



# MARKETING APPROACH TO THE MANAGEMENT OF KNOWLEDGE AND INFORMATION SYSTEMS IN THE DIGITAL ECONOMY

Anna A. Koroleva  
Mukhammadjon T. Butaboyev  
Gulnara M. Davlyatova  
Julia A. Kolesova<sup>1</sup>

Received 23.05.2024.  
Received in revised form 02.07.2024.  
Accepted 18.07.2024.  
UDC – 339.138:005.94

Keywords:

*Marketing approach, Digital economy, Cloud computing, Electronic medicine, Medical services, Digital application*

## ABSTRACT

*We studied the features of implementing cloud computing services in electronic medicine by the example of four companies, which are world leaders in the IT sphere. We also identified the directions for implementing these services, their advantages, drawbacks, and possibilities for adaptation. It was shown that among the four studied technologies (IBM Cloud, Microsoft Azure Open AI, Google Cloud, and Amazon Web Services), only the first one has rather high adaptability in the medical sphere. Three others have unique capabilities, but more features in the context of implementation and segments of consumers. The marketing approach, applied in each company during the promotion of services (products) of partner companies that use their cloud computing in the management of electronic medicine, is connected with the focus on the key advantages of the digital offers and consideration of consumer needs. We revealed the necessity for the use of a more complex marketing approach during the promotion of digital solutions, which are aimed at the management of certain processes that cover a narrow range of consumers.*

*The goal of this research was to reveal the features of the use of the marketing approach (tools for promoting products (services)) in the management of knowledge and information systems in the digital economy. The key research methods utilised in this paper include the aspect analysis, the method of deconstruction, the statistical method, and comparative analysis.*



© 2024 Published by Faculty of Engineering

## 1. INTRODUCTION

Marketing allows ensuring commercialisation in the sphere of information and communication technologies and knowledge. Marketing capabilities increased a lot in

the conditions of the digital economy. Complex and unpopular solutions in the sphere of knowledge management, aimed at certain sectors of the economy and used in the infrastructure of cities and territories, can become in high demand due to a successful

<sup>1</sup> Corresponding author: Julia A. Kolesova  
Email: [usr11010@vyatsu.ru](mailto:usr11010@vyatsu.ru)

marketing approach. New directions in the use of information systems, aimed at companies, organisations, and consumers, can be promoted in domestic and foreign markets with the help of innovative tools of marketing communications. The marketing approach influences the creation and support of quickly changing demand for products (services) in the sphere of the management of knowledge and information systems in the digital economy. The speed of its change and effectiveness depend on the digital revitalization of the sectors of science and technologies, which introduce consumers to new opportunities in the execution of certain processes that are provided by the subjects of innovative activities (Conti et al., 2023). Digital integration, which is connected with the use of innovative tools, is especially relevant for companies of high-tech sectors (Telecom. Review, 2022), including medicine which uses new digital solutions in the sphere of clinical interventions and precise diagnostics.

Most modern consumers of products (services) are acquainted with new trends and offers from the category of the systems of the management of knowledge and information systems. However, marketing can find new segments of consumers, who, despite mass digitalization, are not aware of the advantages of certain products (services). Such niche of promotion of services (products) as digital applications, which are based on AI tools, ensure simplicity, speed, and protection of data in the interaction at the level of consumers and sellers (Ramya and Karthikeyan, 2024). In medicine, an effective marketing approach helps promote digital applications for the interaction between doctors and patients, accounting, and the use of medical data (Faye et al., 2023). There is also the promotion of digital applications of electronic trade platforms, such as AliExpress, Amazon, etc. This allows raising the quality of marketing communications between buyer and seller. The advantages of new digital marketing solutions become obvious for consumers who try to save time and are oriented towards quick purchase of goods (services). The role of the marketing approach is multi-aspect. It consists in stimulation of the achievement of target profit for the seller of products (services), based on the management of knowledge and information systems; and for consumers, who receive an improvement in the quality of life and economic activities.

Given the above, disclosure of the specifics of the considered topic may help expand the theoretical empirical framework in this sphere.

The purpose of this paper was to reveal the specifics of the use of marketing approach (tools for promoting products (services)) to the management of knowledge and information systems in the digital economy. For this, we set the following tasks: distinguishing individual directions for the implementation of marketing in the sphere of improvement of the level of effectiveness of promoting products (services), which

are based on digitalization of the management of knowledge and information systems; considering the features of the marketing approach in the healthcare system.

