

Competitiveness of global brands in high-tech industries

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ANNOTATION. The main purpose of the study is to identify methods and tools of marketing technologies that allow to achieve a global level in creating brands, particularly in high-tech industries. The research methods consisted of studying various materials, including publications, reports, and analysing the information collected from them. To determine the relationship between a brand's revenue and its sales and marketing expenses, the Pearson correlation method was applied to the example of Google's parent company (Alphabet), which helped in further analysis of the role of marketing technologies in building a global brand. In the course of the study, it was established that marketing technology plays an invaluable role in the creation of global brands, as it helps to develop and promote the brand's personality and characteristics that help to identify the brand. Using marketing technologies, a brand is able to develop and position itself and reflect its relevance, as well as its ability to meet consumer expectations and the challenges posed by modernity. In our research, we studied the importance of marketing spend for a brand, with marketing technology being an integral part of it, using Alphabet as an example, which showed a high positive correlation between revenue and marketing spend. We also found that in today's world, the use of marketing technologies is possible with the help of innovative tools such as augmented reality or voice assistants. The use of marketing technologies in the process of formation of global brands was analyzed on the example of companies in the high-tech industry. Despite certain specifics and features of brand promotion in this area, most of the conclusions can be extrapolated to other industries. The study systematised approaches to the interpretation of "brand" and technologies related to its creation; analysed the impact of marketing technologies on this process and the state of the Ukrainian industry. This study aims to address existing gaps in understanding the impact of modern marketing technologies on the formation of global brands in high-tech industries.

KEYWORDS: brand; marketing technologies; high-tech industry; competitiveness.

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Introduction

Today, a brand is one of the most important and widespread forms of business existence. It is through a brand that its creator can convey the values that it wishes to broadcast to the world, and consumers, in turn, can assess the importance of the brand for them and, above all, identify the role of the brand in the market, regardless of its size. Regardless of which market a brand is primarily focused on, marketing technologies play an invaluable role in its creation, i.e. tools that help in brand promotion, development and existence. Identification of marketing technologies involved in the development of global brands determines the overall importance and necessity of their use, and, accordingly, their impact on the existence of a brand as a marketing unit. In order to define the boundaries of the study, the article will consider the approaches to defining the concept of brand, which were defined by the American Marketing Association, using a scientific approach, D. Ogilvy and N. Kapfer, considering the brand as a personality, A. Biel, who identified the brand image, and M. Batey, whose definition describes the brand as a relationship between the consumer and the brand itself. Through the analysis of research and publications, the characteristics of the brand are defined and classified, as well as the tools associated with its construction and necessary for its identification in the market and by the consumer. The study considers marketing technologies as one of the main tools for building a global brand, using the example of brands included in the top global brands, such indices as the Global Brand Index by Brand Finance, as well as the top brands by Net Promoter Score, thus allowing to assess the economic value of the brand and its value in relation to the consumer. The main purpose of the study is to identify methods and tools of marketing technologies that allow to achieve a global level in creating brands.

Theoretical background of the study

With the development of globalization, companies are striving to strengthen their brand in the global market. Increased competition, the desire of manufacturers and sellers to attract potential consumers, and the need to retain customers and clients have significantly intensified the use of brands. Brand has numerous interpretations. While some are very similar to each other, others are fundamentally different, and there are reasons for this. First of all, a brand is treated differently from different angles subconsciously, and this is due to the fact that brands are dynamic, especially in today's digitalized world. Some of the main definitions we would like to point out in the table 1.

Table 1

APPROACHES TO DEFINING THE BRAND

Approach	Authors	Definition	
Brand as a scientific definition	American Marketing Association ⁴	Brand is a collective definition that includes a name, term, sign, symbol, design, or combination thereof that is intended to identify the goods or services of one seller or group of sellers and to distinguish them from those of competitors.	
Brand as a personality	D. Ogilvy (1950s) ⁵ , N. Kapferer (2008) ⁶	A brand is a complex symbol as well, which is an intangible sum of brand attributes, name, packaging, price, history, reputation, created through various advertising methods. The main messages in Ogilvy's definition are to create a brand distinction that sets it apart from the mass of others, meaning to create a brand personality to define its position in the market.	Each brand has its own financial value, which has been built in the customer's perception on the basis of higher values and a stronger emotional connection than that of competing brands. This implies that the values and associations responsible for the emotional connection between the customer and the brand must be unique and strong, so that the brand does not get lost in the mass of competitors
Brand as a brand image	D. Ogilvy (1950s), A. Beil (1993) ⁷	A brand can be reflected through three sub-images: corporate image, consumer image, and product/service image.	
Brand as a relationship	M. Batey (2008) ⁸	A brand is defined in many aspects by its relationship with the consumer. If the relationship between the brand and the consumer is built on strong trust and loyalty, the creation of analogues or the existence of competitors will not shake the strength of the brand.	

