Major Project Report

On

Examining Pharmaceutical Industry's Engagement on Facebook, Twitter, and YouTube: A Social Media Analysis

Submitted by:

Abhinav Sharma

2K22/DMBA/06

Under the Guidance of

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Delhi Technological University

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CERTIFICATE

This to certify that **Mr. Abhinav Sharma,** roll number**- 2K22/DMBA/06,** a student at Delhi School of Management Delhi Technological University has worked on a research project title "**Examining Pharmaceutical Industry's Engagement on Facebook, Twitter, and YouTube: A Social Media Analysis** " in the partial fulfilment of the requirement for the award of the degree of Master in Business Administration program for the academic year 2022-2024.

- -

Signature of Guide

Dr. Shikha N. Khera

Assistant Professor

Delhi School of Management

DECLARATION

1 hereby declare that the project work entitled " **Examining Pharmaceutical Industry's Engagement on Facebook, Twitter, and YouTube: A Social Media Analysis"** submitted to the Delhi School of Management, is a record of an original work done by me under the guidance of Dr Shikha N Khera and this project work is submitted in the partial fulfilment of the requirements for the award of the degree of Master of Business Administration. I declare that this research is my own, unaided work. It has not been submitted before for any other degree, part of degree or examination at this or any other university.

………………………….

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I, Abhinav Sharma, would like to convey my gratitude to the **Head of Department (HOD) Dr. Saurabh Agrawal** of Delhi School of Management, Delhi Technological University for emphasizing on the Major Research Project and giving me the platform to conduct my research smoothly.

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Abhinav Sharma
2K22/DMBA/06

Executive Summary

This project, titled "Examining Pharmaceutical Industry's Engagement on Facebook, Twitter, and YouTube: A Social Media Analysis," investigates the engagement patterns and strategies employed by pharmaceutical companies on three prominent social media platforms. The study aims to provide insights into how pharmaceutical companies leverage social media to interact with audiences, promote their products, and enhance brand visibility.

The research methodology involves a cross-sectional approach, gathering data from official company accounts, public posts, and relevant hashtags on Facebook, Twitter, and YouTube. Purposive sampling is employed to select a diverse range of pharmaceutical companies, considering factors such as size, geographic location, and product categories. Data collection occurs over a specified time frame, allowing for the analysis of current engagement trends and patterns.

Analysis of engagement metrics, including likes, shares, comments, and views, provides quantitative insights into audience interactions and content effectiveness across platforms. Additionally, qualitative analysis techniques, such as content analysis, shed light on the types of content that resonate most with audiences and drive engagement.

Key findings reveal the importance of tailoring content strategies to each platform's unique features and audience preferences. Recommendations emphasize the value of interactive content, multimedia storytelling, influencer partnerships, and data-driven optimization to enhance social media engagement and foster meaningful connections with audiences.

Furthermore, the project underscores the importance of regulatory compliance, transparency, and active engagement in building trust and credibility within the pharmaceutical industry's digital landscape. Continuous monitoring of industry trends and performance metrics enables pharmaceutical companies to adapt and evolve their social media strategies effectively.

In conclusion, this project offers valuable insights and actionable recommendations for pharmaceutical companies seeking to maximize their social media engagement and leverage digital channels to achieve their marketing and communication objectives. By implementing the findings of this analysis, pharmaceutical companies can strengthen their digital presence, engage with stakeholders more effectively, and drive positive outcomes in the evolving landscape of social media marketing.

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CHAPTER 1- INTRODUCTION

1. INTRODUCTION

Businesses are increasingly directing their attention towards social media platforms like Facebook, Twitter, and YouTube in efforts to bolster their profitability (Kaplan & Haenlein, 2010). Within the pharmaceutical domain, the advent of social media has transformed consumer behaviors, enabling bi-directional communication between consumers and pharmaceutical firms, and tilting the power dynamics towards consumers who now actively participate (Rollins & Perri, 2013). Bolotaeva and Cata (2011) propose that social media can amplify brand recognition and awareness while simultaneously reducing budgetary demands.

However, despite the potential advantages, pharmaceutical companies are grappling with several hurdles in adopting social media platforms, chiefly stemming from ethical and legal considerations (Rollins & Perri, 2013). Research by Shankar and Li (2014) and Aitken, Altmann, and Rosen (2014) has shed light on the social media presence of pharmaceutical companies in 2011 and 2014 respectively. Like these scholars, this study endeavours to evaluate the current social media footprint of selected pharmaceutical enterprises.

Liu and Fraser (2012) highlight the pharmaceutical sector's underperformance in social media engagement compared to other industries. Thus, it becomes imperative to gauge each company's engagement levels and ascertain whether they demonstrate uniform behaviours across various social media platforms or exhibit distinctive digital engagement strategies. Moreover, Aitken, Altmann, and Rosen (2014) suggest a potential correlation between the size of pharmaceutical companies and their digital engagement performance. In line with this perspective, this research aims to provide insights by scrutinizing the activities of pharmaceutical companies on Facebook, Twitter, and YouTube.

Industry Overview

The global pharmaceutical industry is expansive and intricate, playing a crucial role in healthcare systems worldwide. Here are key highlights:

1. Market Size and Growth: The pharmaceutical sector is among the largest globally, with a market worth in the hundreds of billions of dollars. Its growth is driven by factors such as an aging population, rising rates of chronic diseases, technological advancements, and increased healthcare spending.

2. Research and Development (R&D): Pharmaceutical companies invest heavily in R&D to discover and refine new drugs and therapies. This involves extensive clinical trials, regulatory approvals, and significant resource allocation. R&D efforts cover a wide range of areas including oncology, infectious diseases, autoimmune conditions, and rarediseases.

3. Regulatory Environment: The pharmaceutical industry is subject to strict regulations overseen by agencies like the U.S. Food and Drug Administration (FDA) and the European Medicines Agency (EMA). These agencies ensure the safety, efficacy, and quality of new medications through the approval process.

4. Intellectual Property Protection: Intellectual property rights, particularly patents, are crucial in the pharmaceutical sector. Companies rely on patents to protect their innovations and recoup investments through exclusive sales rights for a specified period.

5. Market Dynamics: Intense competition exists among pharmaceutical companies, ranging from large multinational corporations to smaller biotech firms. Competition is fueled by innovative drug development, strategic partnerships, mergers and acquisitions, and marketing efforts.

6. Generic Drugs and Biosimilars: Generic drugs and biosimilars play significant roles in providing cost-effective alternatives to branded drugs. They become available once patents expire, offering more affordable options for complex treatments.

7. Globalization: The pharmaceutical industry operates globally, conducting business and research activities across multiple countries. Globalization facilitates collaboration and partnerships but also presents challenges such as differing regulatory requirements and

pricing pressures.

8. Technological Advancements: Technological advancements like genomics, bioinformatics, artificial intelligence, and precision medicine are reshaping drug discovery, development, and personalized healthcare, promising revolutionary advancements in disease treatment and patient outcomes.

9. Pricing and Access: Pricing and access to medications are key concerns in the pharmaceutical industry, particularly for life-saving and specialty drugs. Governments, healthcare payers, and advocacy groups seek to balance incentivizing innovation with ensuring universal access to essential medications.

1.1 Background

This research project aims to investigate how pharmaceutical companies utilize Facebook, Twitter, and YouTube to establish their online presence and engage with various stakeholders, including healthcare professionals, patients, caregivers, and the broader public.

• Emergence of Social-Media in Healthcare: Social media platforms have become integral communication channels in the healthcare sector. Pharmaceutical firms utilize these platforms to share information, interact with stakeholders, raise awareness about diseases, and provide support to patients.

• Shifting Regulatory Landscape: Pharmaceutical companies face new regulatory challenges and opportunities with the increasing prominence of social media. Adhering to regulatory requirements while effectively communicating with diverse audiences presents dynamic challenges.

• Importance of Online Engagement: Engaging stakeholders on social media allows pharmaceutical companies to humanize their brands, build trust, gather feedback, and stay informed about emerging healthcare trends. Understanding engagement dynamics helps refine strategies and enhance online presence.

• Platform-Specific Considerations: Each social media platform has unique features and demographics, necessitating tailored approaches to content creation and engagement. Factors

such as user base and functionality influence messaging and follower interactions.

• Metrics for Engagement Evaluation: Various metrics, including likes, shares, comments, retweets, views, and subscriber counts, are used to assess engagement on social media. Analysing these metrics provides insights into content effectiveness, audience interaction, and campaign impact.

• Ethical and Privacy Considerations: Upholding ethical standards and protecting patient privacy are essential for pharmaceutical companies engaging on social media. Compliance with regulations like HIPAA in the U.S. and GDPR in the EU is critical.

By systematically examining pharmaceutical companies' activities on Facebook, Twitter, and YouTube, this research aims to shed light on the evolving landscape of social media engagement in the pharmaceutical industry. The findings may offer valuable insights for companies seeking to improve their online communication strategies and better serve stakeholders in the digital age.

1.2 Problem Statement

The project aims to investigate the social media engagement strategies employed by pharmaceutical companies on Facebook, Twitter, and YouTube. It seeks to analyse the relationship between company size and levels of digital engagement, as well as to identify common engagement tactics utilized across these platforms within the pharmaceutical industry.

1.3 Research Objectives

1.   To analyse the correlation between the size of pharmaceutical companies (measured by factors such as market capitalization, revenue, or employee count) and their level of engagement on Facebook, Twitter, and YouTube.

2.   To investigate whether larger pharmaceutical companies allocate more resources or employ different strategies to drive engagement on social media platforms compared to smaller companies.

3.   To identify common digital engagement strategies employed by pharmaceutical companies across these platforms, such as content types (e.g., informational posts, promotional materials, educational videos), engagement tactics (e.g., responding to comments, hosting live events), and frequency of updates.

4.   To analyse the effectiveness of digital engagement strategies employed by pharmaceutical companies on each social media platform, considering metrics such as likes, shares, comments, retweets, views, and subscriber counts.

5.   To explore any platform-specific differences in engagement strategies and audience interactions, understanding how factors such as platform demographics, features, and content preferences influence digital engagement efforts.

1.4 Scope of the study

The scope of the research project titled "Examining Pharmaceutical Industry's Engagement on Facebook, Twitter, and YouTube: A Social Media Analysis" encompasses a comprehensive investigation into the social media engagement strategies and practices employed by pharmaceutical companies on three prominent platforms: Facebook, Twitter, and YouTube. The research aims to provide insights into how pharmaceutical companies utilize social media to interact with audiences, promote their products, and enhance brand visibility within the digital landscape.

Key aspects of the research scope include:

- **Platform Analysis:** Examination of social media engagement on Facebook, Twitter, and YouTube to understand the varying dynamics and effectiveness of engagement strategies across different platforms.

- **Content Evaluation:** Analysis of the types of content shared by pharmaceutical companies, including educational materials, promotional campaigns, user-generated content, and multimedia storytelling.

- **Audience Interaction:** Investigation into audience demographics, behaviors, and preferences to identify patterns of engagement and inform targeted communication strategies.

- **Metrics Measurement:** Evaluation of engagement metrics such as likes, shares, comments, retweets, views, and click-through rates to assess the impact and effectiveness of social media activities.

- **Comparative Analysis:** Comparison of engagement levels, content strategies, and audience responses across different pharmaceutical companies and industry segments to identify best practices and areas for improvement.

- **Regulatory Compliance:** Consideration of regulatory guidelines and compliance requirements governing pharmaceutical marketing on social media platforms, including FDA regulations and industry standards.
- **Industry Trends:** Examination of emerging trends, innovations, and challenges within the pharmaceutical industry's social media landscape to provide actionable insights and strategic recommendations.
- **Recommendations:** Development of practical recommendations for pharmaceutical companies to enhance their social media engagement strategies, optimize content creation, foster audience engagement, and ensure regulatory compliance.

CHAPTER 2- LITERATURE REVIEW

2.1. Introduction

The Cambridge Healthtech Institute (2008) underscores the remarkable success achieved by pharmaceutical companies in recent times. However, the institute cautions that the traditional models of growth and profitability within the pharmaceutical industry may not be sustainable in the transformed market landscape of the 21st century. Consequently, industry leaders are urged to comprehend these market shifts and formulate new strategies to effectively navigate challenges and ensure future prosperity (Cambridge Healthtech Institute, 2008).

The proliferation of online social networking platforms dedicated to healthcare has substantially increased the complexity of healthcare systems (Griffiths et al., 2012). With approximately 350 million users globally on platforms like Facebook and Twitter, as reported by Fox and Jones (2009) cited in Green and Kesselheim (2010), research indicates a significant reliance among North Americans on the internet as their primary source of healthcare information, seeking support for healthcare-related issues on these platforms (Green & Kesselheim, 2010).

Despite the widespread adoption of social media by the general population, the pharmaceutical industry has been slow in embracing these platforms (Green & Kesselheim, 2010). Masood, Ibrahim, Hassali, and Ahmed (2009) observe that pharmaceutical marketing has been adapting to technological advancements by exploring new methods such as blogs and social networks, either independently or in conjunction with traditional marketing approaches.

Consequently, social networks provide pharmaceutical companies with a fresh avenue to engage with consumers and healthcare professionals (Webb, 2010). However, Webb points out that transitioning communication with physicians and marketing campaigns to the internet raises various regulatory and legal concerns. Furthermore, regulatory compliance is just one aspect of the challenges faced by companies leveraging the internet. Given the vast reach of the internet, companies must also effectively manage customer relationships, as consumers possess significant power through their active participation and broadcasting capabilities in online discussions (Webb, 2010).

2.2. Evolution of pharmaceutical marketing

The pharmaceutical industry is distinct from other sectors due to its scientific underpinnings and stringent regulatory framework (Stremersch & Van Dyck, 2009 cited in Ding, Eliashberg & Stremersch, 2014). Given the significant impact of medications on individuals' well-being, a global system involving regulators, healthcare providers (such as physicians or pharmacists), and payers (including government and insurance companies) is established to safeguard patient welfare while maintaining affordability (Ding, Eliashberg & Stremersch, 2014).

