

УДК 338.012

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DOI: 10.32702/2306-6792.2023.12.9

STRUCTURE OF THE DIGITAL GAMING INDUSTRY AS A DOMAIN OF THE DIGITAL ECONOMY: CONTEMPORARY ENDEMICS AND THEIR INTERCONNECTIONS

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СТРУКТУРА ЦИФРОВОЇ ІГРОВОЇ ІНДУСТРІЇ ЯК СФЕРИ ЦИФРОВОЇ ЕКОНОМІКИ: СУЧАСНІ ЕНДЕМІКИ ТА ЇХ ВЗАЄМОЗВ'ЯЗКИ

Since the sales of the first computers and game consoles, the digital gaming industry has rapidly evolved and grown into a distinct sector of the digital economy, which has a global impact on culture and entertainment. The process of evolution has not only complicated the structure of the digital gaming industry, but has also formed several endemic spheres within it, each with different categorization, roles in the production of the final product, means of production, and individual gaming products. It is the interaction of the aforementioned endemic spheres that shape the functionality of the digital gaming industry as a sector of the digital economy and determines its production levels. Therefore, the article aims to characterize the structure of the digital gaming industry as a sector of the digital economy. According to the research findings, it has been proven that the structure of the digital gaming industry is complex and encompasses various endemic spheres, including hardware devices, software development, game creation, game publishing, game journalism, and gaming itself. The research findings have demonstrated that each endemic sphere plays an important role in the development of the digital gaming industry and has its functions in the production of digital games. For example, the endemic sphere of hardware devices is focused on creating the necessary devices for generating interactive visual images. The endemic sphere of software development is focused on managing hardware devices through specialized software. The game creation endemic sphere, on the other hand, utilizes existing gaming platforms and software products to create unique digital games based on their creative ideas, often referred to as "master copies" of the games. The endemic sphere of game publishing facilitates the sale and distribution of created digital games through specialized channels. The game journalism endemic sphere, on the other hand, is responsible for disseminating information about games among a large number of gamers, providing reviews, news, and coverage related to the gaming industry. The endemic gaming sphere organizes the effective consumption of products within the digital gaming industry. Research has shown that the interconnections between the endemic spheres of the digital gaming industry are crucial factors for its development. The presence of interconnections allows for the simultaneous existence of both large companies producing high-budget blockbuster games and individual creators developing their independent games without financial backing.

Від часу продажу перших комп'ютерів та ігрових консолей і до сьогодні цифрова ігрова індустрія стрімко еволюціонує і зросла до окремої сфери цифрової економіки, яка має глобальний вплив на культуру і розваги. Процес еволюції не просто ускладнив структуру цифрової ігрової індустрії, а сформував у ній низку ендемічних сфер, які мають різну категоричність, роль у виробництві кінцевого продукту, засоби виробництва та окремі ігрові продукти. Саме взаємодія окреслених нами ендемічних сфер формує функціональність цифрової ігрової індустрії як сфери цифрової економіки та визначає властиві їй рівні виробництва. Відтак, метою статті є характеристика структури цифрової ігрової індустрії як сфери цифрової економіки. За результатами дослідження доведено, що структура цифрової ігрової індустрії є складною та узагальнює різні ендемічні сфери, серед яких технічних пристроїв, програмного забезпечення, створення ігор, видавництва ігор, ігрової журналістики та геймінгу. За результатами дослідження доведено, що кожна ендемічна сфера відіграє важливу роль у розвитку цифрової ігрової індустрії і має свої функції у виробництві цифрових ігор. Так, ендемічна сфера технічних пристроїв орієнтована на створення технічних пристроїв, необхідних для створення керованих рухомих зображень. Ендемічна сфера програмного забезпечення орієнтована на керування технічними пристроями за допомогою спеціального програмного забезпечення. Ендемічна сфера зі створення ігор, залучаючи готові ігрові платформи та програмні продукти, створює майстер копії цифрові ігри (на основі власних творчих ідей). Ендемічна сфера видавництва ігор забезпечує продаж створених цифрових ігор через спеціальні канали. Ендемічна сфера ігрової журналістики займається поширенням інформації про ігри серед великої кількості геймерів. Ендемічна сфера геймінгу організовує ефективне споживання продукції цифрової ігрової індустрії. Дослідження показали, що взаємозв'язки між ендемічними сферами цифрової ігрової індустрії є важливим фактором для її розвитку. Наявність взаємозв'язків дозволяє одночасно співіснувати великим компаніям (що випускають високобюджетні ігри-блокбастери) та окремим особам (які створюють авторські ігри).

