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Priority Areas of Innovation in Corporate Strategies of Multinational Pharmaceutical Companies in Global Coordinates

Abstract

The purpose of the article is to substantiate global trends in the research and innovation activities of multinational pharmaceutical companies and to identify key directions of transformation in corporate innovation strategies in the context of increased international competition in the global pharmaceutical market. *Methodology.* The methodological basis of the work is the following methods of scientific research: dialectical, historical-logical, system-structural analysis of economic processes and phenomena, analysis and synthesis, the method of quantitative and qualitative comparisons. *Results.* One of the key global sustainable development goals of the United Nations for the period up to 2030 is to ensure the health and well-being of nations, which in global terms can be achieved primarily on the basis of the large-scale research activities of multinational pharmaceutical companies and the systematic commercialisation of the results of corporate research and development. In recent decades, under the influence of technoglobalisation processes, the innovatisation of pharmaceutical companies' activities has accelerated. It finds its concentrated expression in the steady increase of R&D costs, diversification of their structure, mass commercialisation of innovative developments and strengthening of their transdisciplinarity, accelerated capitalisation of R&D costs, etc. According to the world experience, the most effective innovative strategies of pharmaceutical companies today are such as mergers and acquisitions, strategic alliances of pharmaceutical and biotechnology companies, innovative outsourcing and insourcing, cointegration and pseudo-concentration, corporatisation of patent portfolios and research technologies, venture financing of R&D of pharmaceutical companies. At the same time, mergers and acquisitions are increasing the capitalisation of the global pharmaceutical industry, strengthening its expansion into global markets, redistributing its regional segments and diversifying the sources of funding for pharmaceutical companies' research activities. *Value/originality.* Current trends and features of corporate strategy formation in multinational pharmaceutical companies are identified. Strategic orientations of research activities of pharmaceutical companies in specialised areas of clinical research in the context of therapeutic categories are determined. The process of capitalisation of pharmaceutical companies is analysed and the tendency to activate the use of corporate mergers and acquisitions (M&A) strategy in the pharmaceutical business is revealed. It is proposed to create strategic alliances of multifunctional pharmaceutical companies with biotech companies using the M&A strategy. It is recommended that pharmaceutical companies strengthen their innovation orientation in the design of their strategies by combining patent portfolios and research technologies, as well as jointly implementing large-scale innovation programmes and projects.

Keywords

innovation, innovation strategies, M&A strategies, innovation of the pharmaceutical business, R&D of the global pharmaceutical business

JEL: F23, O32



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DOI: <https://doi.org/10.30525/2500-946X/2023-1-4>

1 Introduction

The global development of innovation processes is the dominant trend in world economic relations. It manifests itself both in the expansion of the general resource base of the production processes of enterprises and in the constant inflow of qualitatively new breakthrough technologies into production, in the organisational fusion of science with production, in the introduction of advanced methods of organising production and management into the economic practice of enterprises. Near-industrial scientific and technical research sectors are also emerging and developing dynamically. Innovation covers all areas of international economic activity, including the medical industry, which includes the pharmaceutical business.

These trends are most evident in the activities of companies in the global pharmaceutical industry. Associated with high-tech production processes, it now represents one of the most innovative and knowledge-intensive sectors of the global economy. The authors of this paper form the following research objective: to identify, taking into account current trends and changes, new management trends in strategic orientations of research activities of pharmaceutical companies aimed at increasing competitiveness in the global pharmaceutical market. Disclosure of these processes is based on the solution of such tasks as formation of the cost structure of clinical research by therapeutic categories in the global pharmaceutical sector, highlighting the features of corporate mergers and acquisitions (M&A) in the pharmaceutical business, analysis of the capitalisation process of pharmaceutical companies. The authors of the article use the following system of research methods: analysis and synthesis, tabular and graphical methods; analytical, statistical analysis, comparison, deduction and the method of complex evaluation.

The processes of innovation in the pharmaceutical business studied by the authors of the article will reveal current trends and features of corporate strategy formation in multinational pharmaceutical companies.

The research was conducted using web-based databases of statistical overviews of the global pharmaceutical market.