## **2. EXPERIMENTAL SECTION**

The research hypothesis of this work is the assumption of the influence of marketing on the effectiveness of the sales of products (services), which are based on knowledge management and information systems and are realised by innovative subjects; and on the positive influence of innovative and communication digital solutions of the marketing approach on the satisfaction of the needs of the population, company, organisations, and government.

To establish possible directions for the use of the marketing approach in the context of the ICT systems in the economy and infrastructural support for life activities, we used the aspect approach. The method of deconstruction was utilised during the consideration of the main directions and spheres of activities of innovative subjects of the ICT market to reveal the characteristics and set of marketing tools that are used to promote products (services).

The statistical method allowed identifying the indicators of the effectiveness of using certain marketing approaches of innovative companies that are leaders in the ICT sphere and the adjacent spheres of economic activities. Comparative analysis allowed us to reveal the advantages of implementing the considered marketing approaches in the context of realisation of the programmes of promotion of new products (services), based on digitalization of the management of knowledge and information systems.

To ensure the validity of the research, we used provisions of scientific studies that proved the positive influence of the marketing approach and the materials of statistics and analytical data.

Faye et al. (2023) conducted a complex analysis of the activities of Amazon Web Services (AWS) in the creation of digital applications used for the management of electronic medicine (creation, data management, interaction of patients, and their identification). The provisions of this research allowed revealing one of the directions of the use of cloud computing platforms in the sphere of social infrastructure.

Jibreel et al. (2023) dwelt on the specifics of the implementation of cloud computing in the sphere of healthcare of Saudi Arabia, which is the basis of the current electronic management of processing and storing of medical data which allows ensuring remote access for patients and doctors. An important provision of this research is the statement on the necessity of the creation of a unified approach to the management of

medical data, identification, and remote access based on systems that use cloud computing. Mufti et al. (2021) assessed the competitive advantages and characteristics of cloud computing technologies used in various spheres of infrastructure, including electronic medicine management. It is necessary to note the contribution of the authors to the establishment of price characteristics, opportunities, and problems of such technologies as Google Cloud, Microsoft Azure Open AI, and Amazon Web Services (AWS).

Jabour (2020) studied the main aspects and directions for the implementation of cloud computing by AWS in the management of electronic medicine in Saudi Arabia. The authors revealed an advantage of this technology that is peculiar for the current stage of its implementation, namely saving time for making appointments and registration in the medical establishments. The authors also pointed to the prospects for an increase in functional burden in the context of this technology application, which is possible in the case of the growth of medical personnel's digital literacy.

Conti et al. (2023) elaborated on the specifics of production and market growth of the companies of the industrial sphere under the influence of implementing new tools of the digital economy.

Cioppi et al. (2023) are devoted to the complex analysis and systematisation of scientific sources that study the formation and features of marketing in the digital age and the process of digital transformation.

Based on the analysis of the above sources, we concluded the need for substantiating the positive effect of the use of the marketing approach within the distinguished directions (electronic medicine).

### **3. RESULTS**

Let us consider such direction of the implementation of the marketing approach in the management in the ICT sphere as electronic medicine. Medical services have various forms and mechanisms of organisation. This could be a totality of state and municipal services or the domination of private medicine. Transition to digitalization, stimulated by the COVID-19 pandemic, predetermined transformations and the necessity for acceleration for subjects of all forms of property and in all countries (Inshakova et al., 2021). In the sphere of medicine, there was an increased demand for software based on the digital management of knowledge and information systems; digital applications for registration and identification of patients; digital applications ensuring online reception for doctors of certain specialties; digital applications for facilitating the care for patients with certain conditions and diseases.