Source: systematization by authors

Global brand uses the strategy of standardization⁹, which defines global brands as "brands that use similar brand names, positioning strategies, and marketing mixes in most target markets". In addition, a brand is considered as global if it is widely available in global markets where it has established

⁴ American Marketing Association. *Branding*. 1960. <https://www.ama.org/topics/branding/>.

⁵ Gross, Daniel. *Forbes Greatest Business Stories of All Time: David Ogilvy and the Creation of Modern Advertising*. <http://www.stephenhicks.org/wp-content/uploads/2012/01/forbes-ogilvy.pdf>.

⁶ Kapferer, Jean-Noël. *The New Strategic Brand Management: Creating and Sustaining Brand Equity Long Term*. 2008. *BRAND NAME PRODUCTS New Strategic Brand Management*

⁷ Aaker, David A., and Alexander L. Biel. *Brand Equity & Advertising: Advertising's Role in Building Strong Brands*. 1993. <https://books.google.com.ua/books>.

⁸ Batey, Mark. *Brand Meaning*. 2008. http://www.untag-smd.ac.id/files/Perpustakaan_Digital_1/BRAND%20NAME%20PRODUCTS%20Brand%20meaning.pdf.

⁹ Brin, P. V., and N. M. Mechenkova. *Global Brand in International Communication* (in Ukrainian). <https://repository.kpi.kharkov.ua/server/api/core/bitstreams/e05dcca4-ffc3-4495-ab33-071a0c009a2c/content>.

its reputation for quality and prestige; another good characteristic of a global brand is its global recognition, which goes hand in hand with the preservation of all brand characteristics¹⁰. To make brand recognizable and well-known, it needs to be promoted. Brand promotion uses a variety of marketing technologies that work to increase the awareness of the created brand. The definition of marketing technology is a term that encompasses any tools used by digital and physical marketing¹¹. Discussing marketing technologies, we cannot overlook the term marketing mix¹².

Marketing technologies (MarTech) are designed to ensure that the marketing complex works properly. The main role in ensuring this is played by such a tool as marketing analytics, which helps the brand achieve its short-term and long-term goals, as well as ensure their existence. The first method of analytics is the analysis of online views. A marketing technology tool such as business data visualization helps to observe all the obtained data. Another important marketing technology tool is content marketing¹³, which is a way to create a variety of content for the target audience. It is also important to consider such a tool as social media marketing or SMM¹⁴. Social networks are a kind of tool to influence consumer perception, because by attracting famous stars and celebrities to your brand, you can significantly increase its sales and positive impression. Marketing automation¹⁵, another category of marketing technologies, refers to the repetition of marketing tasks with the help of IT technologies, and its main task is to reduce the use of resources.

The adoption of MarTech in companies is mandatory today, but companies should still evaluate all their intentions to adapt it in accordance with the nature of consumer perception and the nature of their future brand. This intention to adopt marketing technologies is a multifaceted aspect that includes a wide spectrum of factors such as: attitude toward martech, social norms of the society for which the brand is being created, trust in marketing technologies, perception and understanding of all risks of marketing technologies, information and communications technology (ICT) competence and advantages of martech and their control. Global brands operate on a global market, where the policy of global marketing is used. Global

¹⁰ Kim, Eugene Song. *The Meaning of the Global Brand: A Perspective from the Korean Consumer*. PhD diss., University of Hawaii, 2004. <https://scholarspace.manoa.hawaii.edu/server/api/core/bitstreams/8b49769c-c134-47ed-8ab5-6f412589fd77/content>.

¹¹ Indeed Editorial Team. "Marketing Technology (MarTech): Definition, Types and Benefits." August 8, 2022. <https://www.indeed.com/career-advice/career-development/marketing-technology>.

¹² Candemir, Aykan. *Marketing Mix Elements (Services)*. 2017. https://www.researchgate.net/publication/346781690_Marketing_Mix_Elements_Services

¹³ Marketo. *The Defining Guide to Engaging Content Marketing*. 2014, p. 112. <https://go.marketo.com/rs/marketob2/images/DG2ECM.pdf>.

¹⁴ Voorveld, Hilde A.M. "Brand Communication in Social Media: A Research Agenda." *Journal of Advertising* 48 (2019): 14–26. <https://www.tandfonline.com/doi/epdf/10.1080/00913367.2019.1588808?needAccess=true&role=button>.

¹⁵ School of Management and Law. *Marketing Automation Report 2021*. https://digitalcollection.zhaw.ch/bitstream/11475/21947/3/2021_Zumstein-et-al_Marketing-Automation-Report.pdf.

marketing is explained as a marketing concept based on the identification of homogeneous needs common to different countries. This concept coordinates its marketing activities in such a way that it is able to create a marketing strategy that meets the needs of a global customer, and is based on both the differences and similarities of markets, in order to maintain the core brand objectives. This way of interpreting created the term glocalization, which combines two niches of global marketing, globalization and localization, and reflects the benefits of combining these strategies. Globalization, or in other words standardization, is dominated by relatively low-cost production and low complexity of implementation, supported by global adoption of concepts. Localization, on the other hand, preserves proximity to the consumer, the ability to penetrate the local market and flexible response to the needs of local consumers.