2 Analysis of the Latest Research and Publications

The analysis of publications on innovation and innovation management has increased significantly in recent years. This shows their importance from the point of view of practical application and a high level of relevance in the face of new challenges of global change for companies. The authors' analysis of the academic literature revealed a broad and diverse

interpretation of the term "innovation" by different schools of economics and authors of publications. However, all of them are united by the practical application of innovative engineering in all spheres of social life, in education, science, medicine, industry, management activities of companies and corporations, in business models, and so on.

In the modern world, scientific concepts for interpreting innovation are constantly evolving. As is well known, the term "innovation" means making changes, updating processes. The Austrian economist J. Schumpeter began his research in this field. It was he who made a great contribution to the reinterpretation of this term at the beginning of the XX century (Schumpeter, 1983). According to his theory, innovation should be considered as a certain bundle in time, which as a result leads to the emergence of new combinations in development. He identified 5 types of changes in the processes of business activities, in particular: the creation of a new good or a new quality of goods; the introduction of a new method in production processes or a new method of commercial use of goods; access to new markets; the supply of the production process with new sources of raw materials or semi-finished products; the possibility of carrying out the necessary reorganisation of the enterprise (Schumpeter, 1983).

A significant part of the research concerns the impact of innovative business activities of companies, their corporate strategies. Thus, P. Drucker claims that innovations lead to changes in the conduct of business activities of companies, allow them to enter new global markets with new products and services (Drucker, 2011). The process of introducing innovations takes place through the acquisition of new knowledge from various spheres of the economy to the consumer, according to the needs formed by him (Barnet, 2015). Designed innovations in the form of patents, scientific discoveries and novelties, trademarks, innovation proposals, know-how, etc., should be creative, realistic, strategically oriented to the long-term perspective in corporate activities, as well as bring profit to the companies that introduce them (Kraus, 2019; Blaug, 1987).

V. Rostou made a significant contribution to the understanding of innovation in terms of its application in the activities of enterprises. He defined the social and economic aspects of the concept of "innovation", among which there are organisational and managerial ones, aimed at reorganising companies, their management systems and strategising (Rostou, 2010).

One of the different types of innovation is innovation strategy. The innovation strategy includes changes made in companies to achieve their long-term sustainable development goals. The authors Ata Taleghani, Mohammad Taleghani, Narges Delafrooz highlight innovative strategies, innovation management and innovative strengthening of the

company's future activities among the approaches to innovation in the field of business (Taleghani, Taleghani, Delafrooz, 2022).

The Pharmaceutical Encyclopedia defines the components of innovative development of pharmaceutical companies, the development of scientific and technological progress in the pharmaceutical business of corporations in the term "strategy for managing intellectual resumes in pharmacy" (Pharmaceutical Encyclopedia, 2023). The main objective of this strategy is to finance the research and development of innovative medicines, the creation of multinational pharmaceutical companies through the implementation of a strategy of mergers and acquisitions and the acquisition of new niches in the global markets of the pharmaceutical business, the introduction of high-tech processes for the production and sale of innovative medicines.

The reference point for today's global world is the Sustainable Development Goals, adopted at the UN Summit on Sustainable Development and enshrined in the official document of the UN General Assembly Resolution "Transforming our world: the agenda for sustainable development for the period up to 2030" (UN General Assembly Resolution, 2015). The resolution, dated 25 September 2015, announces a new plan of action aimed at putting the world on a sustainable development trajectory). One of the 17 goals is to ensure good health and well-being. The implementation of this goal involves reducing mortality in the modern world and ensuring universal access to health services and medicines. This requirement of the modern global world sets new goals and objectives for medical business corporations. They play an important role in the global pharmaceutical services market and invest globally in modern innovative research. The importance of such research was confirmed by the discussions at the World Medical Innovation Forum 2022, which took place in Boston, USA, on 2-4 May 2022. Among the topics of expert discussions at the Forum were patient health, neuroscience in medicine, clinical trials of new innovative medicines, building innovative management models of investment and development with a global perspective on the implementation of the Sustainable Development Goals (World Medical Innovation Forum, 2022).

