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PHARMACEUTICAL MARKETING AND SOCIAL MEDIA: A FACEBOOK, TWITTER AND YOUTUBE ANALYSIS

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To My Mother / À Minha Mãe

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Abstract:

The emerging importance of social media in business organizations is raising the awareness of the decision makers towards this thematic. Platforms such as Facebook, Twitter and YouTube are now a part of the businesses communication strategies, leading to a dialogue between users/consumers and marketers. In the pharmaceutical industry similar communication strategies are being adopted. However, this industry and specially its marketing department are subjected to intensive regulations due to the healthcare nature of the business, that can suppress a quick adoption of these platforms. Moreover, in the pharmaceutical marketing environment, the lack of official and specific regulations for social media creates uncertainty, which also turns social media implementation process into a difficult path to follow.

This research has as objective to evaluate the presence of the pharmaceutical industry on social media platforms such as Facebook, Twitter and YouTube, and characterize the types of digital engagement strategies used.

To perform this research, a new methodological approach and concept model were developed in order to evaluate the top 20 pharmaceutical companies' presence on the selected social media. This new methodology includes a descriptive analysis of each social media platform for each pharmaceutical company, followed by a cluster analysis with a characterization of each cluster using a crosstabs analysis.

Findings from this study show that not all pharmaceutical companies are present on social media, and some platforms are more used than others. Interestingly the level of engagement was not associated with the size of the companies and the digital engagement strategies varied between the analysed social media platforms.

This research provides insights of how pharmaceutical companies are organized on social media, and clearly contributes with a framework and methodology for future researches in this domain. Also, some of the limitations encountered provide suggestions of how to proceed in future studies.

Keywords: Pharmaceutical Marketing, Facebook, Twitter, YouTube, Engagement

Resumo:

Com o aumento da importância dada aos *social media* pelo mundo empresarial, os decisores estão cada vez mais interessados nesta temática. As plataformas online como o Facebook, Twitter e YouTube fazem, hoje em dia, parte das estratégias comunicacionais das empresas, provocando um diálogo entre os *marketers* e os utilizadores/consumidores. Embora estas estratégias comunicacionais estejam a ser usadas na indústria farmacêutica, esta indústria, e especialmente o seu departamento de marketing, encontra-se sob altas pressões regulamentares devido à natureza do seu negócio que podem suprimir a adesão rápida aos *social media*. Também devido à falta de regulação oficial e específica dirigida para os *social media*, torna-se difícil, ao nível do marketing farmacêutico, delinear uma estratégia comunicacional nesta área.

Esta investigação tem como objetivo avaliar a presença da indústria farmacêutica nos *social media*, nomeadamente no Facebook, Twitter e YouTube, e ao mesmo tempo caracterizar as diferentes estratégias para o *engagement* digital.

De forma a concretizar esta investigação foi desenvolvida uma abordagem metodológica específica e um modelo concetual que permitiu avaliar a presença nos *social media* selecionados, das principais 20 das empresas farmacêuticas a nível mundial. Este trabalho incluiu uma análise descritiva das plataformas usadas por cada empresa farmacêutica, bem como uma análise de *clusters* seguida de uma caracterização de cada *cluster* através de uma análise "*crosstabs*".

Através desta investigação foi possível constatar que nem todas as empresas farmacêuticas estão presentes nos social media e que o nível de adoção de algumas plataformas difere entre elas. Verificou-se, também, que o nível de *engagement* parece não estar associado à dimensão das empresas e que as estratégias para o *engagement* digital variam entre plataformas.

Esta investigação tenta fornecer uma visão sobre a atuação das empresas farmacêuticas ao nível dos *social media* e, ao mesmo tempo, contribui com uma metodologia e um modelo base para futuras investigações nesta área. Algumas das limitações encontradas serão trilhos para investigações a desenvolver no futuro.

Palavras-chave: Marketing Farmacêutico, Facebook, Twitter, YouTube, *Engagement*

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LIST OF ABBREVIATIONS

DTC	Direct-to-consumer
EU	European Union
FDA	Food and Drug Administration
OTC	Over-the-counter
USA	United States of America
WOM	Word of mouth

CHAPTER 1 – INTRODUCTION

Companies are concentrating efforts in social media (e.g., Facebook, Twitter and YouTube) in order to increase their streams of profit (Kaplan & Haenlein, 2010).

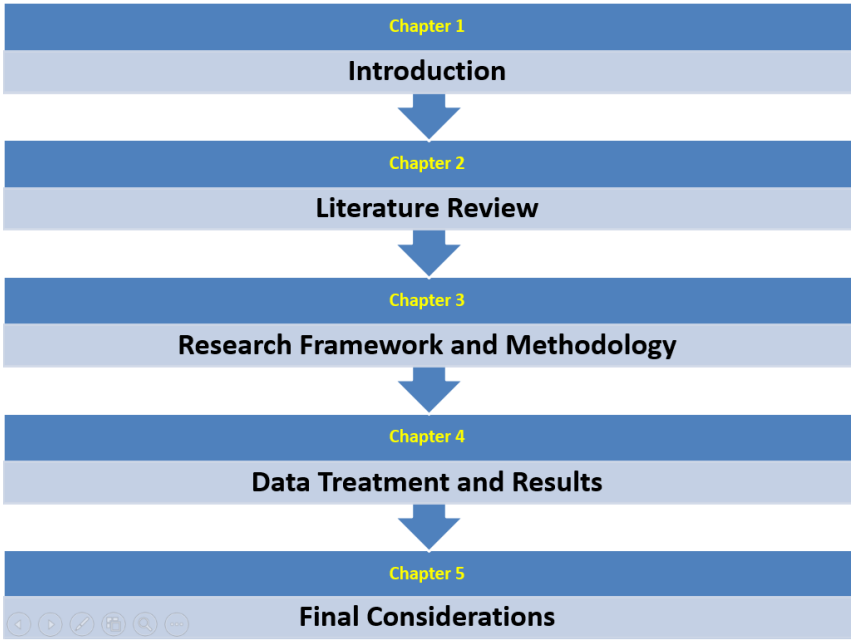
In the pharmaceutical market, social media is changing habits, allowing bi-directional conversations between consumers and pharmaceutical companies, and through it provides a shift of power from the industry to consumers, transforming them into active players (Rollins & Perri, 2013). Bolotaeva and Cata (2011) further states that social media can leverage brand presence and awareness while reducing budget requirements.

While social media seems to bring huge advantages for pharmaceutical companies, it seems their adherence to these platforms is facing several setbacks. According to Rollins and Perri (2013), pharmaceutical companies are experiencing ethical and legal issues when trying to adopt these platforms. Studies of Shankar and Li (2014) and Aitken, Altmann, and Rosen (2014) provided insights of social media presence of pharmaceutical companies in 2011 and 2014, respectively. Like these authors, one of the objectives of this research is to assess the current social media presence of selected pharmaceutical companies.

According to Liu and Fraser (2012), the pharmaceutical industry is performing poorly in terms of engagement when comparing with other industries. For this reason it is important to assess the level of engagement of each company and try to identify if they perform identically or if in fact they have distinguished behaviours on the different social media platforms, and therefore assess their digital engagement strategies. Also for Aitken, Altmann, and Rosen (2014) it seems to exist an association between the size of the pharmaceutical companies and their digital engagement performance. In accordance with this line of thought, this research tries to provide insights about this subject, through the analysis of pharmaceutical companies' activity on Facebook, Twitter and YouTube.

In order to develop this research and achieve its proposed objectives, five chapters were produced, as clearly demonstrated in Figure 1.

Figure 1 – Research structure



The present chapter, provides a short introduction to the research purpose, as well as the questions raised by the literature that led to the formulation of the objectives of this research. Also in this chapter, it is given a view of the research structure.

The second chapter presents a compilation of the state of the art of pharmaceutical marketing and social media in a single and articulated perspective, through published researches and other relevant articles.

As for the third chapter, it includes an innovative conceptual model as well as the theoretical hypothesis raised by the literature, which led to the creation of the research framework. Also it is provided all the information about the steps taken in order to achieve the objectives of this research.

With all the data collected, it was necessary to analyse and interpret the raw data, leading to the creation of the fourth chapter.

In the final chapter, all the conclusions of this research are summarized, including the limitations that emerged during this research. Also it is provided insights for future researches and the major contributions to firm's management.

CHAPTER 2 – LITERATURE REVIEW

2.1. Introduction

The Cambridge Healthtech Institute (2008) stated that over the last years, pharmaceutical companies have had huge success, as never seen before. However, this institute states that the growth and profitability of the pharmaceutical industry in the past cannot continue in a market highly modified as the pharmaceutical market in XXI century. It is clear that pharmaceutical companies' leaders need to understand the changes in this market and identify new strategies in order to have a positive dynamic, leading to a successful future and efficient management of challenges (Cambridge Healthtech Institute, 2008).

With the fast growth of online social networking dedicated to healthcare, the healthcare systems are being submitted to an enormous increase of complexity (Griffiths *et al.*, 2012).

According to Fox and Jones (2009) cited in Green and Kesselheim (2010), Facebook and Twitter, two of the biggest online social networks, possess around 350 million users worldwide. These authors state that some researches indicate that 60% of North Americans use the internet as a first source of healthcare information and also use these online platforms to find support in healthcare matters.

In the meanwhile, pharmaceutical industry has been slow in the adoption of this type of platforms (Green & Kesselheim, 2010).

As stated by Masood, Ibrahim, Hassali and Ahmed (2009), pharmaceutical marketing has been trying to acquire new methods along with the evolution of technology (e.g., blogs, social networks, etc.) and these new methods are being used independently or as a support to traditional marketing.

Therefore, social networks represent a new way for pharmaceutical companies to interact with consumers and physicians (Webb, 2010). However, according to this author, the transition to the internet of the communication with the physician and marketing campaigns raises several regulatory and legal questions.

Nevertheless, Webb states that regulatory issues are only one part of the concerns of companies that use the internet. Due to the reach of the internet, these companies need to manage relationships with customers, since these consumers have at their disposal a

wide-ranging platform that gives them a unique power of communication: they are not just being receptors of messages; they are being active broadcasters and participants (Webb, 2010).

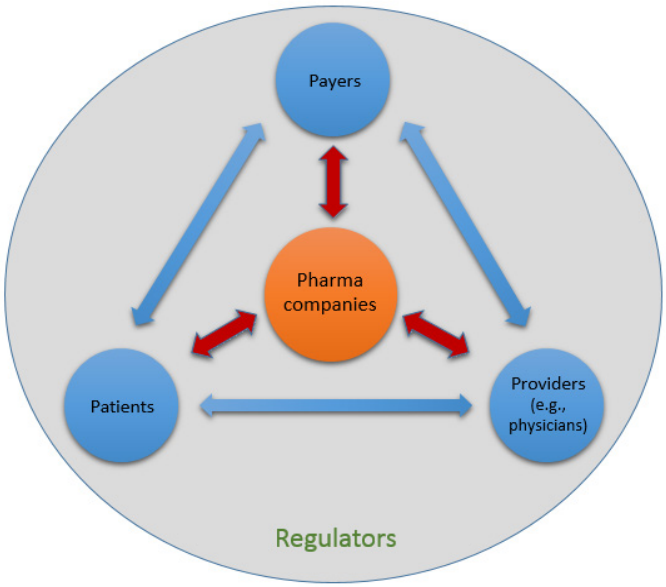
2.2. Evolution of pharmaceutical marketing

The pharmaceutical industry is different from other types of industry (Stremersh & Van Dyck, 2009 cited in Ding, Eliashberg & Stremersch, 2014). It's a science-based industry highly regulated when comparing to other industries. Because medicines have a massive impact on the quality of life of people, the global system constituted by regulators, healthcare providers (e.g., physicians or pharmacists) and payers (e.g., government and insurance companies) is architected in order to protect the welfare of patients at a tolerable cost (Ding, Eliashberg & Stremersch, 2014).

According to Ding, Eliashberg and Stremersch (2014), the pharmaceutical industry has been growing in a steady way, around 4% to 7% annually and is getting quickly to a market value of 1 trillion American dollars, while facing difficult challenges in innovation and marketing. These authors declare that a company with a low capability for innovation will have a low differentiation potential, leading to lower margins, while a company with weak marketing skills will not fully leverage the value that innovation can bring, and consequently will have potential losses of billions of dollars which are required for their stakeholders and for a constant innovation. Therefore, companies who have a robust innovation and marketing skills have been able to manage effectively their challenges and will keep generating value for their stakeholders (Ding, Eliashberg & Stremersch, 2014).

As stated by Ding, Eliashberg and Stremersch (2014), society sees two conflicting features in medicines. Not only they view them as a normal commodity that satisfies some consumer needs, but also as something that people consider as a basic necessity. These authors express that pharmaceutical companies must be aware of these two features while they capitalize on their innovations. As we can see in Figure 2, this task demands a cautious management not only of the relationship between the company with its 3 key stakeholders (patient, healthcare provider and payer), but also the relation between these stakeholders, all subject to tight regulatory pressures from regulatory bodies (Ding, Eliashberg & Stremersch, 2014).

Figure 2 – Players and relationships in the pharmaceutical market



Source: Adapted from Ding, Eliashberg and Stremersch (2014), p. 6

Also Busfield (2010) provides, through Table 1, his vision of the key players (and their characteristics) in the pharmaceutical market.

Table 1 – Key actors and influences on medicine use

Actor	Role	Actor's own expansionary ideas and actions	External pressures
Pharmaceutical industry	Developers, producers, promoters and sellers	Desire to increase profits mechanisms: (a) Marketing/promotion to physicians and public (b) Control over science (c) Disease mongering	×(a) Cost controls of governments and insurance companies ×(b) Drug licensing and safety regulations
Physicians	Prescribers and gatekeepers; sometimes researchers	(a) Interventionism (b) Imbalances in risk assessment (c) Limited knowledge (d) Medicalization	++(a) Industry's promotion of medicines +(b) Patients' requests +(c) Greater risk consciousness ××(d) Cost controls of governments and insurance companies
The public	Potential users	(a) Desire to get better (b) Belief in the value of medicines (c) Active consumers/expert patients	++(a) Industry's promotion of medicines +(b) Growth of consumer-oriented culture +(c) Government focus on choice and the expert patient
Governments and insurance companies	Set framework of health care including access to medicines; funders of health care; responsibilities in safety	(a) Improving access to health care (b) Supporting choice (c) Value of industry to the economy	++(a) Industry's promotion of medicines ××(b) Growing cost of health care provision

Note: ++ = strong expansionary pressure; + = weaker expansionary pressure
×× = strong constraint on expansion; × = weaker constraint on expansion

Source: Adapted from Busfield (2010), p. 940

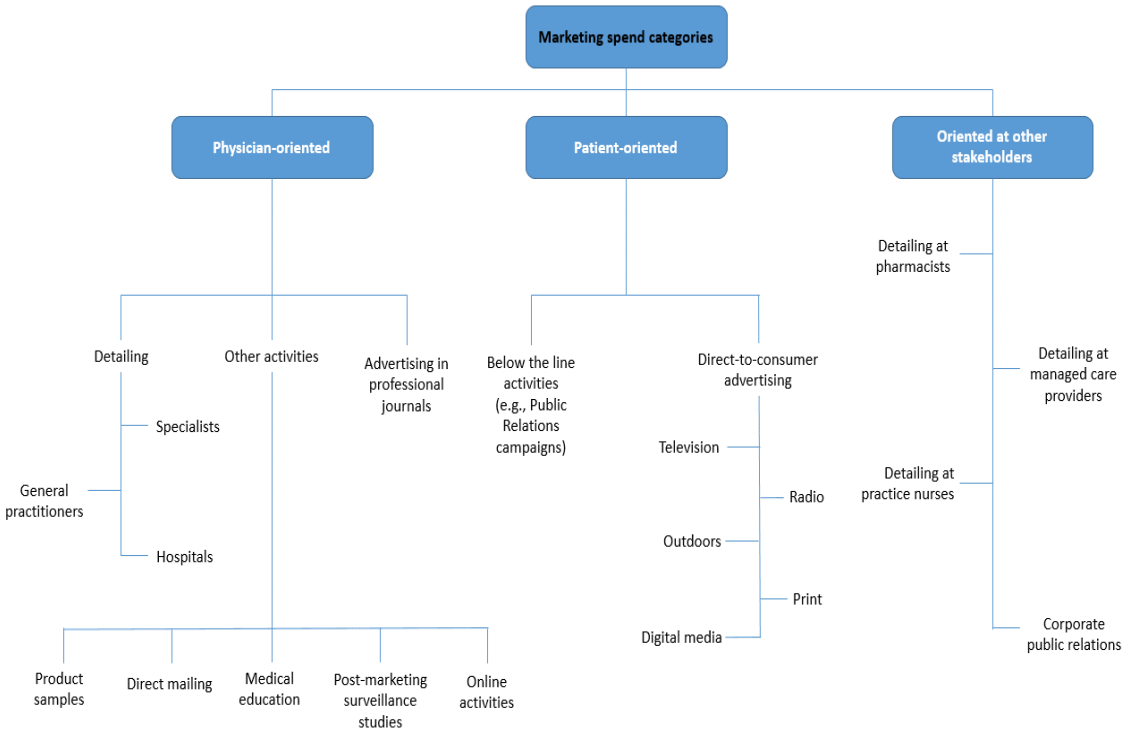
According to Rollins and Perri (2013), pharmaceutical marketing has been changing radically since the 90s. These authors affirm that before the 90s the promotion of pharmaceutical products was focused almost on healthcare professionals. They also state that pharmaceutical marketing had a model of direct sales oriented to prescribers (e.g., physician) that was associated with a high investment in the promotion of the product. Nowadays, diverse stakeholders are involved in the marketing and sales practice. Payers and pharmacists are a part of the distribution channel, and can have a major role in the decision of the dispensed product to the patient (Rollins & Perri, 2013). Sales representatives of pharmaceutical companies do not have the same easy access to the physician of the past and their promotional tools are more regulated. In order to change this trend, pharmaceutical companies started to explore the power of the internet, through websites and mobile technologies, allowing them to spread information to physicians (Rollins & Perri, 2013).

Rollins and Perri (2013) express that the pharmaceutical industry is far behind when comparing to other traditional industries that use direct-to-consumer (DTC) marketing. For these authors, it is clear that this industry needs to change its marketing model based on a push approach into a pull model that is oriented to the consumer (e.g., DTC advertising). They also state that nowadays, social media (e.g., social networks) is having a crucial role, allowing not only the passage from a one way conversation to a dialogue between the consumer and pharmaceutical companies, but also a shift of power from the pharmaceutical companies to the consumers. In this way, the consumer becomes an active participant in the choice of his treatment and is integrated in the pharmaceutical marketing environment (Rollins & Perri, 2013).

2.2.1. Different models approaches

According to Fischer (2014), the pharmaceutical marketing practice is mutating. This author states that the major approach of the 90s and begging of 2000 was the increase of the sales force, allowing the intensification of the diffusion of scientific information. However, Fischer explains that the spending with this approach is decreasing over time and nowadays pharmaceutical companies are leaving the commercial model based on the sales force, and are adopting, a more complex communication strategy. Through Figure 3, Fischer gives an explanation of this new strategy that is composed of more channels of communication which communicate with other stakeholders (e.g., patients, payers, healthcare organizations and professionals), surpassing the almost unique channel based on communication with physicians. The spreading of communication channels and potential message recipients is being perceived as a major trend in pharmaceutical marketing (Fischer, 2014).

Figure 3 – Pharmaceutical spend categories



Source: Adapted from Fischer (2014), p. 560

Physician-oriented model

The pharmaceutical marketing budget is being largely allocated to communicate with physicians (Manchanda & Honka, 2005; Neslin, 2001; Wittink, 2002 cited in Fischer, 2014). According to Fischer (2014), in this communication, pharmaceutical companies are using personal selling through detailing[1] which is directed to physicians that are general practitioners, specialists and hospital physicians. This regulation-dependent model can include: (1) personal selling with discussion of a limited number of products; (2) delivery of some presents and medication samples; (3) payment of meals; (4) conference-related issues; (5) financing of medical education and scientific projects; (6) publicity in professional journals (Rollins & Perri, 2013; Fischer, 2014).

Fischer states that methods like medical education and drug-vigilance studies were developed to strengthen the relationship with physicians and sometimes certain physicians can be provided with financial support from pharmaceutical companies if they are open for reporting their observations on patient trial studies associated with a promoted medicine. Other channels like direct mailings allow pharmaceutical companies to deliver information about treatments or medicines to physicians (Fischer, 2014).

Fischer (2014) also considers that the traditional communication model is under fire from the rise of the internet and other digital media. This author states that the study "Taking the Pulse® Europe", based on physicians behaviour on the internet revealed that physicians are using the internet to diversify the reach of their influence (Manhattan Research, 2008 cited in Fischer, 2014, p. 559). Fischer refers that the findings in this study shows that in the main European countries, 95% of the physicians inquired said that internet is useful in their professional practice and for this reason it seems that pharmaceutical companies are walking sideways with physicians in this matter through the development of electronic strategies.

According to Masood, Ibrahim, Hassali and Ahmed (2009), online detailing to physicians emerged with the evolution of technology, allowing marketers to promote products through a new channel.

[1] Detailing is "an educational activity by pharmaceutical manufacturer sales representatives aimed at providing details or scientific information on a product's potential uses, benefits, side/adverse effects" (Rollins & Perri, 2013, p. 264).

It is clear that a growing number of physicians are networking online, and for that reason pharmaceutical companies see as a priority the diffusion of information through online networking platforms (Ding, Eliashberg & Stremersch, 2014).

Patient/consumer-oriented model

According to Fischer (2014), there is a part of pharmaceutical marketing that is being oriented to patients/consumers, but this direct activity is only accepted in a small group of countries like New Zealand and United States of America (USA). However, in European Union (EU), pharmaceutical companies can advertise directly to consumers when the advertised product is an over-the-counter (OTC) medicine[2] (Buckley, 2004).

Fischer (2014) points that DTC advertising use channels like traditional media (e.g. print media, television and radio) and digital media. When DTC advertising is not allowed in a country, companies use a below-the-line strategy (e.g. Public Relations campaigns associated with diseases and treatments) in order to influence patients/consumers. Though, usually in this type of campaign the branded medicine's name is not promoted (Fischer, 2014). Nevertheless, the global reach of online platforms poses a challenge in this diversified worldwide setting of regulations (Ding, Eliashberg & Stremersch, 2014).

Model oriented at other stakeholders

According to Fischer (2014), the physicians and patients/consumers are not the only stakeholders targeted by pharmaceutical marketing. This author states that to reach this new audience, pharmaceutical companies developed communication strategies that include detailing to pharmacists, practice nurses and managed care providers. Fischer also affirms that the influence of these stakeholders as gatekeepers changes according to the type of medicines and healthcare structure. He exemplifies that in the healthcare business associated with diabetes, a major part of the budget is allocated to sales representatives in order to reach practice nurses and pharmacists since these healthcare professionals

[2] According to Lessenger and Feinberg (2008), Collins and MacAllister explained that "OTC medications are pharmaceuticals that do not require a prescription and are sold on the shelves of markets, stores, and pharmacies" (p. 45)

usually recommend devices that measure the blood glucose to people who suffer from this disease. Also pharmaceutical companies allocate a part of their budget into corporate public relations (Fischer, 2014).

2.2.2. Restrictions, limitations and particularities

The pharmaceutical industry is facing continuous pressures and is being obliged to deal with several external factors (e.g. regulatory environment) that are highly complex, because each situation depends on its geographic location and local legislation. (Ding, Eliashberg & Stremersch, 2014; Desiraju & Tran, 2014). For pharmaceutical marketers it is important not only to adapt to a unique external environment but also differentiate the ways that different medicines categories are commercialized: (1) OTC medicines vs. prescription medicines; (2) branded medicines vs. generic medicines[3] (Rollins & Perri, 2013).