According to Ding, Eliashberg, and Stremersch (2014), the pharmaceutical industry has experienced consistent growth, averaging between 4% to 7% annually, and is poised to reach a market value of $1 trillion. However, it grapples with notable challenges in innovation and marketing. Companies lacking in innovation may struggle to set themselves apart, leading to diminished profit margins. Likewise, those with inadequate marketing capabilities risk underutilizing the value of their innovations, potentially resulting in substantial financial setbacks. Therefore, companies equipped with strong innovation and marketing prowess are better equipped to navigate obstacles and continue generating value for stakeholders (Ding, Eliashberg & Stremersch, 2014).

As emphasized by Ding, Eliashberg, and Stremersch (2014), medicines are perceived by society as both a typical commodity fulfilling consumer needs and a fundamental necessity. Pharmaceutical firms must navigate this dual perception while leveraging their innovations. Figure 2 elucidates the complex task of managing relationships not only between the company and its three primary stakeholders (patients, healthcare providers, and payers) but also among these stakeholders, all within the confines of rigorous regulatory scrutiny (Ding, Eliashberg & Stremersch, 2014).

2.3 Pharmaceutical marketing and the social media

The business world is placing increasing emphasis on the subject of social media (Kaplan & Haenlein, 2010). Decision-makers within companies, alongside consultants, are actively seeking ways to improve company profitability through platforms such as Wikipedia, YouTube, Facebook, and Twitter.

Prior to the rise of social media, the internet was largely characterized as the "read-only web" or Web 1.0 (Aghaei, Nematbakhsh & Farsani, 2012). During this era, users primarily consumed

content, with limited opportunities for interaction or content creation. However, the mid-1990s brought about a shift with the emergence of Web 1.0, granting individuals greater control over the information they accessed. This period witnessed the proliferation of diverse websites, offering an alternative to traditional sources like television and books (Rollins & Perri, 2013).

The subsequent evolution of the internet, known as the "read-write web" or Web 2.0, revolutionized online interaction into a two-way communication process (Aghaei, Nematbakhsh & Farsani, 2012; Rollins & Perri, 2013). Technologies associated with Web 2.0 facilitated the formation of online communities centered around shared interests, enabling greater social interaction. With the rise of Web 2.0, user-generated content gained prominence, challenging the dominance of traditional media channels (Rollins & Perri, 2013). This period also witnessed the emergence of early social networking prototypes, which eventually evolved into contemporary social media platforms such as Twitter and Facebook.

Kotler and Keller (2011) suggest that social media serves as a platform for consumers to exchange various forms of content, fostering deeper engagement with brands. Similarly, Kietzmann, Hermkens, McCarthy, and Silvestre (2011) delineate the seven functional blocks of social media, enabling interaction among users via mobile and web-based technologies. Furthermore, social media platforms can harness cloud-based technologies to enhance their functionality (Khan, 2012).

2.3.1 Online engagement

Goswami et al. (2013) discuss how companies are adopting the concept of "user engagement" to drive traffic to their websites. This concept, as defined by the authors, involves retaining customers by offering quality content on websites.

Similarly, Haven, Vittal, Overby, Favier, and Cokeh (2008) outline the four key elements of user engagement, termed the four "I's" (p. 3):

- "Involvement," which refers to individuals' presence at various brand touchpoints.
- "Interaction," which encompasses the actions taken by individuals at these touchpoints.
- "Intimacy," which relates to the emotional connection individuals have with a brand.
- "Influence," indicating the likelihood of individuals advocating for the brand.

Itskhoki (2011) acknowledges the challenges in managing the relationship between social media and pharmaceutical companies. However, the author suggests that marketers of prescription and over-the-counter (OTC) medicines are increasingly utilizing social media, albeit not as aggressively as in traditional advertising. Itskhoki explains that social media offers pharmaceutical companies the opportunity to listen to consumers and foster relationships. Notably, individuals not only use social media for personal interactions but also express interest in brands by becoming followers or fans.

Additionally, Itskhoki (2011) underscores the growing influence of mobile technology on social media usage. In 2011, 40% of social media users reported using mobile technology for social interactions, a significant increase from 28% in 2010. These users leverage social media to gather information such as pricing and brand reviews while making purchases. This trend is particularly significant for marketers of OTC medicines, as it can amplify their impact on consumers' purchasing decisions.

2.4 Advantages and disadvantages of social media

2.4.1 Advantages

According to Shankar and Li (2014), social media offers several advantages for pharmaceutical marketing compared to traditional media. They argue that social media platforms provide pharmaceutical companies with the opportunity to understand customer needs and engage in two-way communication, facilitating the exchange of information about the company, products, and brands. Additionally, they suggest that this interactive dialogue helps in building relationships with influencers.

Another benefit of social media platforms is their cost-effectiveness, as most are free to use, unlike traditional media channels. Moreover, social media allows access to a larger audience and broader reach than traditional media (Shankar & Li, 2014).

Shankar and Li (2014) propose that social media and traditional media can complement each other, leading to increased revenues and financial returns for companies. They provide an example involving Bristol-Myers Squibb, which used a cartoon in a television advertisement for the antidepressant medicine "Abilify." Viewers who enjoyed the cartoon shared the

advertisement on YouTube, resulting in approximately 10,000 views in a short time. Simultaneously, buzz was created on social media platforms like Twitter and Facebook. This illustrates how social media can enhance brand awareness and attract more viewers to television advertisements, thereby amplifying the impact of traditional advertising efforts.

The researchers also suggest that prescription decision-making is influenced by uncertainty, including factors such as medicine efficacy, risks, and individual clinical situations. They refer to studies by Ching (2010) and Narayanan & Manchanda (2009), indicating that word-of-mouth (WOM) recommendations from individuals facing similar situations are often perceived as more trustworthy than information provided by pharmaceutical companies. Shankar and Li (2014) argue that social networks facilitate the direct flow of WOM to people with common interests, implying that social media-generated WOM can positively influence sales dynamics and return on investment.

2.4.2 Disadvantages

Aitken, Altmann, and Rosen (2014) emphasize the pharmaceutical industry's cautious approach to adopting social media, particularly in Europe, due to various factors. These factors encompass the stringent regulatory landscape, security apprehensions arising from emerging technologies, and uncertainties regarding direct engagement with patients. Despite prior warnings from regulators discouraging social media utilization among pharmaceutical firms, other inhibiting factors contribute to this hesitancy (Aitken, Altmann & Rosen, 2014).

The hurdles associated with integrating social media into the pharmaceutical sector can be segmented into three primary domains: legal, technical, and internal. These domains encompass issues such as ensuring regulatory compliance, addressing concerns about content management, prioritizing privacy considerations, grappling with limited familiarity with social media platforms, and grappling with the challenge of quantifying the return on investment (ROI) for social media endeavors (Aitken, Altmann & Rosen, 2014, p. 9). For example, a solitary negative comment on Facebook holds the potential to swiftly escalate, underscoring the imperative for proficient content oversight.
Moreover, pharmaceutical companies perceive the obligation to report adverse effects mentioned on social media platforms as a disincentive, as it adds to their regulatory obligations (Aitken, Altmann & Rosen, 2014)

CHAPTER 3- RESEARCH METHODOLOGY

3.1 Concept: The conceptual model is based on three essential elements

1. This conceptual framework seeks to explore the correlation between the characteristics of pharmaceutical companies, such as revenue and workforce size, and their digital engagement approaches on various social media platforms.

2. The model specifically examines how pharmaceutical companies deploy digital strategies across three major social media platforms: Facebook, Twitter, and YouTube.

3. Through this analysis, the framework aims to uncover potential links between company profiles and their digital engagement tactics across different social media channels.

Furthermore, it allows for an assessment of the coherence of a company's digital strategy across the chosen social media platforms.
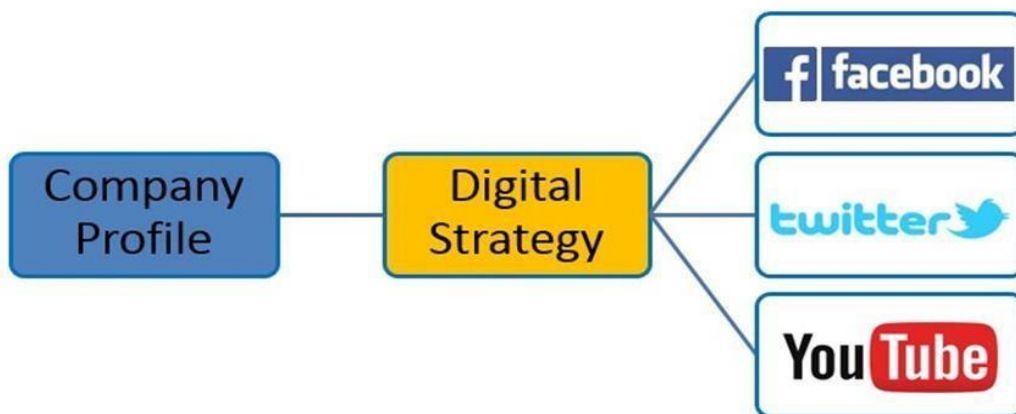
Figure 1- Conceptual model

3.2 Research Design

Cross-Sectional Research Design:

- **Definition:** A cross-sectional research design involves the collection and analysis of data from a population or sample at a single point in time.

- **Snapshot Approach:** This approach allows researchers to capture a snapshot of social media engagement within the pharmaceutical industry across multiple platforms simultaneously.

- **Time Efficiency:** Cross-sectional designs are relatively time-efficient compared to longitudinal studies, making them suitable for exploring current trends and patterns in social media engagement.

- **Comparison Across Groups:** Enables comparisons of engagement levels among different pharmaceutical companies and across various social media platforms within a specific time frame.

- **Data Collection Simplicity:** Simplifies data collection procedures by focusing on a single data collection period, reducing the complexity associated with tracking changes over time.

3.3 Sample Size

- In initiating this investigation, establishing clear criteria for sample selection has been paramount. The study's focus on analysing the social media presence of pharmaceutical companies has necessitated a methodical approach to sample size determination.

- To ensure a comprehensive representation of the industry, the top 20 pharmaceutical companies have been identified for inclusion in the study. This selection has been informed by the Pharmaceutical Executive's authoritative 2022 report, which has ranked the top 50 pharmaceutical companies worldwide based on revenue. By targeting the top performers in terms of financial success, the study has aimed to capture a diverse range of industry leaders with significant market influence.

- This approach to sample size determination aligns with established methodologies for selecting representative samples in research projects. By basing the selection criteria on objective criteria, such as revenue rankings, the study has mitigated potential biases and ensured the reliability and validity of the findings.

- Furthermore, by adhering to recognized industry rankings, the study has enhanced its credibility and relevance within the field of pharmaceutical research. This systematic approach has laid a solid foundation for subsequent data collection and analysis, enabling robust insights into the social media engagement practices of leading pharmaceutical companies.

3.4 Data Collection

3.4.1 Data Sources

- **Official Company Accounts**: Collected engagement data from the official social media accounts of selected pharmaceutical companies. This included posts made directly by the companies.

- **Public Posts**: Gathered data from public posts related to the pharmaceutical industry on Facebook, Twitter, and YouTube. This included posts from users, healthcare professionals, or industry influencers.

- **Relevant Hashtags**: Monitored and analysed engagement on posts containing relevant hashtags related to pharmaceutical topics. Hashtags provides insights into ongoing conversations and trending topics within the industry.

3.4.2 Time Frame

- **Specified Period**: Determined the time frame for data collection based on the objectives of the study and the availability of relevant data. This had a span of 2 weeks to capture short-term and 5 years to capture long-term trends and seasonal variations.

- **Recent Trends**: Focused on recent data to analyse current engagement patterns and industry developments.

3.4.3 Ethical Considerations

- **Privacy Regulations**: Ensured compliance with privacy regulations, such as GDPR or HIPAA, when collecting and analysing social media data. Avoided collecting personally identifiable information without consent.

- **Permissions**: Obtained necessary permissions or licenses to access and analyse social media data, especially if using third-party tools or APIs for data collection.

- **Transparency**: Maintained transparency regarding the purpose of data collection and inform users about how their data will be used, if applicable.

  By following this data collection process, I was able to gather relevant engagement data from social media platforms while adhering to ethical guidelines and ensuring the validity of my research findings.

3.5 Data Collection Tools

- **Facebook and Twitter**

Data collection was facilitated through the utilization of the SimplyMeasured tool for both Facebook pages and Twitter accounts. For Facebook pages, the tool "Free Facebook Fan Page Report" was utilized, while for Twitter accounts, the tool "Free Twitter Customer Service Analysis" was employed. These tools generated comprehensive reports containing the collected data, which could subsequently be analysed using Microsoft Excel.

Platform	Tool	Period number	Period of time
	"Free Facebook Fan Page Report"	1	28 feb 2017 to 12 feb 2022
		2	11 feb 2022 to 27 feb 2022
	"Free Twitter Customer Service Analysis"	1	28 feb 2017 to 12 feb 2022
		2	11 feb 2022 to 27 feb 2022

Table 1– Facebook and Twitter data collection method

- **YouTube and Facebook**

The Social Blade tool, integrated into the website, offered a range of data for the Facebook pages and YouTube channels of each pharmaceutical company.

CHAPTER 4- DATA ANALYSIS AND FINDINGS

4.1 Ranking of the companies on basis of socio-economic data

This study analysed the top 20 pharmaceutical companies, ranked by revenue. A correlation between revenue and the number of employees was depicted in the figure 2, indicating a consistent trend where companies with higher revenue also tend to employ more individuals.

