time, the cognitive neuroscience of aesthetics can explore the complex cognitive processes and functional networks of brain regions involved in these experiences without attaching importance to them. Thus, the cognitive neuroscientific approach may develop in a way that is mutually complementary to approaches in the humanities and exact sciences (Pearce et al., 2016). However, the media has a two-way relationship with behaviour that is considered to be a factor in spreading the preventative factor.

Conclusions

Thus, the integration of cognitive technologies into the professional spheres of mass media is capturing more and more of its branches, helping to create modern products and processes. In fact, cognitive technologies have become an integral part of the new business, taking over computing, recognition, reproduction, and other tasks that were previously done manually with a significant loss of time. At the same time, the automation of many cognitive processes not only provides significant opportunities for development and productivity growth but also creates new tasks and challenges for software developers.

It is proved that the use of modern information technologies in the media gives the opportunity to increase the loyalty of the target audience, expand the presence on the market through new placement platforms and social networks, provide customer support and some accompanying and supporting functions for employees, significantly reducing the cost of operating activities of the company, automating it, and perform many other tasks.

It is noted that although cognitive technologies are a powerful business tool, the pace of innovation is accompanied by the risks they pose to their understanding, restraining, and controlling. There is also a possibility that some employees may be replaced by special software in the future, but today, without human control, programmes cannot fully perform intellectual work. Marketers, financiers, journalists, etc. working in the mass media have been using data obtained with the help of cognitive technologies for quite some time, but human intervention is still necessary for high-quality processing and further application of this information. However, the dynamic development of cognitive technologies in the mass media requires further research, especially in the field of assistance to employees involved in the work of the media.

References

Arafat, S., Islam, M., & Kar, S. (2021). Mass Media and Panic Buying. In S. Arafat, S. Kar & R. Kabir (Eds.), *Panic Buying: Perspectives and Prevention* (pp. 65–80). Cham: Springer. https://doi.org/10.3389/978-2-88971-038-6 [in English].

Artman, N., Stiegler, Z., Szuminsky, B., & Albright, M. (2020). Mass Media in the Mobile Village. *Explorations in Media Ecology*, *19*(2), 139–150. https://doi.org/10.1386/eme_00031_1 [in English].

Cavanaugh, J. M., Giapponi, C. C., & Golden, T. D. (2016). Digital Technology and Student Cognitive Development: The Neuroscience of the University Classroom. *Journal of Management Education*, *40*(4), 374–397. https://doi.org/10.1177/1052562915614051 [in English].

Firth, J., Torous, J., Stubbs, B., Firth, J., Steiner, G., Smith, L., Alvarez-Jimenez, M., Gleeson, J., Vancampfort, D., Armitage, C., & Sarris, J. (2019). The "Online Brain": How the Internet May be Changing Our Cognition. *World Psychiatry*, *18*(2), 119–129. https://doi.org/10.1002/wps.20617 [in English].

Harrington, L. (2016). Cognitive Technology. *AACN Advanced Critical Care*, *27*(1), 12–14 [in English].

Jiang, G., Cai, X., Feng, X., & Lui, W. (2021). Effect of Data Environment and Cognitive Ability on Participants' Attitude Towards Data Governance. *Journal of Information Science*. https://doi.org/10.1177/01655515211019000 [in English].

Luo, F. (2021). Cognitive Technologies: Applications to Cognition Itself. In A. Hooke (Ed.), *Technological Breakthroughs and Future Business Opportunities in Education, Health, and Outer Space* (pp. 133–146). IGI Global. https://doi.org/10.4018/978-1-7998-6772-2.ch008 [in English].

Muzzatti, S. L., & Rigato, B. (2020). *Mass Media and Socialization*. Wiley Online Library. https://doi.org/10.1002/9781405165518.wbeosm041.pub2 [in English].

Obot, C. (2013). Mass Media Electioneering Campaign and Uyo (Nigeria) Voters' Decision during 2011 General Elections. *Journal of Politics and Law*, *6*(1), 173–185. https://doi.org/10.5539/jpl.v6n1p173 [in English].

Pearce, M., Zaidel, D., Vartanian, O., Skov, M., Leder, H., Chatterjee, A., & Nadal, M. (2016). Neuroaesthetics: The Cognitive Neuroscience of Aesthetic Experience. *Perspectives on Psychological Science*, *11*(2), 265–279. https://doi.org/10.1177/1745691615621274 [in English].