Regulation

Regulation is without any doubt a factor that distinguishes the pharmaceutical industry from other types of industries (Desiraju & Tran, 2014). Regulatory activities are present in several pharmaceutical phases like the approval of new medicines, medicine surveillance, and production and promotion to physicians and consumers (Ding, Eliashberg & Stremersch, 2014). The approval of medicine commercialization requires normally a guarantee of safety and efficacy of the product and it is supervised by the Food and Drug Administration (FDA) in the USA, by the European Medicines Agency in the EU (even though individual country members have their own regulatory bodies) and in Japan by the Ministry of Health and Welfare (Morton & Kyle, 2011).

According to Desiraju and Tran (2014), the regulation of marketing practices is not uniform, existing several differences between different areas of the world and between pharmaceutical marketing segments. For example, since 2006, in the physician-pharmaceutical company relationship inside USA territory, it is not possible to communicate off-label medication uses[4] to a physician, but the physician does not have restrictions in using these off-label uses for any situation that he thinks the drug will work (Ding, Eliashberg & Stremersch, 2014; Patsy & Ray, 2008). In other areas of the world,

[3] "The term generic refers to the practice of using the International Non-proprietary Name (INN) for the chemical, in contrast to a "branded" drug that is marketed with a shorter, trademarked name. For example, atorvastatin is the INN corresponding to Pfizer's Lipitor" (Morton & Kyle, 2011, p. 766).

[4] Turner explained that "off-label prescribing is the prescription of a registered medicine for a use that is not included in the product information (Gazarian *et al*., 2006, p. 544).

detailing practices are restricted as well as the medication samples given to physicians (Ding, Eliashberg & Stremersch, 2014).

In accordance with Desiraju and Tran (2014), DTC advertising regulation differs between countries or regions. These authors exemplify that while in the USA the DTC advertising of prescription medicines is authorised, in the EU and Canada there are restrictions for its use.

To Liu and Gupta (2014), there have been some developments regarding DTC advertising in the EU but they did not have a happy ending due to the rejection of European Commission propositions by the European Parliament. However, the European Commission along with other industries that have interests related with medicines are pressuring continuously the adoption of DTC advertising practices (Liu & Gupta, 2014).

In Canada, as DTC advertising is forbidden, pharmaceutical companies are using two types of advertising that are allowed by regulatory institutions. The first type is associated with diseases like "help-seeking" advertisements, where non-branded communications not only appeal to consumers to seek their physician but also increase the awareness of a certain illness, while the second type is "reminder" advertisement that is a branded communication but there is not any type of information about the use of the medicine (Mintzes, 2006 cited in Liu & Gupta, 2014, p. 635).

On the other hand, with the World Wide Web, several concerns arise since online advertising can reach places where DTC publicity is not allowed. (Liu & Gupta, 2014). As an example, in the GlaxoSmithKline blog and AstraZeneca Facebook page, the information is directed only to USA population, but users from all over the globe can access this information, surpassing any possible control (Liang & Mackey, 2011a,b cited in Liu & Gupta, 2014, p.635).

In terms of price regulation, there are also differences between nations (Desiraju & Tran, 2014). Ding, Eliashberg and Stremersch (2014) highlight that price regulation could be through direct price impositions from governments, through price comparison between specific countries or through pricing established by comparison of medicines with an identical therapeutic category. These authors also state that in some situations, governments can limit the global amount of revenues of pharmaceutical companies. According to Desiraju and Tran (2014), countries like France, Italy and Japan control directly prices while countries like Germany, Netherlands and New Zealand manipulate

reimbursements through price orientations, leading to changes in the amount that consumers have to pay (Desiraju & Tran, 2014).

OTC medicines versus prescription medicines

For Rollins and Perri (2013), because prescription medicines and OTC medicines are used in similar situations, one can think that these products can be commercialized equally in terms of marketing communications and strategies, but even though the messages could be similar, the receptor of these communications is different for each case. These authors state that in the case of prescription medicines, pharmaceutical marketers target physicians, pharmacies, wholesalers and payers. All of these stakeholders influence which medicine is dispensed to the final consumer.

Regarding OTC medicines, Rollins and Perri express that physicians and payers are not the main focus of OTC marketers. Albeit physicians have knowledge about this type of products, they are less empowered in its recommendation, leading to less medical communication from pharmaceutical companies. For these authors, the major target of OTC products is consumers because they have the decision power in their hands. Rollin and Perri affirm that since intermediary agents seem to be absent in the OTC market, this market acts as it was a traditional consumer goods market. However, OTC marketers target other stakeholders such as pharmacists because not only they are of easy access in community pharmacies and mass merchandisers, but also they can influence the decision-making process of consumers (Rollins & Perri, 2013).

Branded medicines versus generic medicines

According to Garattini and Tediosi (2000), a generic medicine is a trustworthy replica of a branded medicine which has its patent expired and is commercialized with the active principle's name of the patented medicine. With the rise of generic medicines, pharmaceutical companies stopped with the same nerve-racking approval procedures necessary for biosimilar branded medicines, allowing them to save money, time and diminish process risk (Rollins & Perri, 2013; Desiraju & Tran, 2014).

To Rollins and Perri (2013), the key target of pharmaceutical companies of branded medicines is the physician while consumers and payers are vital targets for the

development of brand loyalty and the maintenance of a favoured status in a formulary[5]. These authors state that generic medicines are similar to commodities in the eyes of the pharmaceutical industry, and therefore the marketing mix is focused on price. They also affirm that the key target audience of generic medicines is different from the target audience of branded medicines. Even though physicians choose the medication for their patients, pharmacies are the last intervenient in the supply chain of medicines to patients and for this reason they can pick the companies that supply their stock, making them the ultimate targets for pharmaceutical marketers of generic medicines (Rollins & Perri, 2013). However, according to Ding, Eliashberg and Stremersch (2014), both physicians and pharmacies can receive financial support from payers in order to encourage the use of generic medicines.

[5] According to Rollins and Perri (2013), "a prescription drug formulary, sometimes referred to as a preferred drug list, is a complete listing of medications that have been approved for use within a prescription drug plan" (pp. 90-91)

2.3. Relationship between pharmaceutical industry and its major stakeholders

Dogramatzis (2001) stated that "a pharmaceutical company's stakeholder is any person or group of persons with which the company has, or wants to develop, a relationship" (p. 27). Thus, all pharmaceutical marketers must be aware of the singularity of each stakeholder in order to interpret correctly the unique needs of each one of them (Dogramatzis, 2001).

According to this author, there are two types of pharmaceutical company's stakeholders: (i) internal and (ii) external. Internal stakeholders are all company's workers, while external stakeholders result from a combination of different interested parties.

According to Kotler and Clark (1987) cited in Dogramatzis (2001), the external stakeholders are divided in three categories: (1) "inputting stakeholders"; (2) "mediators"; (3) "consumers".

Dogramatzis (2001) clarifies that "inputting stakeholders include suppliers, regulators, and politicians, because they play a significant influencing role in the company's success", while the "mediators include prescribers, university professors, and other healthcare professionals who stand between the company and its final customers, the patients" and the "consumers include not only patients and their families or advocacy groups, but the media, general public, and the competitors, too" (pp. 28-29).

Dogramatzis (2001) gives, in Table 2, his view about the different external stakeholders of the pharmaceutical industry, as well as some of their needs and concerns.

Table 2 – Major pharmaceutical industry stakeholders' characteristics

Who they are?					
Patients	**Prescribers**	**Hospitals**	**Influencers**	**Financers**	**Regulators**
- Patient - Patient advocates - Patient families	- Physicians - Non-specialist/ specialist	- Hospitals (State, Private, Military) - Clinics - Health maintenance organisations - Ambulatory care - Nursing homes	- Opinion leaders - Pharmacists - Wholesalers - Nurses - Social workers - Consultants - Suppliers	- Reimbursement funds - Insurance companies - Employers - Managed care organizations	- Ministry of Health - Registration Authority - Pricing Authority - Patent Office - Drug Organization - Ethics Committees - Formulary Committees

(Table 2 continued)

Who they are?					
Patients	**Prescribers**	**Hospitals**	**Influencers**	**Financers**	**Regulators**
			Needs		
- Best possible health care - Lowest cost - Information - Choice - Privacy - Humane treatment - Efficacy - Safety	- Pursue medical rationale - Efficacy - Safety - Tolerability - Quality of life - Credibility - Practice expansion - Information	- Increase clientele - Increase market share - Contain costs	- Opinion leaders need professional recognition and advancement - Healthcare professionals need access to choice - Pharmacists need information and protection of profit margin	- Protect patient benefit - Contain costs	- Preserve public health - Provide coverage - Ensure efficacy and safety - Ensure fair pricing
			Issues		
- Prescription vs. OTC - Compliance	- Up-to-date information	- Discounts - Long payment terms			

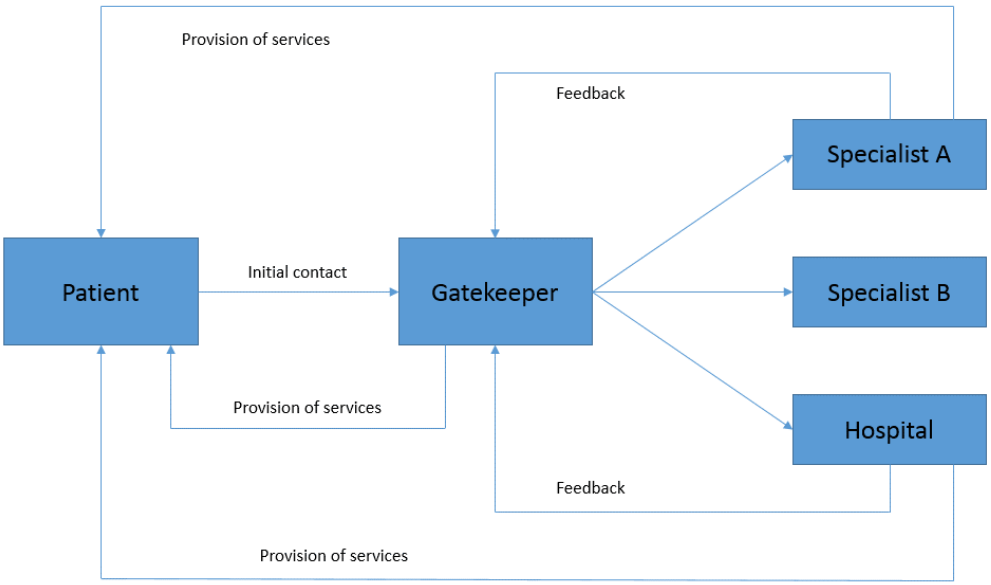
Source: Adapted from Dogramatzis (2001), p. 30

The table above shows that each stakeholder presents distinguished needs, requiring specific approaches which must be designed taking into consideration stakeholders' main issues and characteristics.

2.3.1. Prescribers

According to Amelung (2013), the gatekeeping process usually begins with an appointment with the physician. This author states that usually the general practitioner is responsible for the gatekeeping process, but there are situations that a specialist physician could perform this function. In this model, the gatekeeper is responsible for the management of the treatment process because he will choose what will be the next step in the treatment. Amelung provides, through Figure 4, an exemplification of this gatekeeping network.

Figure 4 – Gatekeeping system

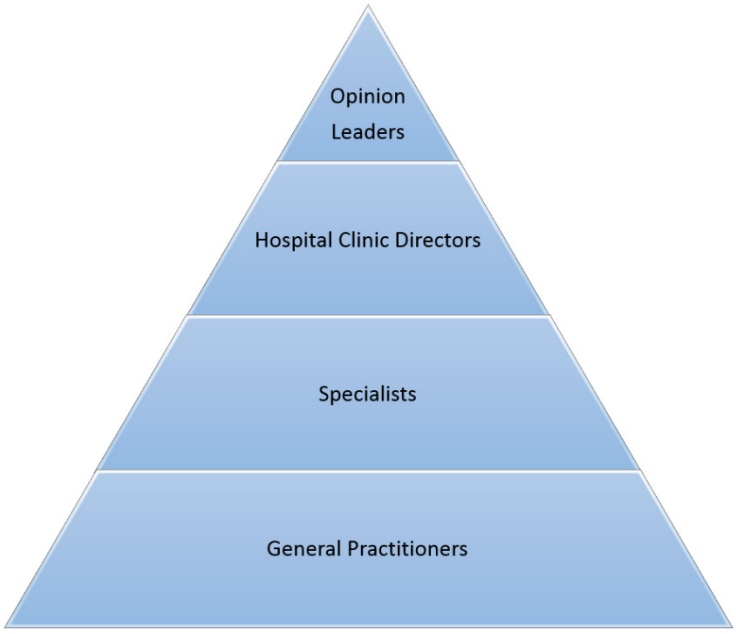


Source: Adapted from Amelung (2013), p. 150

According to Dogramatzis (2001), the prescribers are the main healthcare providers with whom pharmaceutical marketing establishes direct interactions. This author states that these healthcare professionals try to be up-to-date in terms of scientific knowledge associated with their profession, they usually keep their patients' loyalty when working in a private setting and use a cost-benefit approach when associated with a managed care organization. Dogramatzis also affirm that during the promotion of different medicines, pharmaceutical companies usually interact with a diverse type of physicians. This diversity creates a hierarchical pyramid of influence (see Figure 5) where

the youngest and inexperienced physicians that are at the bottom of this pyramid seek the support of more experienced medical professionals that reside on the top (Dogramatzis, 2001).

Figure 5 – The pyramid of influence



Source: Adapted from Dogramatzis (2001), p. 32

In Figure 5, it is possible to verify that the influencing process begins with opinion leaders[6] and finalizes with general practitioners through a communication cascade scheme, and therefore pharmaceutical marketers must follow this process when they want to generate awareness of a new medicine in the healthcare universe (Dogramatzis, 2001).

According to Dogramatzis (2001), the prescribing decision-making process is based on two consecutive steps: (1) choice of a therapeutic category for a specific illness; (2) choice of a brand. It is important for pharmaceutical marketers to be aware of the stages and influence elements in the prescription process because this knowledge can be important for the success of the marketing strategy (Dogramatzis, 2001).

[6] According to Dogramatzis (2001), "opinion leaders may not be active prescribers, holding, instead, academic, administrative, or even political positions that keep them away from everyday medical practice" (p. 33).

Although prescribing role is mostly performed by physicians, in some countries like the United Kingdom, nurses and pharmacists can also have this responsibility (with limitations) (Latter, *et al*., 2012).

2.3.2. Influencers

There is a set of individuals who have the power to affect purchase decisions of others. This happens because of their real or perceived knowledge, authority, position, or relationship. For these reasons they are considered as influencers, and can assume different alias.

Opinion leaders

According to Buckwell (2008), opinion leaders use their influencing skills to educate other medical professionals. Due to their position in the top of the communication cascade of influence (see Figure 5), it is important for pharmaceutical companies not only to reach these opinion leaders in the early stages of development of new medicines but also provide all the important information, increasing the chances of them becoming propagandist of the new product attributes (Dogramatzis, 2001). For this reason, opinion leaders are usually present in pre-marketing activities or in consultative councils (Dogramatzis, 2001; Rollins & Perri, 2013).

Buckwell (2008) states that with the rise of social networking anyone can express their opinion, so it is important for pharmaceutical companies that have new medicines in the pipeline to support key opinion leaders' influence potential and help increase the awareness of their messages. However, it is crucial for a successful relationship that when pharmaceutical marketers engage opinion leaders, they use a soft and courteous approach and not a hostile one (Dogramatzis, 2001).

Wholesalers

According to Rollins & Perri (2013), the wholesalers are a crucial player in the pharmaceutical supply chain and marketing. As they possess a significant number of customers, it is important for pharmaceutical marketers to be aware and to respond to wholesalers' needs/requests. These authors state that these marketers must not only practice a generous pricing and payment policy towards wholesalers but also have a production plan that meets the needs of both wholesalers and pharmacies. As compensation, wholesalers can provide priceless information to pharmaceutical

companies regarding market share, volume and they also can alert for any logistical problem that could be present (Rollins & Perri, 2013).

Pharmacists

According to Chiarello (2013), in today's pharmacy, pharmacists possess university studies in pharmaceutical sciences, allowing them not only to become specialists of medicines in the healthcare environment but also experience issues that physicians face when dealing with patients. This author states that pharmacists are secondary gatekeepers, responsible for later stages of health care, while physicians perform the gatekeeping role at the beginning of the health care provision.

According to Dogramatzis (2001), pharmacists are being seen as crucial players in a managed care environment. He further states that, in order to reduce costs, pharmacists are more empowered regarding the possibility of substituting medicines. To put into practice this increase of empowerment, a pharmacist or a pharmacy benefit manager relies on formularies of medicines for the decision-making of which bioequivalent medicine (usually a generic medicine) will be dispensed (Dogramatzis, 2001).

For Morton and Kyle (2011), some parts of the USA and other developed countries promote the use of generic medicines by forcing pharmacists to dispense generics (if existing). However, these authors state that there are situations where the dispensing of generics is not imposed by authorities, existing only a provision of incentives for it. This provision of incentives varies between countries, because of the different legal and regulation environments among them. In some countries like Germany and the Netherlands, the power of choice of the pharmacist is limited because the authorities choose the supplier with the least expensive generic medicine to be responsible for providing all the market (Morton & Kyle, 2011).

According to Drogamatzis (2001), there are differences between hospital pharmacists and community pharmacists concerning their needs and wishes. This author states that pharmaceutical companies need to be aware of them because in some situations big packages can occupy too much storage space or products with strict conservation needs require special storage conditions. Also it is important for pharmaceutical marketers to provide pharmacies with informational material for patients along with

promotional material (e.g. in-store displays) and publicity campaigns that will attract customers, fulfilling in this way the needs of pharmacists (Dogramatzis, 2001).

Other healthcare professionals

In 2001, Dogramatzis advocated that healthcare professionals that are not pharmacists and physicians are an essential piece of the healthcare system. He states that they have an important active role in the patient treatment, assisting the physician in his function. This author also states that healthcare providers such as nurses and physiotherapists are sometimes more present in chronic patient treatment than physicians and they also can explain medicines' side-effects and emphasise the importance of therapeutic compliance. Dogramatizis affirms that nurses that are following chronic patients in a healthcare facility can have the power of choosing the medicines brand (when physicians choose only the active principle). Due to the relevance of these healthcare professionals in some specific settings, it is important for pharmaceutical companies to provide them with information about products and diseases (Dogramatzis, 2001).

Hospital administrators

Hospital administrators are habitually responsible for the hospital budget dedicated to medicines, and they can perform their role as customers or influencers in the pharmaceutical environment (Dogramatzis, 2001). According to Smith (1991), pharmaceutical companies have a new gatekeeper in their environment. This author states that hospital administrators have distinguished motivations, experiences and studies when comparing with some healthcare professionals. In this new gatekeeping process, there is a major control of the access to some parts of the market through a formulary or buying orders (Smith, 1991).

For Smith (1991), pharmaceutical marketers must develop messages that are in harmony with the needs (e.g. product and information needs) of hospital administrators, in order to increase their success. This author affirms that pharmaceutical companies are acknowledging the major role of hospital administrators in the process of medicines selection and purchase. One of these companies is Stuard Pharmaceuticals, that used a professional journal named "*Hospitals*" (aimed at hospital management), to promote the

higher benefits of the branded medicine “Cefotan” when comparing to cefoxitin and other antibiotics (Smith, 1991).

2.3.3. Regulators

Dogramatzis (2001) refers that the pharmaceutical industry is clearly the industry most regulated by governments. This author state that in this industry "there are multiple regulatory controls and levels, starting with the institutional to the local, national, international, or even global level" (p. 34).

For example, in the USA, the population requires a prescription from a licensed prescriber (e.g. physician) in order to have access to the majority of medicines (Carpenter, 2010). This author states that the medicines used in the prescription must be previously approved by the FDA. In this approval process, the FDA must evaluate the safety and effectiveness of medicines in order to see if they are fit for commercialization, making this government agency a gatekeeper of the pharmaceutical market. According to Carpenter (2010), this gatekeeper role is associated with seven powers: (1) "power to define medical success and shape scientific careers"; (2) "power to limit advertising and product claims"; (3) "power to govern drug manufacturing"; (4) "power to enable drug firms to generate vast riches"; (5) "power to chase...[drug] firms from the marketplace"; (6) "power to sculpt medical and scientific concepts; (7) "power to influence the lives and deaths of citizens" (p. 1). This regulation has two faces because it can unleash positive or negative consequences for pharmaceutical companies (Dogramatzis, 2001). This author specifies, in Table 3, the different types of governments' influence over the pharmaceutical industry.

Table 3 – Aspects of Government influence on the pharmaceutical industry

Funding	Regulating	Promoting	Rewarding
- Research & Development grants	- Patent protection	- Influence on other governments	- Innovation awards
- Social security	- Registration	- Local industry incentives	- Export awards
- Facility creation	- Reimbursement	- Substitution legislation	- Quality awards
	- Pricing	- Disease diagnosis campaigns	- Orphan drug exclusivity
		- Manufacturing	
		- Marketing	
		- Prescribing decision	
		- Trade barriers	

Source: Adapted from Dogramatzis (2001), p. 35

Adding to this Dogramatzis (2001) suggested that the major problems existing in the pharmaceutical industry-government regulation relationship are in the "collaboration, compliance, harmonization, negotiation and lobbying" (p. 34). This author states that if

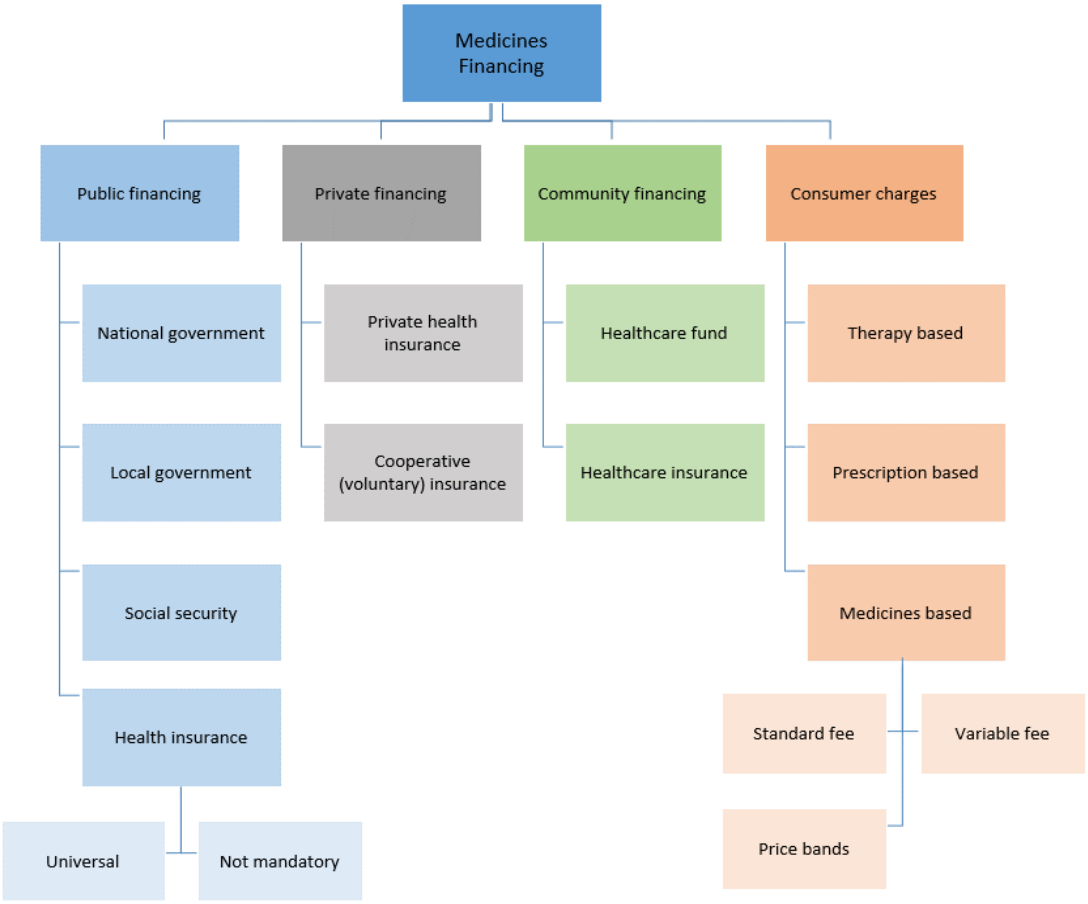
the pharmaceutical industry reacts aggressively to regulation, it can create an unfriendly environment with regulators that could not be positive for pharmaceutical companies.