Key words: esports; endemic sphere of the digital economy; game publishing; game development; gamers.

Ключові слова: кіберспорт; ендемічна сфера цифрової економіки; видавництво ігор; створення ігор; геймери.

TARGET SETTING

The emergence of the digital gaming industry took place before the 1970s. However, it was during this time that the industry began its active development, as it coincided with the sales of the first computers and gaming consoles designed for mass consumers. Since the sales of the first computers and gaming consoles today, the digital gaming industry has evolved rapidly and grown into a distinct sector of the digital economy. It has had a global impact on culture and entertainment as a whole. The process of evolution has not only complicated the structure of the digital gaming industry but has also formed several endemic spheres within it. These endemic spheres have different categorizations, roles in the final product production, means of production, and individual gaming products. It is the interaction of the aforementioned endemic spheres that shape the functionality of the digital gaming industry as a sector of the digital economy and determines its production levels.

ANALYSIS OF RESEARCH AND PUBLICATIONS

Several researchers have extensively studied the individual components of the digital gaming industry as a sector of the digital economy. Among them are M.O. Proskurina, A.V. Grechko, N.V. Za-

kharov, M.O. Falko, I.O. Lazneva, and D.I. Tsaranenko. However, most of these researchers primarily focus on the presence of endemic spheres within the digital gaming industry and the dynamics of revenue generation in these spheres. Unfortunately, the comprehensive investigation of the structure of the digital gaming industry as a sector of the digital economy has received less attention from scholars.

THE WORDING OF THE PURPOSES OF ARTICLE (PROBLEM)

The goal of the article is to characterize the structure of the digital gaming industry as a sector of the digital economy.

To achieve this goal, the following research tasks have been accomplished:

1) identification of the endemic spheres of the digital gaming industry (its endemics); 2) identification of the interconnections between the endemic spheres of the digital gaming industry.

THE PAPER MAIN BODY WITH FULL REASONING OF ACADEMIC RESULTS

Within the scope of the outlined research, the digital gaming industry has been identified as a structure of endemic spheres, which encompasses a distinct set of economic actors, communities, individuals, as well as technologies and processes.

Table 1. Scheme of the structure of the digital gaming industry as a sector of the digital economy

Signs of an endemic spheres	endemic spheres					
	technical devices ¹	software ²	create games ³	publishing games ⁴	game journalism ⁵	gaming ⁶
Category	Hardware platforms	Software platforms	Development	Publishing	Journalism	Gameplay
Role	Platform development	Platform development	Game development	Publisher	Mass media	Gamers
Means	Computers, laptops, gaming consoles, mobile devices	Operating systems, drivers, game engines	Creative ideas	Online and offline stores, licenses	Interviews, exhibitions, reviews and critiques, news stories, streaming, and video content	Gaming communities, esports, player creativity
End product	Computational power and graphic capabilities	Toolset for game development	master copy games	Game copies for sale and game distribution channels	Game promotes	Games consumption

Note

1. An endemic sphere oriented towards the creation of technical devices necessary for generating interactive moving images.
 2. An endemic sphere focused on controlling technical devices through specialized software.
 3. An endemic sphere that, by incorporating existing gaming platforms and software products, creates master copies of digital games based on original creative ideas.
 4. An endemic sphere that facilitates the sale of created digital games through specialized channels.
 5. An endemic sphere that disseminates information about games among a large number of gamers.
 6. An endemic sphere engaged in the consumption of products from the digital gaming industry.
- Source: formed based on [1; 3].

The peculiarity of each endemic sphere of the digital gaming industry is that its constituent elements form a complete production cycle (development, sale, offer, consumption) of the final product.

This enables the identification of endemic spheres based on categorization, roles, means, and the final product. By the aforementioned structure, the scheme of the digital gaming industry as a sector of the digital economy is presented in Table 1.