These tools of the management of the healthcare sphere are implemented with the help of a complex service IaaS. It includes such capabilities as the provision of services, networks, and big data storage. Services of the IaaS category, which are present in the market, include the following (Jibreel et al., 2023):

- IBM Cloud, developed and serviced by IBM (IBM, 2024a). Advantages of this service are as follows: higher speed of installation and work of new digital applications (the company declares acceleration of 62 %), including digital apps of the system of healthcare; saving time required for constant monitoring of effectiveness, change in design and architecture of the services (saving of up to 800 hours); integrated means of the management of processes and procedures allow saving 30 % for supporting for digital apps and software;

- Microsoft Azure Open AI, presented and promoted by Microsoft Corporation (USA) and Persistent Systems (India). This is a digital solution for patients, doctors, and medical personnel (Persistent Systems, 2024);

- Google Cloud, developed by Google (Health.google, 2024). This digital solution is connected with the integration of teams of medical personnel for clinical interventions and research; R&D in the sphere of vision diagnostics, etc. Effects of this technology for medical establishments and groups of medical personnel include promotion of their services, increase in their rankings in the healthcare system, and growth of demand from consumers; for patients – receipt of the most optimal services and satisfaction of demands in the sphere of preservation and recovery of health. The marketing approach here is connected with the fact that this technology has more local characteristics as to the client company. Additionally, the marketing promotion of this technology by Google is oriented towards individualisation and taking into account the market needs of the client company;

- Amazon Web Services (AWS). This technology in the healthcare sphere is promoted by Amazon.com as a digital solution for the automatization of appointments and registration (including digital identification). This digital solution allows saving patients' time for registration procedures (from 5.5 minutes to 0.9 minutes) and ensures the management of patients' data databases. Massachusetts eHealth Collaborative (MAeHC) performs a gradual transition to this process due to the large array of data presented in patients' medical cards (10 terabits in 2024). To protect these data and ensure continuous data management, the companies started using AWS technology.

Each of the considered developers of IaaS services, used for the functioning of electronic medicine, has its advantages, which are offered to customers. For the subjects of the healthcare system, advantages include the opportunity of effective execution of strategic tasks of development (provision of traditional medical services and promotion of new medical services, receipt of income from activities and attraction of new patients,

guarantees of the patients' protection). The advantages for the population include satisfaction with services and healthcare support. According to Mufti et al. (2021), the implementation of cloud computing, which is the basis of IaaS, enabled the implementation of the system of knowledge management at the level of remote members of medical teams and information systems providing opportunities for patients in the sphere of remote consultation.

Table 1 presents the main advantages of the marketing approach in the provision of the IaaS service by IBM (IBM, 2024b).

Table 2 presents the specifics of the implementation of Microsoft Azure Open AI technology into the system of cloud computing of electronic medicine.

Table 3 presents the features of the marketing approach of Google in promoting Google Cloud technology.

**Table 1.** Specifics of the marketing approach of IBM in the provision of cloud computing in electronic medicine

	Indicator/direction	Characteristics
1	2	3
1	Optimisation of technologies and processes of web pages, digital applications of customer companies (state-funded and private establishments and organisations of the healthcare system)	Facilitates and promotes new types of services (diagnostics, tests, etc.). A new service may be introduced in the market 75% quicker compared to the focus on the traditional marketing programme that does not use cloud computing in electronic medicine. Optimisation is ensured by the IT sphere and marketing and takes into account the features and goals of the customer company in the market.
2	Key marketing solution that ensures effective management of the client company	Decentralisation of online management of each structural department, centralisation in data collection in the unified centre of strategic decisions. The success of the introduction of new types of services is due to the focus on decentralisation of interaction. A new (or existing) customer addresses a decentralised department of the medical company that provides the advertised services, without any complications with the interaction. The advantage of electronic decentralisation compared to traditional one lies in the absence of individual expenses that are impossible or difficult to control.
3	Examples of the influence of the marketing approach proposed by IBM	
3.1	NHS Digital (UK)	Implementation of cloud computing by IBM facilitated the following: reform of the system of cyber security in the sphere of data management and remote interaction with patients. Marketing programmes, presented on websites of the main subjects of the UK healthcare system, increased the trust of the population and growth of the number of applications for patient care with the use of digital applications. Transition to the system of online management of this process reduced the time of a traditional appointment and increased doctors' productivity. All medical establishments of the country and medical personnel function within information interaction and data exchange with NHS Digital. Information systems and systems of knowledge management of websites of medical companies and digital apps are adapted to systems of knowledge management of NHS Digital. This allows the implementation of national programmes of healthcare support connected with new services.
3.2	Providence Health & Services (Providence) (Washington, USA)	Creation and promotion of digital apps that ensure quick identification of patients and doctors, organisation of services and experience exchange. An AI tool is used, with data n all patients. This allows simplifying the interaction between doctor and patient.