The style of implementing global marketing is different for different large-scale enterprises and small and medium-sized enterprises not only from the outside. For example, SMEs have much smaller resources and therefore have more limited capital when globalizing marketing, which is why attention to the evaluation of all aspects should be at the highest level. This also applies to financial resources, the number of employees and the quality of their business education, as SMEs are more likely to employ generalists, while large enterprises prefer specialists¹⁶. The situation is also similar with risk taking, as a large enterprise usually already has a decision-making model, which will be refined and adapted depending on the problems that arise in the global marketing strategy. The use of information on market success for further analysis is better developed in large enterprises, as they can order professional market reports written by specialists, while for small and medium-sized enterprises this process is handled independently.

Assessment of high-tech companies in global ratings

Evaluation is an important process for determining the value of any brand, and can be provided from both an economic and consumer perspective. Talking about the methods of global brand valuation indices, the first one is called the Brand Value Score, which is provided by Brand Finance, the world's leading brand valuation consultancy; the second, which helps to better assess a global brand from a consumer perspective, is called the Net Promoter Score or NPS. In accordance with the first approach, a ranking that evaluates 500 global brands from all sectors and industries was created. To understand further analysis, it is better to consider the TOP 10 most valuable global brands, shown in Table 2.

¹⁶ Pearson (2019). *Global Marketing*, 8th ed.

Table 2

MOST VALUABLE GLOBAL BRANDS, TOP 10, 2022–2023

Brand	Sector	Rank in 2023	Rank in 2022	Rating in 2023	Rating in 2022	Change in ranking	Change in rating
Amazon	Retail	1	2	AAA	AAA+	↑ 1	↓ 1
Apple	Tech	2	1	AAA-	AAA	↓ 1	↓ 1
Google	Media	3	3	AAA+	AAA+	-	-
Microsoft	Tech	4	4	AAA	AAA	-	-
Walmart	Retail	5	5	AA+	AAA-	-	↓ 1
Samsung	Tech	6	6	AAA-	AAA-	-	-
ICBC	Banking	7	8	AAA	AAA+	↑ 1	↓ 1
Verizon	Telecoms	8	10	AA+	AAA-	↑ 2	↓ 1
Tesla	Automobiles	9	28	AAA-	AA+	↑ 19	↑ 1
TikTok/Douyin	Media	10	18	AAA-	AA+	↑ 8	↑ 1

Source: systematization by authors based on¹⁷

Among the top ten most valuable brands, three positions are occupied by technology brands, reflecting the importance and relatively strong influence of the sector on the global market. Another interesting thing about this ranking is that 7 out of 10 global brands are American, while two of them are Chinese, and another one is from South Korea. The situation with Chinese companies is quite interesting, because according to the Understanding Global Opinion of Chinese Businesses¹⁸, confidence in Chinese companies in developed markets fell by 5% in 2019.

Another indicator, which is called net promoter score or NPS, is invariably important, as it can form an idea not only of how well the manufacturer understands its target audience, but also reflect how much sales have increased as a result of previous innovations, driven by positive feedback on the product, and which can then provide an opportunity to analyse future sales based on customer loyalty. Considering the Net Promoter Score on the Top Brands, compiled by the Comparably platform, which provides data on the NPS values of public and private companies¹⁹, it is possible to

¹⁷ Brand Finance. *Global 500: The Annual Report on the World's Most Valuable and Strongest Brands*. January 2023. <https://static.brandirectory.com/reports/brand-finance-global-500-2023-preview.pdf>.

¹⁸ Brunswick. *Understanding Global Opinion of Chinese Businesses: A Growing Divide Between Developed and Emerging Markets*. 2020, p. 33. https://www.brunswickgroup.com/media/7164/brunswick_group-understanding-global-opinion-chinese-businesses-may-2020.pdf.

¹⁹ Comparably. *Net Promoter Score*. 2022. <https://www.comparably.com/brands/top-100-brands>.

create deep analysis. Since these two indicators, both Brand Finance and NPS are equally important, the TOP 10 brands according to the NPS ranking for 2022 in Table 3, will be considered.