Thus, the structure of the digital gaming industry encompasses six fundamental endemic spheres, including:

1. The endemic sphere of technical devices focuses on the creation of devices necessary for generating controlled moving images. Currently, such devices include personal computers, laptops, gaming consoles, and mobile devices. With the increase in computational power and graphical capabilities of these devices, games played on them are becoming increasingly complex and visually appealing.

2. The endemic sphere of software is focused on managing technical devices through specialized software. This includes all software that supports and optimizes the operation of gaming platforms, data processing, and input control, among other functions. Currently, such software includes operating systems, drivers, and game engines (or

software platforms that allow the creation, development, and execution of games). They provide developers with a set of tools for creating gameplay, physics, artificial intelligence, and other components of the gaming experience. For example, Unity and Unreal Engine are popular game engines used for modeling the gameplay of many well-known games. Additionally, there is software available for virtual and augmented reality that allows the development of immersive games. Unity and Unreal Engine also support the development of VR and AR applications. Operating systems such as Windows, macOS, Linux, Android, and iOS are the primary software that manages the operation of technical devices. Besides these components, the endemic sphere of software also includes other tools, libraries, frameworks, and more.

3. The endemic sphere of game creation incorporates existing gaming platforms and software products to produce master copies of digital games based on original creative ideas. The development of these master copies involves specialists from various professions, including game programmers, artists, designers, level designers, composers, arrangers, actors, and others.

4. The endemic sphere of game publishing encompasses the sale of created digital games through specialized channels. It involves the

Table 2. Features of interaction between specialists from different professions in the structure of the digital gaming industry

components	feature of components	Features of specialists' interaction.
Game design	Development of game concepts and gameplay.	Creation of game scripts, levels, game mechanics, and balance.
Graphic design	Development of visual style, characters, objects, and game environment.	May involve 2D or 3D modeling, texturing, animation, and special effects.
Sound design	Creation of music, sound effects, and dialogues.	Emphasizing the atmosphere and action in the game.
Programming	Development of software code to implement game logic, player interaction, physics, artificial intelligence, and other aspects of the game.	Using programming languages and frameworks such as C++, C#, Java, Python, and others
Testing and quality improvement	Performing game testing to identify errors, flaws, and optimize the product.	Achieving quality gameplay and player satisfaction.
Release and support	After the game development is complete, it can be released on various platforms such as personal computers, consoles, mobile devices, and others.	After release, developers can continue to support the game by releasing updates, expansions, and enhancements.

Source: formed based on [1; 2].

activities of companies that facilitate the sales and distribution of digital games. These companies play a crucial role in the release and dissemination of gaming products, helping developers reach a wide audience of players.

5. The endemic sphere of game journalism deals with the dissemination of information about games among a large number of gamers. This sphere is crucial for providing objective and up-to-date information about games, news, reviews, interviews, updates, and other gaming-related materials.

6. The endemic gaming sphere is dedicated to consuming products of the digital gaming industry. This sphere revolves around gaming communities, esports (which is a domain where professional players compete in specific types of digital games in organized tournaments and championships), player creativity (including gameplay and strategies, modding and content creation, streaming and content creation, gaming communities, and co-creation).

So, each endemic sphere plays an important role in the development of the digital gaming industry and has its functions and interconnections with other spheres.

The structure of the digital gaming industry functions as a unified organism, driven by the following interrelationships:

All technical devices interact with digital stores and platforms for the distribution and utilization of games, such as Steam, PlayStation Store, etc.

All software interactions are facilitated by game engines and developers, enabling faster and

more efficient game creation regardless of the platform.

The collaboration of specialists from various professions allows for the creation of games based on their creative ideas and encompasses the components listed in Table 2.

Publishers can provide developers with financial resources for game creation, including funding for development, marketing, advertising, and distribution. They can also provide expert support in marketing, product positioning, sales strategies, and player interaction.

1. Interaction between game developers and publishers in the field of sales and distribution of created digital games according to the components listed in Table 3.

So, the interaction between game developers and publishers in the sales and distribution of created digital games contributes to the effective market introduction and successful commercial utilization of gaming products. This is achieved through financial support, marketing and promotion, distribution, support, and service provided by the publishers.