Nowadays, pharmaceutical companies have a Regulatory Affairs department, where personnel with scientific background establish specific interactions with regulators (Gopinath, Bhadauria, Gunjan & Insha, 2012; Rollins & Perri, 2013).

2.3.4. Financers

Pharmaceutical marketers need to be aware of the medicines financing structure in each market when choosing the prices of their products because this financing system varies between geographical locations (Dogramatzis, 2001; Morton & Kyle, 2011). Dogramatzis (2001) exemplifies, in Figure 6, the most common ways of financing medicines.

Figure 6 – Medicines financing methods in different healthcare systems



Source: Adapted from Dogramatzis (2001), p. 238

This author states that these methods "are broadly based on long-term financing scheme (insurance, social security, and so on) or a fee-for-service consumer copayment" (p. 237). Because these methods can influence the consumption of medicines, it is important to have them into account when establishing the marketing strategy (Dogramatzis, 2001).

2.3.5. Consumers

There are two types of consumers that need to be acknowledged: individuals who buy products for personal use and not for manufacture or resale and organizations who buy products to incorporate in their delivery system.

Patients

The rise of television advertising and accessibility to information (particular on the internet), led to a healthcare model where patients and physicians participate in the decision-making process (Rollins & Perri, 2013). Because physicians are not the only source of information about treatments, empowered patients (due to the acquisition of information from various sources), decide together with the physician what will be the best treatment option (Rollins & Perri, 2013). These authors state that with this paradigm shift, patients not only have become a main focus of pharmaceutical companies but also are demanding the fulfilment of their healthcare and information needs.

According to Dogramatzis (2001), there are several forms of patient involvement and decision-making steps that are related with purchase of medicines: (1) consumer is driven by "inertia" when buying OTC medicines (involvement is low and decision-making a is repetitive process); (2) consumer is driven by "brand loyalty", for example, in chronic situations like asthma (involvement is high and decision-making is a repetitive process); (3) consumer seeks different physicians for opinions and pharmaceutical solutions (involvement is low and decision-making level is high); (4) consumer that requires multiple consultations and diagnostic testing, multi-level intake of medicines and lifestyle modifications will have high decision-making and involvement levels.

Therapeutic non-compliance is a major worldwide subject of discussion. (Dogramatzis, 2001; Ilyuk, Irmak, Kramer & Block, 2014). For Ilyuk, Irmak, Kramer and Block (2014), the World Health Organization revealed that only nearly 50% of the patients in the world follow their medicines prescription correctly. These authors state that this problem can result in negative consequences not only for consumers (increase of health care risk) but also for pharmaceutical companies. Therapeutic non-compliance is facing strong opposition from healthcare providers and pharmaceutical industry because

they are using techniques such as the ones included in "disease management initiatives" (e.g. treatment guidelines, prevention strategies, etc.) (Dogramatzis, 2001).

Table 4 – Needs or wishes of pharmaceutical industry and patients' organisations

A patients' organisation needs help with…	**A pharmaceutical company would like patients to help with…**
[S] – Project funding: surveys of members and of services available for them	[S] [M] – Market expansion: Use of its drugs by all who might benefit; more efficient and prompt diagnosis of the problem the drug is intended for
[S] [M] – Information about treatments and diagnosis; production of information materials	[S] [M] – First line use of its products (rather than competing ones)
[M] – Lobbying for resources to help people with the disease or problem	[M] – Lobbying against restrictive government or health service policies and regulations
[M] [L] – Business know-how (fundraising, publicising itself, growing big)	[L] – Being seen as a caring and socially responsible business
[L] – Core funding	

Note: [C]: Short term [M]: Medium term [L]: Long term

Source: Adapted from Herxheimer (2003), p. 1208

Through Table 4, it is possible to verify that patient's organizations can also establish relationships with the pharmaceutical industry (Herxheimer, 2003).

Organizational buyers

According to Dogramatzis (2001), although organizational buyers of medicines bear a resemblance to unitary customers, they also possess unique features that need to be carefully managed by the pharmaceutical industry. This author states that these organizational buyers are "composed of physicians and nurses, hospital pharmacy directors, formulary specialists, pharmacy benefit managers, financial administrators, and others who usually work in teams assigned to compare, evaluate, and purchase large pharmaceutical orders from manufacturers" (p. 37). Individual members of these groups can influence, take decisions, perform the gatekeeping process or even be simple users, while the whole unit is considered as a "buying center" (Dogramatzis, 2001).

Also for Dogramatzis (2001), the decision-making process of organizational buyers needs to be well scrutinised by pharmaceutical marketers in order to develop a strategy that can provide success to pharmaceutical companies. Dogramatzis affirm that this strategy must be reformed according to each institution's needs and also must be flexible in order to adapt to changing scenarios.

2.4. Pharmaceutical marketing and the social media

The subject of social media is a high priority of discussion in the business world (Kaplan & Haenlein, 2010). These authors state that people responsible for taking decisions in companies and also consultants are trying to find ways to increase companies' profitability through social media (e.g. Wikipedia, YouTube, Facebook and Twitter).

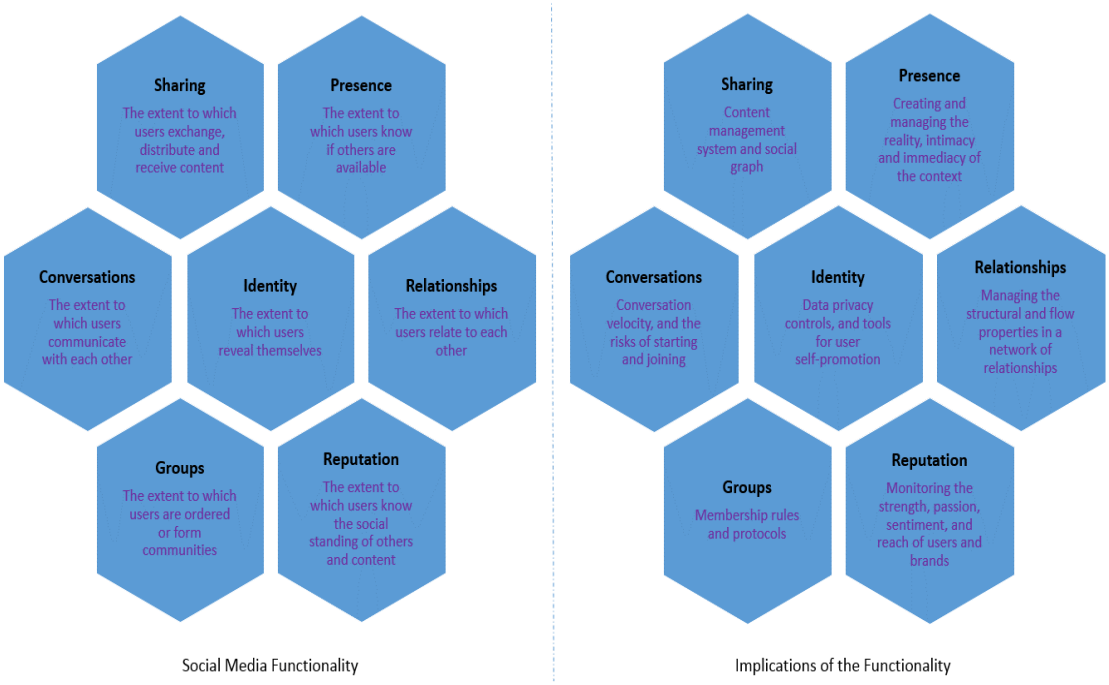
According to Aghaei, Nematbakhsh and Farsani (2012), before social media, the internet already allowed a limited user interaction. These authors state that the Web 1.0 (first web generation) is considered to be the "read-only web". This web provided users the possibility of establishing limited interactions and releasing content, but with it users could only search and read information (Aghaei, Nematbakhsh & Farsani, 2012). For Rollins and Perri (2013), in the middle of the 90s, the increasing people's awareness of the internet provided a new way for them to control the information received. These authors state that with the Web 1.0 people started to have access to the content of countless diverse websites, as an alternative to the controlled information available, for example, in television transmissions and books. Several of these websites appear to be like simple brochures, whereas electronic commerce websites were similar to catalogues (Rollins & Perri, 2013).

The Web 2.0 is considered to be the "read-write web" (Aghaei, Nematbakhsh & Farsani, 2012; Rollins & Perri, 2013). As said by Aghaei, Nematbakhsh and Farsani (2012), the technologies associated with the Web 2.0 permitted the creation of groups of people who shared the same interest for social interactions. These authors state that with this Web, the online interaction was based on a two-away communication. According to Rollins and Perri (2013), in the rise of the Web 2.0, the most relevant information was not coming from several media channels but from online users. These authors suggested that simultaneously with the rise of the Web 2.0, social networks prototypes started to appear, providing new ways for facilitating interactions between people. These prototypes converted, with time, into modern social media platforms (e.g. Twitter and Facebook) (Rollins & Perri, 2013)

Kotler and Keller (2011) considered that "social media are a means for consumers to share text, images, audio, and video information with each other and with companies and vice versa, encouraging brand engagement at a deeper and broader level than before"

(p. 291). Likewise, Kietzmann, Hermkens, McCarthy and Silvestre (2011) advocated that these social media which are composed of seven functional blocks (see Figure 7) can, through mobile and web-based technologies, allow interaction between users. In addition to the previous technologies, social media can also employ cloud based technologies (Khan, 2012).

Figure 7 – The "honeycomb" of social media



Source: Adapted from Kietzmann, Hermkens, McCarthy and Silvestre (2011), p. 243

To Kotler and Keller (2011), social media can provide marketers with the possibility of being present on the web, reinforcing their communication strategy. These authors state that the most important social media platforms are: (1) forums and online communities; (2) social networks; (3) blogs.

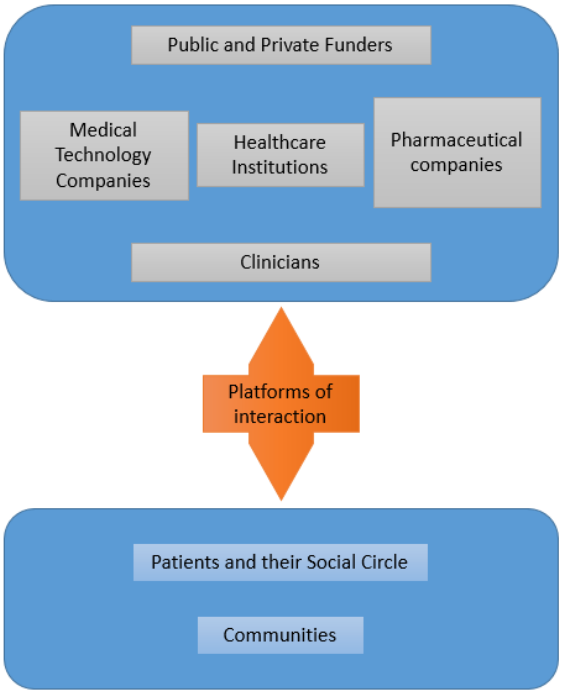
According to Kaplan and Haenlein (2010), social networks sites are applications that allow users to interact through online profiles. According to Shankar and Li (2014), in 2010, the social networks were adopted by 96% of the Generation Y[7] (Shankar & Li,

[7]This generation describes the generational cohort after the Generation X. There is not an exact period for Generation Y, but researchers believe it is between the beginning of the 80s and the early 2000s. This generation uses actively social media platforms for different purposes (Millennials, 2014; Bolton *et al.*, 2013).

2014). For Kotler and Keller (2011), the business-to-consumer and business-to-business communication can be leveraged through social networks (e.g. Facebook, Twitter and LinkedIn). These authors affirm that marketers are still trying to understand what will be the best approach to social networks and their users. They also state that it is difficult to capture the attention of users and persuade them because social networks are viewed as non-commercial platforms (users want mostly to interact with other users). Moreover, Kotler and Keller complement the previous idea saying that the presence of advertising content in social network platforms could be viewed by users as inappropriate or offensive. Facebook presence has become a must for numerous companies and Twitter can enhance businesses (even for small companies) (Kotler & Keller, 2011). Bolotaeva and Cata (2011) explain that social networks can leverage brand presence, brand awareness and also they can reduce advertisement costs (especially important in fragile economic situations). However, it is important for companies to be aware of ethic matters (e.g. user privacy; spamming and publicity policies; data mining and legal concerns) (Bolotaeva & Cata, 2011).

According to Griffiths *et al*. (2012), social networks allow the exchange of healthcare information associated with symptoms, possible diagnosis and treatments, adverse effects experienced, medical evidence, as well as opinions about their experiences with healthcare providers. These authors affirm that in the health care system, there are two sides, namely the patients-side and providers-side that connect with each other through common platforms (see Figure 8). In the providers-side there are medical technology companies, pharmaceutical companies, healthcare professionals, managers and professional groups that control patient data, and through it they can influence the shape of health care systems. In the patients-side lays the demand-side, where each single patient acquires information from providers and can find support and advices in their social circle. Griffiths and colleagues state that in order to establish a connection between the two sides, platforms such as physician-patient appointments, health services provided by hospitals and communities, organizations functioning as funding channels (e.g. Medicare) and other types of interactions between equipment/treatment providers and patients, must exist. They also emphasize that online social networking can also be a form of interaction between the two sides. These platforms can be important in the gatekeeping and mediation process and can act as a vehicle for information (Griffiths *et al*, 2012).

Figure 8 – The health care system as a two-sided network



Source: Adapted from Griffiths *et al.* (2012), p. 2235

According to Shankar and Li (2014), the rise of e-communications through social media is changing healthcare and pharmaceutical industry. Liu and Fraser (2012) stated that the empowerment among patients and providers is increasing and social media is allowing greater control to their users. These empowered audiences will establish connections with the pharmaceutical industry through social media if pharmaceutical companies are trustworthy through their eyes and have something positive to offer (Liu & Fraser, 2012). According to Rollins and Perri (2013), social media platforms provide wonderful opportunities for pharmaceutical marketers interact with their customers and acquire knowledge of their markets. In order to pharmaceutical marketers effectively manage these platforms, they need to understand how to listen to customers' voices and approach these customers; they need to create optimized messages for each scenario and possess a great ability to adapt to regulatory and technological settings that are in constant mutation (Rollins & Perri, 2013). Liu and Fraser (2012) suggested that pharmaceutical companies can gather data through social media platforms that are important for brand monitoring and can also obtain critical information about consumers. For them, these two

resources enable pharmaceutical companies to develop innovative marketing strategies and services that could increase brand awareness, customer loyalty, improve patient compliance, as well as respond promptly to information requests from patients and physicians. However, the data such as the user-generated content created and provided by patients and physicians needs to be treated in a secured environment, according to regulations (Liu & Fraser, 2012).

Nevertheless, several pharmaceutical companies are ignoring this social media adherence trend due to ethical and legal issues that surround these platforms (Rollins & Perri, 2013). Aitken, Altmann and Rosen (2014) noticed that the global reach of social media poses several problems to pharmaceutical companies because of the regulatory discrepancies between regions and countries (see Table 5).

Table 5 – Regulation differences of key regions/countries

Country/Region	Regulatory bodies	Key documents	Additional comments
EU	- International Federation of Pharmaceutical Manufacturers and Associations (IFPMA): self-regulating	- Regulatory document rejected in June 2009 - United Kingdom - ABPI's Code of Practice for the Promotion of Prescription-Only Medicines (the "ABPI Code")	- While little regulation exists companies are self-regulating: digital marketing strategies are underway but investment is small and initiatives limited in scope - Regulators fear DTC information and escalating pharma costs due to increased patient advocacy for drugs. - The European Federation of Pharmaceutical Industries and Associations (EFPIA) is attempting to push for self-regulation
USA	- Food and Drug Administration (FDA) - The Office of Prescription Drug Promotion (OPDP)	- Guidance for Industry: Responding to Unsolicited Requests for Off-Label Information About Prescription Drugs and Medical Devices, Dec 2011 - Update expected by July 2014 at the latest - "The development and issuance of guidance for social media is among the highest of FDA's priorities"	- The existing guidance for the pharmaceutical industry mostly governs the topic of off-label usage. Other regulations must be extrapolated from precedent - The "One Click Rule" is inadmissible: social media posts must always display a full product profile when naming a drug online - A consumer survey's post-hoc study is not considered sufficient evidence for advertising claims. - Can discuss investigational uses of the drugs in an appropriate manner, but no off-label promotion
Canada	- Pharmaceutical Advertising Advisory Board (PAAB) - Health Canada's Health Products and Food Branch	- Health Canada's general advertising policies are intended to apply to social media - PAAB Code Review 2012, "Section 6.5: Online Activities" - Latest update in 2012 appears to cover much of the industry	- Once a website is determined to be advertising, the site in its entirety, including any user-generated content, is subject to regulatory control

Source: Adapted from Aitken, Altmann and Rosen (2014), p. 8

However, and in accordance to Rollins and Perri (2013), pharmaceutical companies and their marketing departments must implement social media in their routines. These two authors further explain that pharmaceutical marketers must be aware that the days of television transmission and physician influence in the behaviour of consumers are condemned. Albeit this new approach could be difficult to manage in the near future, a well-managed social media platform will allow the creation of consistent customer-marketers relationship and will bring significant benefits to pharmaceutical companies beyond the simple benefits of a one-way communication (Rollins & Perri, 2013).

2.4.1. Types of digital relationships

Shankar and Li (2014) reports that the Web and social networks are modifying the pharmaceutical industry through their power of influence. For these authors, the internet has naturally transformed into a fundamental piece of the search for clinical information performed by physicians and patients.

According to Shankar and Li (2014), the online social networking is being adopted by physicians in order to interact with other colleagues. Physicians are using online platforms such as Sermo (the largest physician networking platform), Ozmosis, Social MD and DoctorNetworking, which are growing at a rapid pace (Shankar & Li, 2014). These authors state that the main reasons for the adoption of these online platforms by physicians are the possibility to share opinions and discuss medical practice issues with other physician colleagues, and learn from most experienced colleagues. Shankar and Li also found that physicians are using online platforms to reach patients. Platforms such as Facebook, Twitter and blogs are used by physicians to interact with patients to share counsels, patients' past experiences and explanations about treatment procedures (Shankar & Li, 2014).

The online information and the social media are integrating the routine of patients who want to manage their health issues. (Shankar & Li, 2014; Davies, 2008). In 2008, the internet has become the first choice for retrieving health information, surpassing the physicians as a primary source (Manhatan Research, 2008 cited in Shankar & Li, 2014, p. 481). The study "Pew Research Center's Internet & American Life Project" that was based on interviews with 3001 adults living in the USA (74% of them used the internet) found: (1) 80% of the internet users have searched information about certain diseases or treatments; (2) 24% of the internet users (corresponding to 18% of adults) have seen online reviews of medicines or treatments while only 4% posted their personal testimonials about medicines or treatments; (3) of the 62% adult internet users (46% of the total adults) who use social network sites, only 15% have taken some health information from these platforms (Fox, 2011). The "PwC HRI Social Media Consumer Survey" that was based on 1060 consumers living in the USA found: (1) 42% used social media to find reviews of consumers about health (12% related with medication or treatments, 11% with physicians, 10% with hospitals and other healthcare facilities, and 9% with insurance companies related to healthcare); (2) 32% used social media to search

for past health experiences of friends and family; (3) 29% searched for other patients' testimonials related to their diseases; (4) 24% obtained health care information through videos or images posted by other patients on social media (PricewaterhouseCoopers Health Research Institute, 2012). In a study that involved more than 22,000 Americans found that one in each five respondents said that social media platforms provide them healthcare information. Of these respondents, 94% stated that Facebook was the primary source of information, 32% preferred YouTube, and 18% used Twitter as a first source (National Research Corporation, 2011 cited by Shankar & Li, 2014, p. 481).

Shankar and Li (2014) reported that patients are having energetic interventions in several online communities. These authors state that they are sharing positive and negative opinions (e.g. adverse effects) of medicines, and also have access to testimonials of patients in similar conditions. According to Shankar and Li (2014), the social networking site named PatientsLikeMe promotes the interaction between patients in similar health conditions in order to share their experiences with their diseases and treatments. HealthChapter, IMedfix, Inspire, Disaboom and DiabeticConnect are other patients' online communities (Shankar & Li, 2014).

Although social media platforms raise several difficult issues for pharmaceutical companies, they are still adopting these platforms (Shankar & Li, 2014). For example, the pharmaceutical company Pfizer established a deal with Sermo that allows physicians to access the company's clinical data and in the other hand, allows Pfizer to interact directly with physicians of the online community (Anon, 2007 cited in Alkhateeb, Clauson & Khanfar, 2008). The formation of this kind of relationship can allow pharmaceutical companies to alter prescription routines of member physicians (Alkhateeb, Clauson & Khanfar, 2008). Also, the Baxa Corporation, not only possess a corporate Facebook named "Culture of Safety", but also a "LinkedIn Business Group" (Shankar & Li, 2014).

The authors report that the Johnson & Johnson Company bought the online community named "Children with Diabetes", and provides support to Facebook pages like ADHD-MOM, Johnson's Baby and Neutrogena. This company also has an active Twitter account, with more than 6 million followers and a YouTube channel (Shankar & Li, 2014).

The Genentech Inc. also established a 5-year collaboration with the PatientsLikeMe platform, in order to have access to patients' experiences related to health

issues (Adams, 2014). Other companies like GlaxoSmithKline and Sanofi-Aventis started their presence on Facebook in 2011 (Meyers, 2012). For example, Pfizer's Facebook page had 21,832 "likes" in April 2011 (Meyers, 2012), while in April 2014 had 103,630 "likes" (Pfizer, 2014). In this page, the company was, at the time of author's writing, focused on posts related to science, to corporate information, and corporate social responsibility (Meyers, 2012). According to this author, Pfizer didn't allow users to post on its Facebook page.

Another big company, Novartis, has a Facebook page that had in April 2011 5,076 "likes" (Meyers, 2012), while in April 2014 it had 51,521 "likes" (Novartis, 2014). At the time of the author's writing, the majority of posts on Novartis' Facebook page were related to the company (Meyers, 2012). AstraZeneca also possesses a Facebook page named AstraZeneca US Community Connections that had 14,862 "likes" in April 2014 (AstraZeneca, 2014), while in April 2011 had only 10,049 "likes" (Meyers, 2012). This Facebook page shares similarities with Pfizer's Facebook page in terms of posts and restrictions, but there were also posts about politics and healthcare topics focused on consumers' needs (Meyers, 2012).

Table 6 – Utilization of social media platforms by top 20 pharmaceutical companies

Ranking[a]	Company	Revenue[a] (million)	Blog	YouTube	Facebook	Twitter	Physician or patient community
1	Pfizer	$58.523	Yes	Yes	Yes	Yes	No
2	Novartis	$44.420	No	Yes	Yes	Yes	Yes
3	Merck & Co.	$39.811	No	Yes	Yes	Yes	Yes
4	Sanofi	$37.403	No	Yes	Yes	Yes	No
5	GlaxoSmithKline	$36.156	Yes	Yes	Yes	Yes	No
6	AstraZeneca	$32.515	Yes	Yes	Yes	Yes	Yes
7	Johnson & Johnson	$22.396	Yes	Yes	Yes	Yes	Yes
8	Eli Lilly & Co.	$21.685	Yes	Yes	Yes	Yes	No
9	Abbott Laboratories	$19.894	No	Yes	Yes	Yes	No
10	Bristol-Myers Squibb	$19.484	Yes	No	Yes	Yes	Yes
11	Teva	$16.121	No	Yes	Yes	Yes	Yes
12	Takeda Pharma	$14.829	No	No	Yes	No	No
13	Bayer Schering	$14.485	No	Yes	Yes	Yes	Yes
14	Boehringer-Ingelheim	$12.883	No	Yes	Yes	Yes	No
15	Astellas	$11.161	No	Yes	Yes	Yes	No
16	Dalichi-Sankyo	$10.794	No	No	Yes	Yes	No
17	Eisai	$8.542	No	No	Yes	Yes	No
18	Otsuka Pharmaceutical	$8.440	No	No	Yes	No	No
19	Gilead Sciences	$7.390	No	No	Yes	Yes	Yes
20	Mylan	$5.404	No	No	Yes	No	No

Note:
(a) Top 20 pharmaceutical companies based on 2010 revenues (revenue source: ContractPharma.com)

Source: Adapted from Shankar and Li (2014), p. 485

According to Heywood *et al*. (2007) cited in Alkhateeb, Clauson and Khanfar (2008), several pharmaceutical companies are trying to take advantage, through online DTC advertising, of the adoption of Web 2.0 platforms by patients.