3 Global Trends in Innovations in the Pharmaceutical Business

The authors of the study look at the innovation processes of the global pharmaceutical industry through the financing of multinational pharmaceutical companies' R&D expenditures. The analysis showed that of the total amount spent on R&D in the pharmaceutical industry, 20-40% is

spent on in-house R&D and drug licensing, 15-30% on manufacturing, 5-15% on technical and administrative costs, 20-30% on marketing and distribution, and 20-35% on marginal profit reinvested in new research (Gassmann, Reepmeyer, & Zedtwitz, 2007).

The dynamics of R&D costs in the global pharmaceutical business is shown in Figure 1, which shows that their annual volume will increase from 108 billion USD in 2006 to 238 billion USD in 2022, with a promising trend of increasing to 285 billion USD in 2028.

At the same time, the largest amounts of R&D funding are now carried out by large companies, which are the main subjects of innovation in the global pharmaceutical industry, the large-scale commercialisation of technological developments and the international transfer of knowledge and technology in this sector of the global economy. Let's look at the figures: in 2018, the total R&D expenditure of the top 10 pharmaceutical companies in the world was almost 69 billion. This represents 38.5% of the total innovation costs of the pharmaceutical industry, and the ratio of these costs to the companies' total prescription drug sales is 20.4% (Table 1).

It is also worth noting the promising upward trend in innovation spending by the top ten multinationals, which will reach a record high of 79.1 billion USD by 2024. This is a record amount of USD 79.1 billion (37.1% of global expenditures), with a ratio of 19.6% to the value of total sales of prescription drug companies. This suggests that monopolistic tendencies in the production and appropriation of the global innovation rents generated by the pharmaceutical industry are being maintained by the largest companies. A small group of the largest pharmaceutical innovators is currently represented by companies such as Johnson&Johnson (USD 8.4 billion in innovation costs in 2018), Roche (9.8 billion), Merck&Co (7.9 billion), Novartis (8.2 billion), Pfizer (8.0 billion), GlaxoSmithKline (5.0 billion), Bristol-MyersSquibb (5.1 billion), Sanofi (6.2 billion), EliLilly (5.0 billion) and AstraZeneca (5.3 billion). Their large innovative expenditure has become the key to the discovery of new rare diseases and the development of innovative approaches to their treatment, and the highest R&D intensity of these multinational companies sets global trends in the development of R&D in the pharmaceutical sector. Although the global average level of spending on R&D in the pharmaceutical sector is currently around 17% of companies' gross revenues, some companies spend significantly more. In particular, in 2019, AstraZeneca spent 25.6% of its revenues for innovation purposes, EliLilly – 22.4% and RocheHoldings – 21.3%, which testifies to their global innovation leadership in developing and bringing new types of medicines to the market.