Pfizer was identified as the company with the highest revenue, whereas Gilead Sciences reported the lowest. Conversely, Novartis had the largest workforce, while Gilead Sciences ranked lowest in terms of the number of employees.
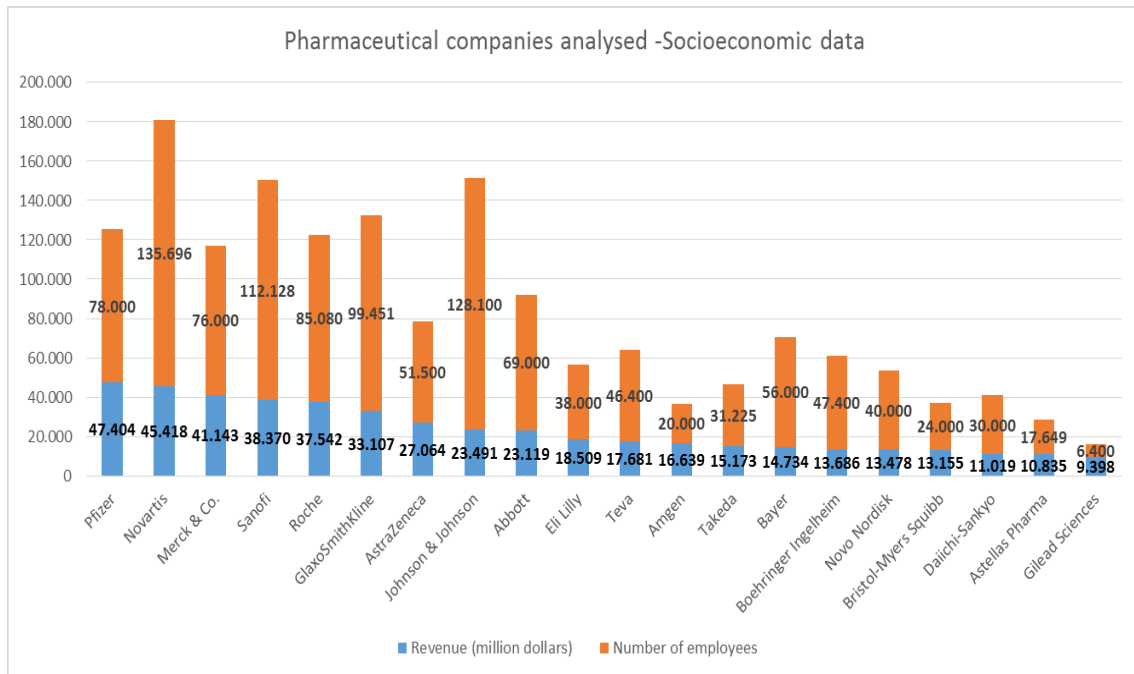
Figure 2– Pharmaceutical firms analysed: Socioeconomic profile

After scrutinizing the social media presence of the top 20 pharmaceutical companies, several findings emerged. The data indicates that 70% of these companies have a Facebook page, 90% are active on Twitter, and only one company has a presence on YouTube.
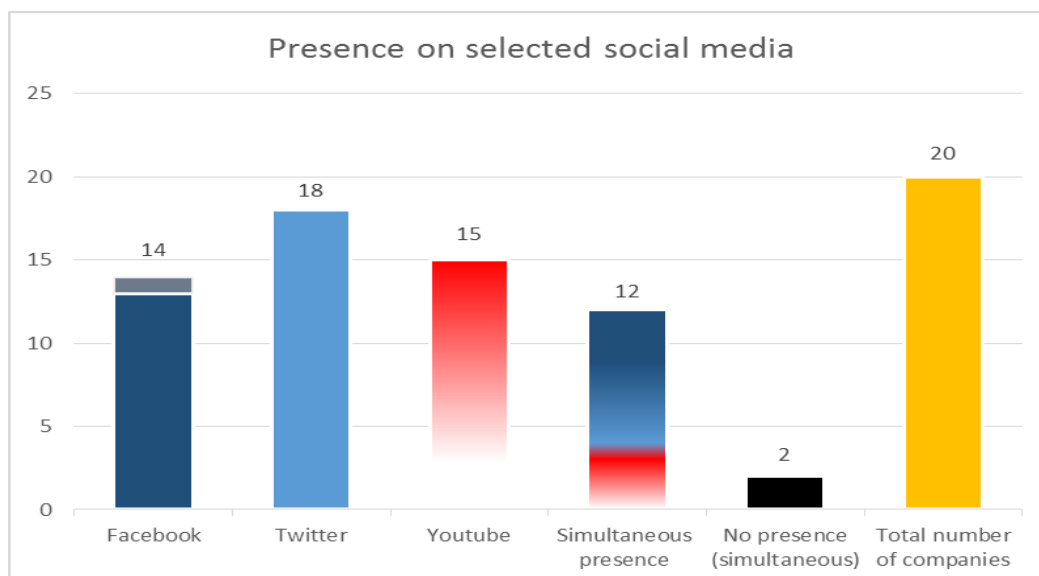
Figure 3– Pharmaceutical firms analysed: Social media presence

Of the companies included in the study, a mere 12 (60%) are active across all the analysed social media platforms. In contrast, only 2 (10%)—Takeda and Daiichi-Sankyo pharmaceutical companies—are completely absent from these platforms.

4.2 YouTube data analysis

The investigation into pharmaceutical companies' presence on YouTube revealed that 15 of them have a YouTube Channel. The figure displays all 15 companies with a YouTube account. It's important to note again that Genentech, as part of the Roche Group, was included in Roche's data analysis due to its role in developing Roche's most successful medicines. Additionally, Bayer's YouTube channel was not directly associated with Bayer Healthcare, so the company's symbol in figure 4 merely represents Bayer.

* Genentech was included because it is part of Group Roche, and it is accountable for the most successful medicines of Group Roche

Figure 4– Pharmaceutical firms analysed on YouTube

4.2.1 Subscribers

Subscribers are vital to the activity of YouTube channels, as they receive notifications for each new video uploaded. Therefore, it's crucial to analyse this metric.

As illustrated in figure 5, the number of subscribers varies among companies, ranging from 68 to 9,866 subscribers. Johnson & Johnson notably leads the pack with the highest number of subscribers, while Amgen follows closely with 3,320 subscribers. Furthermore, six companies have subscriber counts below 1,000.
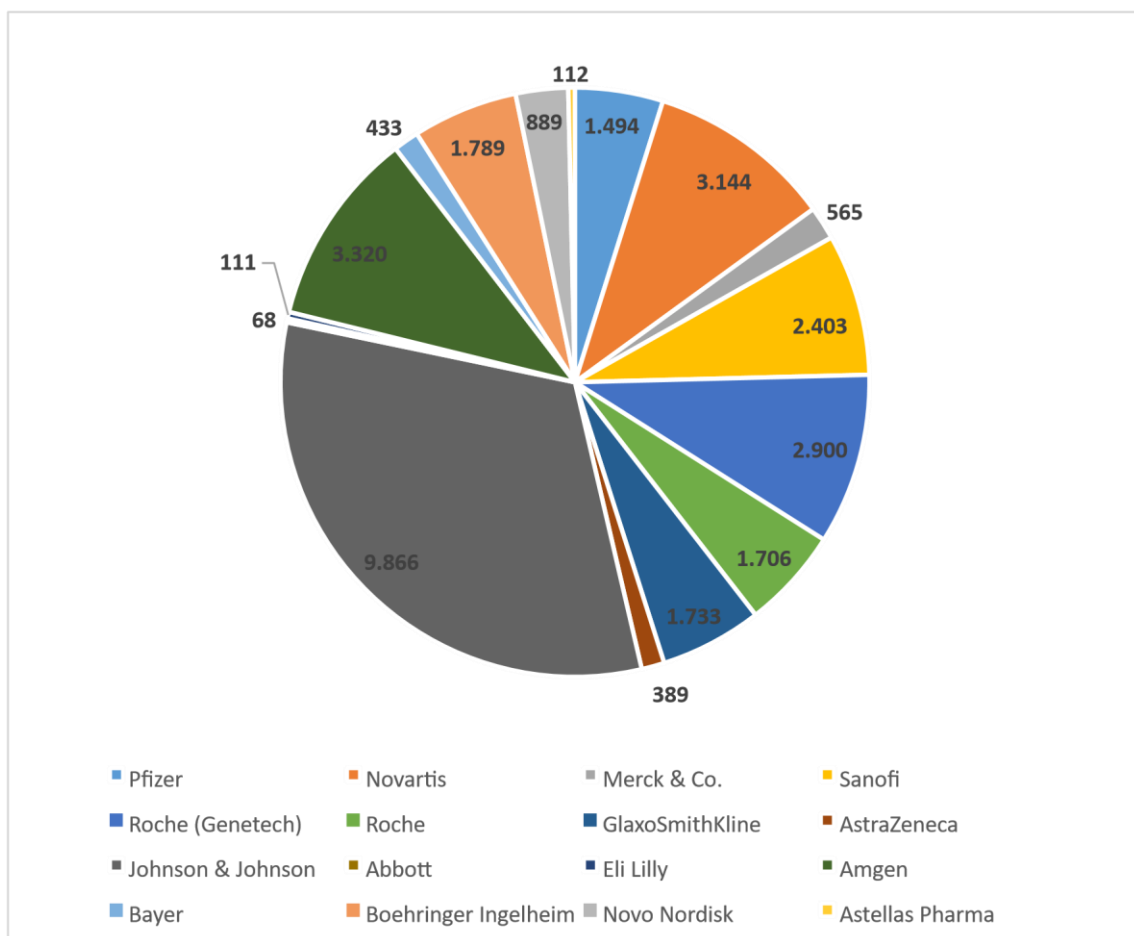
Figure 5– Pharmaceutical firms analysed on YouTube: Number of subscribers

4.2.2 Videos and their views

Videos serve as the primary means for disseminating information on YouTube channels. Figure 6 analysis reveals the distribution of videos across each YouTube channel. Johnson & Johnson leads in this regard with 679 videos, representing 29% of the total count. Meanwhile, other YouTube channels exhibit video counts ranging from 264 to 3.
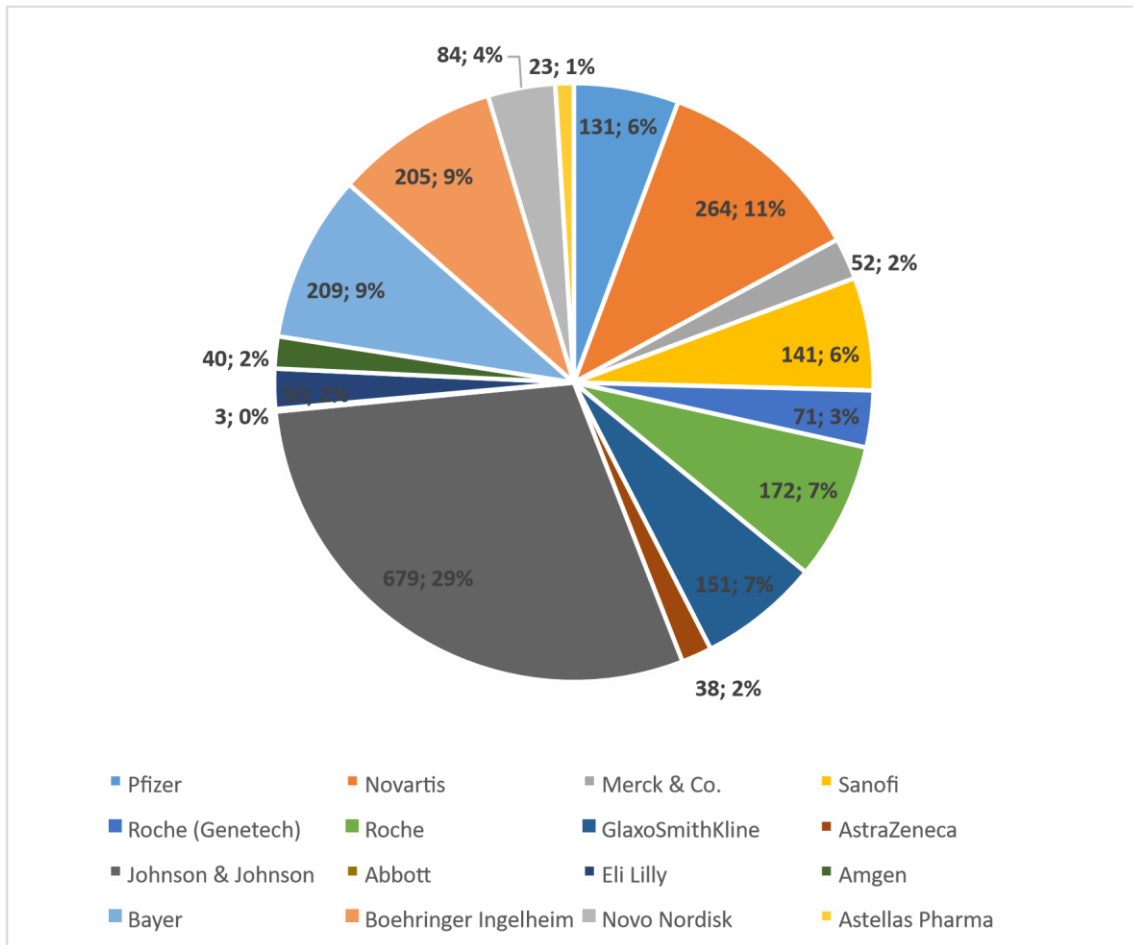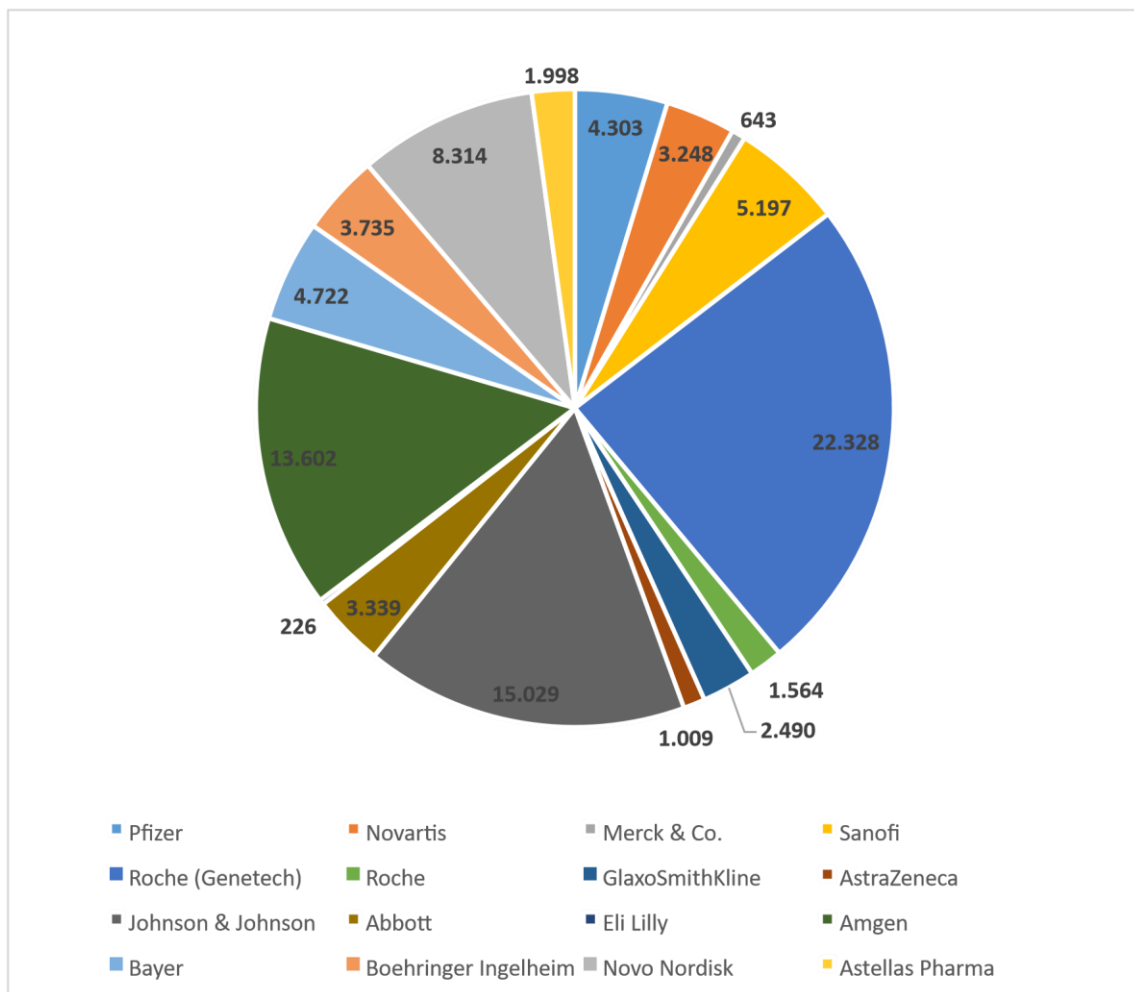