Table 3

TOP 10 BRANDS BY NPS, COMPARABLY PLATFORM, MAY 2022

Brand	By gender		By ethnicity		By age		By usage		NPS
	M	F	highest	lowest	highest	lowest	highest	lowest	
Peloton	72	69	Hispanic/ Latino	Native American	46-50	66+	2-5 years	10+ years	51
Netflix	52	54	Hispanic/ Latino	Native American	41-45	61-65	10+ years	1-2 years	48
Costco	60	68	Hispanic/ Latino	Others*	41-45	51-55	2-5 years	>1 year	57
Click- fil-a	64	64	Caucasian	Asian or Pacific Islander	31-35	26-30	5-10 years	>1 year	63
Amazon	51	63	Hispanic/ Latino	Native American	66+	26-30	5-10 years	>1 year	51
Apple	60	57	Hispanic/ Latino	Asian or Pacific Islander	56-60	61-65	10+ years	1-2 years	52
Nike	54	52	Native American	Caucasian	51-55	46-50	10+ years	>1 year	50
Target	31	65	Hispanic/ Latino	Native American and Others*	46-50	61-65	10+ years	>1 year	43
Google	49	57	Hispanic/ Latino	Native American	18-25	66+	10+ years	>1 year	46
Spotify	51	67	Hispanic/ Latino and Native American	African American	46-50	61-65	2-5 years	>1 year	53

Others* – here, all other ethnicities, excluding Caucasian; Hispanic/Latino; African American; Asian or Pacific Islander; and Native American. Source: systematization by authors based on²⁰

The lowest brand scores are given by users who usually use its services or products for less than one year. An interesting observation about Google is that it has the highest scores from people in the 18-25 age bracket, and

²⁰ Comparably. *Net Promoter Score*. 2022. <https://www.comparably.com/brands/top-100-brands>.

at the same time the highest NPS score for use from 10 years old. This indicates how deeply, in contrast to other companies, it has penetrated. Google has penetrated the lives of the current generation. It is also important to note that in 2022, three brands – namely Amazon, Apple and Google – are in both rankings, although they do not share the same positions. This shows the high attention of brands to both their economic performance and the feedback provided by consumers.

After reviewing all the information provided, it can be concluded that these two methods use martech techniques to analyse all the information collected and create up-to-date information graphs and tables. Thus, a data visualisation tool is widely used, which is clearly reflected in the creation of ratings, as well as their detailed analysis, as offered by Net Promoter Score. This platform allows you not only to see the points scored by a brand, but also to analyse it by various criteria, including age, gender, etc. It can be assumed that this rating also helps in marketing automation, as it creates a detailed analysis of the target audience and, as a result, helps to save resources for email marketing. As for the Brand Value, data visualisation tools are also invariably important, as they allow you to visually see the brand's success in such sub-ratings as Environment Score, which, as was seen, is now being actively worked on by Tesla, in connection with their plans for renewable energy. Using these marketing technology tools, it becomes possible to analyse all the problems faced by brands in an appropriate and adequate manner and apply methods to them in time to help improve overall performance.

From the preliminary analysis, it is understood that the technology industry has a large share in both indices that evaluate brands. The classification Nomenclature statistique des activités économiques dans la Communauté européenne, which uses the abbreviation NACE from its French name, is created by the European Union and widely used in the world. It includes manufacturing industries of high-tech products, medium-high-tech products, medium-low-tech products and low-tech products²¹. Currently, the classification has a 3-digit level and a 2-digit level for assembly units. The first of these levels reflects a broader classification, with a greater division, while the second level reflects a generalised classification. According to the classification above, it can be concluded that the high-tech industry includes such industries as pharmaceuticals, medical chemicals and botanical products and instruments, office equipment and computers, radio, television and communication equipment, watches, clocks and aircraft and spacecraft. In addition to this classification, there is a patent classification that distinguishes the following high-tech groups: aviation, communication technolo-

²¹ Eurostat. *Aggregations of Manufacturing Based on NACE Rev 1.1*. https://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an2.pdf.

gies, computer and automated business equipment, lasers, microorganisms and genetic engineering, and semiconductors. It can be seen that in many respects the patent classification overlaps with the sectoral classification, where aviation can be classified under code 35.3; communication technologies under code 32, and so on. The latter classification by product includes the calculation of R&D intensity and is indicated in the Standard International Trade Classification as Section 5 and Section 7 products²². First of all, it is needed to return to the Brand Value evaluation using the Brand Finance methodology, but this time focusing on the technology industry and the share it occupies compared to other brands. The value of these brands will be analyzed in Table 4, where the data for 2022 and 2023 reflect the actual performance of the brand during the previous year.

Table 4

MOST VALUABLE GLOBAL HIGH-TECH BRANDS, FROM TOP 50, 2022—2023

Brand	Rank in 2022	Rank in 2023	Rating in 2022	Rating in 2023	Change in ranking	Change in rating
Apple	1	2	AAA	AAA-	↓ 1	↓ 1
Microsoft	4	4	AAA	AAA	-	-
Samsung	6	6	AAA-	AAA-	-	-
Huawei	9	31	AAA-	AAA-	↓ 22	-
Oracle	57	35	AA	AA+	↑ 22	↑ 1

Source: systematization by authors based on²³

The most valuable of all five brands is the American brand Apple, which is now known in every corner of the world. Although Apple has dropped in the ranking, this high-tech global brand continues to be the most successful of the brands in the brand value index. First of all, the reason is that Apple is widely recognized around the world, and, in addition, has gained a strong and positive reputation over the years. Nevertheless, this brand with its price range presents itself as a premium brand, and is only accessible to the middle and upper class of the population, while brands such as Huawei and Samsung, which are actually Apple's competitors, are more accessible to the lower level of income and in some countries are more affordable than Apple²⁴. Another brand that is also in the top 10 most valuable global

²² Eurostat. *Standard International Trade Classification (SITC)*. [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Standard_international_trade_classification_\(SITC\)](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Standard_international_trade_classification_(SITC)).