As seen in Table 6, by the end of 2011, all the 20 most profitable pharmaceutical companies in 2010 had a Facebook presence, while 17 had a Twitter account, 13 had a YouTube channel, 8 supported online communities and 6 had a blog (Shankar & Li, 2014). Another study reported by Aitken, Altmann, and Rosen (2014) and developed in 2014 by IMS Institute for Healthcare Informatics revealed that of the top 50 pharmaceutical companies assessed, only 10 companies had simultaneous presence on Facebook, Twitter and YouTube. They further discovered that only 22 had a Twitter account, 17 had a YouTube channel, while 15 had a Facebook presence.

2.4.2. Changes in the communication

Back in 2011, Pantaleoni believed that, the Web 2.0 was present in the lives of youngsters born in the 90s. This author states that for these youngsters this web is a natural channel of communication, like was the telephones for previous generations. In this way, users have accepted naturally the social networks. Pantaleoni states that in the year 2009, there was a blast of social networks' users. Nowadays, social networks like Facebook, LinkedIn and Twitter are the source of news and communications for the worldwide population (Pantaleoni, 2011).

According to Goswami *et al*. (2013), social media provides value to companies through the development of a relationship between the brand and the online networking community. These authors state that it is important for companies to integrate online networks in order to manage effectively the relationship with customers (through marketing strategies that are proactive and nonreactive). In a business-to-consumer scenario, it is important to create an empowered relationship (Goswami *et al*., 2013). According to Camacho (2014), patients have fewer restrictions when they are trying to find health care information. With the internet, the searches for this type of information have become an ordinary activity, contributing for the rise of patient empowerment (Camacho, 2014).

Rollins and Perri (2013) suggested that a successful marketing strategy depends on the communication processes. For achieving this success it is necessary to communicate positive attributes of products, answer to questions and doubts and adapt the message when the consumer and competitor behaviour changes. In traditional marketing, the communication was based on a monologue (one-way communication), where television and print advertisements were developed to transmit highly specific messages at key moments (Rollins & Perri, 2013). Through social media platforms, the possibility of a dialogue was implemented, allowing customers to participate with questions and doubts while the brand has the possibility to establish a relationship with these customers (Rollins & Perri, 2013; Shankar & Li, 2014).

According to Bonet and Garrote (2011) and Davies (2008), the webs of health 2.0 provided patients with the possibility of having interactions with people with common interests and clinical situations, as well as the access to mixed networks composed of both healthcare professionals and patients. These authors affirm that patients are choosing

what, when and how to share information about their symptoms, treatments (including opinions about physicians), healthcare facilities, medicines, etc. They further state that patients' filiations and participation in online communities enhance their positive thinking and offer emotional support.

Another important role of social networks (related to health) is their ability to promote prevention (Bonet & Garrote, 2011; Davies, 2008). According to Camacho (2014) and Shankar and Li (2014), social media platforms are becoming a main channel for communication between pharmaceutical companies and patients/customers, allowing an accessible dialogue between them. For example, the Vice-President of Genentech's Medical Affairs department stated that the recent agreement with PatientLikeMe.com platform will possibly improve the engagement of healthcare providers and allow to listen to patients (Adams, 2014).

Still, one big concern for pharmaceutical companies regarding social media is the fact that they are forced to follow all patients-generated content, especially because of the consequences that may arise with adverse effects posting and other negative situations (Camacho, 2014). This author completes his previous idea by stating that harmful opinions about medicines can lead to problematic situations that are difficult to manage for any pharmaceutical company's brand manager.

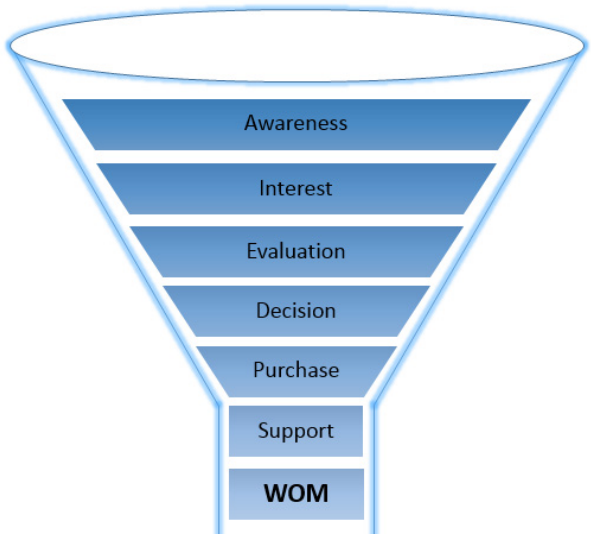
According to Brown, Broderick and Lee (2007), word of mouth (WOM) communication is considered to be a major form of online interactions between consumers, especially in online communities. These authors state that WOM is a channel of communication where the consumer is the prime intervenient and is independent of the market. For this reason, this type of communication is more accepted than the communication made by pharmaceutical companies towards patients. (Schiffman & Kanuk, 1995; Arndt, 1967 cited in Brown, Broderick & Lee, 2007). When comparing traditional marketing communications with WOM, this last presents itself as having higher influence in the opinion of products, development of attitudes and decision-making processes (Herr, Kardes & Kim, 1991; Bone, 1995 cited in Brown, Broderick & Lee, 2007). Marketers need to realise that the brand control is shared with consumers who wish to develop a fertile dialogue with them (Brown, Broderick & Lee, 2007). For Trusov, Bucklin and Pauwels (2009), WOM marketing occurs notably in the internet. These authors state that not only does the internet provides the possibility for consumers to share

opinions and experiences between them, it also allows companies to take advantage of WOM (e.g. WOM can be less expensive than traditional advertising).

According to Shankar and Li (2014), with the social media (e.g. social networks), researchers started to dedicate more of their time to WOM occurring online instead of the offline WOM settings. These authors state that there are three main differentiating factors between online and offline settings: (1) WOM in social media is of easy access and more scalable than WOM offline mode. It is clear that user-generated content in social media can reach a vast number of users, while in the offline settings is restricted to interpersonal communications; (2) WOM in social media can influence more than WOM in offline context because the information underlined in the messages of people with the same interests is perceived to be more credible; (3) WOM in social media is not confined to one place as it is the case of WOM in offline settings. Because this WOM occurs on the internet, it can reach users in any place at any time with no restrictions.

These same authors stated that "in the pharmaceutical industry, WOM influence can emanate from different players such as patients, physicians, healthcare providers, insurers, regulatory authorities, general public, and others" (Shankar & Li, 2014, p. 489).

Figure 9 – How WOM helps in the sales funnel



Source: Adapted from Shankar and Li (2014), p. 498

However, these authors conclude that there is not a consensus in the studies regarding the influence of WOM in the pharmaceutical environment. For them, it is clear

that it is necessary additional studies in order to provide marketing insights about this subject to pharmaceutical companies (Shankar & Li, 2014).

Nevertheless, social media can have a crucial role in the sales funnel (see Figure 9), since it "can enhance effectiveness of the sales funnel's different stages such as lead generation, lead qualification, persuasion, customer relationship management, and support" (Shankar & Li, 2014, p. 498).

2.4.3. Online engagement

According to Goswami *et al*. (2013), there is a concept that is being used by companies in order to direct their customers to their websites. They further explain that this concept, which was defined as "user engagement", consists in retaining customers through websites, using quality content.

Along with Haven, Vittal, Overby, Favier and Cokeh (2008), user engagement is composed of four "I's" (p. 3):

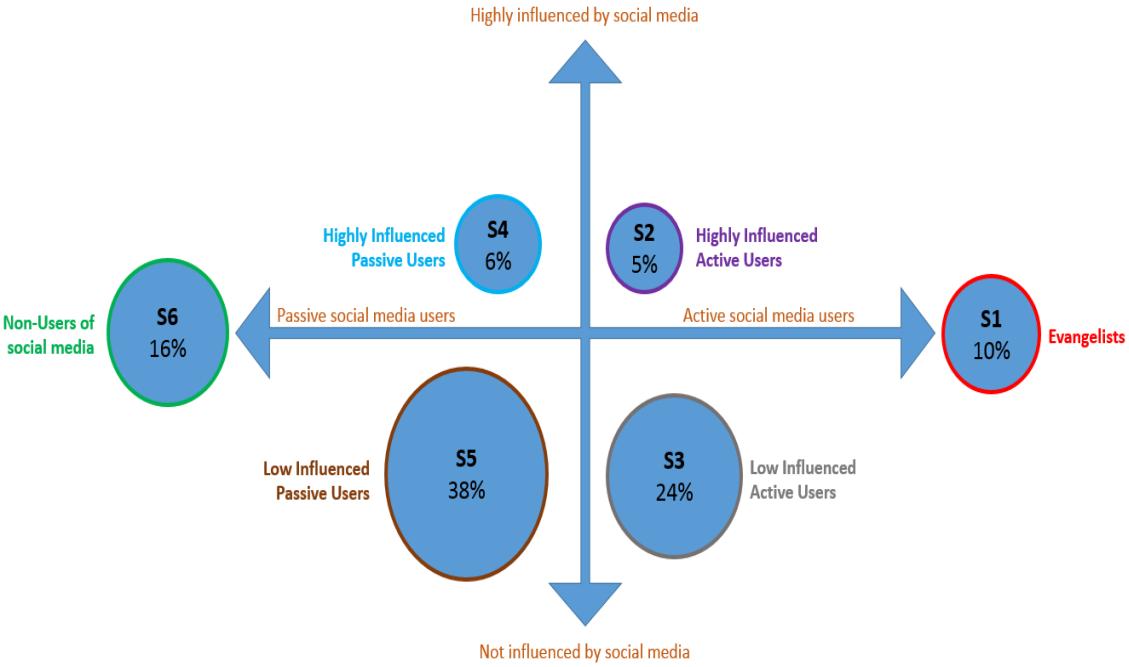
- "Involvement" ("the presence of a person at the various brand touchpoints");
- "Interaction" ("the actions people take while present at those touchpoints");
- "Intimacy" ("the affection or aversion a person holds for a brand");
- "Influence" ("the likelihood a person is to advocate on behalf of the brand")

Therefore, Itskhoki (2011) claimed that the relationship between social media and pharmaceutical companies is not easy to manage. However, this author affirms that marketers of prescription and OTC medicines are using social media, even though not as aggressively as in traditional advertising. Itskhoki further explains that social media gives the opportunity to pharmaceutical companies to listen to consumers while allowing a development of a relationship. People not only are using social media to interact with their friends but they also manifest their interest in brands by becoming their fans. According Itskhoki (2011), through a tool named "MultiMediaMentor®" developed by Knowledge Networks it was possible to verify that in 2011, 28% of the USA population between 13 and 80 years old were regular users of social media, while the correspondent percentage for consumers who bought prescription and OTC medicines was 26% and 28% of the total population, respectively.

To Itskhoki (2011), mobile technology has brought significant changes to social media use. In 2011, 40% of social media users stated that they used mobile technology to interact on social media, while in 2010 this value was only 28%. This author affirms that these users search information (e.g. prices and brand reviews) through social media when purchasing on-site. This scenario is quite interesting for marketers of OTC medicines because it can lead to more power of influence over consumers' choice in this type of purchasing (Itskhoki, 2011).

Itskhoki (2011) also referred a study named "The Faces of Social Media^{SM}", which identifies six segments of social media users, with each one of them possessing singular aspects (see Figure 10).

Figure 10 – Social media segments (% population 13-80 years old (USA))

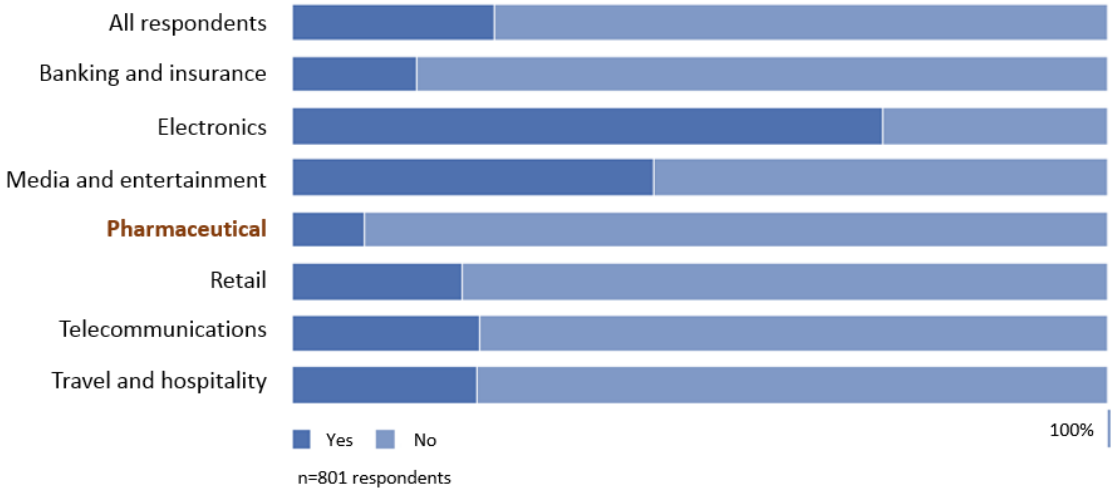


Source: Adapted from Itskhoki (2011), p. 2

The "Evangelists", "Highly Influenced Active Users" and "Low Influenced Active Users" segments are composed of youngsters that are actively posting and reviewing brands, while the "Highly Influenced Passive Users", "Low Influenced Passive Users" and "Non-Users" segments are associated with older users. These segment dimensions are reproduced when analysing only users of prescription and OTC medicines (Itskhoki, 2011).

In a study titled "IBM Institute for Business Value Benchmarking Program - Sales and marketing Study" developed by IBM in the beginning of 2011, several sales and marketing managers (88 from pharmaceutical companies) were inquired. According to retrieved data (see Figure 11), the pharmaceutical sector is far behind in terms of social media engagement when comparing to other industries (Liu & Fraser, 2012).

Figure 11 – Does your company engage potential or current customers via social media?



Source: Adapted from Liu and Fraser (2012)

According to PricewaterhouseCoopers Health Research Institute (2012), in a study of 2012 titled "PwC HRI Social Media Consumer Survey", 1,060 adults living in the USA where inquired, leading to several findings: (1) more than 80% of the interviewed individuals between 18 and 24 years old will probably share health information through social media and 90% of the same individuals will engage in health activities in these same platforms; (2) only 45% of the inquired individuals between 45 and 64 years old consider to share health information and 56% probably will engage in social media; (3) Only 16% of the inquired admitted to use social media to review medicines or treatments; (4) 43% of the questioned individuals consider to share a positive experience with medicines and treatments, while 38% will share a negative experience; (5) 23% of the respondents expect an answer within an hour when requesting information to a health company through social media, while 42% expect an answer within few hours and 70% expect an response within a day; (6) when posting a complain through social media about a service, product or experience related to a health company, 22% of the respondents stated they expect an answer within an hour, 29% expect a reply in few hours and 66% hoped to have an answer within a day; (7) 34% of the inquired affirm that social media can influence their decision about taking a medicine.

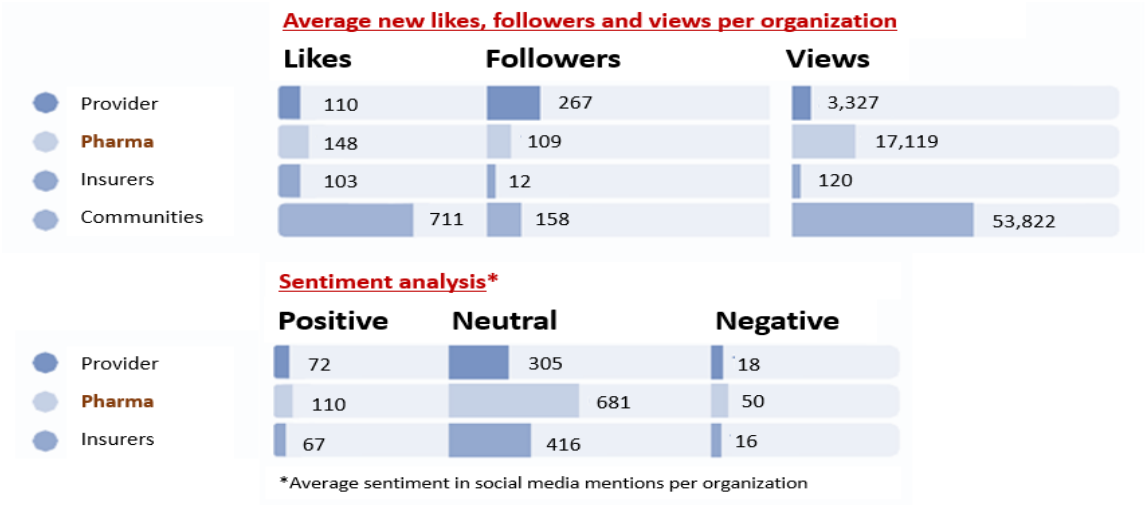
In terms of pharmaceutical companies' presence in social media, the "PwC HRI Social Media Consumer Survey" found that: (1) 68% of the inquired individuals would

like the presence of discounts and coupons; (2) 65% of the respondents consider interesting the possibility that social media brings for making complains and access customer support; (3) 58% and 60% of the respondents thought that was interesting having reminders for appointments and treatments, respectively; (4) 65% found value in information that could help find the cheapest medication; (5) 56% of the respondents felt that it is interesting having support groups for similar patients; (6) 53% saw value in the possibility of sharing positive experiences with other patients; (7) 42% of the interviewed people supported games and contests that could encourage healthy behaviours. However, the data retrieved also showed: (8) only 37% of the respondents will probably trust in the information made available through social media by pharmaceutical companies, while only 28% will share it.

According to PricewaterhouseCoopers Health Research Institute (2012), in the study "HRI Week in the Life Of Analysis", developed in 2012, the interactions between consumers and pharmaceutical companies through the company's Facebook page were assessed and conclusions point that consumers interactions are divided as: (1) 5% made questions; (2) 48% provided feedback, (3) 47% shared and developed conversations in the online platform. On the other hand, the pharmaceutical companies: (4) 35% of them provided information through their Facebook page; (5) 8% developed promotional activities; (6) 57% shared and developed conversations in the online platform.

In this same study, several social media where analysed leading to several findings (see Figure 12): (1) pharmaceutical companies' social media have less activity than online consumer communities, but when comparing with other healthcare companies they possess a higher number of views; (2) the sentiment analysis revealed that a small number of social media mentions related to pharmaceutical companies were negative (around 6%), while neutral mentions were about 81% of the total mentions, leaving only 13% for positive mentions; (3) the highest social media activity in the pharmaceutical sector was registered when a pharmaceutical company alerted members about a product recall, leading to 12 "likes", 47 shares and 12 comments.

Figure 12 – A week in the life of social health (social media)



Source: Adapted from PricewaterhouseCoopers Health Research Institute (2012), p. 22

According to Aitken, Altmann, and Rosen (2014), in order to evaluate the use of Facebook, Twitter and YouTube by the top 50 pharmaceutical companies, the IMS Institute for Healthcare Informatics developed three indices (Reach, Relevance and Relationship) that define the global IMS Health Social Media Engagement Index (see Table 7).

Table 7 – IMS Health measures and raking for social media engagement

Ranking	IMS Health Reach Index[a]	IMS Health Relevance Index[b]	IMS Health Relationship Index[c]	IMS Health Social Media Engagement Index[d]
1	Johnson & Johnson	Johnson & Johnson	Johnson & Johnson	Johnson & Johnson
2	GlaxoSmithKline	GlaxoSmithKline	Novo Nordisk	GlaxoSmithKline
3	Novartis	Novartis	Bayer	Novo Nordisk
4	Pfizer	Pfizer	UCB	Pfizer
5	Novo Nordisk	Boehringer Ingelheim	Hospira	Novartis
6	Boehringer Ingelheim	Novo Nordisk	GlaxoSmithKline	Boehringer Ingelheim
7	Merck & Co	Bayer	Boehringer Ingelheim	Bayer
8	Bayer	Merck & Co	Merck & Co	Merck & Co
9	Merck KGaA	Merck KGaA	AstraZeneca	AstraZeneca
10	Lilly	Lilly	Pfizer	UCB

Note:
(a) Reach is a measure of the absolute number of listeners and the index is based on the number of people reached by each channel through likes, shares and re-tweets on Facebook, Twitter and YouTube
(b) Relevance measures whether people found posts or content relevant and/or useful, and the index is based on the extent to which content is being shared and forwarded across social networks
(c) Relationship is a measure of interaction - the back and forth of conversation - and a measure of company and consumer or patient integration, while the index measures the level of interaction between a company and those who post, reply or otherwise interact with the company's postings
(d) This index results of the combination of all three indices (Reach, Relevance and Relationship). To reflect the different importance and usages of social media, each index was weighted by a factor of 1, 2 and 4 for the Reach, Relevance and Relationship indices respectively The Index reflects the current overall usage of social media by pharmaceutical companies on healthcare related topics

Source: Adapted from Aitken, Altmann and Rosen (2014)

Aitken, Altmann and Rosen further state that the companies composing the global index are specialized, have a big presence in the consumer health business and generate large amounts of revenue. For them, medium size companies can compete with large ones in terms of social media engagement because they are more flexible and have reduced audiences (see Relationship index in Table 7). Johnson & Johnson's high performance on social media is clearly distinguished from the performance of other companies in the indices, revealing a lack of maturity of pharmaceutical companies towards social media adherence (Aitken, Altmann, and Rosen, 2014).

Elsevier Pharma Solutions (2012) referred that physicians use different social media platforms. Through Table 8 it is possible to verify that YouTube is the platform mostly used by the inquired physicians in the study. Physician communities are the preferred channel in United Kingdom and Italy while French and Spanish physicians use more YouTube. Twitter reveals itself as the least used platform. It is clear that physicians use more physician communities for professional-related issues, while Facebook and Twitter register the lowest value regarding this matter.

Table 8 – Social media use by physicians in different countries

Social media	Total[(a)]	United Kingdom (n=199)	France (n=138)	Italy (n=375)	Spain (n=286)	Professional use[(a)]	Personal/professional use[(a)]
YouTube	73%	75%	77%	64%	80%	3%	33%
Physician communities	67%	82%	38%	86%	44%	49%	16%
Google+[(b)]	65%	52%	57%	70%	71%	4%	46%
Facebook	58%	59%	49%	50%	73%	1%	16%
Blogs	55%	47%	50%	54%	66%	8%	31%
LinkedIn	38%	35%	21%	45%	43%	22%	11%
Patient communities	33%	22%	42%	36%	28%	20%	10%
Twitter	28%	29%	14%	25%	38%	2%	10%

Note:
(a) n=1026
(b) Google+ is probably being perceived as the search engine Google. Therefore this result is directional

Source: Adapted from Elsevier Pharma Solutions (2012)

In a Publicis Touchpoint Solutions (2014) study, 245 physicians using the online platform Sermo were interviewed. The data retrieved showed that 63% of the physicians also use Facebook, while 40% uses LinkedIn. Far behind in the choices of these physicians are Google+ with 20% and Twitter with 19%.

2.4.4. Advantages and disadvantages of social media

Advantages

According to Shankar and Li (2014), pharmaceutical marketing performed through social media brings more benefits when comparing to traditional media. These authors state that social media platforms allow pharmaceutical companies to be aware of the customers' needs, while engaging them in a two-way communication, allowing marketers to retrieve information about the company, products and brands. They also affirm that this dialogue allows the establishment of a relationship with influencers.