Figure 6– Pharmaceutical firms analysed on YouTube: Number of videos

When assessing the number of views on each YouTube channel, Johnson & Johnson clearly stands out as the top performer. With 10,204,972 views, it captures 58% of the total views registered. Meanwhile, other YouTube channels have view counts ranging from 10,017 to 1,585,289 views. However, the perspective changes significantly when considering views per video.
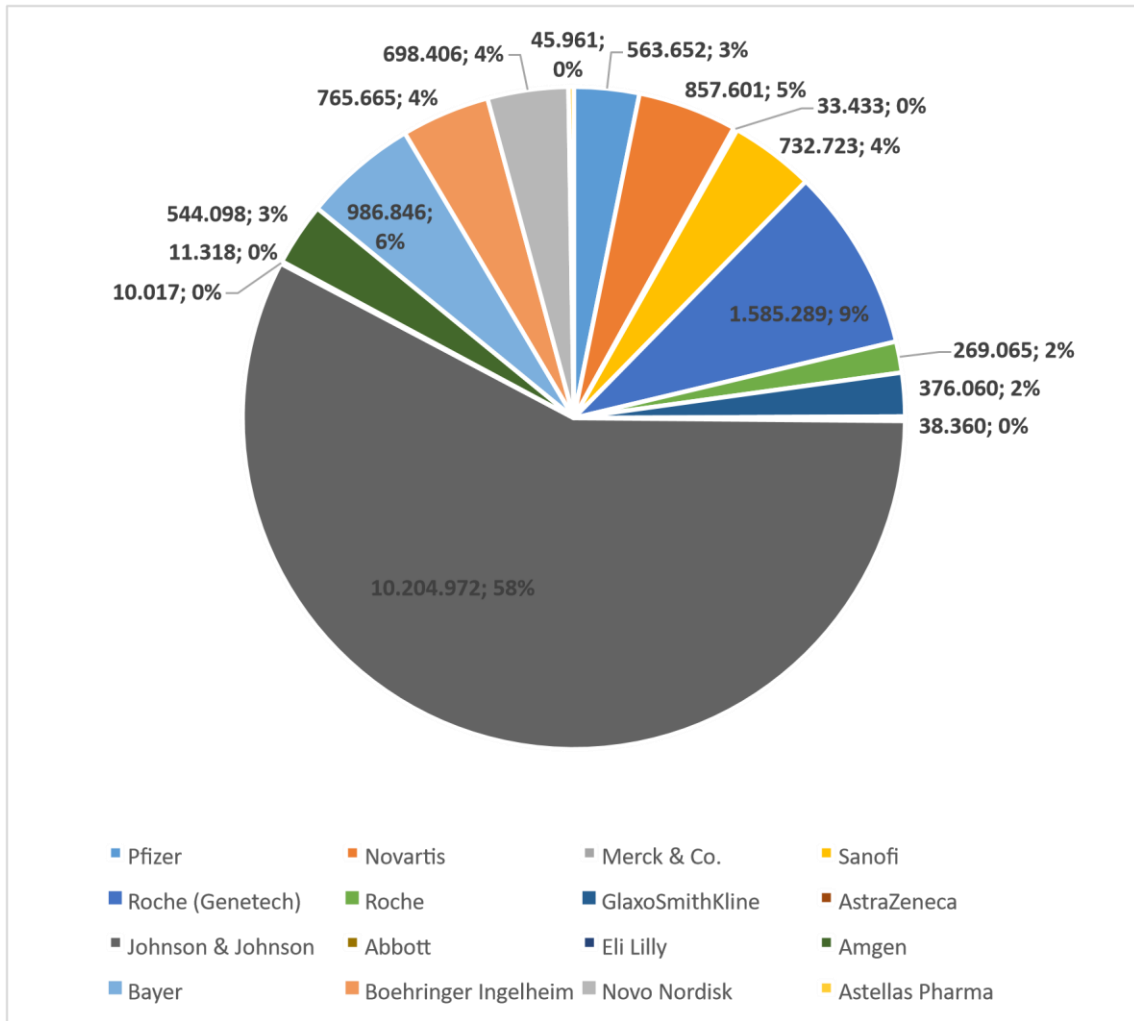
Figure 7– Pharmaceutical firms analysed on YouTube: Video views

As shown in Figure 7, the distribution of views per video seems more consistent than the overall view counts depicted in the figure. Roche (Genentech) takes the lead with 22,328 views per video, followed by Johnson & Johnson with 15,029 views per video. Additionally, Amgen emerges as the third top YouTube channel with 13,602 views per video. The remaining companies display view counts per video ranging from 226 to 8,314.
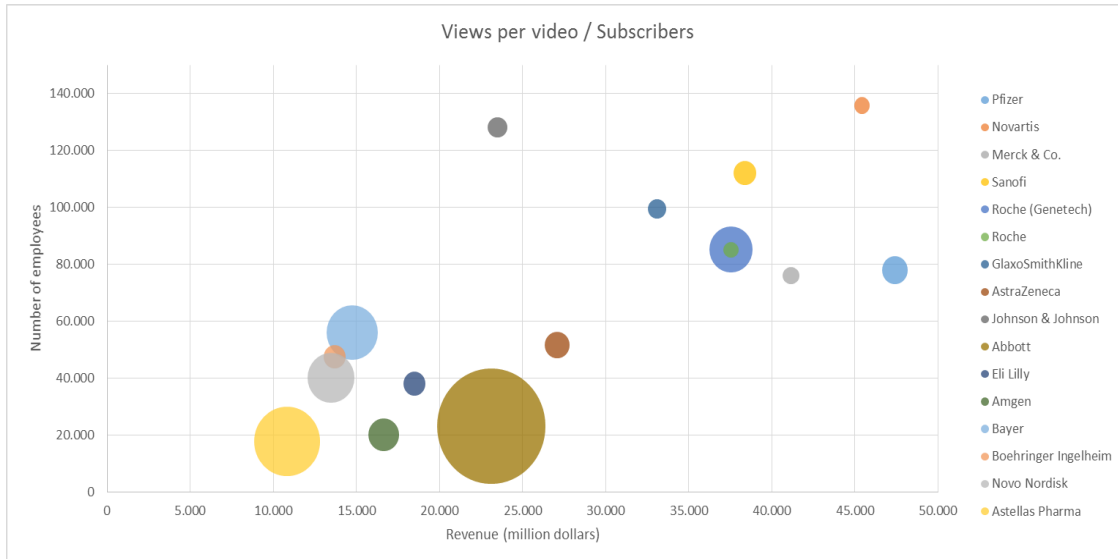
Figure 8– Pharmaceutical firms analysed on YouTube: Views per video

Figure 8 was created to explore the correlation between the number of views, videos, and subscribers. The data suggests that, in general, as the number of subscribers and videos increases, there is a tendency for the number of views to also rise in clusters.

4.2.3 Engagement

The engagement rate for YouTube channels was determined by dividing Views per video by Subscribers. As shown in Figure 9, there seems to be a trend where the engagement rate decreases as the revenue and number of employees of companies increase. However, this relationship does not exhibit a strong association or proportionality between the variables.

Figure 9– Pharmaceutical firms analysed on YouTube: Engagement by firm

4.2.4 YouTube cluster analysis

An analysis using clustering techniques was performed on the YouTube channels of pharmaceutical companies, revealing the existence of four distinct clusters: "Subscriber-Friendly with Low to Medium Activity", "Subscriber Appreciators with Medium Activity", "Subscriber Haters Mostly Highly Active", and "Weakly Active Subscriber Lovers".
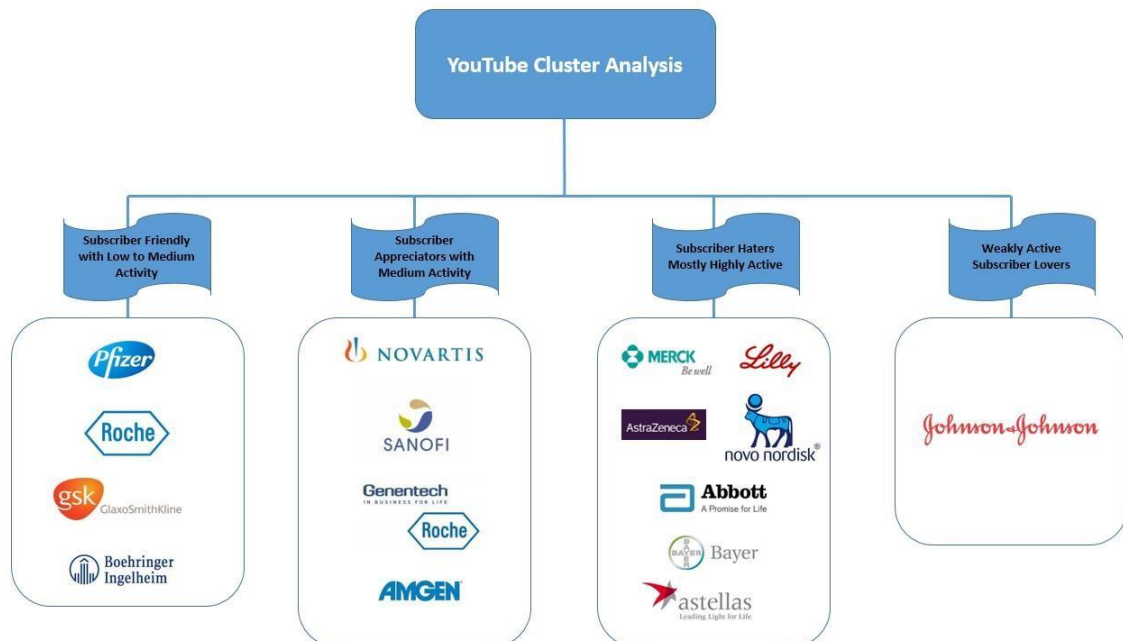
Figure 10– YouTube cluster analysis with defined cluster names

The clusters show diverse levels of activity and lack uniformity, as they encompass companies excelling in one variable alongside others performing poorly in the same variable.

You Tube	Subscriber Friendly with Low to Medium Activity	Subscriber Appreciators with Medium Activity	Subscriber haters Mostly Highly Active	Weakly Active Subscriber Lovers
Revenue	++/--	++/-	+/--	+/-
Employees	++/-	+++/-	+/--	++
Videos	++	+/-	+/---	+++
Total Views	+/-	++/-	+/---	+++
Total Views / Videos	+/--	+++/-	+/--	++

Table 2– YouTube clusters: characterization

Note:

-> Each + sign reveals the positive intensity in each parameter while each – sign reveals the negative intensity in each parameter, because clusters are not homogeneous.

4.3 Facebook data analysis

When evaluating the pharmaceutical companies' presence on Facebook, it's essential to identify each of the companies that have established a presence on this platform.

Figure 11 displays the Facebook pages of all 14 companies.