²³ Brand Finance. *Global 500: The Annual Report on the World's Most Valuable and Strongest Brands*. January 2023, <https://static.brandirectory.com/reports/brand-finance-global-500-2023-preview.pdf>.

²⁴ Chen, Xuanyi, Yiran Liu, and Hanzhen Gong. "Apple Inc. Strategic Marketing Analysis and Evaluation." *Advances in Economics, Business and Management Research*, vol. 203, 2021. DOI. 10.2991/assehr.k.211209.499

brands is Samsung, whose ranking remained the same in 2022-2023. This stability may to some extent be due to the brand's greater availability, although the product lifecycle is much shorter than Apple's, which could be a challenge for brand promotion in the future and reduce consumer confidence in the long-term perspective. The last, and least valuable global brand from the communication devices sector in this analysis is Huawei, whose value has declined significantly, falling 22 positions in 2023, making it, in our opinion, the most interesting case among the three. Huawei is one of the largest telecommunications and high-tech companies in China. In a way, the issue of trust in Huawei is precisely the country of origin, as data security and user protection have long been a concern in China. The main reason for this distrust is in fact the Chinese Communist Party, which has constantly raised questions about information security. Huawei has a kind of security dilemma²⁵, which ultimately exists not because of problems related directly to technology, but because of potential cyber espionage by the Chinese authorities, which poses threats to the cybersecurity of users and other states. Next two global brands in the selection, Microsoft and Oracle, are known in the world for creating software. Both companies are American and, while Microsoft, according to the table, has kept its popularity at a stable level for two years, Oracle has gained significant popularity, rising to 22 positions in the overall ranking. Speaking of Microsoft, it is worth noting that they are aware of a wide range of risks that could affect their brand value. They note this in their 2022 annual report²⁶, also mentioning the risks associated with Russia's invasion of Ukraine. Based on the information provided, Microsoft understands the possible losses that the brand may incur in the context of sanctions and economic instability in the affected countries, but the placing in rankings show that the brand managed to cope with the challenges it faced without critical damage to it, which indicates the prompt and high-quality work of the departments with the amount of information obtained through the use of martech. As for Oracle, in its 2021-2022 report, the brand identified the main risks and ways to mitigate them in one table²⁷, using such a tool as data visualization. They note that they are working hard to ensure the cybersecurity of their users, services and products by implementing controls over various interventions in their processes.

Returning to the net promoter score, highlighting of the high-tech brands scores is important. The top 5 high-tech brands include all of the technology brands mentioned in the ranking, namely Apple, Google, Spo-

²⁵ Kaska, Kadri, Henrik Beckvard, and Tomáš Minárik. *Huawei, 5G and China as a Security Threat*. Tallinn, 2019. <https://www.ccdcoe.org/uploads/2019/03/CCDCOE-Huawei-2019-03-28-FINAL.pdf>.

²⁶ Microsoft Corporation. *Annual Report*, 2022. <https://annualreport.stocklight.com/nasdaq/msft/221115247.pdf>.

²⁷ Oracle Financial Services Software Limited. *Annual Report, 2021-2022*, p. 200. <https://www.oracle.com/a/ocom/docs/industries/financial-services/annual-report-2021-22.pdf>.

tify, Zoom and Microsoft. A special note regarding the Google brand should be made, as it was considered a media brand in the previous brand assessment, while in the NPS assessment it is rightly considered a technology brand. Also, when analyzing the pages of global brands on the Comparably platform, an interesting feature is that among the five selected brands, Google has the highest stability in NPS in terms of the period of use of services and products among respondents. Apple is on the second place by stability, whose only period of decline is from 1 to 2 years of usage, but after that, the scores only grow. At the same time, the other four brands do not have such stability. From this it can be concluded that the confidence in further use among users is highest among Apple. Microsoft is the lowest performing brand in the industry, with NPS growth between the two periods of use increasing only between 2 and 5 years and 5 and 10 years, and then declining again.