Source: Compiled by the authors based on IBM (2024b)

**Table 2.** Indicators of the marketing approach presented within the Microsoft Azure Open AI technology

	Indicators of the marketing approach	Characteristics
1	2	3
1	Promotion within the categories of users:	
1.1	Medical establishments in the USA and India	Participation for: - Provision of information on prices and conditions of medical services, available for patients; - Promotion of own services within this digital app at national markets; - Real-time assessment of information on similar offers from rivals; - Provision of services in case of requests from new customers; - Consultations between the participants of the digital app regarding pre-hospital care. Marketing solution for medical establishments – participation in the electronic platform and timely acceptance of requests from customers. Effects from participation in knowledge management and information systems: saving time and expenses for oral consultations; promotion of medical services at the national level; promotion of the brand of medical establishments due to preliminary audit of its state and the level of protection of patients' information.

1.2	Doctors and other medical personnel	<p>These users' participation in the digital app's functioning has the following form:</p> <ul style="list-style-type: none"> <li>- The doctor receives a request from the patient regarding health issues and, after examination, may determine the need for additional medical procedures;</li> <li>- Patients receive recommendations and information (in digital form) on tests, etc.;</li> <li>- At the level of the automatized centre, the necessity of the given recommendations is evaluated. A chatbot helps learn about the possibility of replacing clinical interventions with changes in the way of life, diet, care, etc. The effects of the marketing approach of this technology for doctors and other medical personnel consist in the promotion of their rankings in the market of specialists (the ranking is required for the change of job and demand from patients).</li> </ul>
1.3	Patients (existing and new) and their representatives	<p>This digital app allows the patient to receive the most optimal variant of behaviour to obtain medical services or pre-clinical treatment (procedures). As per the patient's request, he receives the following: initial order from the attending physician; conclusion of the automatized electronic system of the assessment of the necessity for clinical interventions or selection of an alternative form of treatment or care.</p> <p>With the conclusion regarding the necessity of clinical interventions, the patient receives the following: price list for medical services offered on their coverage (determined by the system with the help of an AI tool, based on additional knowledge about the patient: income, etc.).</p> <p>Also, the patient is offered a range of possible medical establishments that provide necessary services and are located in close proximity to his place of residence. Medical establishments and medical services (all or recommended) are selected, with information passed in digital form. After that, the patient receives a notification about the processing of the request and the choice and, after that, a notification about the date and time of provision of medical services.</p> <p>The patient receives selected medical services, with this information recorded in the online data card.</p> <p>In case of the need for additional care after clinical interventions, the patient receives it within the selected list of services. This care can be conducted by medical establishments, and social organisations, and with the involvement of additional medical personnel.</p> <p>Effects of the marketing approach of this digital system for the patient include the following: declaration and realisation of a differentiated, human-centred approach to medical services, which ensures attraction of the population to the use of the digital app; saving time of patients in the context of registration services, traditional appointments, oral consultations; the possibility of reducing expenditures for care due to its modelling in cooperation with the doctor and other medical personnel</p>

Source: Compiled by the authors based on Persistent Systems (2024)

**Table 3.** Characteristics of the marketing promotion of the Google Cloud technology

1	Main elements of implementation 2	Characteristics 3
1	Circle of consumers	Companies of the medical sphere (state and private medical establishments); organisations involved in the sphere of electronic interaction of this sphere's participants (national operators, private operations); companies in the adjacent spheres (production and promotion of medical products, pharmaceutical products, medical equipment for surgeries and diagnostics, etc.); medical insurance organisations, etc.
2	Emphasis on Google's marketing approach in the interaction with client companies	Parameters of the management of knowledge and information systems within the types of activities of client companies: <ul style="list-style-type: none"> <li>- The need to search for consumers from a certain market environment;</li> <li>- Development of databases according to market features;</li> <li>- Acceleration of promotion of new types of products (services) that are introduced in the market due to technological features of Google Cloud;</li> <li>- Possibility of accelerating visualisation and growth of efficiency of AI during the modelling of forecasts of objects' development. In cooperation with NVIDIA, Google created highly effective processors NVIDIA L4 and virtual machine G2. The use of these technologies, together with Google Cloud, allows increasing the speed of graphic modelling by 120 times.</li> </ul>
3	Character of interaction with various client companies (including in the marketing promotion of their products (services) in the market)	
3.1	Bayer AG (multi-profile joint-stock company, which conducts economic activities in the pharmaceutical industry) (Germany)	Digital application and programme for a quick search for medicines (by name, type of disease, availability in drugstores, etc.). This technology is promoted by Google together with Bayer AG. Speed of search is the key focus of the marketing approach.