Another advantage of social media platforms is the fact that they are a more cost-efficient approach (almost all of them are free to use) than traditional media. At the same time, they allow to communicate with a larger audience and a wider reach when comparing to traditional media (Shankar & Li, 2014).

According to Shankar and Li (2014), social media and traditional media can also coexist in a symbiosis, leading to increased revenues and financial returns of a company. These authors exemplify this cooperation with a situation of a pharmaceutical company (Bristol-Myers Squibb) that used a cartoon in a television advertisement in order to promote the anti-depressant medicine named "Abilify". Several viewers who were fond of the cartoon posted the advertisement on YouTube, and in a small period of time the video reached around 10,000 views, while in social media platforms such as Twitter and Facebook a buzz was created around it. In this way, with social media, it is possible to increase brand awareness and attract more viewers towards the advertisement, leveraging the television advertising (Shankar & Li, 2014).

The same researchers suggested that prescription decision-making is surrounded by uncertainty and associated with medicine efficacy and risks such as adverse effects, and it is leveraged by the different clinical situations that different patients experience (Ching, 2010; Narayanan & Manchanda, 2009 cited in Shankar & Li, 2014). For Shankar and Li (2014) and Brown, Broderick and Lee (2007), WOM produced by people who share similar situations is seen as more trustworthy when comparing to information provided by pharmaceutical companies. Shankar and Li (2014) stated that social networks allow WOM to flow directly to people with common interests. For them, social media's WOM can influence positively the sales dynamic and the return on investment.

Disadvantages

As suggested by Aitken, Altmann and Rosen (2014), the pharmaceutical industry has been slow to adopt social media (especially in Europe) because of the highly stressing regulatory environment, security issues raised by new technologies and the uncertainty of how to engage directly with patients. In the past, regulators have sent warning letters that discouraged the adoption of social media by pharmaceutical companies, but there are other reasons for this phenomenon (Aitken, Altmann & Rosen, 2014). The main issues related to social media adoption from the pharmaceutical industry can be divided in three categories: legal, technical and internal. These categories, according to Creation Healthcare and Weber Shandwick, "include regulatory compliance, loss of content control, privacy concerns, lack of familiarity with social media and proving…[return on investment] for social media" (Aitken, Altmann & Rosen, 2014, p. 9). For example, a negative Facebook comment can become viral in a short period of time.

Also, the adverse effects reported in social media and the consequent obligation to communicate them to authorities are perceived by pharmaceutical companies as restraining measure (Aitken, Altmann & Rosen, 2014).

CHAPTER 3 – RESEARCH FRAMEWORK AND METHODOLOGY

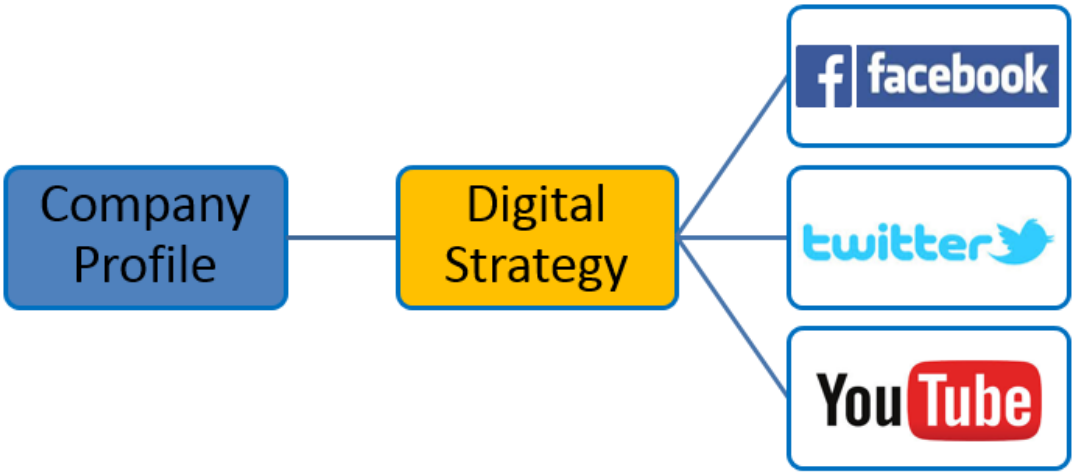
Social media is becoming a powerful tool. Not only it helps users to gather information, it can also enhance the communication of companies with their customers. Nowadays, several companies have marketing strategies developed exclusively for social media communication, as they are starting to see the benefits of its use. However, in the pharmaceutical industry, the social media thematic is surrounded by doubts raised by the absence of official rules and guidance, leading to concerns that are difficult to manage in the eyes of this industry. Nevertheless, several pharmaceutical companies are still adopting social media even without a clear view of how to proceed.

According to the literature review, several studies report the activity of pharmaceutical companies on social media, especially on Facebook, Twitter and YouTube. However, the majority of these studies do not evaluate the digital strategy of pharmaceutical companies on such social media platforms. Moreover, only one unpublished study from Aitken, Altmann, and Rosen (2014) tries to characterize the digital engagement strategy of pharmaceutical companies by establishing an integrated engagement raking for Facebook, Twitter and YouTube.

3.1. Research Framework

Without any mature, robust and published conceptual model being applied to the pharmaceutical industry, this research tries to follow the footsteps of the Aitken, Altmann, and Rosen (2014), however with its own innovative conceptual model that is represented in Figure 13.

Figure 13 – Conceptual model



The conceptual model proposed in Figure 13 is based on three essential elements: (1) the type of pharmaceutical company regarding its size (revenue and number of employees); (2) the digital strategy that each pharmaceutical company puts in place for each social media platform; (3) the most relevant social media platforms that are the focus of analysis (Facebook, Twitter and YouTube).

With this conceptual model, it is possible to evaluate possible associations between the companies profile with their digital engagement strategy in all the three assessed social media platforms. Also it allows verifying if the digital strategy of a company is consistent between the social media targeted for analysis.

With the conceptual model defined, three hypotheses emerged:

H1: The larger the pharmaceutical companies the higher engagement on social media.

Investment in social media depends on the capability of a company to allocate resources to this specific field. Because larger companies generate larger amounts of

revenue, they possess larger budgets and human resources numbers that can be used to manage social media. As these companies have more means to enhance the social media activity, they can reach out their audience better than small companies that do not possess the same resources of larger companies. Moreover, Aitken, Altmann, and Rosen (2014) found an association between the company size and their engagement performance. In this way, this research tries to give insights of if this association is or is not present on Facebook page, Twitter account and YouTube channel of selected pharmaceutical companies.

H2: The digital engagement strategy is common in the most popular social media platforms (Facebook, Twitter and YouTube).

The analysis of the level of engagement raises another question: Do pharmaceutical companies use the same strategy on Facebook, Twitter and YouTube?

Considering that companies have limited resources, they can allocate more resources only to a social media platform and less to the others. As showed by Shankar and Li (2014), not all pharmaceutical companies are present in these three social media platforms, especially smaller companies. This research attempts to verify if pharmaceutical companies use the same strategy in all three platforms or if they focus more on specific platforms.

3.2. Research Methodology

In order to initiate this investigation, it was necessary to define the sample. As the subject of analysis was pharmaceutical companies' presence in social media, the first important step was to choose the size of the sample. It was decided to use the top 20 pharmaceutical companies within a raking of the top 50 pharmaceutical companies (in terms of revenue) elaborated by Pharmaceutical Executive in 2013[8].

After defining the size of the sample, the social media (Facebook, Twitter and YouTube) presence of the top 20 pharmaceutical companies was analysed by visiting their global homepage in order to search for evidence of their adherence to social media. When the homepage did not have a reference to social media adherence, other official websites of the companies (e.g., websites of companies in specific countries) were visited and analysed (see Annex I). At the same time, social media platforms of these pharmaceutical companies were visited, where a list of links was elaborated for each platform in order to facilitate the next steps of the investigation (see Annex II, III, and IV). When there were several social media channels for the same social media platform, only one was chosen (except for the case of Roche, because Genentech - company from Roche Group - was included). In these choices, the most relevant criteria for inclusion were the fact that these channels were associated with healthcare. Also, when a company did not have a global social media channel, a country-specific channel was considered and added to the list.

With all the data provided through the listing of websites, it was possible to initiate a second phase of the analysis. This phase consisted in the analysis of each and every social media platform for each pharmaceutical company using tools provided by two websites: www.simplymeasured.com[9] (for Facebook and Twitter) and www.socialbakers.com[10] (for Facebook and YouTube).

The SimplyMeasured tool for collecting data from Facebook pages was "Free Facebook Fan Page Report", while for Twitter accounts was "Free Twitter Customer Service Analysis". Because these tools have time frame restrictions, two distinguished

[8] The Pharmaceutical Executive article can be found at http://www.imsconsultinggroup.com/deployedfiles/consulting/Global/Content/How%20We%20Help/Strategy%20&%20Portfolio/PharmExec-pharma50.pdf
[9] http://simplymeasured.com/free-social-media-tools
[10] http://www.socialbakers.com/bookmarks/

periods of time were analysed (see Table 9). These tools retrieved data (in a form of a report) that was possible to analyse through Excel (Microsoft Office tool). The Socialbakers tool is a built-in website tool that provided several data for each pharmaceutical company's Facebook page (country of origin of fans in percentage) and YouTube channel.

Table 9 – Facebook and Twitter data collection method

Platform	Tool	Period number	Period of time
	"Free Facebook Fan Page Report"	1	29 May 2014 to 12 June 2014
		2	14 June 2014 to 27 June 2014
	"Free Twitter Customer Service Analysis"	1	5 June 2014 to 12 June 2014
		2	20 June 2014 to 26 June 2014

With all information collected, the next step was to export the most relevant data to Excel. By accomplishing this step, it was possible to execute several Excel tools in order to analyse efficiently the data.

For the data retrieved from SimplyMeasured, the two periods of time were aggregated into one, being this last one the major target of analysis. Because it was necessary more socioeconomic data from the pharmaceutical companies, employee data was collected from different sources and integrated in the Excel files (see Annex V).

Table 10 – Engagement formulas

Platform	Engagement formulas
	$Period\ engagement = \frac{"People\ Talking\ About\ This"}{nº\ of\ Fans}$ $Period\ and\ Total\ engagement = \frac{nº\ of\ Post + nº\ of\ Shares + nº\ of\ Likes + nº\ of\ Comments}{nº\ of\ Fans}$
	$Period\ and\ Total\ engagement = \frac{Retweets + Mentions\ (including\ replies)}{nº\ of\ Followers}$
	$Total\ engagement = \frac{Views\ per\ video}{nº\ of\ Subscribers}$

With all data collected, the next step was to calculate the engagement in each platform for each pharmaceutical company, according to the formulas demonstrated in Table 10.

Another important tool for analysing specific data related to Facebook and Twitter was provided by www.tagxedo.com[11], which consists in presenting a visualization of the most frequent words in the analysed texts (comments, posts and tweets). Also some data from Excel files were exported to SPSS statistics software in order to run descriptive statistics (Crosstabs) and also multivariate statistics (Hierarchical Cluster Analysis). The first step was to define how many clusters exist for each social media platform. To perform this step the tool "Hierarchical Cluster Analysis" of SPSS was used, using as variables the "Engagement" for each social media platforms and the variable "Fans" for Facebook, "Followers" for Twitter and "Subscribers" for YouTube (see Annex VI). All of the analysis was performed according to Ward's method.

With the clusters created for each social media platforms, it was time to define their designations. Using the "Crosstabs" tool of SPSS, the same two variables were again analysed in function of each cluster for each social media platforms. Through this, each cluster received a designation (see Annex VII).

Given that all clusters were identified and named, a more profound analysis was made using more variables, in order to characterize each cluster. For this analysis, the "Crosstabs" tool was used in the same way for the definition of clusters designations (see Annex VIII, IX, X).

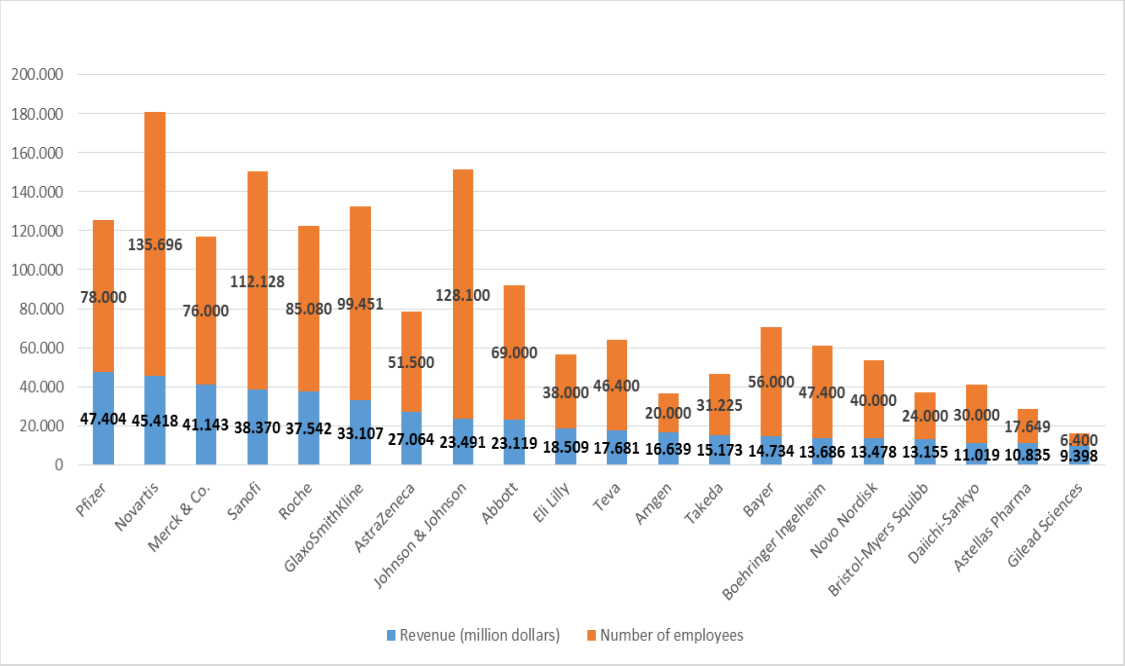
[11] http://www.tagxedo.com/app.html

CHAPTER 4 – DATA TREATMENT AND RESULTS

In this research, top 20 pharmaceutical companies by revenue were analysed. In Figure 14, a relationship between revenue and company's employees was established, demonstrating that, in general, companies with larger amounts of revenues have also more employees.

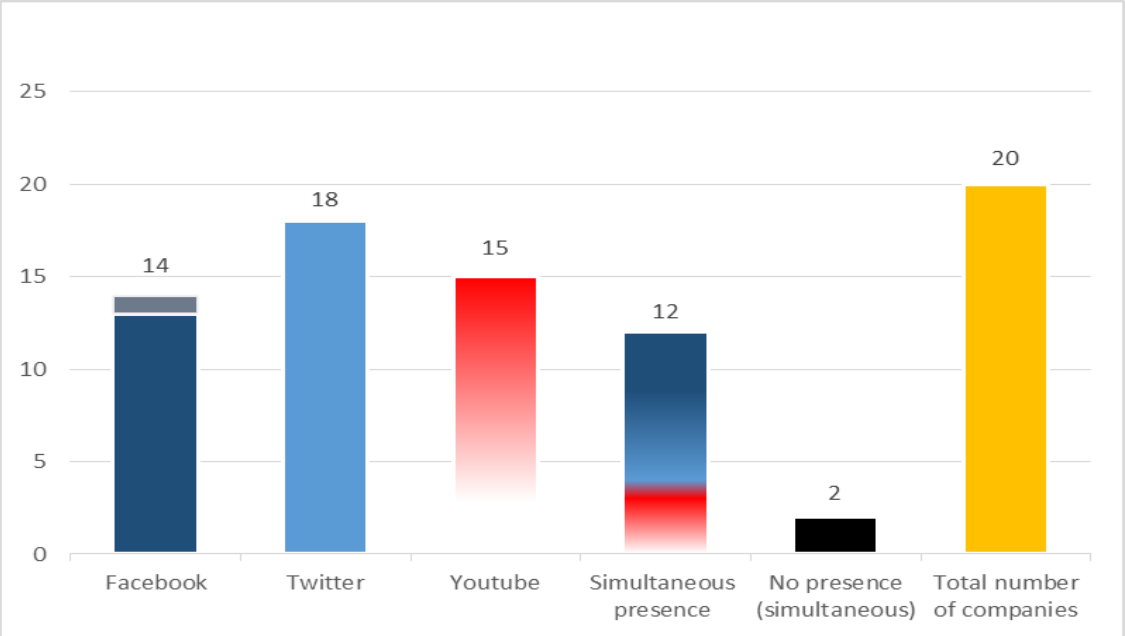
The company with the highest revenue amount was Pfizer while the lowest was Gilead Sciences. On the other hand, the company with the larger number of employees was Novartis while Gilead Sciences continues to be in the bottom also for the number of employees.

Figure 14 – Pharmaceutical firms analysed: Socioeconomic profile



When analysing social media presence of the top 20 pharmaceutical companies, several conclusions were taken. According to Figure 15, 14 (70%) companies have a Facebook page (Johnson & Johnson has Facebook page but was not analysed due to method's restrictions), 18 (90%) have a Twitter account, while 15 have a YouTube channel.

Figure 15 – Pharmaceutical firms analysed: Social media presence



Of the companies examined, only 12 (60%) are in all social media platforms analysed, while merely 2 (10%), namely Takeda and Daiichi-Sankyo pharmaceutical companies, are completely absent on such platforms.

4.1. Facebook data analysis

To evaluate the presence of pharmaceutical companies on Facebook, it is important to identify each of the companies that have adhered to this platform.

In Figure 16, all the 14 companies which have a Facebook page are represented. However, it is important to clarify some details related to two companies. The pharmaceutical company Johnson & Johnson is highlighted because it was not possible to analyse its Facebook presence due to method's restrictions. On the other hand, it was included the company Genentech (part of Group Roche) in the Roche analysis, because it is responsible for the most successful medicines of Group Roche. Another important aspect is the fact that Roche's and Abbott's Facebook pages are dedicated to careers, while AstraZeneca's and Sanofi's Facebook page are dedicated to USA population.

Figure 16 – Pharmaceutical firms analysed on Facebook

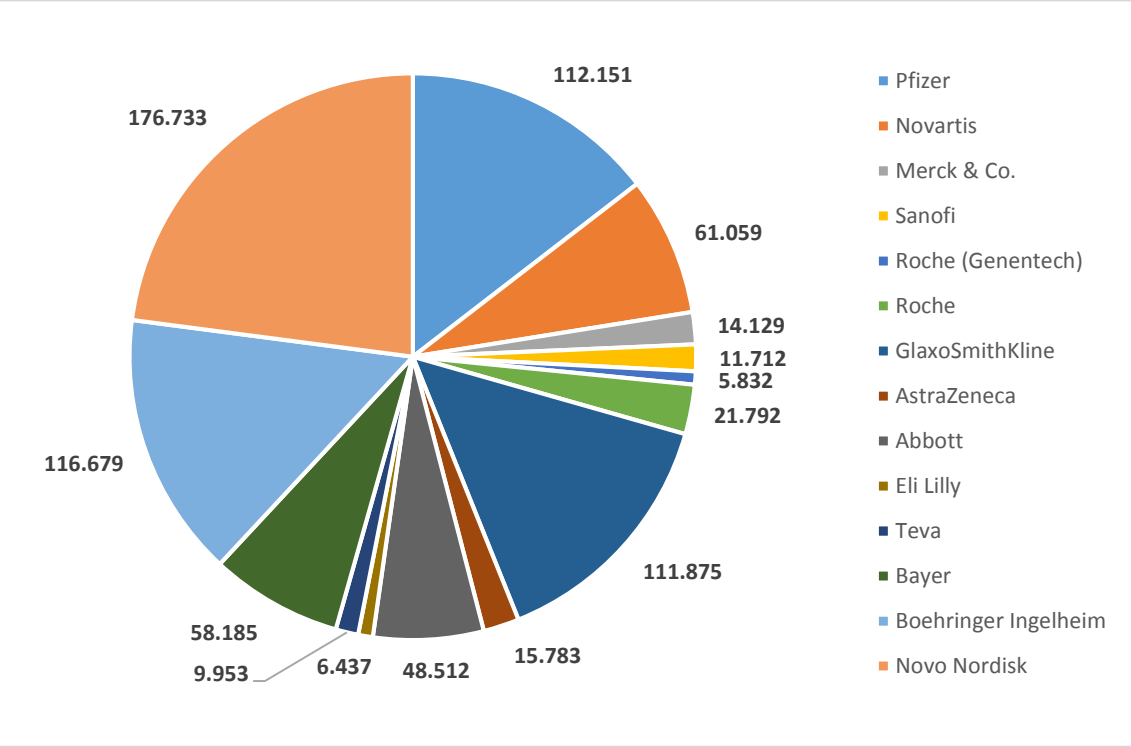
* Johnson & Johnson has Facebook page but it was not analyzed due to the method's restrictions
* Genentech was included because it is part of Group Roche, and it is accountable for the most successful medicines of Group Roche

Fans

One important step in this research was to analyse pharmaceutical companies in terms of number of fans (likes in Facebook page). According to Figure 17, there are 4 companies that have achieved a number of fans greater than 100.000. The leading

company in this category was Novo Nordisk with 176.733 fans. On the other hand, 3 companies had a number of fans inferior to 10.000. The company with the least number of fans was Roche (Genentech), with a total number of fans of 5.832.

Figure 17 – Pharmaceutical firms analysed on Facebook: Page fans



After defining the number of fans of each company, it was important to verify the country of origin of fans. According to Table 11, at the time of retrieval of the data from www.socialbakers.com, all the companies were composed by fans that came from more than 4 countries.

The Facebook pages that are dedicated to USA residents (AstraZeneca and Sanofi) have the majority of fans from USA but also have fans from other countries. Some of the companies also appear to have a connection between their headquarters and the majority of fans' country of origin (Merck & Co., Roche (Genentech), GlaxoSmithKline, Eli Lilly and at some point Teva). According to these findings, the concerns (e.g., DTC advertising) raised by the fact that social media can reach countries where Facebook pages are not intended, are without any doubt factual.