2. The interaction between game developers, publishers, and the media. Yes, media outlets can interact with developers and publishers through interviews, reviews, and critiques of their games, reporting on news and updates in the gaming world, as well as assisting in game popularization through streaming and creating video content. This interaction between developers, publishers, and the media helps promote products in the market, attract more players, and receive

Table 3. Features of the interaction between game developers and publishers in the sales and distribution of created digital games

components	feature of components	Features of specialists' interaction.
Game Release	Publishers provide funding and resources for game development.	They collaborate with developers at every stage of the game development process and the release of the finished product on the market.
Marketing and Advertising	Publishers conduct market research, develop marketing strategies, and create advertising campaigns to promote games.	They work together in utilizing communication channels such as websites, social media, trailers, and demo materials to attract players' attention and encourage them to purchase games.
Distribution	Publishers establish specialized distribution channels for selling gaming products. These can include retail stores, digital download platforms, online stores, distributors, and more.	

Source: formed based on [1; 4—6].

feedback and reactions from the public. It also contributes to increasing awareness of new games and the overall development of gaming culture.

3. The interaction between game developers, publishers, and players. This interaction promotes understanding, engages players in the game

development process, gathers feedback, and enhances the quality and satisfaction of the gaming experience, as outlined in Table 4.

Indeed, the interaction between game developers, publishers, and players is crucial for the success and popularity of gaming products. Having these connections allows for coexistence of both

Table 4. Features of interaction between game developers and publishers with players in the field of consuming digital gaming industry products

components	feature of components	Features of specialists' interaction.
Beta testing and feedback	Game developers can invite players to participate in beta testing their games.	Players are given the opportunity to test the game in its early stages of development and provide feedback regarding bugs, suggestions for game improvements, and overall impressions.
Forums and social media	Developers and publishers actively engage with players on forums and social media platforms.	Developers actively engage with players by answering questions, collecting feedback, posting news about upcoming updates and changes in the game, communicating with players, and taking their wishes into account.
Patches and updates	Developers release patches and updates for their games, which include bug fixes, new content, and improvements.	They consider player feedback and suggestions to improve the game and ensure players' satisfaction.
Public events and meet-ups	Developers and publishers organize public events that allow players to meet them in person.	Discussions about the game, sharing impressions, and making suggestions are encouraged.
Player involvement in the development process	Game developers involve players in the actual development process. For example, they may conduct surveys to gather ideas for new content or game features.	This interaction allows developers to fine-tune the game to meet players' needs and create a more satisfying gaming experience.
Contests and giveaways	Developers and publishers often hold various giveaways of exclusive content, prizes, or opportunities to meet the development team.	The interaction between players and developers is facilitated through various means such as mass media, support channels, and player engagement initiatives.
Reviews and feedbacks	Developers and publishers closely monitor player feedback and reviews of their games to understand what players liked and what can be improved.	This helps developers refine their games and provide players with a more enjoyable gaming experience.

Source: formed based on [1; 4—6].

large companies releasing high-budget blockbuster games and individual creators developing their own indie games without funding.

CONCLUSIONS FROM THIS STUDY AND PROSPECTS FOR FURTHER EXPLORATION IN THIS AREA

The research findings have demonstrated that the structure of the digital gaming industry is complex and encompasses various endemic spheres, including technical devices, software, game creation, game publishing, gaming journalism, and gaming itself. The following conclusions have been drawn based on the research findings:

1. Each endemic sphere plays an important role in the development of the digital gaming industry and has its functions in the production of digital games. They are as follows:

— The technical devices' endemic sphere focuses on creating the necessary hardware devices to generate interactive visuals.

— The software endemic sphere is oriented toward managing technical devices through specialized software.

— The game creation endemic sphere involves utilizing existing gaming platforms and software products to create unique copies of digital games based on original creative ideas.

— The game publishing endemic sphere facilitates the sale and distribution of created digital games through specialized channels.

— The gaming journalism endemic sphere is responsible for disseminating information about games among many gamers.

— The gaming endemic sphere organizes efficient consumption of products within the digital gaming industry.

2. The research has shown that the interconnections between endemic spheres within the digital gaming industry are crucial for its development. The presence of these interconnections allows for the coexistence of both large companies that produce high-budget blockbuster games and individual creators who develop their original games without financial backing.

The obtained results serve as the foundation for the development of a methodology for structural modeling of the spheres within the digital gaming industry as part of the digital economy.

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Стаття надійшла до редакції 05.06.2023 р.