Spotify has the highest NPS score, and to some extent this may be due to the fact that the number of active Spotify users per month has been increasing almost every quarter of the year, with only a small deviation in the first quarter of 2018²⁸. The next brand whose rating differs by only one point is Apple. According to a study published in 2022²⁹, almost 58% of the 120 respondents surveyed rate the brand's quality as very high, and 42.5% say that the quality of the product encourages them to buy. In addition, 17.5% say that they pay attention to how consumer-friendly the brand is when they want to buy Apple products. Analysing the information provided, it can be concluded that the brand maintains its high position thanks to a strong brand image built over the years, as potential buyers are confident in consumer friendliness in advance. Third place among the brands surveyed was taken by Zoom, which has gained incredible popularity since the outbreak of COVID-19. Zoom meets a sharp decline in the two years since the peak of app usage, which is not surprising given the decline in the impact of COVID-19 on people's lives since the vaccine was introduced, except China, where the impact has long included a severe lockdown. Thus, in the future, brand valuation may decline significantly for the simple reason of low future use. When it comes to Google, I would like to remind you once again how much this brand has become intertwined with our lives. It offers a wide range of additional features such as Google Maps, Google Academy, Google Classroom, Google Translate and many others. Gmail is also their product and by creating a Google account, you actually create your own online identity. The diverse number of services for

²⁸ Statista. *Number of Spotify Monthly Active Users (MAUs) Worldwide from 1st Quarter 2015 to 4th Quarter 2022*. <https://www.statista.com/statistics/367739/spotify-global-mau/>.

²⁹ Helda Mary, A., and T. Sathiyaprakash. "A Study on Consumers' Behaviour on Apple Products with Special Reference to Coimbatore City." *IJSART* 8, no. 6 (June 2022). <https://ijsart.com/Content/PDFDocuments/IJSARTV8I654938.pdf>.

software can affect the relatively low NPS, as failures can affect both individual brand services and the entire platform, jeopardising the security of user data. Such a high frequency of use and user trust in the brand will naturally minimise such events. The last on the list is Microsoft, which also has a wide range of services and also offers software services. Positive reviews for the promotion of the brand's NPS are most often left by people who have been using the products for more than five years. Microsoft's popularity has also increased to some extent due to the COVID-19 pandemic, for example, a study was conducted in Portugal on online learning during lockdowns³⁰, which found that 86.1% of respondents used Microsoft Teams.

The influence of modern technologies on the competitiveness of high-tech companies

After reviewing all the information provided, it can be partially argued that the COVID-19 pandemic was in some way a driver in the popularity of global high-tech brands. Staying at home, many people were limited to what they had at home, and work or study required online communication via computer or other means of communication, which understandably increased the use of the previously mentioned Microsoft and Google, as well as the Zoom video conferencing service. The use of high-tech brands has also been shown to have a positive effect on learning abilities, as shown by the use of podcasts published on Spotify. In this way, it influences the popularisation of the use of other applications that would help to perceive information visually or in audio format. In the future, this practice may extend to the use of simulations that would help students dive deeper into a topic by visually seeing the consequences or results of their work, and employees to analyse more deeply the market share of their product or service or to predict technology failures with greater accuracy in order to avoid them.

Today, the use of marketing technologies is an important component in the creation and development of a global brand. Analysing a brand and its advantages over competitors helps to take a thorough and adequate look at the current state of the brand, its products and services, assess website or app traffic, which will help analyse the brand's convenience for the consumer and its compliance with his or her wishes. Before analysing the specifics of the use of marketing technologies by the above-mentioned global brands, it is worth drawing a correlation – the cost of marketing complex expenses per sales level. Starting from 2016, Apple hid the data on market-

³⁰ Escola, Joaquim, Natália Lopes, Paula Catarino, and Ana Paula Aires. "Portuguese Teachers' Conceptions of the Use of Microsoft 365 during the COVID-19 Pandemic." 2022. <https://doi.org/10.3390/computers11120185>

ing and sales expenses by including them in the general Selling, General, and Administrative Expenses (or SG&A Expenses), where it further includes a brief summary of the analysis by year. In the 2022 report, Apple, for example, noted that the annual growth of SG&A was due to annual increases in professional services, advertising, and personnel costs.

It is valuable to emphasise the use of one of the main tools of marketing technology, namely marketing analytics, which helps to analyse the traffic to a global brand's website, as well as understand the audience the brand is targeting and many other features. A service such as Similarweb^{31 32} can help to understand this particular part of the brand in more depth, as it displays a huge amount of data available for analysis. Thus, looking at Apple's website, it can be observed a decline in its global traffic, where the brand is ranked 92nd with an average time spent on the site of 2 minutes and 40 seconds. The time spent on the site does not necessarily indicate poor functionality, but rather the experience that customers have already gained and usually know what they want to buy. In fact, this is a sign of a successful advertising campaign through the years that has provided all the necessary information about the product and staying on the site for a long time to increase online traffic is not vital for the brand. In contrast to Apple, Google ranks first in terms of website traffic, which is not surprising, as this brand has the most developed global search service, and the average visit time reaches almost 11 minutes. This difference between the two brands does not seem surprising to us, as the brands pursue different goals when selling a product or service – Apple sells communication products and watches of one particular brand, while Google mostly works as a search engine among a database of various websites registered on the web. To search for the same site, Apple will first need to use Google.