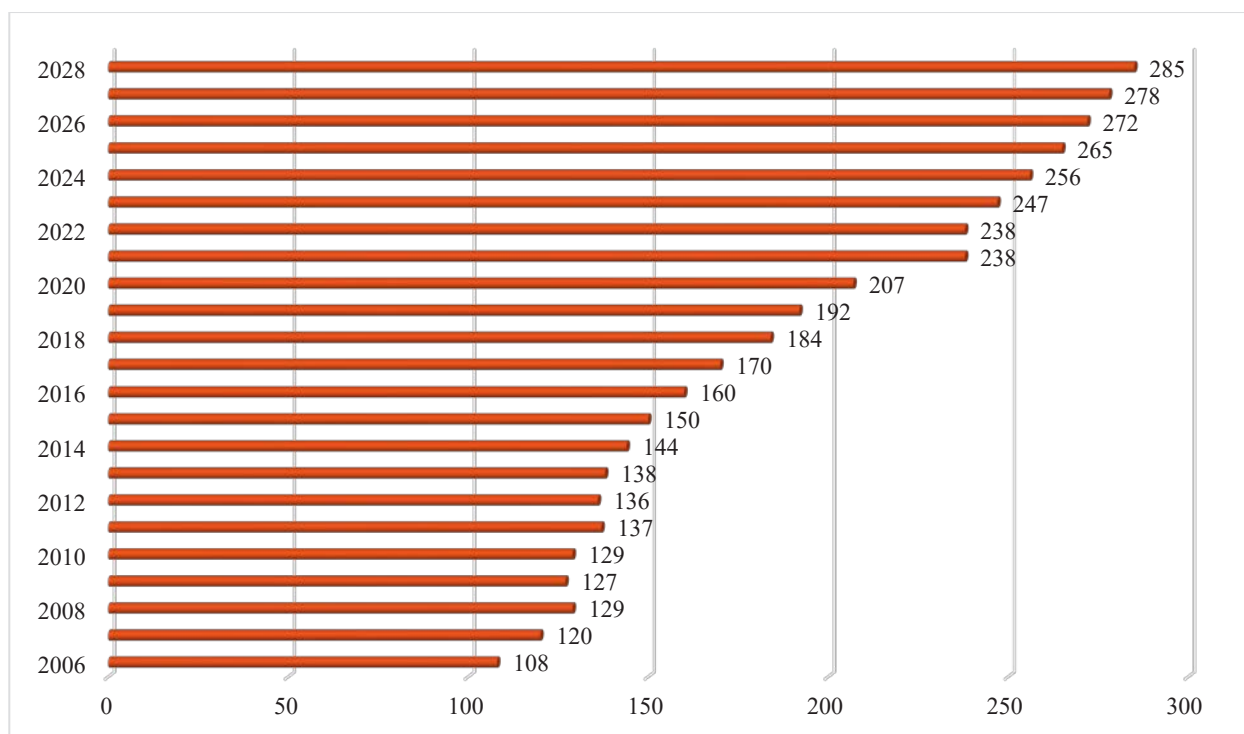


FIGURE 1 Total global spending on pharmaceutical R&D, 2006–2028, billion USD

Source: developed by the authors on the basis of the data of the Total global pharmaceutical R&D spending from 2010 to 2022; World Total Pharmaceutical R&D Spend in 2006–2020; Total global spending on pharmaceutical research and development from 2014 to 2028

In the highly monopolised pharmaceutical markets, some small companies with much lower revenues are forced to spend more than 50% of their total revenues on R&D (Average Research & Development Costs for Pharmaceutical Companies, 2019). And this is almost the only way to stay in the market and withstand fierce competition from both small and

medium-sized companies and large corporations. Average research and development costs for companies in the pharmaceutical sector were around 7 billion USD. US, ranging from a minimum of 3.4 billion USD at Bayer to a maximum of 9.9 billion USD at RocheGroup (Global Pharmaceuticals, 2018).

TABLE 1 Total spending on research and development of the top 10 pharmaceutical corporations in 2018 and 2024 (forecast)

Rank	Company	R&D, billion USD		CAGR, 2018–2024, %	R&D as a% of Prescription Sales	
		2018	2024		2018	2024
1	Johnson&Johnson	8,4	9,9	+2,6	21,8	21,6
2	Roche	9,8	9,9	+0,1	22,0	21,1
3	Merck & Co	7,9	9,2	+2,5	21,2	21,6
4	Novartis	8,2	9,2	+2,0	18,8	18,4
5	Pfizer	8,0	8,9	+1,9	17,6	17,4
6	GlaxoSmithKline	5,0	6,8	+5,3	16,3	17,6
7	Bristol-Myers Squibb	5,1	6,7	+4,5	23,8	22,5
8	Sanofi	6,2	6,7	+1,2	17,7	16,4
9	Eli Lilly	5,0	6,1	+3,4	25,5	23,6
10	AstraZeneca	5,3	5,9	+1,8	25,5	18,2
	Total Top -10	68,9	79,1	+2,3	20,4	19,6
	Other	110,0	133,9	+3,3	X	X
	Total	178,9	213,0	+3,0	21,6	18,0

Source: World Preview, 2019

TABLE 2 Clinical development costs versus risk-adjusted FDA approvals for therapeutic areas of the current US pipeline