3.2	Medical companies:	
3.2.1	Mayo Clinic (multi-profile medical centre that provides medical services and conducts R&D for the healthcare system) (USA)	The marketing approach of Google in cooperation with the company consists in ensuring technological solutions for clinical processes. The main marketing emphasis during the promotion of Mayo Clinic services is connected with the declaration of high technology and precision of clinical interventions.
3.2.2	Hackensack Meridian Health (integrated network of suppliers of medical services in the USA)	Digital apps used in the sphere of patient care. The marketing emphasis is made on the speed of data management in the process of care and confidentiality of information.
3.2.3	Cardinal Health (large medical company) (USA)	Software for the management of corporate and external databases for effective and professional work of doctors and other medical personnel. The key direction for the marketing approach in the interaction of Cardinal Health and Google is the unification of knowledge in the sphere of medical services, which ensures a unified approach to diagnostics and treatment.

Source: Compiled by the authors based on Cloud.Google (2024), Health.Google (2024), and NVIDIA (2024)

#### 4. DISCUSSION

In the process of the research, we confirmed the hypothesis on the dual influence of the effective marketing approach, which is connected with the promotion of products (services) in the sphere of electronic medicine on the effectiveness of companies and satisfaction of requests of consumers, state, and municipalities in the implementation of social programmes. Achievement of effectiveness is predetermined by the high level of innovativeness of digital solutions and the optimality of the marketing approach.

We considered the features of the marketing approach of innovative companies that develop and support cloud computing for the healthcare sphere. The performed analysis showed that all four companies develop and promote in the ICT market similar technologies. Each of these technologies has its advantages, the focus on which allows customers a choice which allows, in turn, improving the necessary parameters or processes. The complexities in this context are universal. They include the level of digital literacy and readiness of clients for digital transformations. It is possible to state that the highest universality and simplicity in the marketing promotion in the market is observed in IBM Cloud (possibility to cover a wide range of processes and activities – from online management of medical establishments and their networks to digital applications used by hospitals for registration and identification of patients and the management of their medical data). Such technology as Microsoft Azure Open AI is largely oriented towards support for the management of knowledge and information systems in the sphere of medical treatment; Though Google Cloud is a rather individualised digital solution, it can ensure the effectiveness of application in various spheres of the management of knowledge and information systems in medicine and adjacent sectors. As for the effectiveness of the marketing approach that is used during the promotion of Amazon Web Services (AWS) technology, we can note its effectiveness in an increase

in automatization and quality of certain processes of medical establishments' functioning. This includes an increase in the speed of registration and identification of patients, their appointments, etc. This technology could be further used in other spheres and directions.

#### 5. CONCLUSION

The effectiveness of the influence of marketing approaches of the leading companies in the sphere of the digital economy during the promotion of their products (services), which are aimed at an increase in the level of the management of knowledge and information systems, depends on the level of marketing and exclusiveness of the offer. Given the specifics of the proposed innovative technologies, it should be noted that consumer studies their advantages, disadvantages, and adaptability to consumer's needs. According to Cioppi et al. (2023), the consumer is just a passive recipient of digital offers. Here the marketing approach can facilitate the explanation to the consumer of the necessity to purchase and use the concrete digital app. In view of access to information and digital literacy, the role of marketing can be assessed as secondary compared to the technological characteristics and capabilities of offered services (products).

The creation of new offers in the market of the management of knowledge and information systems in the conditions of the digital economy is mainly oriented towards specific demands and needs, including the medical sphere. The age of digitalization allows developers to find – more effectively and quickly – the target segments of consumers or create them due to the introduction of new offers, which are aimed at the resolution of existing, but insufficiently actualised, problems in the healthcare sphere. Digital applications, aimed at solving local problems and connected with servicing narrow groups of consumers, require a more thoughtful and targeted marketing approach.