Nowadays, social media, and more specifically, such a marketing technology tool as social media marketing, helps to introduce all the features of a product. This type of marketing also helps to stay in touch with the user, which helps to respond in time to problems that consumers may have. It is a popular practice among global brands to create additional brand pages on social media, provided they offer a wide range of products or operate in many countries. In this way, the brand successfully filters emerging issues into different divisions, optimising operations. The study *The role of social media marketing and brand image on smartphone purchase intention*³³ proved that social media marketing has a positive impact on increasing sales, which is well demonstrated by the example of Apple's main account, as the brand's social media reflects the idea and personality of the brand without publishing anything on the pages. In contrast to Apple, Google's

³¹ Similarweb. *Google, Overview, 2023*. <https://www.similarweb.com/website/google.com/#overview>.

³² Similarweb. *Apple, Overview, 2023*. <https://www.similarweb.com/website/apple.com/#overview>.

³³ Similarweb. *Apple, Overview, 2023*. <https://www.similarweb.com/website/apple.com/#overview>.

social media is filled with informative posts, where in most cases you can see links to posts that can be found on Twitter and Facebook. This is a good reflection of the brand, which is best known as a search platform, as it works on the strategy of informing the consumer, actually providing them with information before the question arises.

Next in the martech niche is content marketing. It is clearly reflected in product or service presentations when it comes to brands such as Apple or Google. In this case, content marketing aims to tell about product features and new innovations that will diversify the consumer's experience of using the brand. In the case of Apple, content marketing is used in interactive content directly on the website, where you can compare the colours of the phone from one angle, accompanied by additional widgets with information that also change the colour scheme. In addition, thanks to the annual release of new products, the brand has the opportunity to introduce its target audience and potential customers through video, which is especially important in the post-quarantine era.

Data visualisation, which is the next marketing technology tool, works best as an auxiliary tool for analysing further brand implementations and helps business partners understand the state of the company. This martech tool is widely used in the reports that were observed at earlier and is used to form data into tables and figures. Taking into account the specifics of Google's services, data visualisation features can be transferred through their data visualisation tool called Looker Studio. The programme provides various functions for data analysis, but in order to use it, one of the fields requires entering the name of the company.

The last of the tools that will be covered at in this section is marketing automation. Any automated messages sent by a brand are part of it. Marketing automation is closely related to social media marketing, as it allows you to duplicate posts on different pages at the same time without wasting time. A brand can also create automated messages that will be sent under certain conditions. A good example is automated notifications sent to email when you log into your Google account from another device. Automation also works with Apple, when they send emails containing data from recent purchases, provided that Apple Pay was used. In addition, marketing automation can be used in the company's databases in processes related to analytics and data visualisation by combining programs with each other to optimise the work of processes and save time on more pressing problems and issues.

Discussion and interpretation of the results

The feature of using marketing technologies is that they greatly help not only to promote the brand and make the user interested in it, but also to study the consumer and his interests to the core to be able to of-

fer or improve your products in a high-quality and targeted manner. Martech is a powerful tool, the cost of which will continue to grow every year, as its importance and leverage in modern marketing has been especially proven by the COVID-19 pandemic. In addition, the current pace of technology development will have a significant impact on the digitalisation of advertising and promotion tools for global brands, as it is currently one of the most convenient ways to reach customers from anywhere in the world.

With the development of technology, more and more innovative products are emerging that can diversify the number of marketing technology tools for brand promotion. The simplest and most widespread in use are, first of all, artificial intelligence and its objects of activity, such as natural language processing (further referred to as NLP) and machine learning. NLP is a tool that helps chatbots and virtual assistants understand and manipulate text to improve the user experience in the future³⁴. Machine learning works in a way that helps a program learn from human or animal habits and then use them in the right context without actually being programmed to do so³⁵.

One of the easiest examples of such a mechanism among global high-tech brands is Apple's virtual assistant, Siri. Apple's artificial intelligence is indeed capable of processing queries and generating answers to them in the form of calculations if a mathematical expression is given, or answering questions containing well-known facts and truths. Siri can also be used to launch applications that are already installed on the phone by using the voice command, "Hey Siri, launch the name of the application". The use of artificial intelligence (further referred to as AI) that responds to voice queries is a fairly common feature that works with NLP. In 2022, Alexa surpassed Siri and Google Assistant in three markets where the use of voice assistants has increased overall, as shown in the Voice Consumer Index 2022³⁶ and Figure 1.

Voice assistants are now available on many types of devices manufactured by global brands, but as was mentioned earlier, not all of them are still able to distinguish speech perfectly. Manufacturers need to understand that as the use of voice assistants grows every year, they need to be prepared to monitor their assistants to improve their speech recognition. The voice assistant was able to identify changes in patients' voices that could indicate the presence of a particular strain of COVID-19.

³⁴ Muam Mah, Pascal, Iwona Skalna, and John Muzam. "Natural Language Processing and Artificial Intelligence for Enterprise Management in the Era of Industry 4.0." 2022. <https://doi.org/10.3390/app12189207>

³⁵ Colliot, Olivier. *A Non-Technical Introduction to Machine Learning*. 2023. <https://hal.science/hal-03957125/document>.