* Johnson & Johnson has Facebook page but it was not analyzed due to the method's restrictions
* Genentech was included because it is part of Group Roche, and it is accountable for the most successful medicines of Group Roche

Figure 11– Pharmaceutical firms analysed on Facebook

4.3.1 Fans of the company

A pivotal aspect of this study involved analysing pharmaceutical companies based on the number of fans (likes on Facebook pages). As depicted in Figure 12, four companies have accumulated more than 100,000 fans, with Novo Nordisk leading this category with 176,733 fans. In contrast, three companies have fewer than 10,000 fans, with Roche (Genentech) having the lowest number at 5,832 fans.
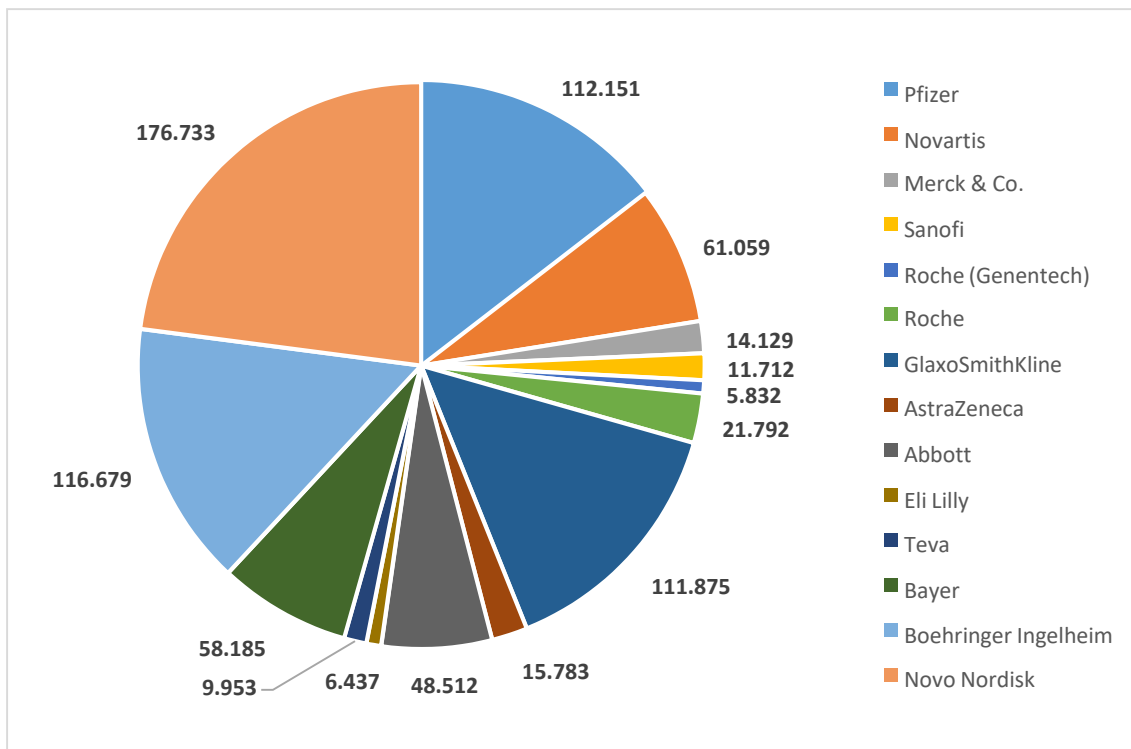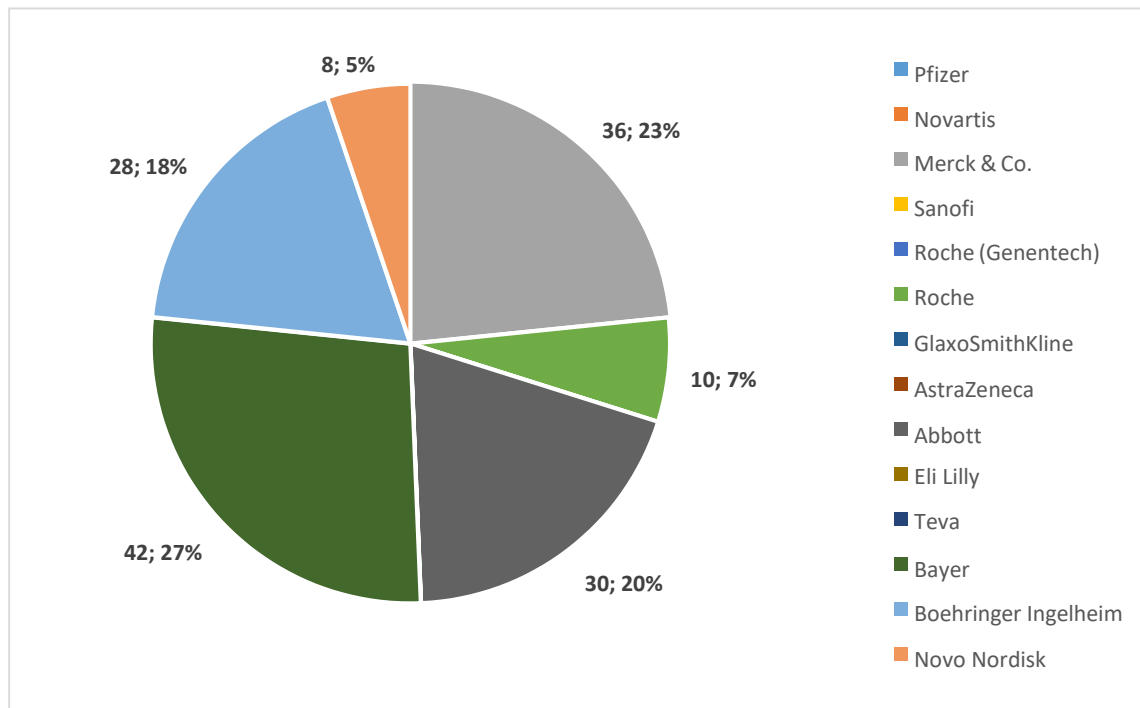
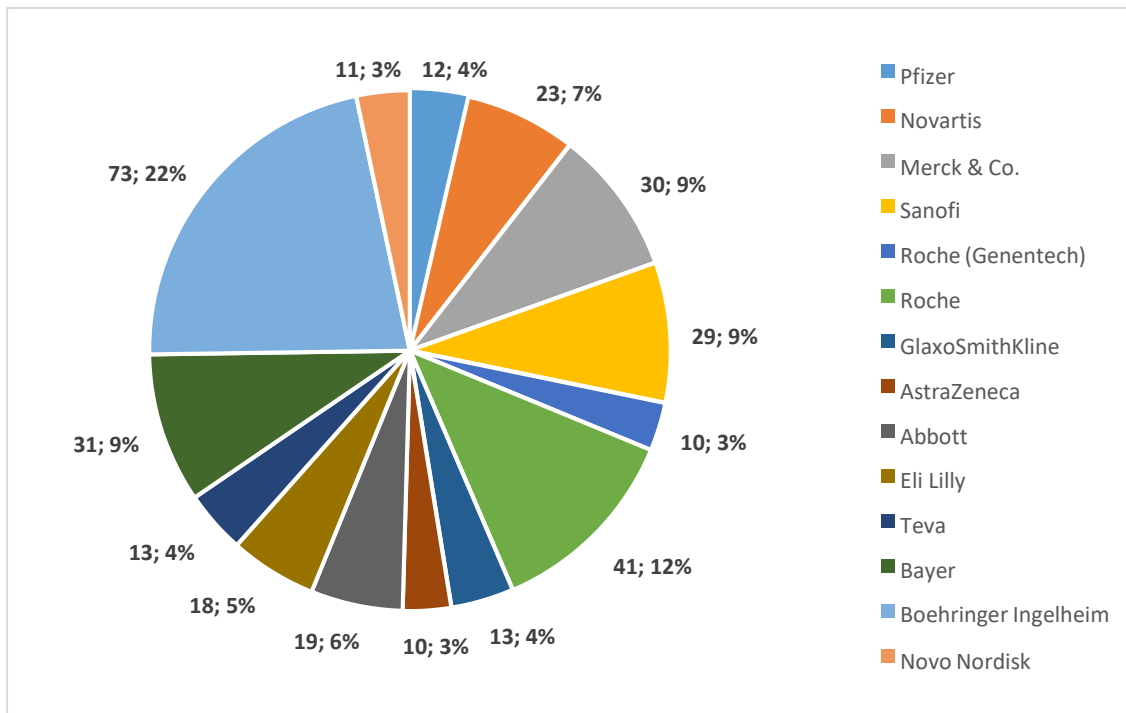*Figure 12– Pharmaceutical firms analysed on Facebook: Page fans*

4.3.2 Posts

Facebook activity, particularly in terms of posts, underwent evaluation, with posts categorized into two types: (1) user posts; and (2) brand posts. As shown in Figure 13, only six Facebook pages (Merck & Co., Roche, Abbott, Bayer, Boehringer Ingelheim, and Novo Nordisk) displayed user posts on their wall, each demonstrating differing levels of activity.

Figure 13– Pharmaceutical firms analysed on Facebook: Users posts

When it comes to brand posts, every Facebook page analysed includes them on their walls. As depicted in Figure 14, Boehringer Ingelheim showed the highest level of activity with 73 posts, while Roche (Genentech) and AstraZeneca were the least active, each with 10 posts.
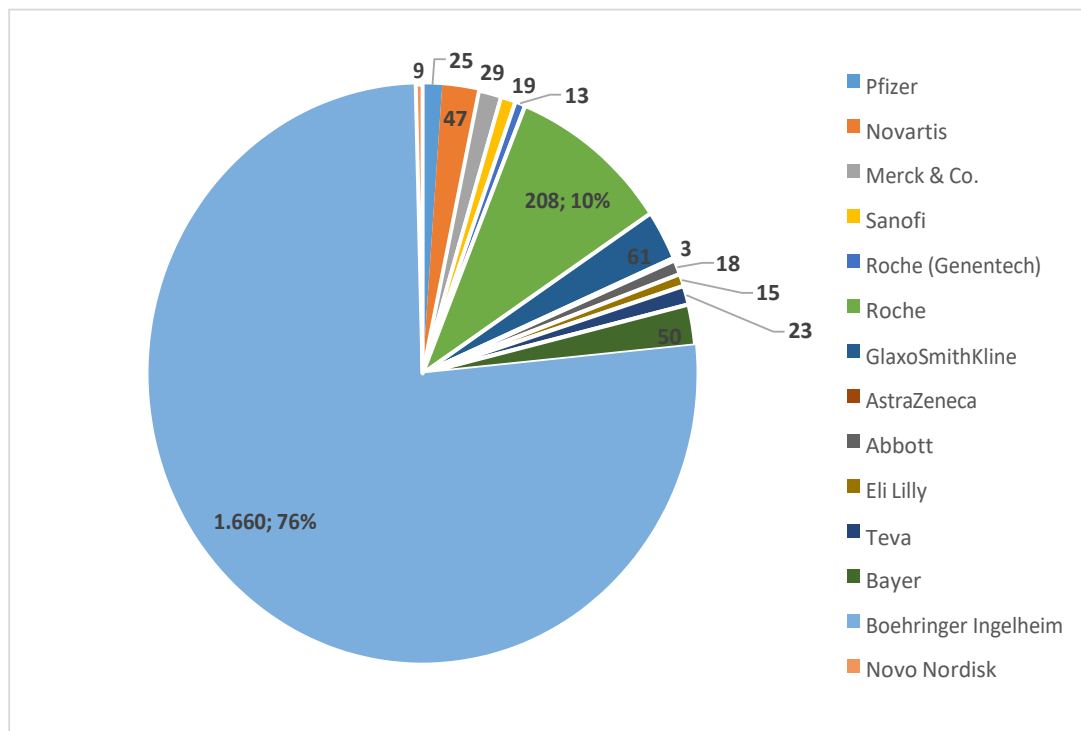
Figure 14– Pharmaceutical firms analysed on Facebook: Brand posts

4.3.3 Comments, shares and likes in brand posts

Engagement with brand posts takes different forms, including comments. As depicted in Figure 15, comment activity was observed across all Facebook pages. Boehringer Ingelheim emerged as the leader in this aspect, garnering the highest number of comments at 1,660, constituting 76% of all comments registered.

Roche's Facebook page followed closely in terms of comments, recording 208 (10%), indicating a notable contrast in engagement levels compared to Boehringer Ingelheim and other companies.

Figure 15– Pharmaceutical firms analysed on Facebook: Comments to brand posts

The second type of interaction analysed on Facebook pages was the sharing of brand posts. According to Figure 16, share activity was evident across all Facebook pages. Boehringer Ingelheim emerged as the leader in this aspect, accruing the highest number of shares at 1,074, representing 48% of all shares registered.

GlaxoSmithKline's Facebook page followed closely behind with 307 shares (17%), highlighting a notable disparity between Boehringer Ingelheim and the rest of the companies.
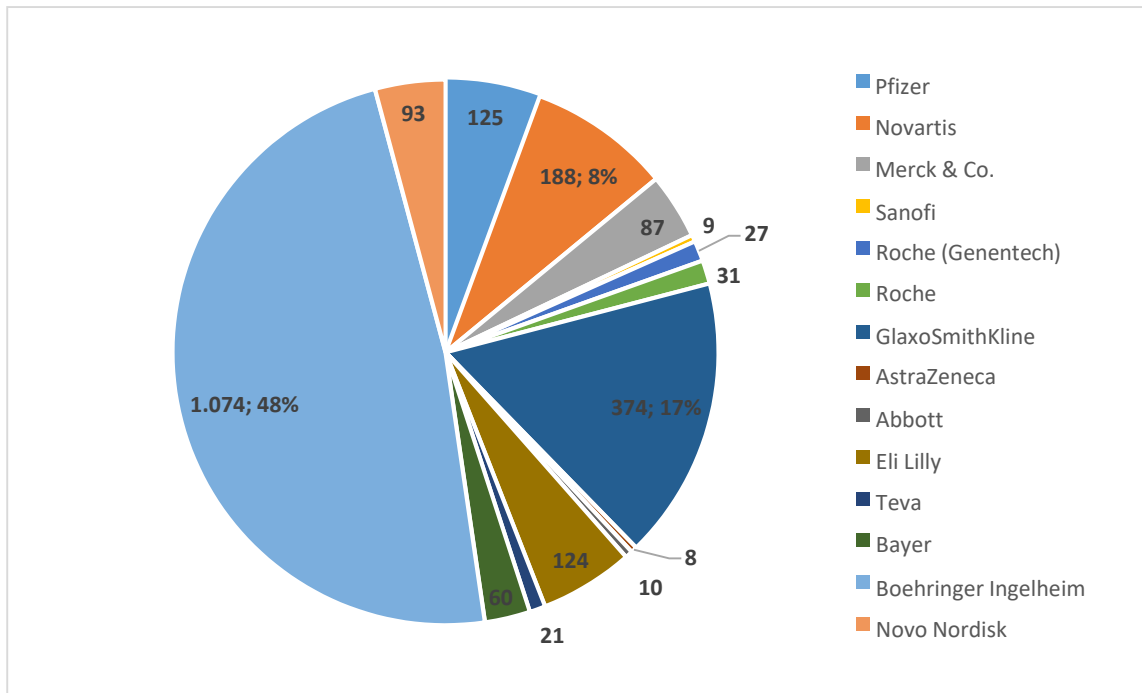
Figure 16– Pharmaceutical firms analysed on Facebook: Shares of brand posts

The analysis of interactions on Facebook pages included examining the sharing of brand posts. Figure 16 illustrates share activity across all Facebook pages. Boehringer Ingelheim emerged as the most active, recording the highest number of shares at 1,074, making up 48% of all shares registered.