Rank	Therapeutic Category	Total R&D expenditures			Percentage of Total			Clinical Development Spend per Approval (USD bn)
		Expenditure on clinical development (USD bln)	Risk-based FDA approval	Total NPV (USD bn)	Expenditure on clinical development	Risk-based FDA approval	Total NPV	
1	Oncology	91,1	126	78,2	40,0	29,1	30,6	0,7
2	Central nervous system	31,0	42	16,7	13,6	9,7	6,6	0,7
3	Musculoskeletal system	19,9	24	21,2	8,8	5,6	8,3	0,8
4	Cardiovascular system	19,7	19	5,6	8,7	4,4	2,2	1,0
5	Immunomodulators	15,0	27	29,3	6,6	6,2	11,5	0,6
6	Respiratory system	9,2	16	32,1	4,0	3,7	12,6	0,6
7	Gastrointestinal tract	8,4	24	17,0	3,7	5,5	6,7	0,4
8	Systemic anti-infective agents	8,2	51	8,3	3,6	11,9	3,2	0,2
9	Blood	6,4	21	20,4	2,8	4,9	8,0	0,3
10	Sensory organs	4,9	15	11,9	2,1	3,4	4,7	0,3
11	Dermatology	3,9	19	5,9	1,7	4,4	2,3	0,2
12	Endocrine	3,9	11	4,5	1,7	2,5	1,8	0,4
13	Genitourinary organs	2,0	8	0,3	0,9	1,8	0,1	0,3
	Various	4,1	29	3,6	1,8	6,8	1,4	0,1
	Total	227,5	431	255,2	100	100	100	X

Source: World Preview, 2019

In order to understand the strategic orientations of pharmaceutical companies' research activities, it is important to look at the structure of their R&D in relation to therapeutic categories. The data presented in Table 2 indicate a dominance in the structure of clinical research and development costs in oncology (9 91.1 billion). 40% of the total innovation costs of the global pharmaceutical sector in 2018), diseases of the central nervous system (31 billion, 13.6%), musculoskeletal system (19.9 billion, 8.8%), cardiovascular diseases (19.7 billion, 8.7%), immunomodulators (15 billion, 6.6%), diseases of the respiratory system (9.2 billion, 4%), gastrointestinal tract (8.4 billion, 3.7%) and systemic anti-infectives (8.2 billion, 3.6%). This essentially reflects the peculiarities of the modern structure of therapeutic areas of medical technology monopolisation by multinational pharmaceutical companies. It is aimed at strengthening their competitive positions in the most expensive areas of health care treatment and prevention, which primarily meet the needs of the populations of the leading countries and require the constant development and launch of innovative medical products.

VX-659/VX-445-Tezacaftor-Ivacaftor, Upadacitinib, DS-8201, Liso-cel, Zolgensma, Sacituzumab-Govitecan, Ozanimod, Brolocizumab and Voxelotor have become the most expensive projects in the history of the global pharmaceutical industry. A characteristic trend in the development of the modern pharmaceutical industry is therefore the innovation of all production processes.

4 M&A Strategies for Pharmaceutical Companies

Increasing the proportion of pharmaceutical companies' expenditure on R&D naturally requires the introduction of effective management strategies. A natural response to these processes has been the *activation of corporate mergers and acquisitions (M&A)*, which are now considered to be the most effective mechanism for concentrating and centralising the capital of pharmaceutical companies, increasing their market expansion to global markets, redistributing regional segments, strategically reorienting financial, economic and innovative activities, and getting rid of non-core types of production. Such a mechanism of concentration of capital of pharmaceutical companies

is the main driver of achieving the economic effect of scaling up production, optimising innovation costs, gaining access to innovative developments of their partners and competitors, as well as increasing the efficiency of introducing innovative developments into mass production by reducing the time lag between their production and commercialisation.

In addition to these universal motivations for M&A, which are inherent to companies in those sectors of the economy where the competitive advantages of technological leadership of large corporate structures over small and medium-sized enterprises become a priority, the pharmaceutical industry also has its own unique motivations. These are mainly the result of the significant complication of the processes of clinical trials of drugs and their production, the strict regulatory control of the pharmaceutical sector, a strict system of state certification of drugs (Bansal, 2018), as well as the high innovative capacity of pharmaceutical production and the enormous costs of companies in this sector to create strategic alliances with biotech companies. In this way, pharmaceutical companies gain another important competitive advantage, namely increased export expansion into already dominated market segments by more intensive use of their own specialised profile in the production of certain pharmaceutical products.