³⁶ Vixen Labs. *Voice Consumer Index*, 2022. https://vixenlabs.co/wp-content/uploads/2022/06/VixenLabs_VoiceConsumerIndex2022.pdf.

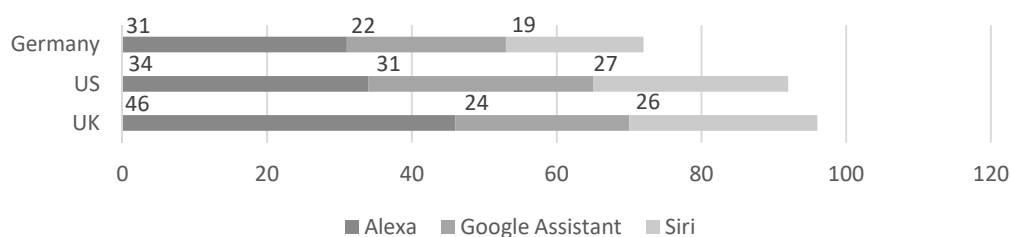


Figure 1. Voice assistant usage in the US, Germany and the UK, Voice Consumer Index 2022, %

Source: systematization by authors based on³⁷

Virtual or augmented reality can also be used to promote brands. Apple uses built-in augmented reality apps to enhance the user experience. For the brand, augmented reality (AR) helps even in terms of saving shipping and travel costs when product development took place elsewhere. One of Apple's products that allows the use of AR without additional convectors is their built-in measuring device. It is positioned as a useful product for education, which can help students save time on drawings and recognises the shapes of given objects automatically.

The use of voice assistants, considered to be a weak level of AI, and augmented reality are currently the most used innovative technologies among the leading high-tech brands examined in this thesis. Their application is mainly focused on helping people to use a product or service more easily, which in turn plays an important role in attracting consumers to the product, as it builds on consumer trust in the brand. All of these factors combined require brands to use AI carefully and wisely, or to use their own developed technology that will meet all the safety standards promoted by the brand.

Talking about Ukrainian high-tech products, its development in this decade has just begun, but has already faced difficulties due to the full-scale invasion launched by Russia on 24 February 2022. The development of Ukrainian industries in general has been somewhat frozen in its development status. During martial law, the IT army also plays an important role, as it is actually responsible for the collapse of Russian systems of operation, which include banking systems, communication technologies and hacking attacks on certain public authorities. This not only helps to raise the morale of the Ukrainian people during martial law, but also helps to develop the coding skills of IT professionals.

³⁷ Vixen Labs. *Voice Consumer Index, 2022*. https://vixenlabs.co/wp-content/uploads/2022/06/VixenLabs_VoiceConsumerIndex2022.pdf.

In the context of the full-scale invasion and the war that has been going on since 2014, the population of Ukraine has faced the problem of limb loss. Given the modern capabilities of combat units and weapons, the period requiring treatment and rehabilitation is also increasing, which is becoming a modern challenge for medicine and bioengineering, which even high-tech specialists from Ukraine who have now moved abroad are taking on. The production of prosthetic limbs, especially for Ukrainians, is currently being carried out by a company called Esper Bionics³⁸, which started as a start-up by Ukrainian students with different educational profiles. For Ukrainians who have lost their upper limbs, the company provides a free hand prosthesis and a series of trainings in its use.

Taking into account the preceding overview of Ukraine's high-tech industry, it can be said that its future, although it has potential, is under threat. The outflow of talent abroad, despite a certain ban, is severely undermining the industry. This is why there are problems with the use of marketing technologies for the development of Ukrainian brands. For example, one of the simplest promotion tools – namely, social media marketing, which is also closely related to content marketing – has actually started to develop actively only in the last few years, during which Ukrainian brands have started using social media as an active marketing tool. According to our observations, the most active area of SMM marketing in Ukraine for any brand – from mobile operators to postal and transport services – is Twitter. This social network is associated with some jokes and laughter, which is what Ukrainians need at the moment, as the level of stress and anxiety, even if people don't feel it, is enormous. Ukraine's high-tech industry still has a long way to go, both from a technical and marketing perspective, but it has a successful future.

Conclusions

Marketing technology plays an invaluable role in the creation of global brands, as it helps to develop and promote the brand's personality and characteristics that help to identify the brand. Through the use of marketing technologies, a brand is able to develop and position itself and reflect its relevance, as well as its ability to meet consumer expectations and the challenges posed by modernity. In our study we studied the importance of marketing spend for a brand, with marketing technology being an integral part of it. We also found that in today's world, the use of marketing technologies is possible with the help of innovative tools such as augmented reality or voice assistants. Regarding the development of the use of market-

³⁸ Esper Bionics. *Official Website*. <https://ukraine.esperbionics.com/>.

ing technologies by Ukrainian brands, we found that they are currently focused on social media marketing, due to the martial law imposed in the country.

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