Following closely, GlaxoSmithKline's Facebook page ranked second with 307 shares (17%), underscoring the notable difference between Boehringer Ingelheim and the other companies.
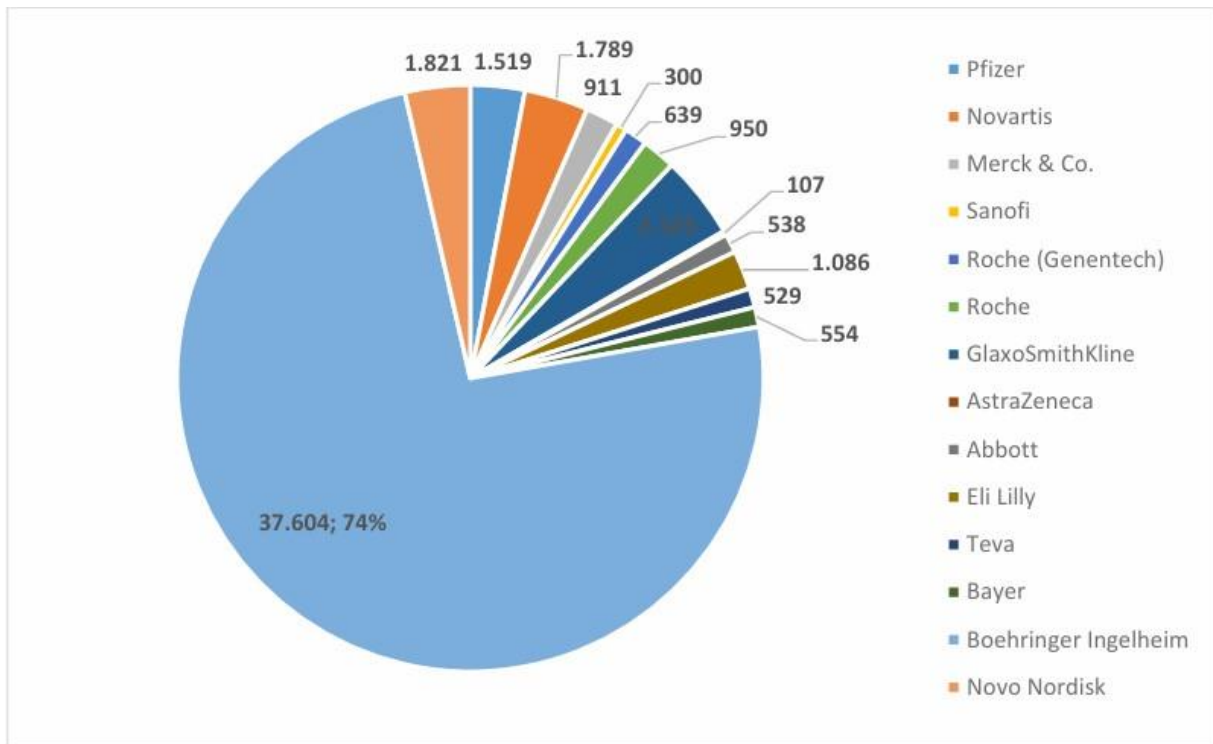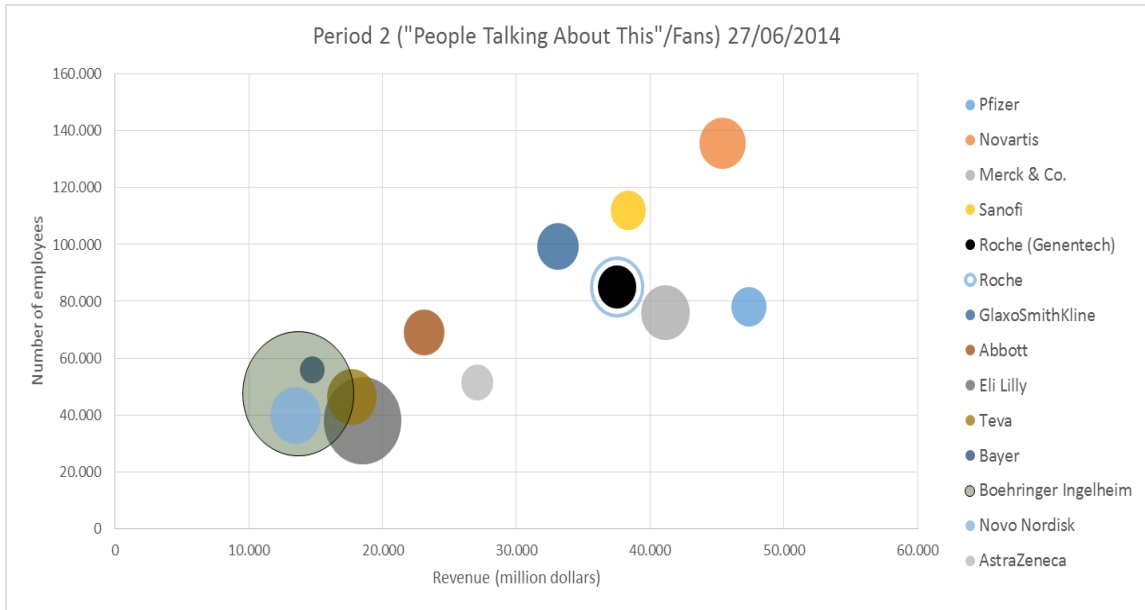
Figure 17– Pharmaceutical firms analysed on Facebook: Likes in brand posts

The last type of interaction scrutinized on Facebook pages was the liking of brand posts. As illustrated in Figure 17, likes were observed across all Facebook pages. Remarkably, Boehringer Ingelheim emerged as the frontrunner in this aspect, accruing 37,604 likes, representing 74% of all likes registered. In contrast, the brand posts of other companies received notably fewer likes compared to those of Boehringer Ingelheim.
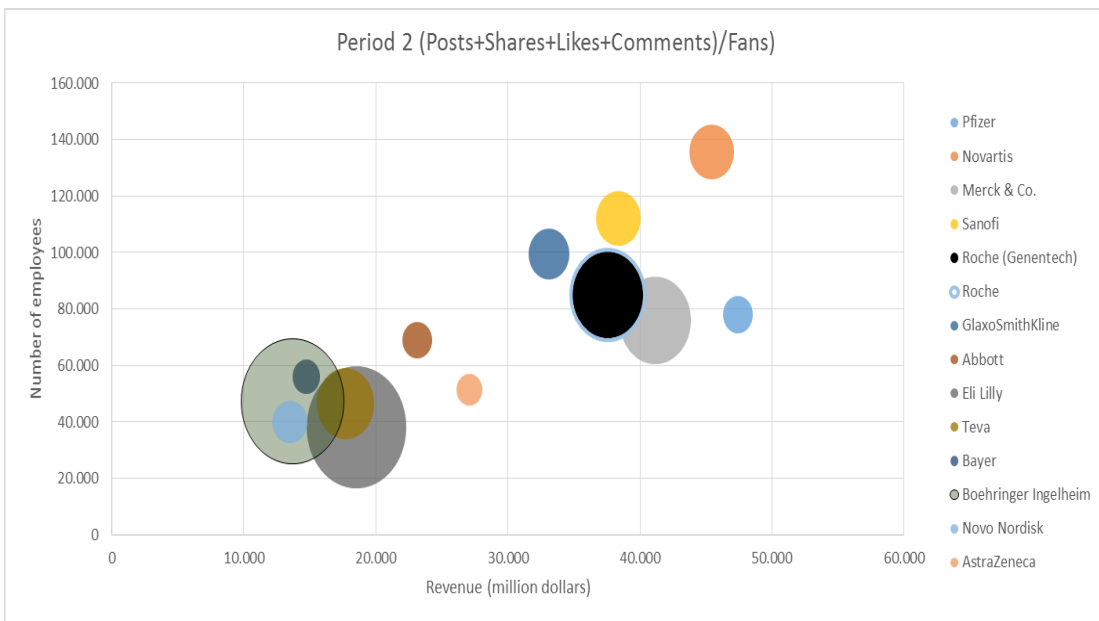
4.3.4 Engagement

Utilizing insights from existing literature and prior conceptualizations of engagement, we present the Facebook engagement findings across two dimensions: (1) "People Talking About This" divided by Fans; (2) (Posts + Shares + Likes + Comments) divided by Fans. Our initial emphasis is on "People Talking About This" divided by Fans.

The analysis underscores that Facebook engagement does not exhibit a proportional relationship with company size. However, it's crucial to acknowledge that the assessment period of one week may not offer comprehensive insights into actual engagement levels, necessitating further examination during subsequent activity periods.

Figure 18– Pharmaceutical firms analysed on Facebook: Engagement rate period 2 (1)

Figure 19– Pharmaceutical firms analysed on Facebook: Engagement rate period 2 (2)

As Boehringer Ingelheim stands out as the most engaging pharmaceutical company on Facebook, Figure 20 presents a selection of its most interactive posts. These posts predominantly feature quizzes, discussions on particular diseases, and insights into the company's history.


Figure 20– Examples of Boehringer Ingelheim most engaging brand posts

4.3.5 Facebook cluster analysis

In this section, a cluster analysis was performed to classify Facebook engagement data and the number of Fans into specific clusters. Each cluster was named according to its level of engagement and the size of its fan base. Following the identification and naming of each cluster, various variables were used to characterize them.

Four clusters were identified by analysing the correlation between Facebook engagement data and the number of Fans. These clusters are labeled as "Fan Appreciators with High and Low Activity," "Fan Friendly with Medium Activity," "Strongly Active Fan Haters," and "Non-Active Fan Lovers."
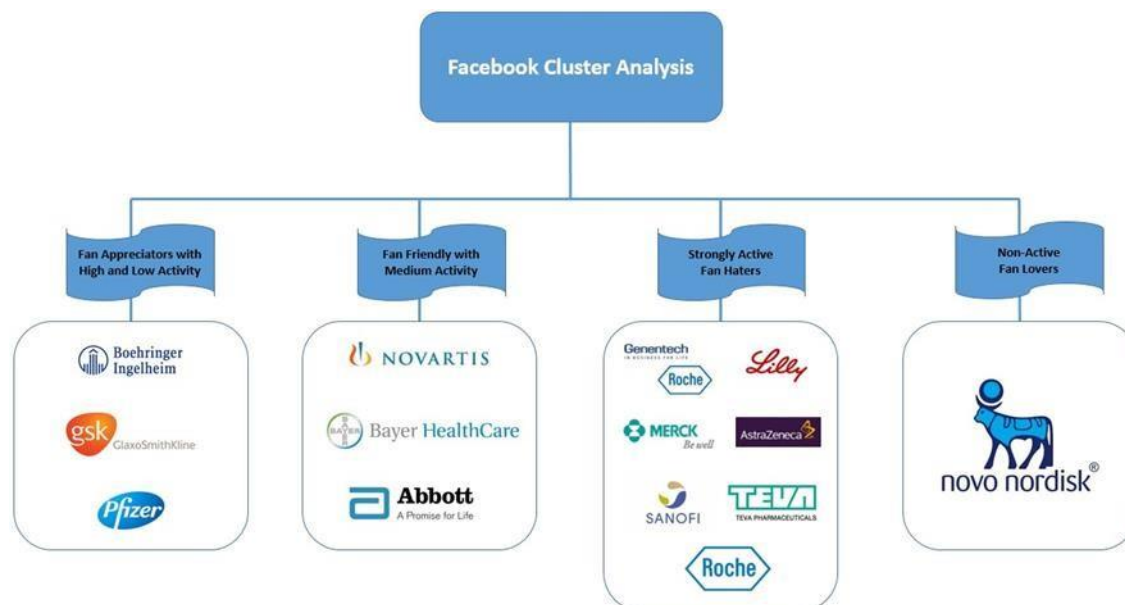
Figure 21– Facebook cluster analysis with defined cluster names

After naming all four clusters, a thorough analysis was conducted to characterize each one. Table 3 delineates the variables employed to gain deeper insights into each cluster. This characterization reflects the performance of each cluster across diverse parameters, acknowledging that these clusters lack homogeneity, and as such, the companies within them may demonstrate both low and high performance within the same cluster.

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	Fan Appreciators with High and Low Activity	Fan Friendly with Low to High Activity	Strongly Active Fan Haters	Non-Active Fan Lovers
Revenue	+++/--	++/--	++/-	---
Employees	++/-	+++/-	++/--	---
Brand Posts	+++/--	+/-	++/--	--
Brand Post Shares	+++	++/--	+/---	+/-
Brand Post Likes	++	+/--	+/---	++
Brand Post Comments	+++/-	++/-	++/---	--
User Posts	+/---	++/-	+/---	+/-

Table 3– Facebook clusters: characterization

Note:
-> Each + sign reveals the positive intensity in each parameter while each – sign reveals the negative intensity in each parameter, because clusters are not homogeneous.

4.4 Twitter data analysis

The presence of pharmaceutical companies on Twitter comprised 18 entities. Figure 22 illustrates all 18 companies that maintain a Twitter account.