It is worth noting the huge synergistic effect that the growing capitalisation of pharmaceutical companies has on the efficiency of their research and innovation activities. First of all, it is about combining patent portfolios and research technologies, as well as joint implementation of large-scale innovation programmes and projects that significantly increase the amount of local economic effects from R&D if they are implemented separately within separate corporate structures. For example, AbbVie Corporation bought Pharmacyclics for 21 billion USD in 2015 (Why Abb Vie Inc Spent \$21 Billion to Buy Pharmacyclics, 2016), and Pfizer acquired Medivation for 14 billion USD (Pharma R&D Outsourcing Is On the Rise, 2018), which allowed them to significantly increase their patent portfolios and thus significantly strengthen their competitive influence on the global pharmaceutical market. In addition, the purchase of biopharmaceutical company Shire by TakedaPharmaceutical in 2018 will, according to expert estimates, lead to the generation of an additional 1.4 billion USD three years after the closing of the transaction through the use of ancillary product portfolios and organisational structures (Bansal, 2018).

In addition, a diversified research portfolio can effectively spread the innovation risks of pharmaceutical companies, while increasing their chances of generating so-called "serendipitous" innovative discoveries, which are not associated

with systematic and planned R&D, but arise mainly as a side-effect of innovative developments in a particular pharmaceutical field. The objective nature of this process, according to the authors, is due to the economic laws of concentration and monopolisation of production, capital accumulation and social division of labour, socialisation of production and labour, and cyclical economic development, which determine the strategic orientation of investors towards the development of concentration processes in order to strengthen their competitive position in the world market. This is particularly true in the pharmaceutical industry, where the investment of capital in the development of small companies and patent portfolios always has a low economic impact and is therefore unlikely, given the strategic interest of foreign investors not so much in buying local pharmaceutical companies as in acquiring their trademarks, patents and brands. In other words, the most promising acquisition targets in the global pharmaceutical industry are companies that have not only their own production facilities, but also patented innovative developments and promising technological platforms that can enable large-scale production of new-generation medicines, including on the basis of extensive application of the R&D results of biotechnological research.

As the data in Figure 2 show, in the period 1985–2022, the total number of mergers and acquisitions in the global pharmaceutical sector increased from 32 to 1,733 (with a "peak" value of 2,475 deals in 2018) per year, and their value from 10.1 to 237.5 billion USD (500.9 billion in 2014). Two other important conclusions can be drawn from the data in Figure 2: firstly, the presence of a clearly expressed cyclical nature of M&A in this sector, which does not coincide with the cyclicity of global economic development; secondly, a certain multidirectionality of the dynamics of the quantitative and value indicators of pharmaceutical M&A. Thus, the "peaks" in the number of deals were in 1991 (222 deals), 1996 (331 deals), 2000 (437 deals), 2008 (888 deals) and 2018 (2475 deals), while the maximum value of deals was in 1989 (34.7 billion USD), 1999 (222.3 billion USD) and 2014 (500.9 billion USD).

This shows, firstly, that the concentration and centralisation of the capital of pharmaceutical multinationals through M&A is largely due to the steady increase in the prices of innovative medicines in global conditions (Richman, 2016), although there is no direct correlation between the increasing dynamics of the pricing environment and pharmaceutical M&A, and inter-firm competition in this sector of the global economy remains at relatively high levels at all stages of national and global business cycles (Richman, 2016).

The rapid development of scientific and technological progress on a global scale provides