Table 11 – Pharmaceutical firms' Facebook fans: country of origin

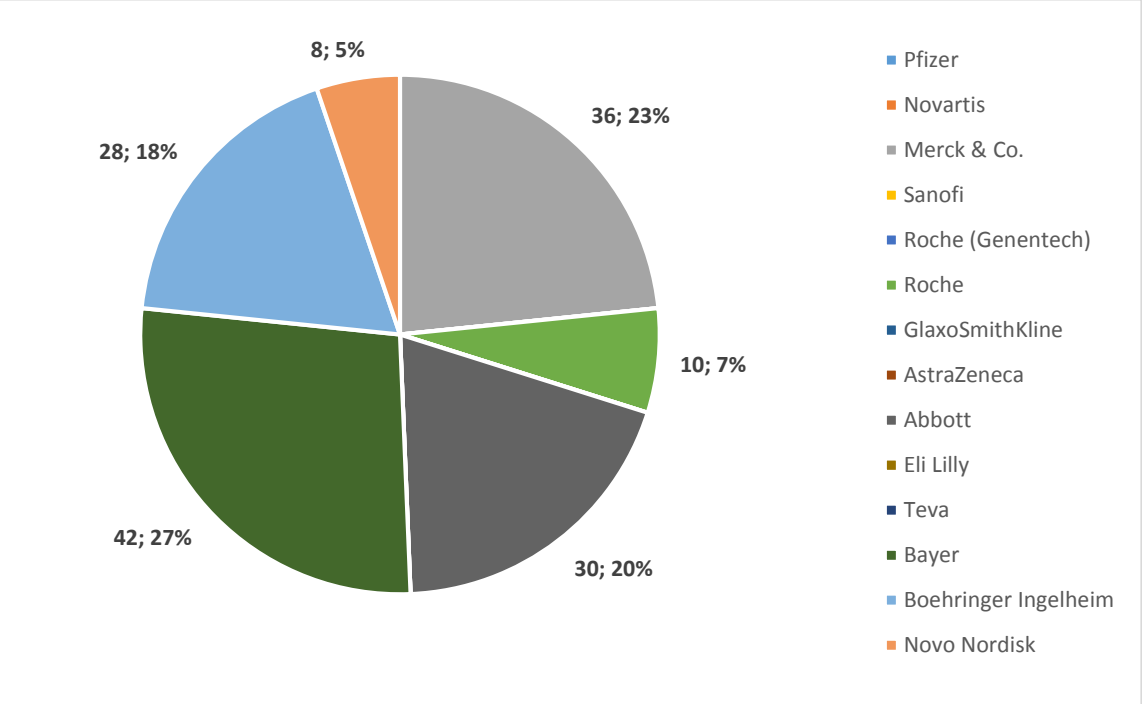
Company	Headquarters	Country of origin of fans (Facebook) (%)[a]			
		1º	2º	3º	4º
Pfizer	USA	Egypt 19,6%	USA 13,5%	India 9,5%	Brazil 4,7%
Novartis	Switzerland	Egypt 17,5%	India 10,6%	USA 8,7%	Brazil 8,6%
Merck & Co.	USA	USA 30,9%	India 8,5%	Egypt 5,9%	Brazil 4,5%
Sanofi	France	USA 65,3%	Brazil 3,7%	Egypt 3,6%	Algeria 2,6%
Roche	Switzerland	Egypt 29,5%	USA 9,5%	Germany 7,4%	India 5,8%
Roche (Genentech)	USA	USA 75,4%	India 3,2%	United Kingdom 1,6%	Egypt 1,2%
GlaxoSmithKline	England	United Kingdom 33,3%	Egypt 10,3%	India 7,4%	Pakistan 6,4%
AstraZeneca	England	USA 64,7%	Egypt 7,9%	India 3,3%	Brazil 2,1%
Abbott Laboratories	USA	India 32,3%	USA 12%	Brazil 7,9%	Egypt 5,2%
Eli Lilly	USA	USA 43%	Brazil 6,3%	India 5,5%	Egypt 3,8%
Teva	Israel	USA 18,1%	Israel 16,9%	India 9,0%	Hungary 5,9%
Bayer	Germany	Mexico 15,6%	Italy 13,7%	Pakistan 12,7%	Egypt 12,4%
Boehringer Ingelheim	Germany	Egypt 18,9%	Pakistan 16,4%	Philippines 16,2%	India 7,3%
Novo Nordisk	Denmark	Algeria 35,8%	Indonesia 15,6%	Egypt 12,5%	Peru 9,1%

Note:
(a) Data retrieved from www.socialbakers.com (19/05/14)

Posts

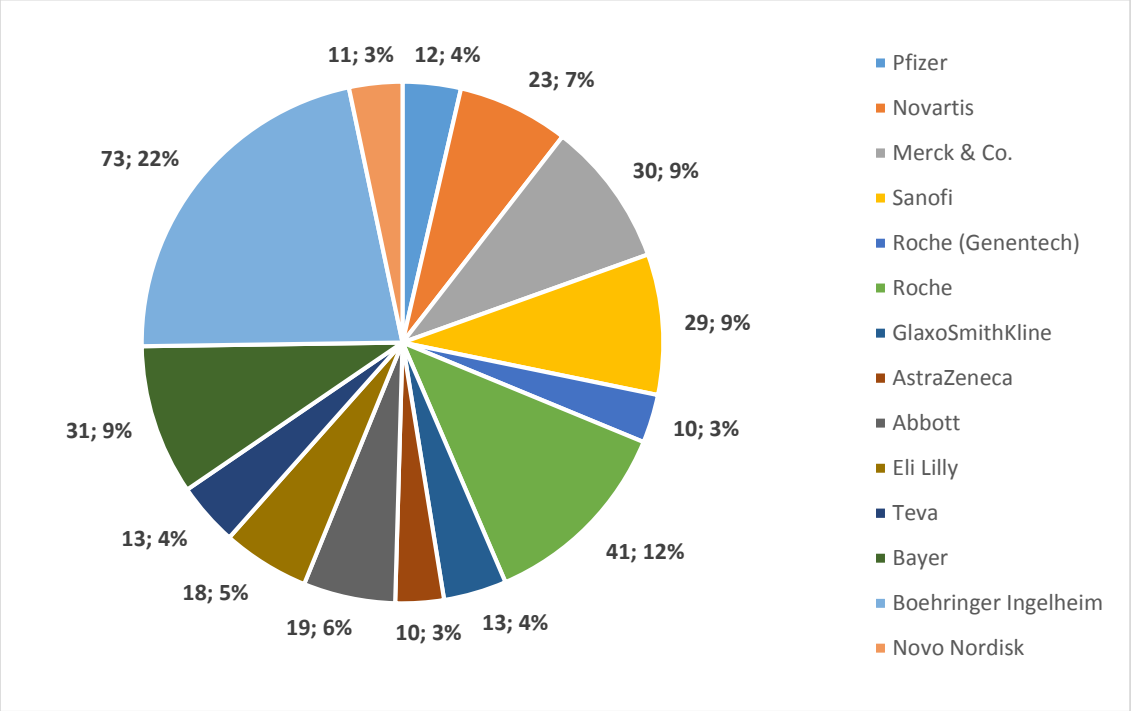
The activity on Facebook in terms of posts was also assessed. There are two categories of posts registered: (1) user posts; (2) brand posts. According to Figure 18, only 6 Facebook pages (Merck & Co., Roche, Abbott, Bayer, Boehringer Ingelheim and Novo Nordisk) had user posts on their wall, with each one having its own differentiated activity.

Figure 18 – Pharmaceutical firms analysed on Facebook: Users posts



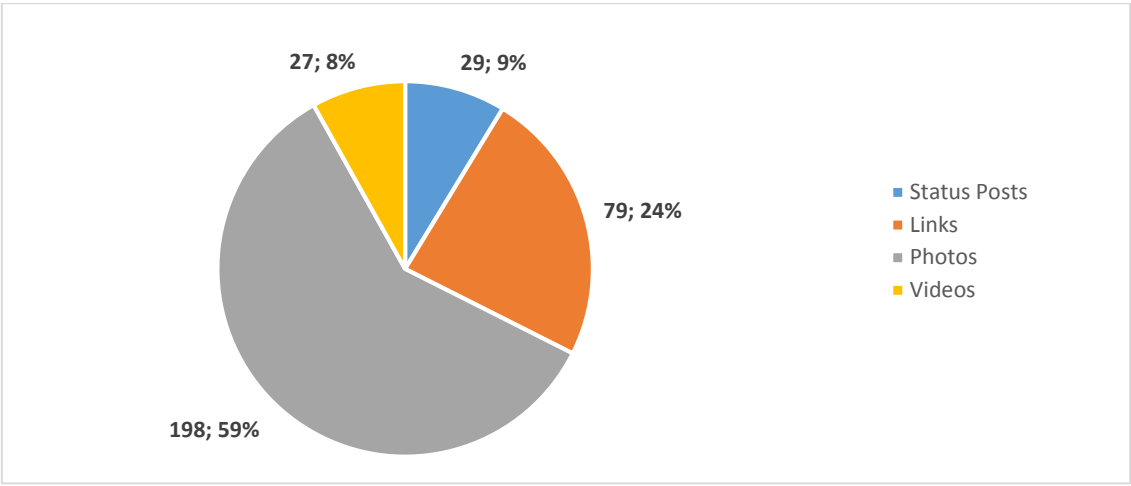
In terms of brand posts, all Facebook pages analysed have brand posts in their wall. According to Figure 19, the company which had the highest activity was Boehringer Ingelheim with 73 posts while the two companies with the lowest activity were Roche (Genentech) and AstraZeneca, both with 10 posts.

Figure 19 – Pharmaceutical firms analysed on Facebook: Brand posts



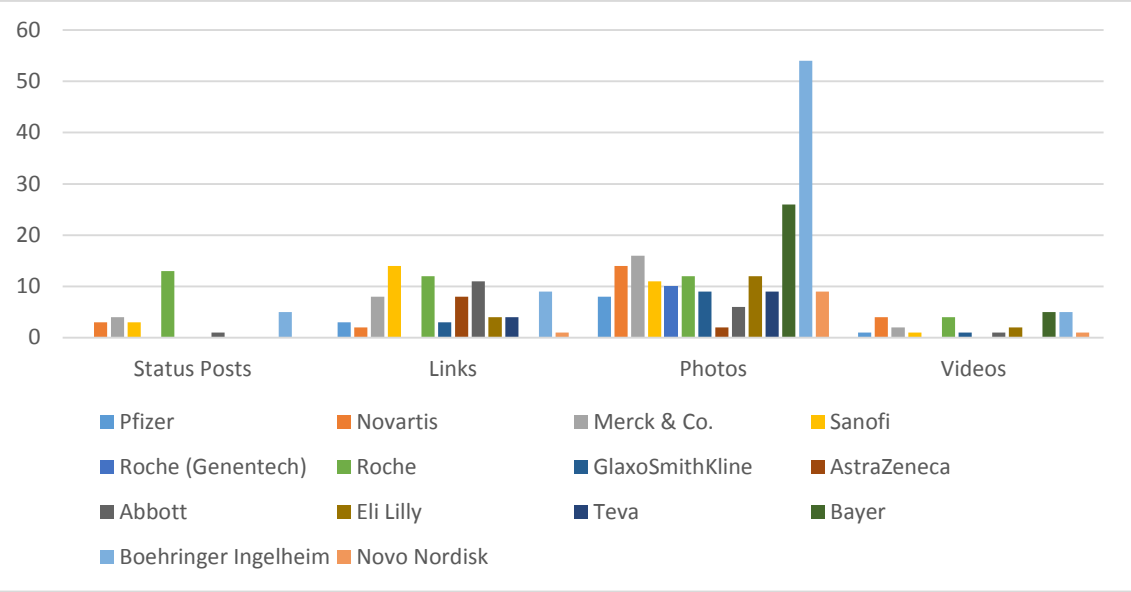
After analysing the quantity of brand posts per company, a qualitative analysis of these posts was made. According to Figure 20, the majority of brand posts were in a form of photo, totalizing 198 (59%) posts. In second place are posts with links, with 79 (24%) posts. The least frequent form of posting was in a form of status posts and video, with 9% and 8%, respectively.

Figure 20 – Pharmaceutical firms analysed on Facebook: Brand posts type



In order to have a precise qualitative analysis of brand posts, another comparison was made. In Figure 21, it is possible to observe the type of brand post per company. It is clear that the choice for each type of brand post is company-dependent, meaning that some companies can post more one type and less another type. Also there are companies that do not post some types of brand posts.

Figure 21 – Pharmaceutical firms analysed on Facebook: Brand posts type per company



Furthermore, to complete the qualitative analysis, the brand posts were analysed adopting a content analysis approach and using "Tagxedo - Creator"[12] as data treatment tool (see Figure 22, Figure 23, Figure 24, Figure 25, Figure 26), which consists in presenting a visualization of the most frequent words in the analysed texts.

[12] http://www.tagxedo.com/app.html

Figure 22 – Facebook brand posts “Tagxedo” (Pfizer, Novartis and Merck)

Pfizer

Novartis

Merck

Figure 23 – Facebook brand posts “Tagxedo” (Sanofi, Roche and Genentech)

Sanofi

Roche

Roche (Genentech)

Figure 24 – Facebook brand posts “Tagxedo” (GlaxoSmithKline, AstraZeneca and Abbott)

GlaxoSmithKline

AstraZeneca

Abbott

Figure 25 – Facebook brand posts “Tagxedo” (Eli Lilly, Teva and Bayer)

Eli Lilly

Teva

Bayer

Figure 26 – Facebook brand posts "Tagxedo" (Boehringer Ingelheim and Novo Nordisk)

The analysis of the previous "Tagxedo" figures shows that an international patient approach is followed by all companies, emphasizing in general the science, new programs, diseases and patients' health.

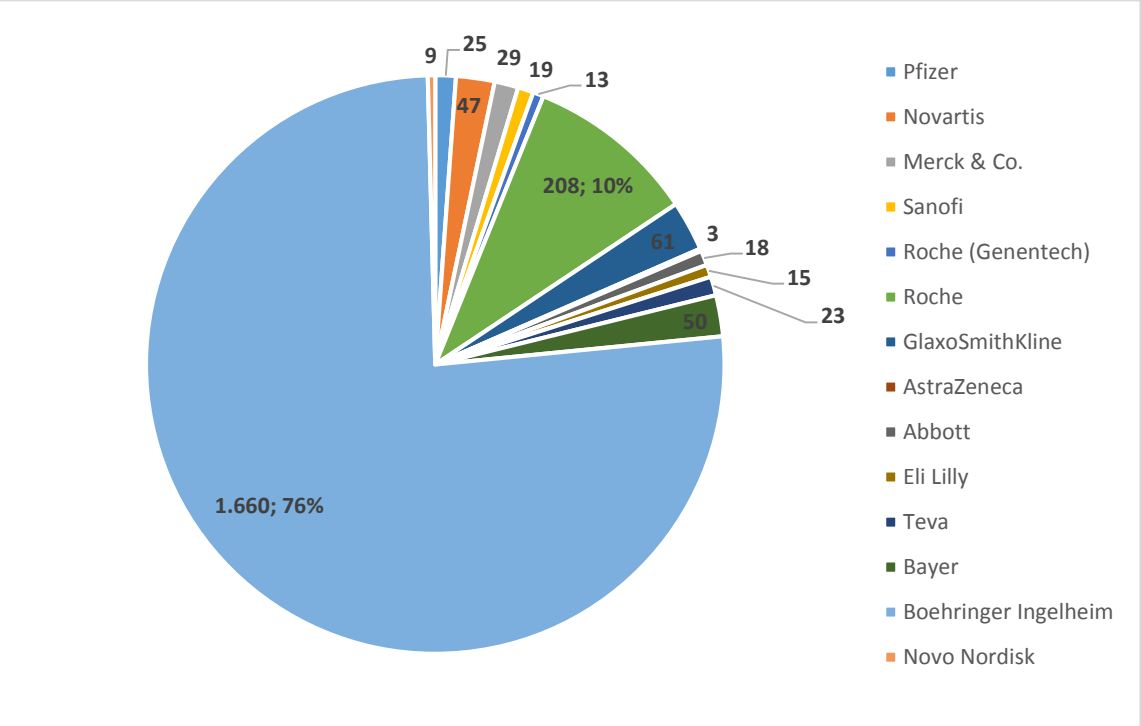
Comments, shares and likes in brand posts

The interaction with brand posts is made at different levels. The first type of interaction analysed is in a form of comments. According to Figure 27, all Facebook pages registered comment activity. Furthermore, the company which registered the

largest amount of comments was Boehringer Ingelheim, with 1.660 comments, corresponding to 76% of all comments registered.

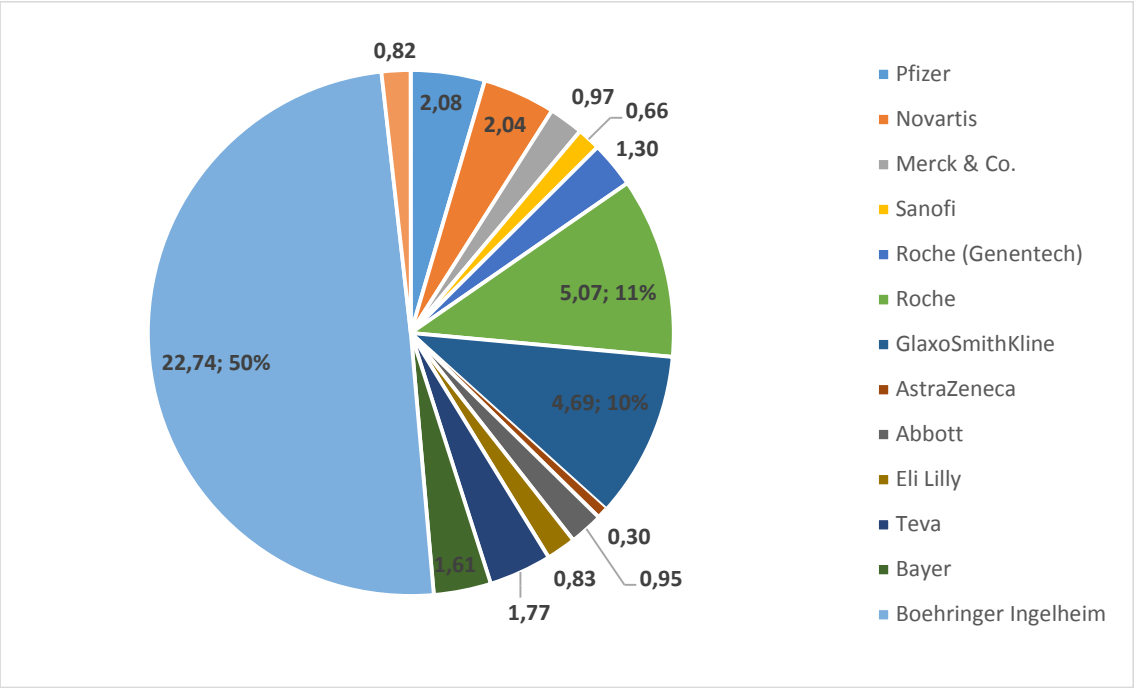
The second biggest Facebook page in terms of comments was from Roche, with 208 (10%), demonstrating a large difference between Boehringer Ingelheim and the other companies.

Figure 27 – Pharmaceutical firms analysed on Facebook: Comments to brand posts



In order to have a more precise analyse of the comments within brand posts it was necessary to display the comments per brand post. According to Figure 28, Boehringer Ingelheim continues in front with a ratio of 22,74 (50%) comments, Roche continues in second place with 5,07 (11%) comments, but a third company (GlaxoSmithKline) emerges with 4,69 (10%) comments. Even with this new ratio, Boehringer Ingelheim continues to dominate in this category.

Figure 28 – Pharmaceutical firms analysed on Facebook: Comments per brand posts



As was made for the brand posts, the comments associated to the same posts were analysed by "Tagxedo - Creator" (see Figure 29). It seems, in general, that the most frequent words appear to be positive rather than negative.

Figure 29 – Pharmaceutical firms analysed on Facebook: "Tagxedo" view of comments

For a more precise analysis, each "Tagxedo" of each company is displayed in the following figures. The analysis shows that not all companies have positive comments, with some registering only negative comments (e.g., AstraZeneca and Novo Nordisk).

Figure 30 – Facebook comments “Tagxedo” (Pfizer, Novartis and Merck)

Pfizer

Novartis

Merck

Figure 31 – Facebook comments “Tagxedo” (Sanofi, Roche and Genentech)

Sanofi

Roche

Roche (Genentech)

Figure 32 – Facebook comments “Tagxedo” (GlaxoSmithKline, AstraZeneca and Abbott)

GlaxoSmithKline

AstraZeneca

Abbott

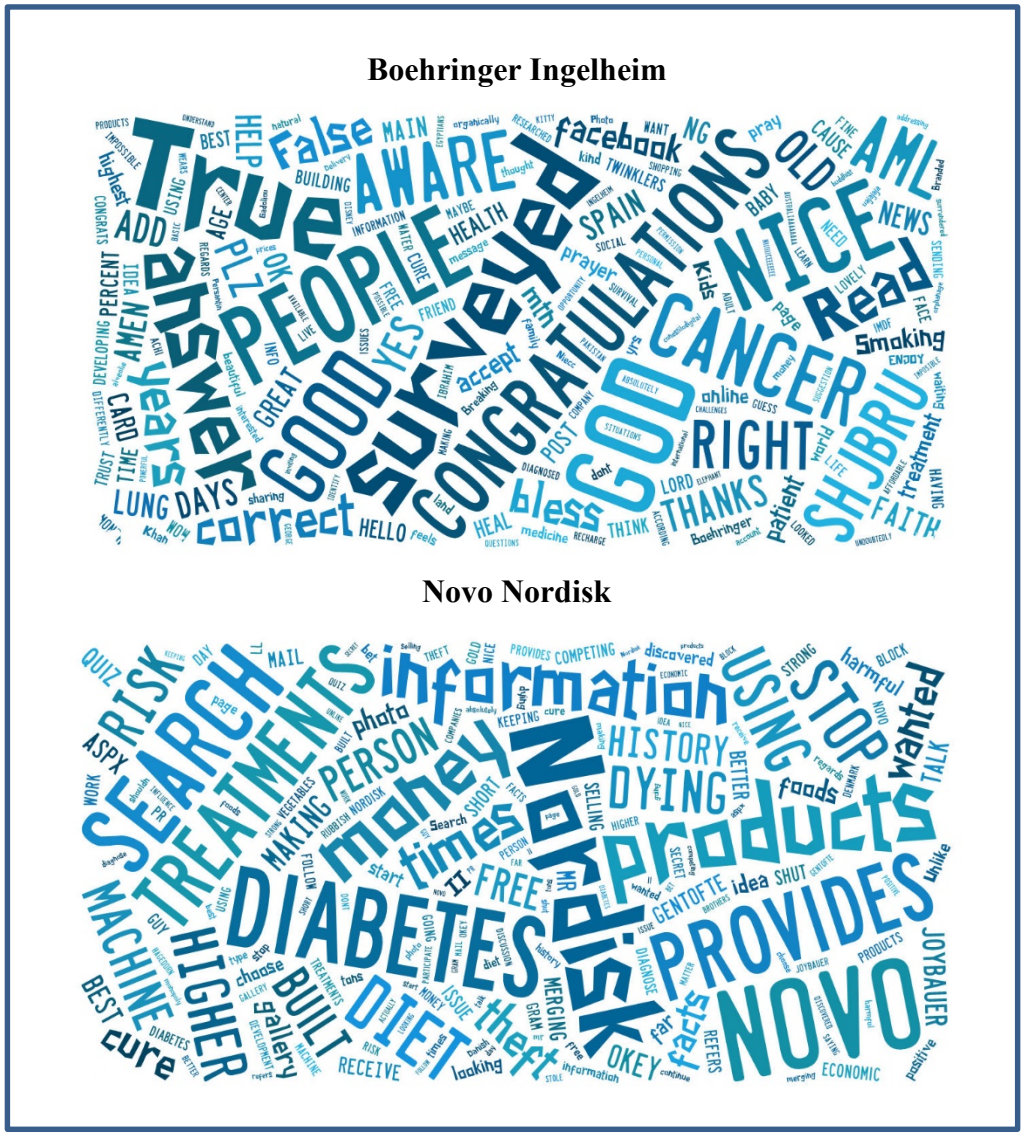
Figure 33 – Facebook comments “Tagxedo” (Eli Lilly, Teva and Bayer)

Eli Lilly

Teva

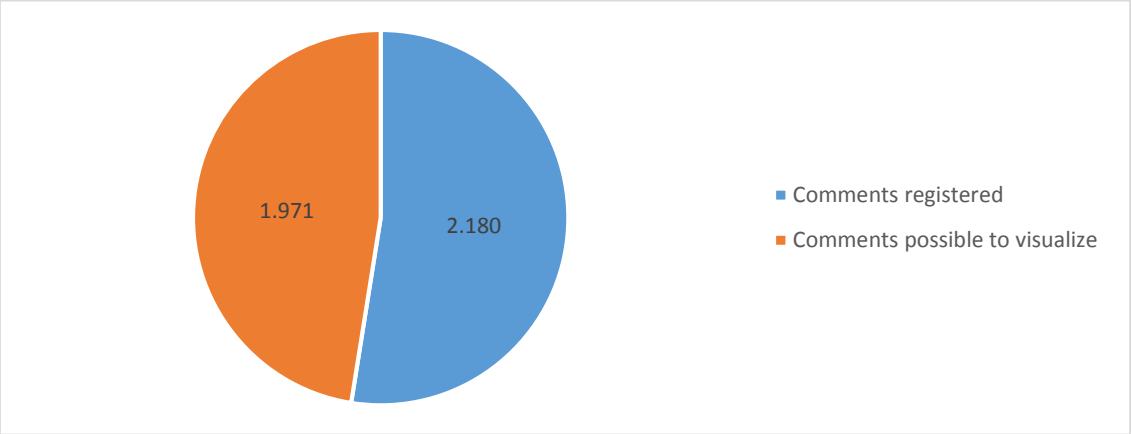
Bayer

Figure 34 – Facebook comments “Tagxedo” (Boehringer Ingelheim and Novo Nordisk)



However, when comments were analysed, there were some that were not available for visualization. According to Figure 35, of the 2.180 comments registered for all Facebook pages, only 1.971 (90%) were possible to visualize. It means that 10% of comments were not analysed by “Tagxedo – Creator”, leading to a speculative result.