Figure 22– Pharmaceutical firms analysed on Twitter

4.4.1 Followers

The first aspect examined in the analysis of pharmaceutical companies' presence on Twitter was their follower count. Figure 23 illustrates that none of the companies have exceeded 100,000 followers, with Pfizer and Novartis emerging as the frontrunners with 99,709 and 84,495 followers, respectively. Additionally, three companies—Eli Lilly, Amgen, and Gilead Sciences—have fewer than 5,000 followers each.
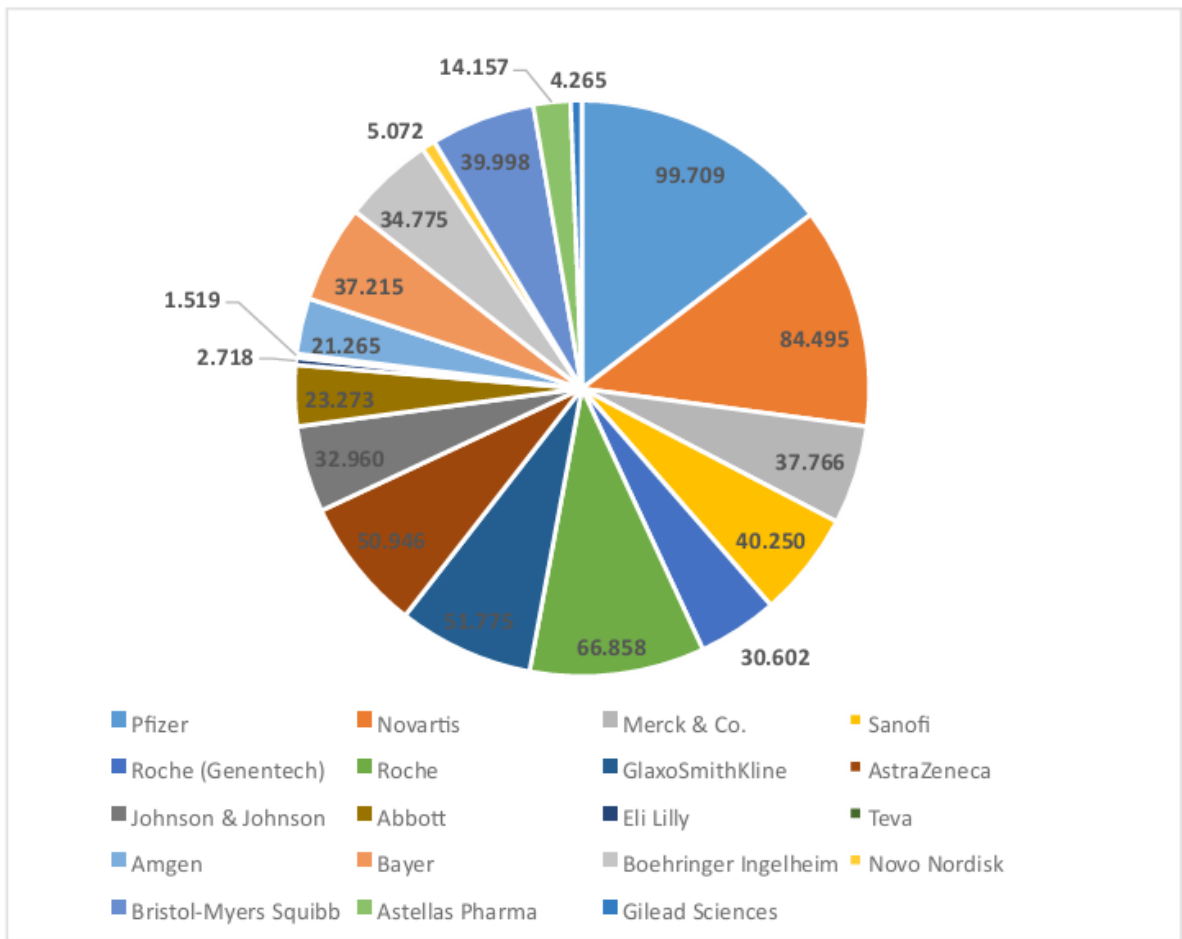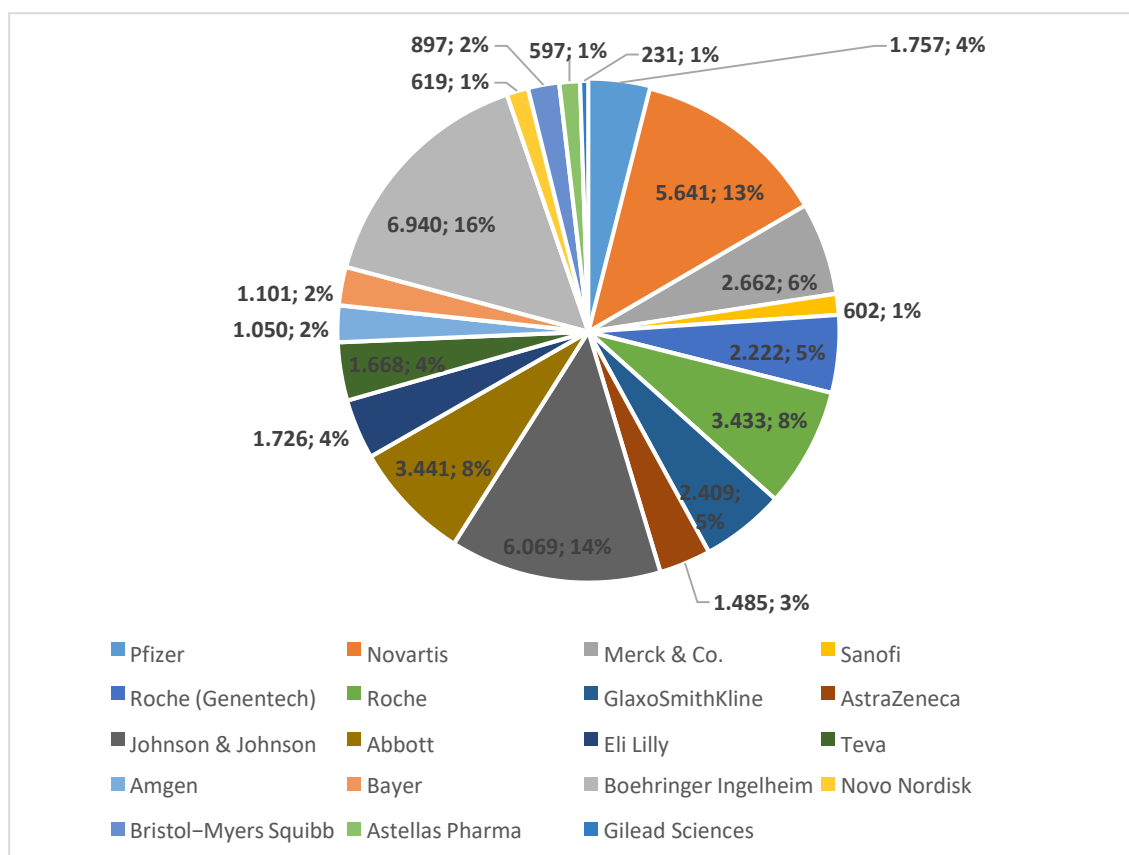
Figure 23– Pharmaceutical firms on Twitter: Number of followers

4.4.2 Tweets, retweets and mentions

To comprehensively understand Twitter activity, three key aspects were examined: (1) tweets; (2) retweets; and (3) mentions, including replies.

Regarding tweets, the analysis was divided into lifetime tweets and tweets during specific analysis periods. According to Figure 24, three companies have shown high activity (over 5,000 tweets) since the establishment of their Twitter accounts. Boehringer Ingelheim leads with 6,940 tweets (16%), followed by Johnson & Johnson (6,069 tweets; 14%) and Novartis (5,641 tweets; 13%). Conversely, five companies have recorded fewer than 1,000 lifetime tweets.

Figure 24– Pharmaceutical firms on Twitter: Number of tweets (lifetime)

Figure 25 presents the total number of tweets registered during periods 1 and 2. Notably, the top three companies in terms of lifetime tweets maintain their positions for the total number of tweets registered.

However, there is a slight change in rankings. Johnson & Johnson leads with 179 tweets, constituting 21% of the total tweets. Novartis closely follows with 97 tweets (11%), while Boehringer Ingelheim is placed third with 87 tweets (10%). Only two companies, AstraZeneca and Gilead Sciences, recorded tweet activity below 10 tweets.
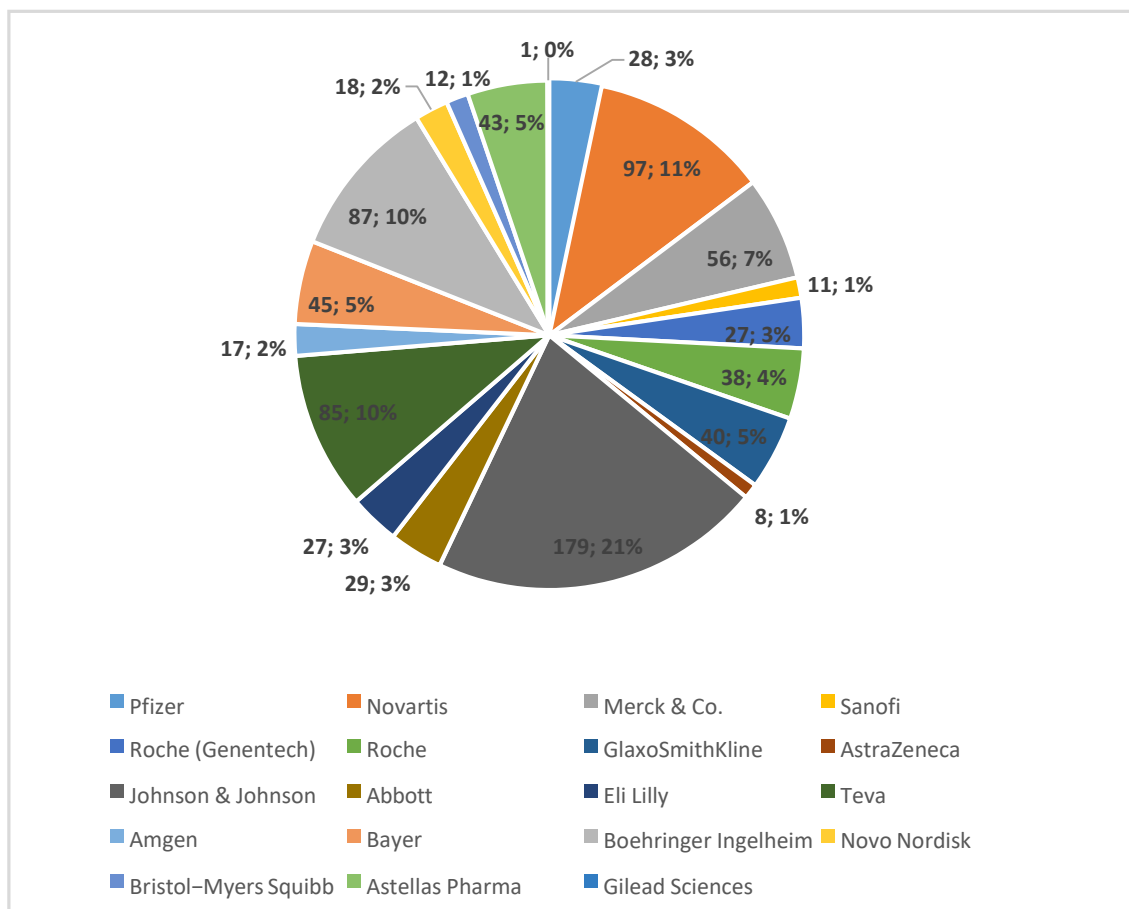
Figure 25– Pharmaceutical firms on Twitter: Total of tweets registered

Figure 26 demonstrates that the top three companies in terms of retweets correspond with the findings of the tweets analysis. These top three companies collectively accounted for 51% of the registered retweets. Boehringer Ingelheim led with the highest number of retweets, totalling 509, which represents 20% of the total retweets. Johnson & Johnson closely followed with 492 retweets (20%), while Novartis secured the third position with 270 retweets, constituting 11% of the total retweets. Only two companies, Novo Nordisk and Gilead Sciences, recorded retweet numbers below 20.
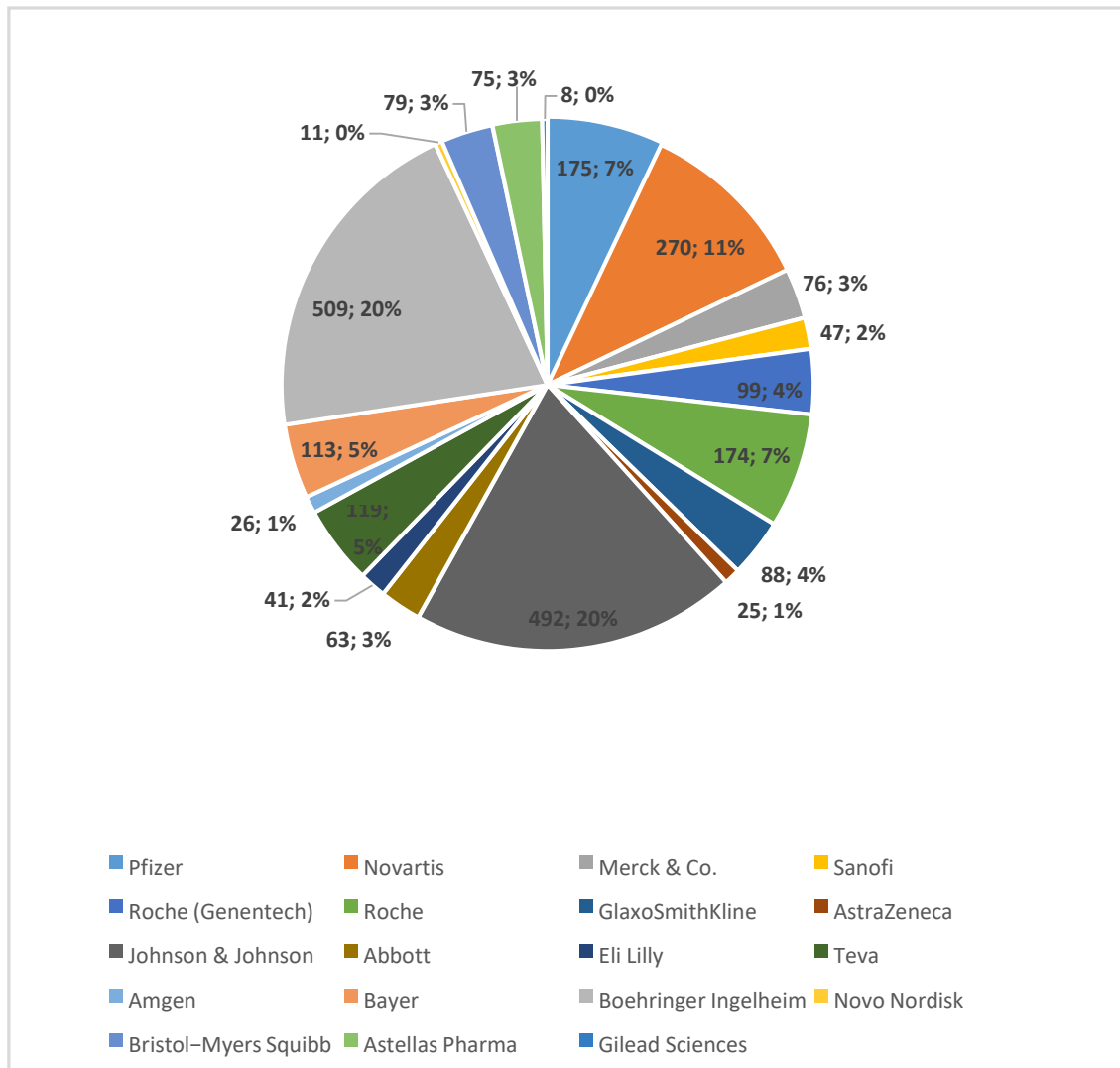
Figure 26– Pharmaceutical firms on Twitter: Total of retweets registered

While tweets and retweets exhibit some commonality in top performance, the analysis of mentions introduces two new leaders in this category

As depicted in Figure 27, Merck & Co emerges as the top performer in mentions activity with 1,752 mentions, representing 21% of the total mentions. Close behind is Roche (Genentech) with 1,198 mentions (14%). These were the only companies to exceed the 1,000 mentions mark. In contrast, Gilead Sciences received fewer than 100 mentions.