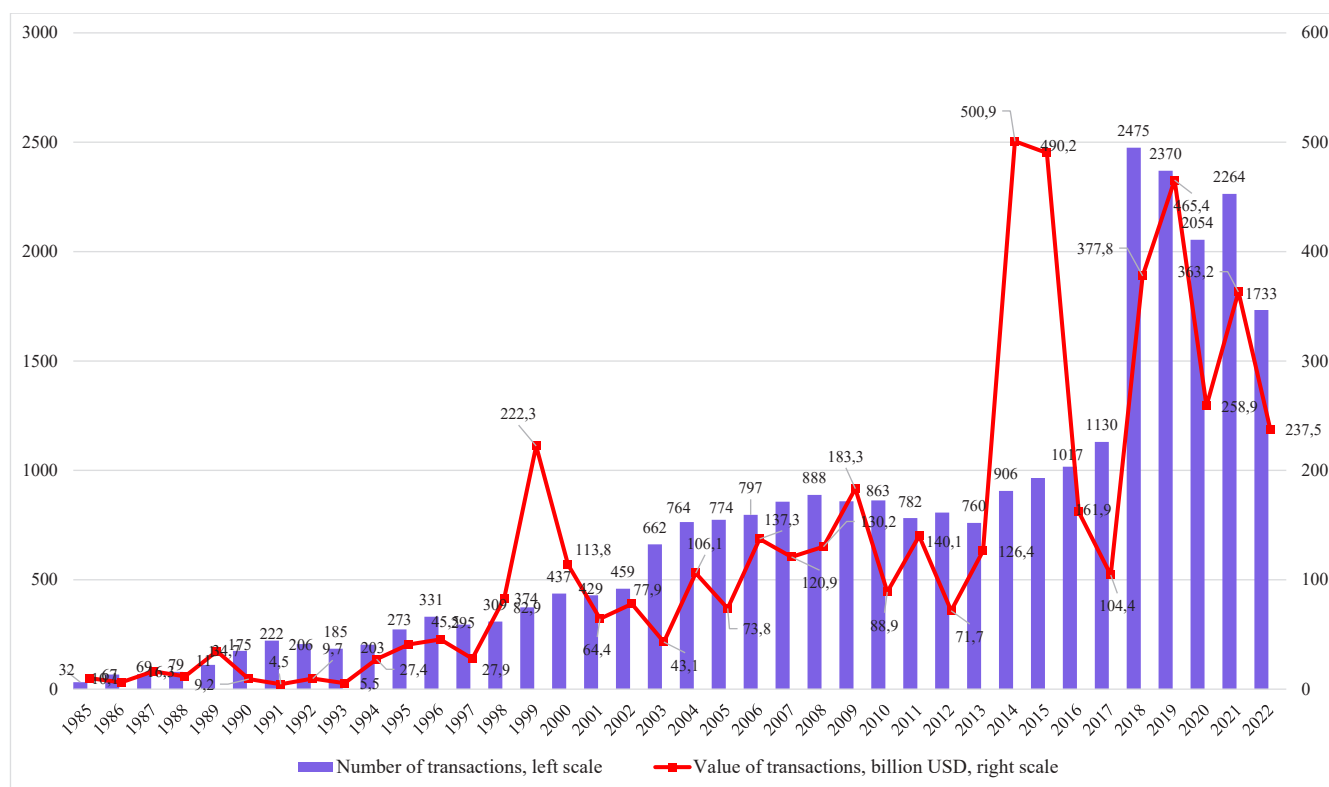


FIGURE 2 M&A Biotechnology & Pharmaceuticals, 1985–2022, number and value of transactions

Source: built by the authors on the basis of Statista of the Total global spending on pharmaceutical research and development from 2010 to 2022

access to innovative discoveries for all companies on the open market. This is encouraging multinational pharmaceutical companies to reorient their strategies towards new outsourcing business models.

5 Conclusions

In the current conditions of development and management of the global pharmaceutical business, the dominance of innovation processes can be observed. The capitalisation share of this sector in the global market is gradually increasing. Large multinational pharmaceutical companies are now the subjects of innovation in the global pharmaceutical industry. The dynamics of their R&D spending shows a steady upward trend. In addition, after the COVID 2020–2021, the growth rate of R&D spending has stabilised and the upward trend has resumed. Nevertheless, there are still monopolistic tendencies in the creation and appropriation of global innovation rents by the largest companies. The cost structure of clinical

trials in the context of therapeutic categories is characterised by the largest share of costs for oncology, diseases of the central nervous system and diseases of the musculoskeletal system.

An effective mechanism for the capitalisation of pharmaceutical companies and their market expansion in global markets is the activation of the corporate mergers and acquisitions (M&A) strategy. The implementation of this strategy is based on an increase in funding for the innovative activities of multinational companies, which redistributes regional segments of the pharmaceutical market in favour of large pharmaceutical companies. The research portfolio of these companies becomes more diversified, which reduces their risks.

Consequently, the highest competitive advantages in the pharmaceutical market are obtained by companies that have acquired or absorbed companies with a high portfolio of innovative developments. The development of strategies by pharmaceutical companies aimed at implementing outsourcing business models may be a recommended area for further research.

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Received on: 19th of April, 2023

Accepted on: 22th of May, 2023

Published on: 31th of May, 2023