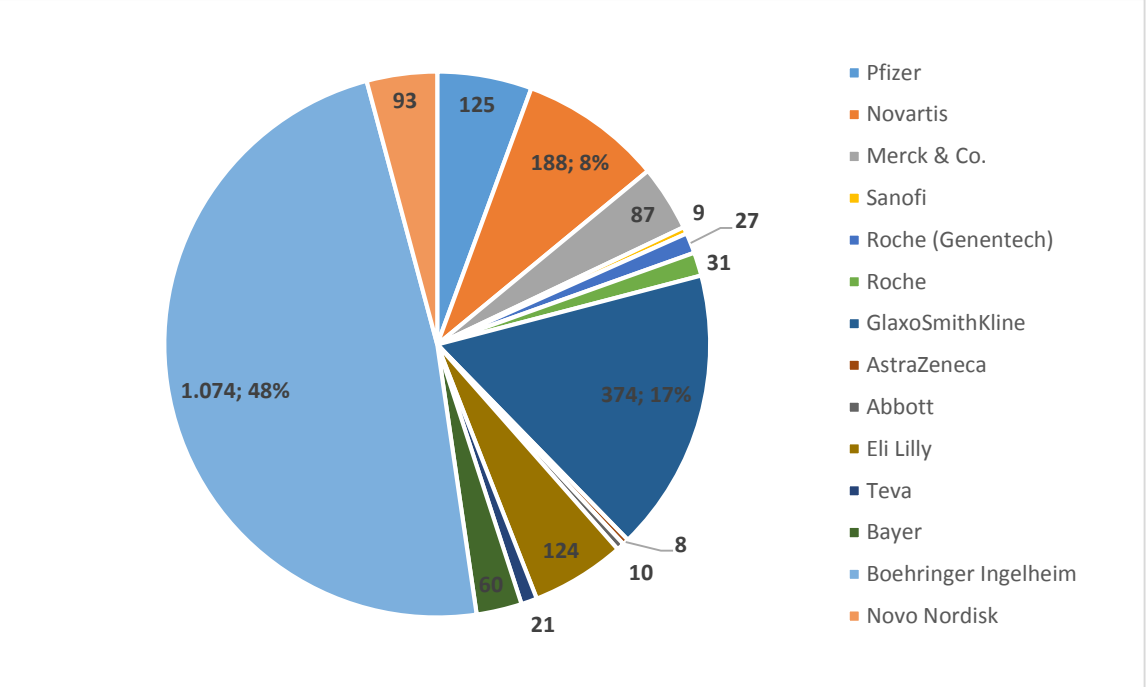
Figure 35 – Pharmaceutical firms comments status on Facebook



The second type of interaction with Facebook pages that was analysed was shares of brand posts. According to Figure 36, all Facebook pages registered shares activity. Furthermore, the company which registered the largest amount of shares was Boehringer Ingelheim, with 1.074 comments, corresponding to 48% of all shares registered.

The second biggest Facebook page in terms of comments was from GlaxoSmithKline, with 307 (17%), demonstrating again a large difference between Boehringer Ingelheim and the other companies.

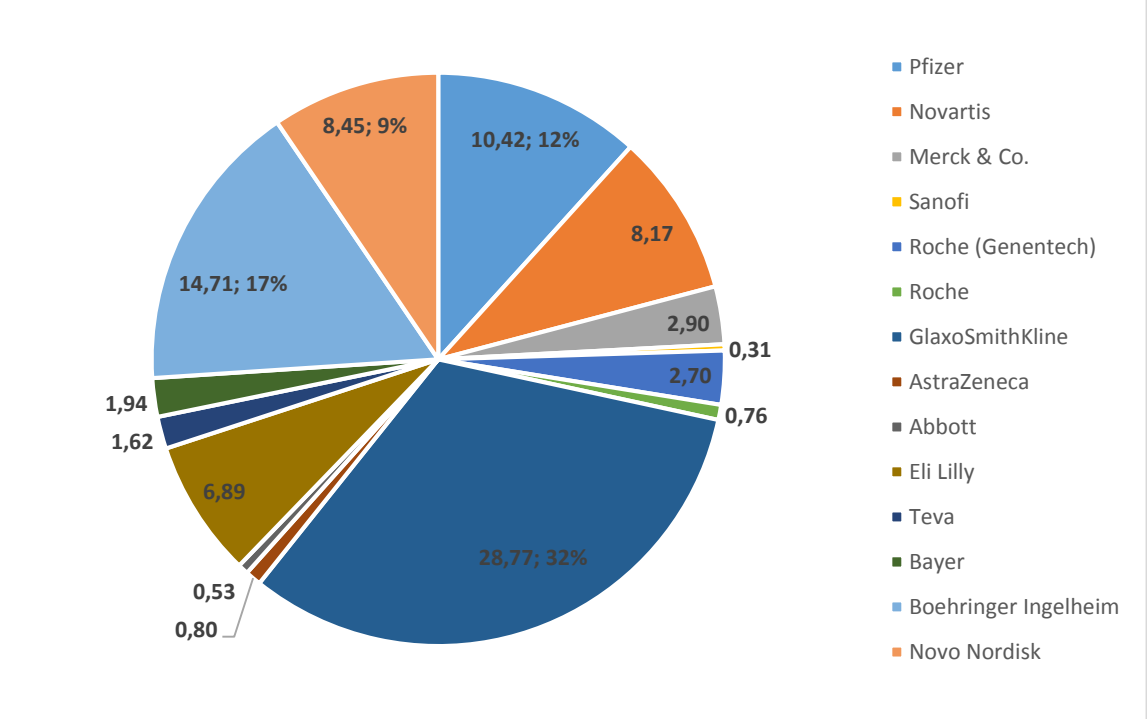
Figure 36 – Pharmaceutical firms analysed on Facebook: Shares of brand posts



As was made for comments, a display of shares per brand post was produced to widen the analysis of shares status. According to Figure 37, GlaxoSmithKline takes the lead with a ratio of 28,77 (32%) shares, while Boehringer Ingelheim is relegated to second place with 14,71 (17%) shares.

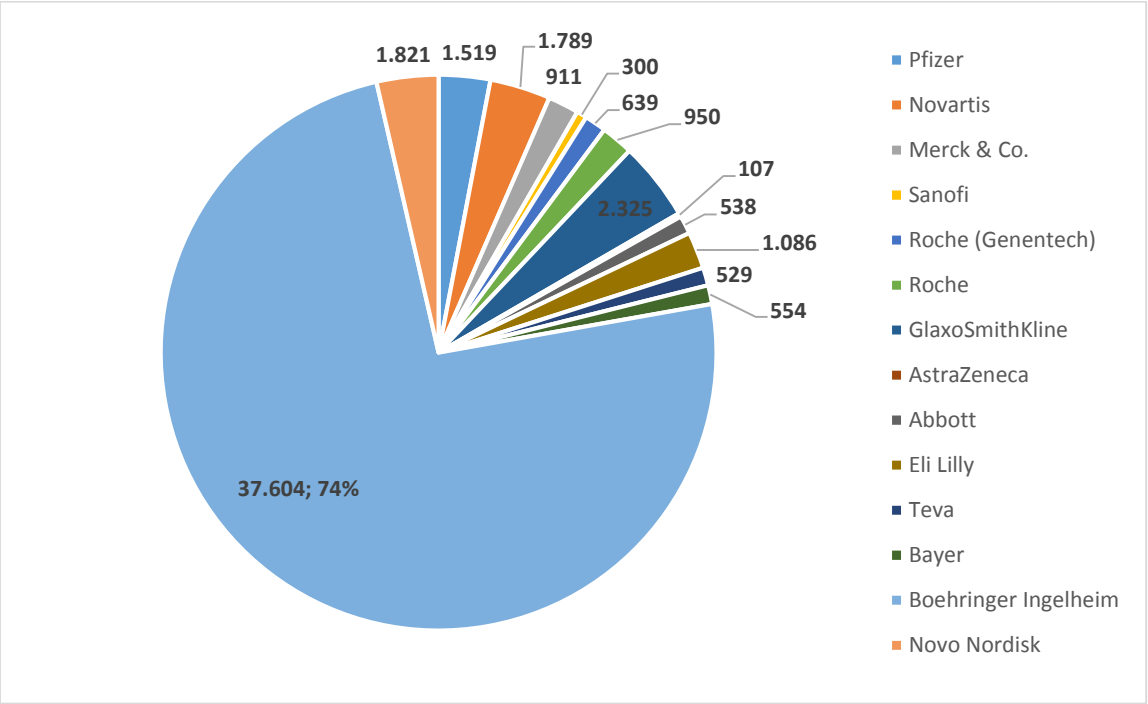
There is also a more homogeneous distribution of shares per brand post between companies. As opposed to the comments analysis, there were changes in the positions between the leading companies in this category when executing the two types of analysis.

Figure 37 – Pharmaceutical firms analysed on Facebook: Shares per brand posts



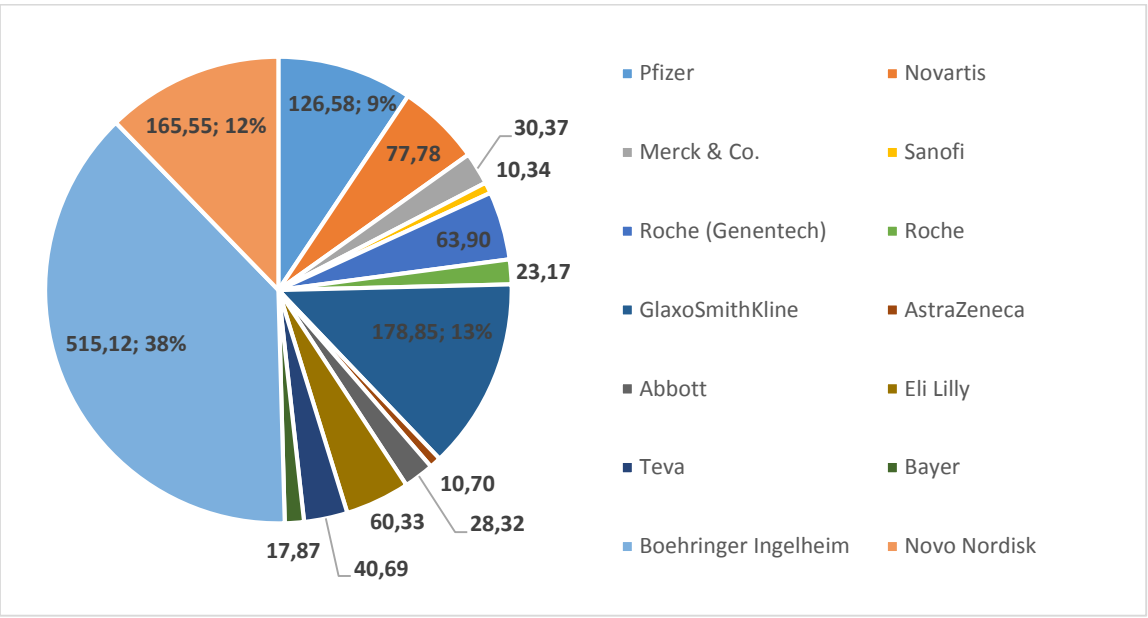
The third and last type of interaction with Facebook pages that was analysed was likes in brand posts. According to Figure 38, all Facebook pages registered likes activity. Furthermore, Boehringer Ingelheim dominates this category, with 37.604 comments, corresponding to 74% of all likes registered. The other companies' brand posts possess small number of likes when comparing to Boehringer Ingelheim.

Figure 38 – Pharmaceutical firms analysed on Facebook: Likes in brand posts



When comparing likes in the form of likes per brand posts, the dominant position of Boehringer Ingelheim diminishes to 515,12 (38%) likes per brand post, followed by other companies such as GlaxoSmithKline, Novo Nordisk and Pfizer register 178,85 (13%), 165,55 (12%) and 126,58 (9%) likes per brand post, respectively (see Figure 39).

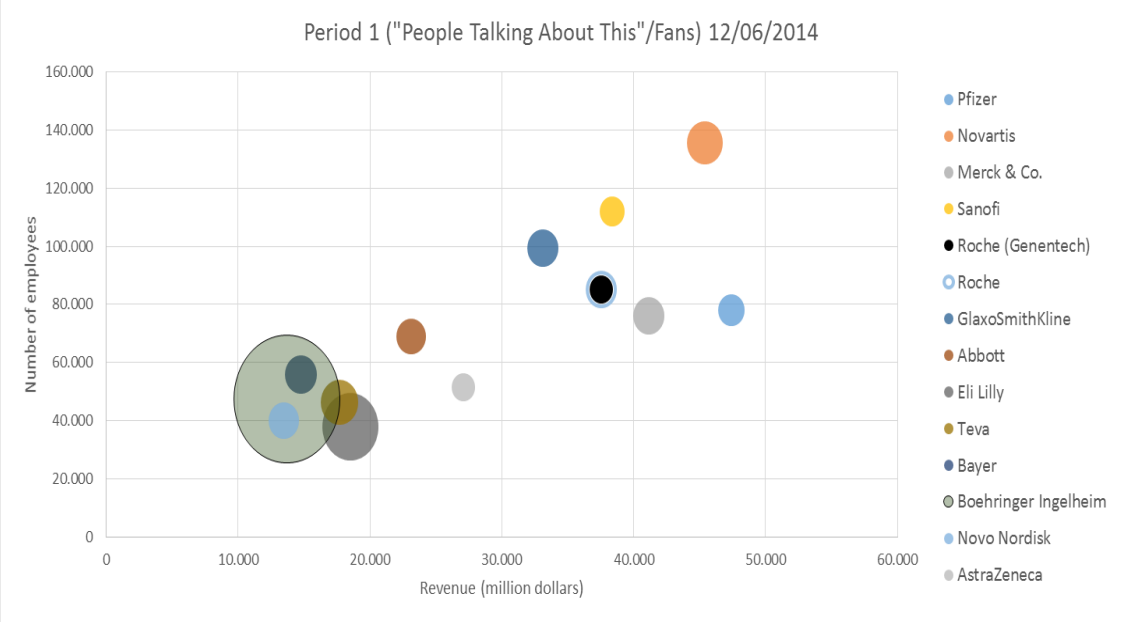
Figure 39 – Pharmaceutical firms analysed on Facebook: Likes per brand posts



Engagement

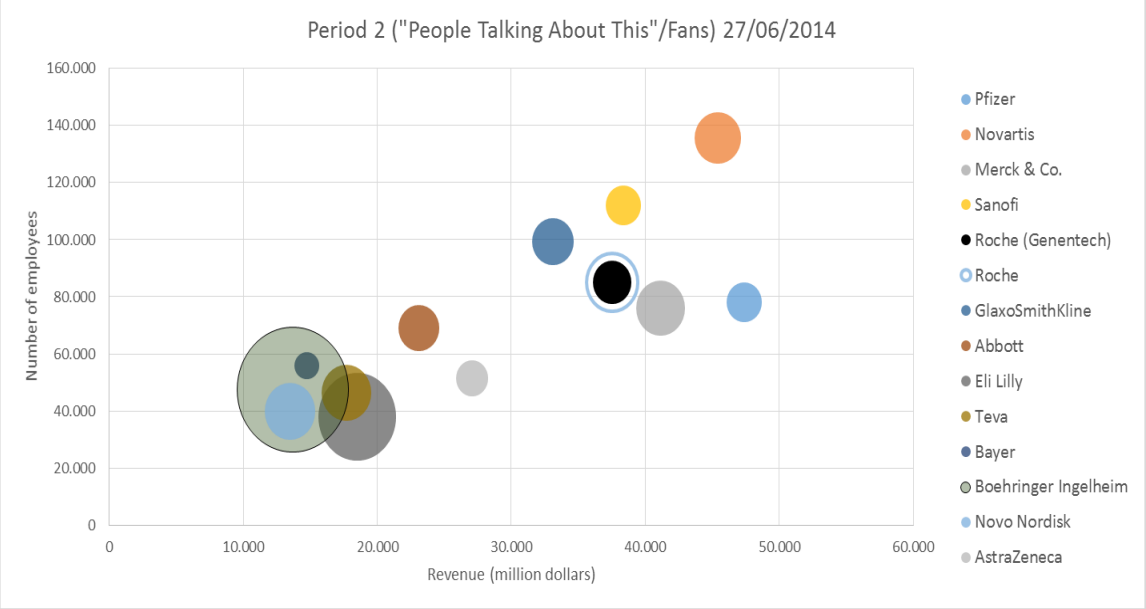
As discussed in the literature, and based on previous operationalization of the concept of engagement, we present the results for Facebook engagement considering it in two forms: (1) "People Talking About This"/Fans; (2) (Posts+Shares+Likes+Comments)/Fans. The first form to be discussed will be "People Talking About This"/Fans.

Figure 40 – Pharmaceutical firms analysed on Facebook: Engagement rate period 1 (1)



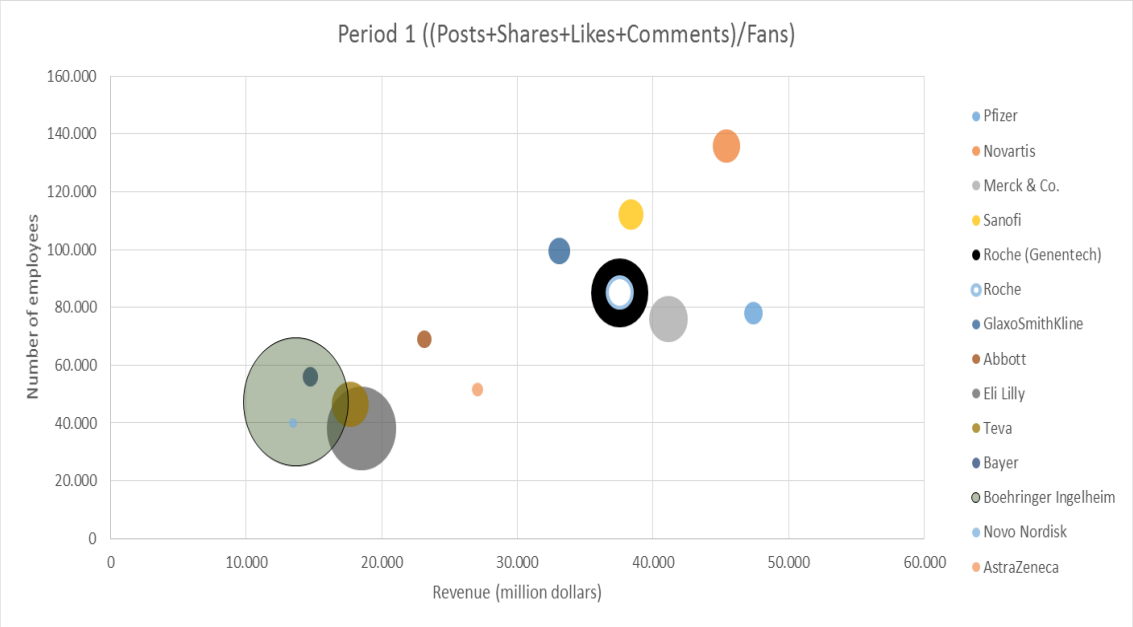
As noticed from the figure above, Facebook engagement does not increases proportionally with the firm size. Since one week period analysis is not enough to conclude about the true engagement, a second period of activity was analysed. According to Figure 41, the same disproportionality of period 1 maintains, but it appears to show an increase of proximity between companies in terms of engagement.

Figure 41 – Pharmaceutical firms analysed on Facebook: Engagement rate period 2 (1)



As stated before, a second engagement analysis was performed using a second formula. In Figure 42, Facebook engagement for period 1 is represented and it is clear that it maintains the same disproportionality of Figure 40. However, it seems that there is a higher discrepancy between companies' engagement.

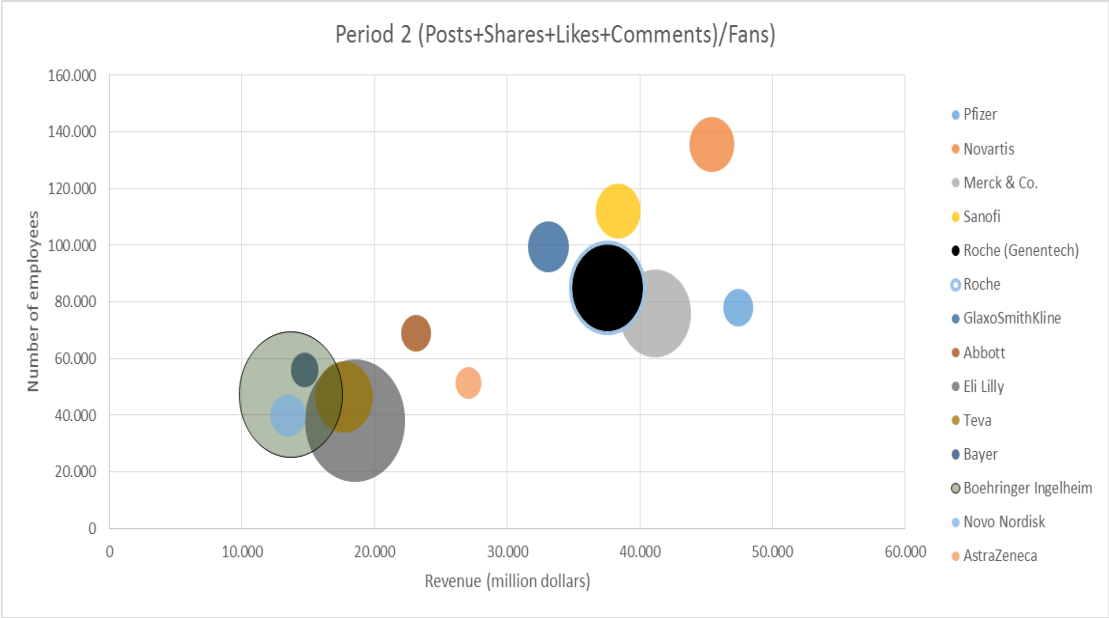
Figure 42 – Pharmaceutical firms analysed on Facebook: Engagement rate period 1 (2)



For the same reasons stated before, a second period was analysed (see Figure 43). Again, it appears to exist a lack of proportionality like the other period analysis, but like Figure 41 it seems to show an increase of proximity between companies in terms of engagement.

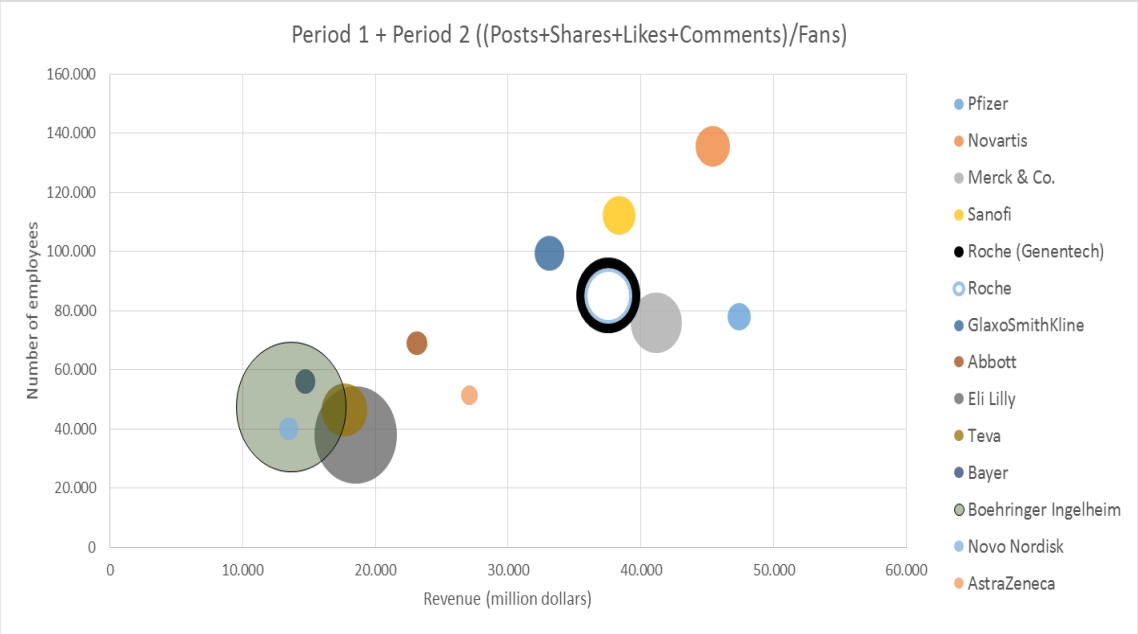
In all period 1 and 2's analysis, Boehringer Ingelheim and Eli Lilly show the widest engagement ring.