Figure 27– Pharmaceutical firms on Twitter: Total of mentions registered

4.4.3 Customer service

The interaction between pharmaceutical companies and users' inquiries on Twitter is reflected in customer service responses. As depicted in Figure 28, throughout the analysis period, only 11 Twitter accounts associated with pharmaceutical companies responded to user requests. These accounts belong to Novartis, Merck & Co., Roche (Genentech), Roche, GlaxoSmithKline, Johnson & Johnson, Teva, Bayer, Boehringer Ingelheim, Novo Nordisk, and Astellas Pharma.

Johnson & Johnson emerged as the most proactive company in this aspect, providing 48 customer service responses, which represents 48% of the total responses.
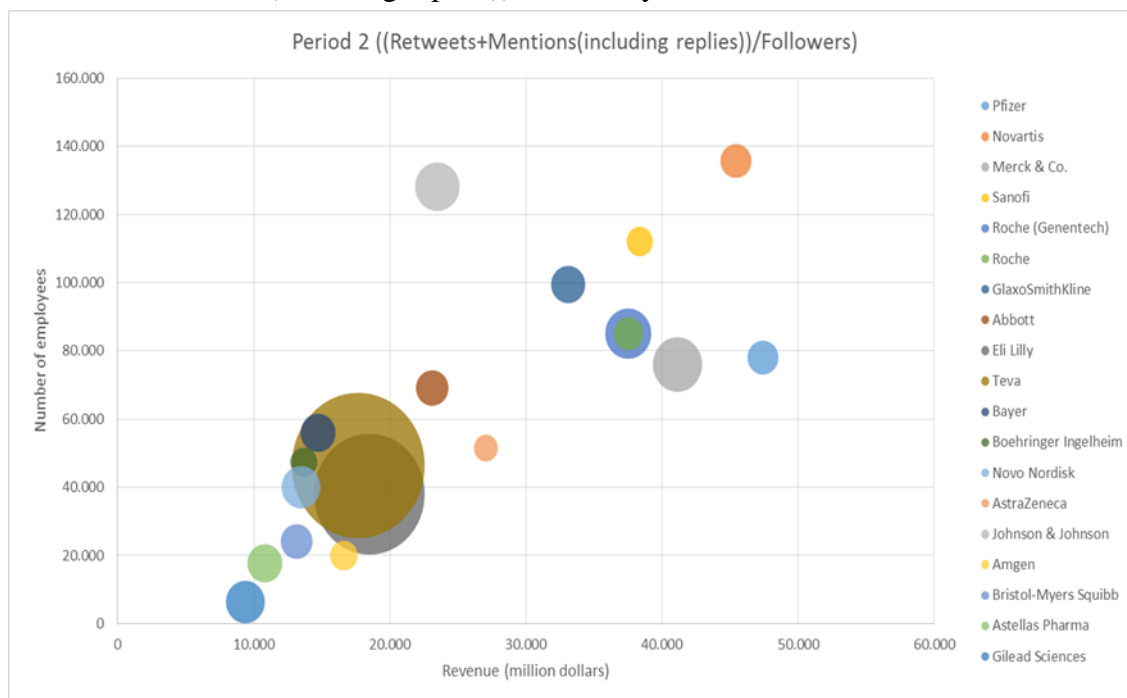
Figure 28– Pharmaceutical firms on Twitter: Total customer service responses

4.4.4 Engagement

Similar to the Facebook analysis, we present the results for Twitter engagement, calculated as (Retweets + Mentions (including replies)) divided by Followers.

Figure 29– Pharmaceutical firms on Twitter: Engagement rate period 2

The engagement analysis for period 2 is shown in Figure 29. According to the graphical representation in this figure, it's clear that the engagement rate doesn't increase proportionally with company size. However, Teva and Eli Lilly stand out for their high performance compared to the other companies.

4.4.5 Twitter cluster analysis

A cluster analysis was undertaken to categorize the Twitter presence of pharmaceutical companies, resulting in the identification of five clusters. These clusters were established based on engagement data and the number of followers.

The clusters are designated as follows: "Follower Lovers with Very Low to Medium Activity," "Follower Friendly with Low to High Activity," "Weakly Active Follower Appreciators," "Follower 'Dislikers' with Very Low to Medium Activity," and "Follower Haters with High to Very High Activity."
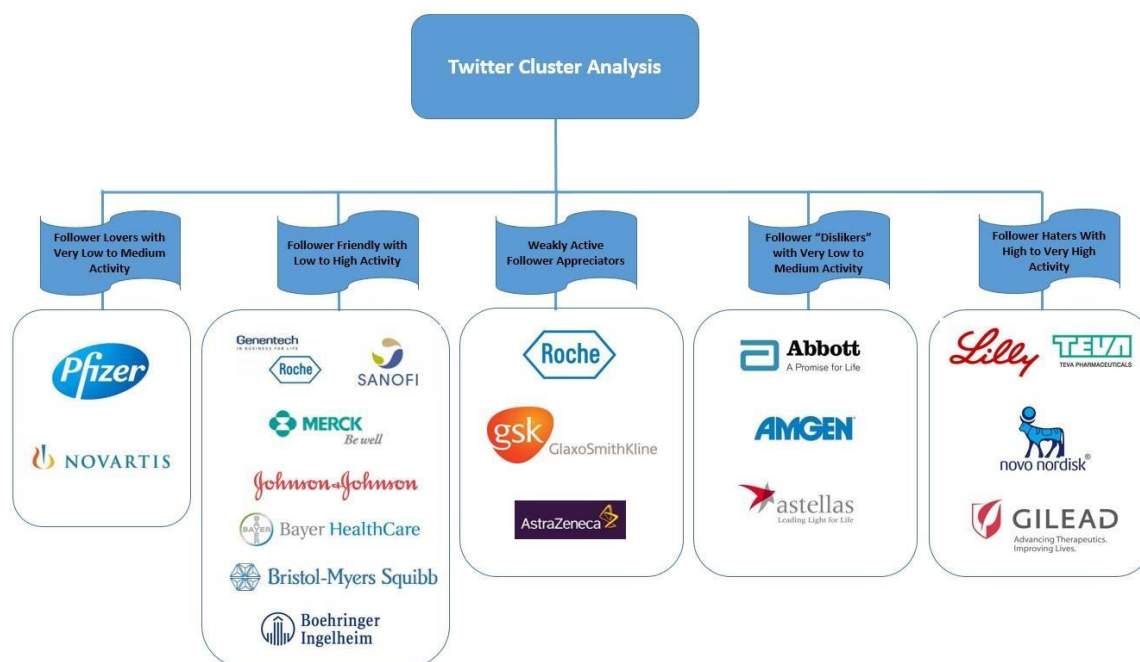
Figure 30– Twitter cluster analysis with defined cluster names

After assigning names to all five clusters, a thorough analysis was conducted to delineate the characteristics of each one . Table 3 delineates the variables used to gain deeper insights into each cluster. This characterization underscores how each cluster performs across various parameters, recognizing the non-homogeneity of these clusters and the potential for companies within the same cluster to exhibit both low and high performance.

	Follower Lovers with Very Low to Medium Activity	Follower Friendly with Medium Activity	Weakly Active Follower Appreciators	Follower "Dislikers" with Very Low to Medium Activity	Follower Haters with High to Very High Activity
Revenue	+++	++/--	+	+/--	--
Employees	+++/-	++/-	++/-	+/---	--
Tweets (Lifetime)	++/-	+++/--	++/-	++/--	+/---
Tweets (Periods)	++/-	+++/--	+/--	+/-	+/--
Retweets	++	+++/-	+/--	--	+/---
Mentions with Replies	++	+++/-	+	--	--
Customer Service Responses	--	+++/--	++/-	--	++/--

Table 4– Twitter clusters: characterization

Note:
-> Each + sign reveals the positive intensity in each parameter while each – sign reveals the negative intensity in each parameter, because clusters are not homogeneous.

CHAPTER 5- CONCLUSION

Over the last decade, social media has transformed the digital landscape, fostering connections among individuals, businesses, and brands. Yet, some industries still struggle to fully harness social media's potential for exposure and customer engagement. This raises questions about the factors motivating firms to invest more in social media and which platforms they prioritize.

In the pharmaceutical sector, social media plays a crucial role as a communication channel with consumers. Analysis of pharmaceutical companies' social media activity reveals diverse patterns across various parameters examined for each platform. While some companies excel in certain aspects, they may perform less effectively in others, and some companies appear to have minimal activity on these platforms.

Moreover, when evaluating the key indicator of activity—the engagement ranking—smaller companies often outshine larger ones. However, there is no clear correlation between a company's engagement ranking and its size in terms of revenue and workforce.

Regarding digital engagement strategies, pharmaceutical companies demonstrate diversity across the three social media platforms studied. Cluster analysis highlights that these companies generally adopt distinct approaches on Facebook, Twitter, and YouTube. This is evident in their distribution across different clusters or segments, each presenting unique characteristics across these platforms.

Recommendations

1. Tailor Content for Each Platform

- **Platform-Specific Strategies:** Develop content strategies tailored to the unique features and audience preferences of each social media platform (Facebook, Twitter, YouTube).
- **Visual Content:** Prioritize visual content on platforms like Facebook and YouTube, leveraging videos, infographics, and images to enhance engagement.
- **Concise Messaging:** Craft concise and compelling messages for Twitter, focusing on brevity and clarity to capture audience attention in a fast-paced environment.

2. Foster Engagement Through Interactive Content

- **Interactive Posts:** Create interactive content such as polls, quizzes, and live streams to encourage audience participation and increase engagement.
- **User-Generated Content:** Encourage user-generated content by soliciting feedback, testimonials, and user stories, fostering a sense of community and involvement among followers.

3. Embrace Multimedia Storytelling

- **Storytelling Approach:** Adopt a multimedia storytelling approach to convey brand narratives and product stories effectively across social media platforms.
- **Behind-the-Scenes Content:** Share behind-the-scenes glimpses of research and development processes, employee stories, and corporate social responsibility initiatives to humanize the brand and foster transparency.

4. Leverage Influencer Partnerships

- **Influencer Collaboration:** Collaborate with healthcare professionals, patient advocates, and industry influencers to amplify brand messaging and reach a wider audience.
- **Authentic Partnerships:** Prioritize authentic partnerships with influencers who align with the brand's values and target audience, ensuring credibility and relevance in influencer-driven campaigns.

5. Implement Data-Driven Strategies

- **Data Analysis Tool:** Utilize social media analytics tools to track and analyse engagement metrics,

identify trends, and measure the effectiveness of contentstrategies.

- **Iterative Optimization:** Continuously iterate and optimize content based on data insights, experimenting with different formats, posting times, and messaging strategies to maximize engagement.

6. Ensure Regulatory Compliance

- **FDA Guideline:** Adhere to FDA guidelines and regulatory requirements governing pharmaceutical marketing on social media, ensuring compliance with advertising andpromotional regulations.
- **Transparency:** Maintain transparency in promotional content, clearly disclosing relevant safety information, indications, and potential risks associated with pharmaceutical products.

7. Engage in Conversations and Address Concerns

- **Active Engagement:** Actively engage with followers by responding to comments, addressing inquiries, and participating in conversations relevant to the pharmaceuticalindustry.
- **Crisis Management:** Develop a robust crisis management plan to address potential negative feedback or adverse events on social media promptly and transparently.

8. Educate and Inform

- **Educational Content:** Provide valuable and informative content that educates audiences about health conditions, treatment options, and advancements in thepharmaceutical industry.
- **Empower Patients:** Empower patients to make informed healthcare decisions by sharing resources, tips, and guidelines for managing health-related issues.

9. Monitor Industry Trends and Best Practices

- **Industry Benchmarking:** Monitor industry trends and benchmark against competitors to identify emerging best practices and opportunities for innovation.
- **Continuous Learning:** Invest in ongoing education and training to stay abreast of evolving social media algorithms, trends, and regulations impacting the pharmaceuticalindustry.

10. Measure Impact and ROI

- **Key Performance Indicators (KPIs):** Define clear KPIs aligned with business objectives, such as engagement rates, reach, brand sentiment, and conversion metrics.
- **ROI Analysis:** Conduct regular ROI analysis to evaluate the effectiveness of social media initiatives in driving business outcomes and informing strategic decision- making.

By implementing these recommendations, pharmaceutical companies can optimize their social media engagement strategies, foster meaningful connections with audiences, and enhance brand reputation and credibility within the digital landscape.

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