## References:

- Cioppi, M., Curina, I., Francioni, B., & Savelli, E. (2023). Digital transformation and marketing: a systematic and thematic literature review. *Italian Journal of Marketing*, 2023(2), 207-288. <https://doi.org/10.1007/s43039-023-00067-2>
- Cloud.google (2024). Google Cloud for healthcare and life sciences. Retrieved from <https://cloud.google.com/solutions/healthcare-life-sciences>
- Conti, E., Camillo, F., & Pencarelli, T. (2023). The impact of digitalization on marketing activities in manufacturing companies. *The TQM Journal*, 35(9), 59-82. <https://doi.org/10.1108/TQM-11-2022-0329>
- Faye, A., Sow, O., Diop, M., Ndiaye, J., Traore, Y., & Diallo, O. (2023). Stand-Alone Patient Reception and Referral System with Health Data Management. *Engineering*, 15, 596-611. doi: 10.4236/eng.2023.1510042.
- Health.google (2024). Helping billions of people be healthier. Retrieved from <https://health.google/>
- IBM (2024a). Cloud transformation solutions. Retrieved from <https://www.ibm.com/cloud/transformation#Benefits>
- IBM (2024b). Transforming marketing to deliver personalized client experiences. Retrieved from <https://www.ibm.com/case-studies/ibm-marketing>
- Inshakova, A. O., Sozinova, A. A., & Litvinova, T. N. (2021). Corporate fight against the covid-19 risks based on technologies of industry 4.0 as a new direction of social responsibility. *Risks*, 9(12). doi: 10.3390/risks9120212
- Jabour, A. M. (2020). The impact of electronic health records on the duration of patients' visits: time and motion study. *JMIR medical informatics*, 8(2), e16502. doi: 10.2196/16502.
- Jibreel, E. A., Bakar, M. S. A., Nadzir, M. M., & Alhaiti, A. H. (2023). Exploring an E-Health Cloud Computing Adoption in Saudi Arabia: Review Article. *International Journal of Intelligent Systems and Applications in Engineering*, 12(11s), 365–379. Retrieved from <https://ijisae.org/index.php/IJISAE/article/view/4457/3115>
- Mufti, T., Mittal, P., & Gupta, B. (2021). A Review on Amazon Web Service (AWS), Microsoft Azure & Google Cloud Platform (GCP) Services. *EAI*. doi: 10.4108/eai.27-2-2020.2303255
- NVIDIA (2024). Google Cloud and NVIDIA Expand Partnership to Advance AI Computing, Software and Services. Retrieved from <https://nvidianews.nvidia.com/news/google-cloud-and-nvidia-expand-partnership-to-advance-ai-computing-software-and-services>
- Persistent Systems (2024). Persistent Launches Population Health Management Solution Using Microsoft Azure OpenAI Service. Retrieved from <https://www.persistent.com/media/press-releases/persistent-launches-population-health-management-solution-using-microsoft-azure-openai-service/>
- Ramya, K., & Karthikeyan, K. (2024). A study on the usage of Artificial Intelligence Technology in Influencing Consumer buying Behaviour with Special reference to online Shopping. *Proceedings on Engineering Sciences*, 6(1), 13-20. doi: 10.24874/PES06.01.002
- Telecom.Review (2022). ICT's Crucial Role in Digitalization. Retrieved from <https://www.telecomreview.com/articles/reports-and-coverage/6363-ict-s-crucial-role-in-digitalization>

---

### Anna A. Koroleva

Abylkas Saginov Karaganda Technical University,  
Karaganda,  
Kazakhstan  
[annushka.koroleva@mail.ru](mailto:annushka.koroleva@mail.ru)  
ORCID 0000-0003-4514-6217

### Mukhammadjon T. Butaboyev

Fergana Polytechnic Institute,  
Fergana,  
Uzbekistan  
[m.t.butaboyev@ferpi.uz](mailto:m.t.butaboyev@ferpi.uz)

### Gulnara M. Davlyatova

Fergana Polytechnic Institute,  
Fergana,  
Uzbekistan  
[g.davlyatova@ferpi.uz](mailto:g.davlyatova@ferpi.uz)  
ORCID 0000-0003-2421-3345

### Julia A. Kolesova

Vyatka State University,  
Kirov,  
Russia  
[usr11010@vyatsu.ru](mailto:usr11010@vyatsu.ru)  
ORCID 0000-0002-2284-1869

---