Poell, T. (2020). Three Challenges for Media Studies in the Age of Platforms. *Television & New Media*, *21*(6), 650–657. https://doi.org/10.1177/1527476420918833 [in English].

Prakash, S., & Thangavel, K. (2020). *Influence of Mass Media on the Behaviour of Adolescents*. *EDUREACH*, *4*(2). https://cutt.ly/qWOhb6E [in English].

Saragih, M. Y. (2020). Journalistic Mass Media Management. *SIASAT Journal of Social, Cultural and Political Studies*, *5*(4), 59–64. https://doi.org/10.33258/siasat.v5i4.71 [in English].

Saravanakumar, A. (2019). *Mass Media* [Presentation]. https://doi.org/10.13140/RG.2.2.26562.22722 [in English].

Stever, G. (2020). Evolutionary Psychology and Mass Media. In T. K. Shackelford (Ed.), *The SAGE Handbook of Evolutionary Psychology: Applications of Evolutionary Psychology* (pp. 398–416). SAGE Publications Ltd [in English].

Thomas, M., Vora, J., Dee, C., Mangla, U., Sathi, N., Chandrasekaran, S., & Sathi, A. (2016). *Cognitive Computing in the Telecommunication and Media & Entertainment Industries*. IBM Developer https://developer.ibm.com/technologies/artificial-intelligence/ [in English].

Tomic, B. (2017). New Media Technologies and Mass Media Reform Processes. *Politeia*, *7*(13), 72–83. https://doi.org/10.5937/pol1713072T [in English].

Waxman, A. (2017). *Rogues of Wall Street: How to Manage Risk in the Cognitive Era*. Wiley [in English].

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What is cognitive technology? (n.d.). The Institute of Chartered Accountants in England and Wales. Retrieved August 25, 2021, from https://cutt.ly/lWOi8Xp [in English].

Zayyrbekova, A. (2020). Frequency of Aggression in the Mass Media. *Applied Psychology and Pedagogy*, *6*(1), 97–105 [in English].

ОСОБЛИВОСТІ РОЗВИТКУ КОГНІТИВНИХ ТЕХНОЛОГІЙ У МАС-МЕДІА

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Мета статті — виявити основні чинники впливу когнітивних технологій, імплементованих у сферу засобів масової інформації, та дослідити ефективність їх використання. В статті досліджується використання когнітивних технологій, імплементованих у ЗМІ, що впливають на весь комплекс роботи мас-медіа. Актуалізує це питання необхідність прогнозу наслідків для суспільства активного їх використання. Методологія дослідження полягає у системному і логічному аналізі, а також методах порівняння, синтезу, дедукції та класифікації, що дали змогу детально розглянути об'єкт дослідження як систему, виявити рушійні сили в галузі мас-медіа та категорії різноманітних когнітивних технологій, їх ключових особливостей. Наукова новизна полягає у розкритті імплементації когнітивних технологій у мас-медіа, які можуть формувати не лише лояльність споживача, а й визначати вподобання аудиторії на значний проміжок часу завдяки системі самонавчання. Висновки. Визначено, що інтеграція когнітивних технологій у професійні сфери діяльності мас-медіа захоплює все більше її галузей, допомагаючи в створенні сучасних продуктів та процесів, перебираючи на себе обчислювальні, розпізнавальні, відтворювальні та інші завдання, які раніше робилися вручну зі значною втратою часу. Доведено, що використання сучасних інформаційних технологій у мас-медіа дає змогу підвищити лояльність цільової аудиторії, розширити власну присутність на ринку за допомогою нових платформ розміщення та соціальних мереж, здійснювати клієнтську підтримку та деякі супровідні й допоміжні функції для працівників, суттєво зменшивши витрати на операційну діяльність компанії, автоматизувавши її, та виконати безліч інших завдань. Зауважено, що хоча когнітивні технології є потужним бізнес-інструментом, однак темпи інновацій супроводжуються ризиками, які вони створюють на способи їх розуміння, стримування та контролю.

Ключові слова: штучний інтелект; засоби масової інформації; управління даними; соціальні мережі; новина