Figure 43 – Pharmaceutical firms analysed on Facebook: Engagement rate period 2 (2)



After analysing each period, a total engagement (corresponding to the addition of period 1 and period 2) calculated using the second formula, was analysed. According to Figure 44, Facebook engagement does not increases proportionally with firm's revenue and number of employees. Like in the periods' analysis Boehringer Ingelheim and Eli Lilly are the top performers in terms of engagement.

Figure 44 – Pharmaceutical firms analysed on Facebook: Total engagement (2)



Since Boehringer Ingelheim was the most engaging pharmaceutical company on Facebook, some of the most engaging posts were reproduced in Figure 45. The most engaging posts are related to quizzes, special diseases and company's history.

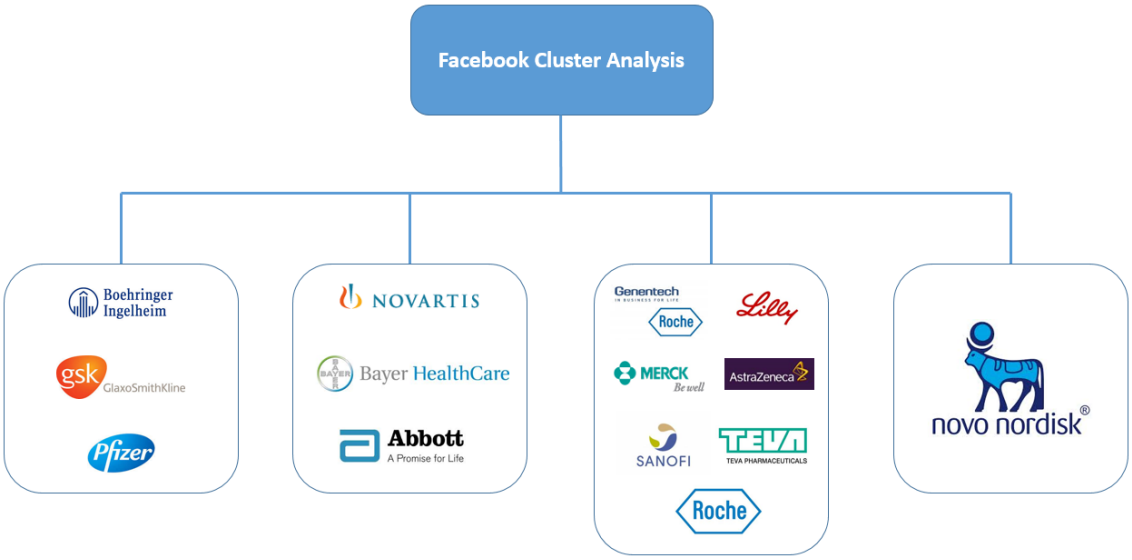
Figure 45 – Examples of Boehringer Ingelheim most engaging brand posts

4.1.1. Facebook cluster analysis

In this section, a cluster analysis was performed in order to identify each cluster on Facebook. After identifying each cluster, they were named according to engagement data and the number of Fans. With the clusters identified and named, a characterization was performed through several variables.

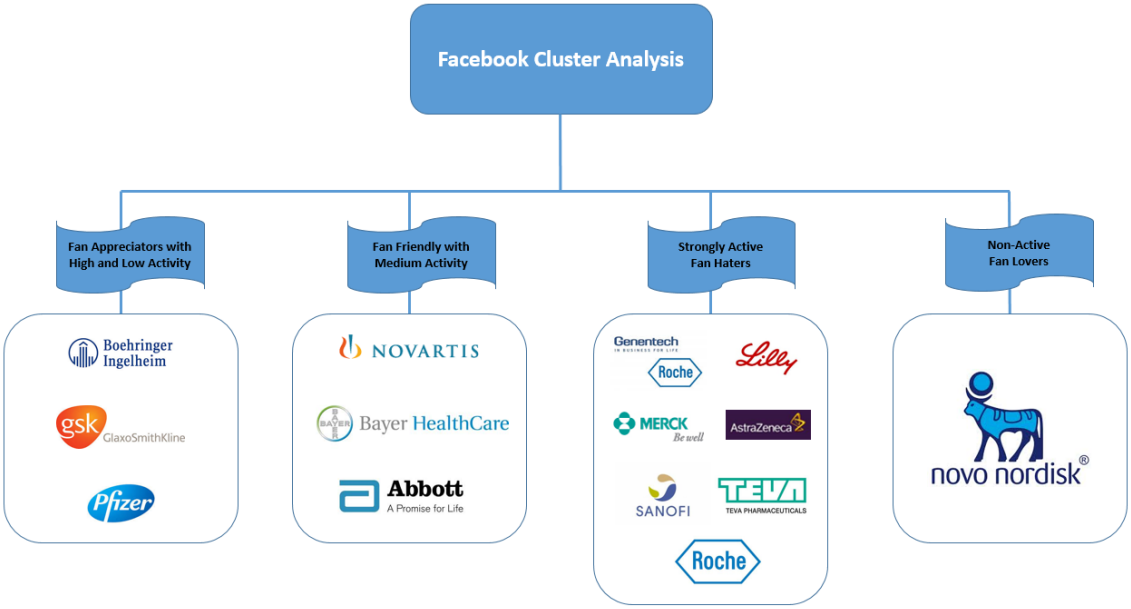
Several clusters were identified when performing a "Hierarchical Cluster Analysis" on Facebook data. According to Figure 46, four clusters emerged when crossing Facebook engagement data with the number of Fans (see Annex VI).

Figure 46 – Facebook cluster analysis



After discovering the clusters, a "Crosstabs" analysis was performed with the same variables in order to attempt to assign a name to each cluster (see Annex VII). According to Figure 47, the names of each cluster are "Fan Appreciators with High and Low Activity", "Fan Friendly with Medium Activity", "Strongly Active Fan Haters" and "Non-Active Fan Lovers".

Figure 47 – Facebook cluster analysis with defined cluster names



With all four clusters named, a more profound analysis was carried in order to characterize each cluster (see Annex VIII). Through Table 12, it is possible to verify the variables used to further characterize each cluster. This characterization reflects the performance of each cluster in each parameter, knowing that these clusters are not homogeneous and therefore the companies included can have low and high performance in the same cluster.

Table 12 – Facebook clusters: characterization

	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	+/---	++/-	+/---	+/-

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.

4.2. Twitter data analysis

The pharmaceutical presence on Twitter, was composed of 18 pharmaceutical companies. In Figure 48, all the 18 companies which have a Twitter account are represented. However, it is important to clarify some details related to one company. As was the case for the Facebook analysis, the company Genentech (part of Group Roche) was included in the Roche analysis, because it is responsible for the most successful medicines of Group Roche. Another important aspect is the fact that Teva's Twitter account is directed to Spanish population while Astellas Pharma's Twitter account is dedicated to USA population.

Figure 48 – Pharmaceutical firms analysed on Twitter

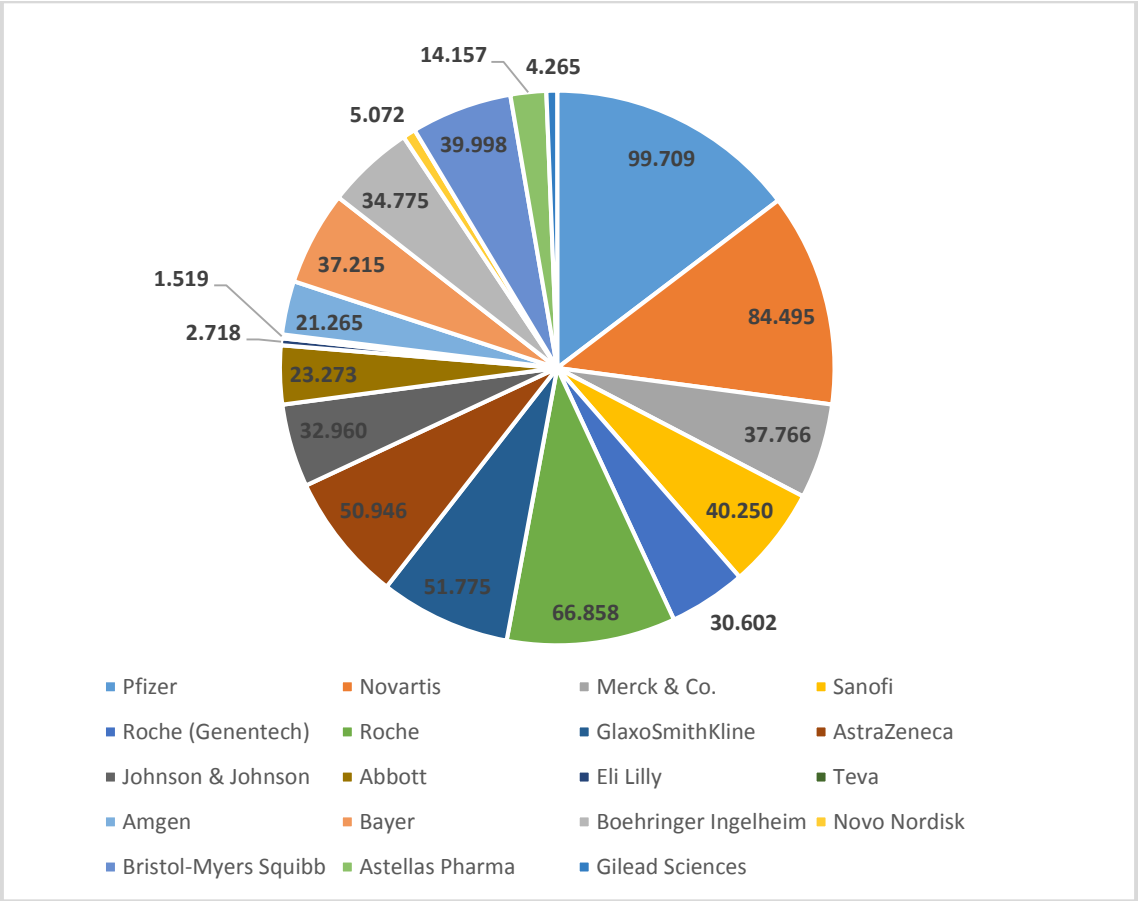
* Genentech was included because it is part of Group Roche, and it is accountable for the most successful medicines of Group Roche

Followers

The first parameter evaluated in pharmaceutical companies' presence on Twitter was the number of followers. In Figure 49 it is possible to verify that none of the companies have reached 100.000 followers, with Pfizer and Novartis leading with 99.709 and 84.495 followers, respectively. Three companies are below 5.000 followers (Eli Lilly, Amgen and Gilead Sciences).

When comparing the number of followers with the number of fans (Facebook fans, see Figure 17), it appears that followers have a more homogeneous distribution.

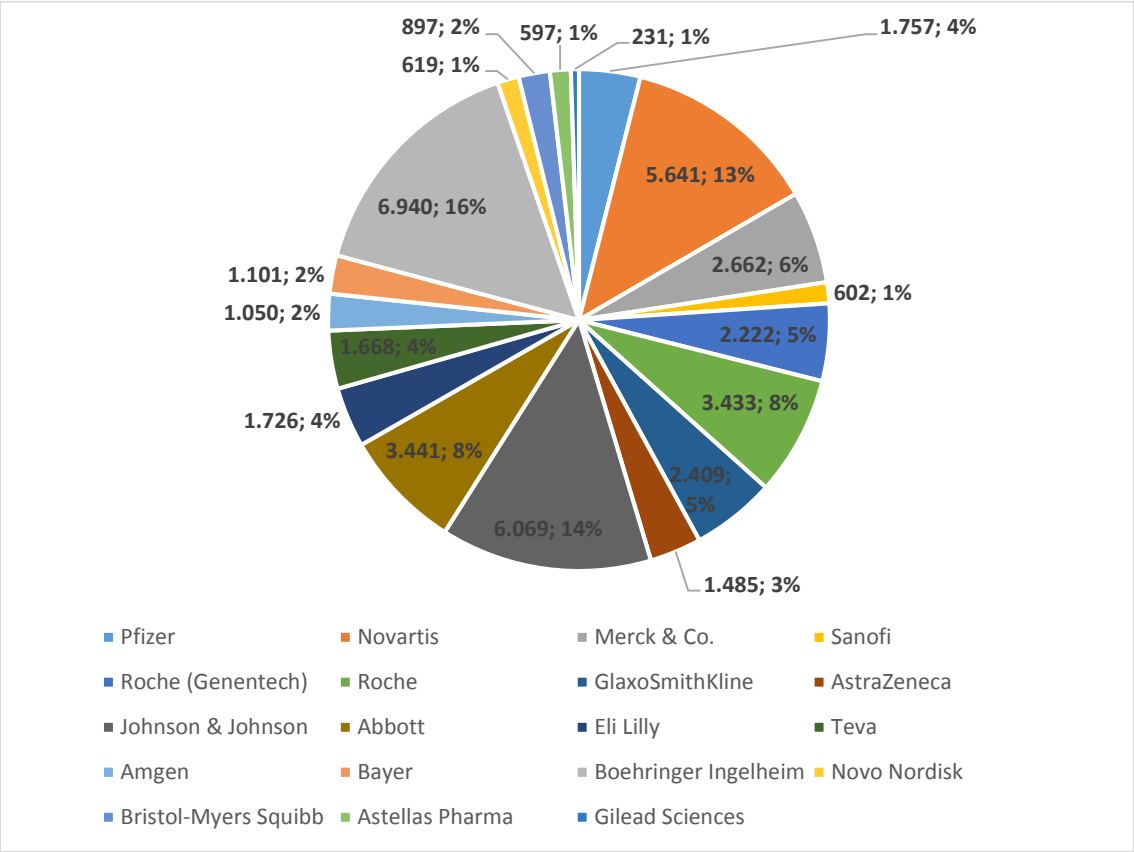
Figure 49 – Pharmaceutical firms on Twitter: Number of followers



Tweets, retweets and mentions

In order to have a clear view of the activity on Twitter, three important aspects were analysed: (1) tweets; (2) retweets and (3) mentions which includes replies. Regarding the first one, the analysis was separated in lifetime tweets and tweets registered during the periods of analysis. According Figure 50, three companies have high activity (over 5.000 tweets) since their Twitter account conception, with Boehringer Ingelheim leading with 6.940 (16%) tweets, followed by Johnson & Johnson (6.069 tweets; 14%) and Novartis (5.641 tweets; 13%). On the other hand, five companies registered less than 1.000 lifetime tweets.

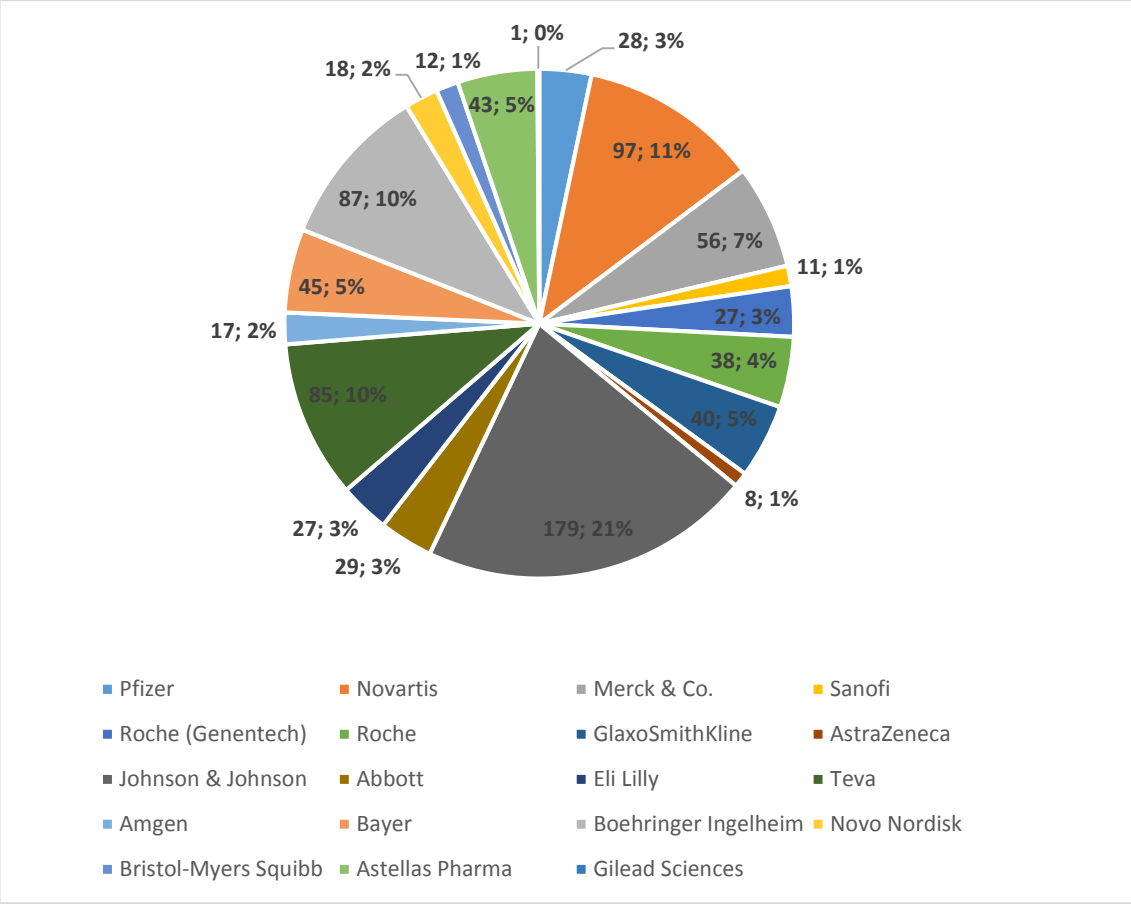
Figure 50 – Pharmaceutical firms on Twitter: Number of tweets (lifetime)



Regarding the total number of tweets registered in period 1 and 2, they are registered in Figure 51. Interestingly, the top three companies in lifetime tweets are the same for the total number of tweets registered.

The only difference was that the leading company was Johnson & Johnson with 179 tweets, corresponding to 21% of the total tweets; and, Novartis (97 tweets; 11%) continues in second place, while Boehringer Ingelheim (87 tweets; 10%) was relegated to third place. Only two companies (AstraZeneca and Gilead Sciences) registered tweet activity inferior to 10 tweets.

Figure 51 – Pharmaceutical firms on Twitter: Total of tweets registered



Furthermore, to complete the qualitative analysis of tweets, the total tweets registered were analysed by "Tagxedo - Creator"[13] (see Figure 52, Figure 53, Figure 54, Figure 55, Figure 56, Figure 57 and Figure 58). The analysis of these figures reveals that pharmaceutical companies tweet about healthcare subjects, such as certain diseases and programs. In general, they focus on patients' healthcare related issues.

[13] http://www.tagxedo.com/app.html

Figure 52 – Twitter tweets “Tagxedo” (Pfizer, Novartis and Merck)

Pfizer

Novartis

Merck

Figure 53 – Twitter tweets “Tagxedo” (Sanofi, Roche and Genentech)

Sanofi

Roche

Roche (Genentech)

Figure 54 – Twitter tweets “Tagxedo” (GlaxoSmithKline, AstraZeneca and Johnson & Johnson)

GlaxoSmithKline

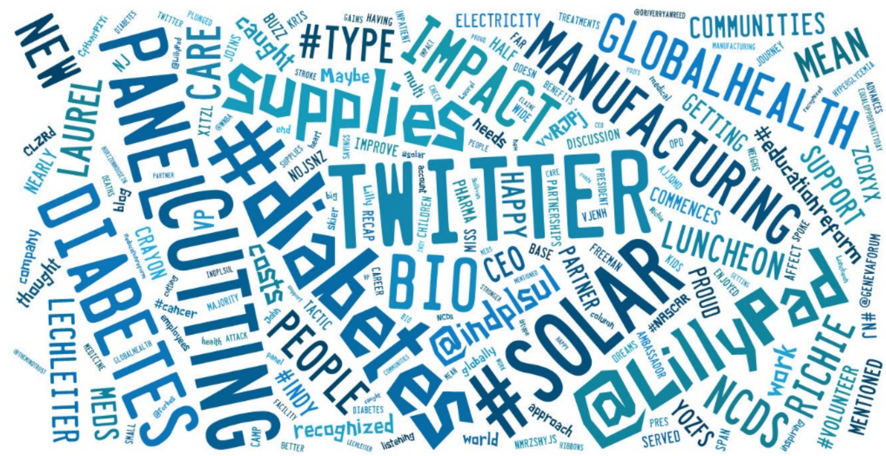
AstraZeneca

Johnson & Johnson

Figure 55 – Twitter tweets “Tagxedo” (Abbott, Eli Lilly and Teva)

Abbott

Eli Lilly



Teva

Figure 56 – Twitter tweets "Tagxedo" (Amgen, Bayer and Boehringer Ingelheim)

Amgen

Bayer

Boehringer Ingelheim

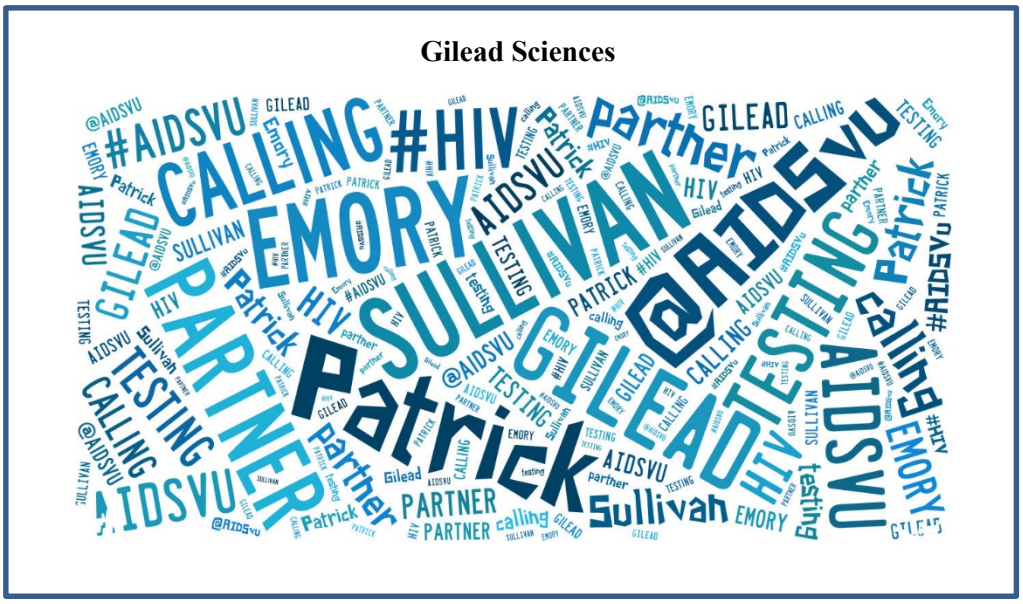
Figure 57 – Twitter tweets "Tagxedo" (Novo Nordisk, Bristol-Meyers Squibb and Astella Pharma)

Novo Nordisk

Bristol-Meyers Squibb

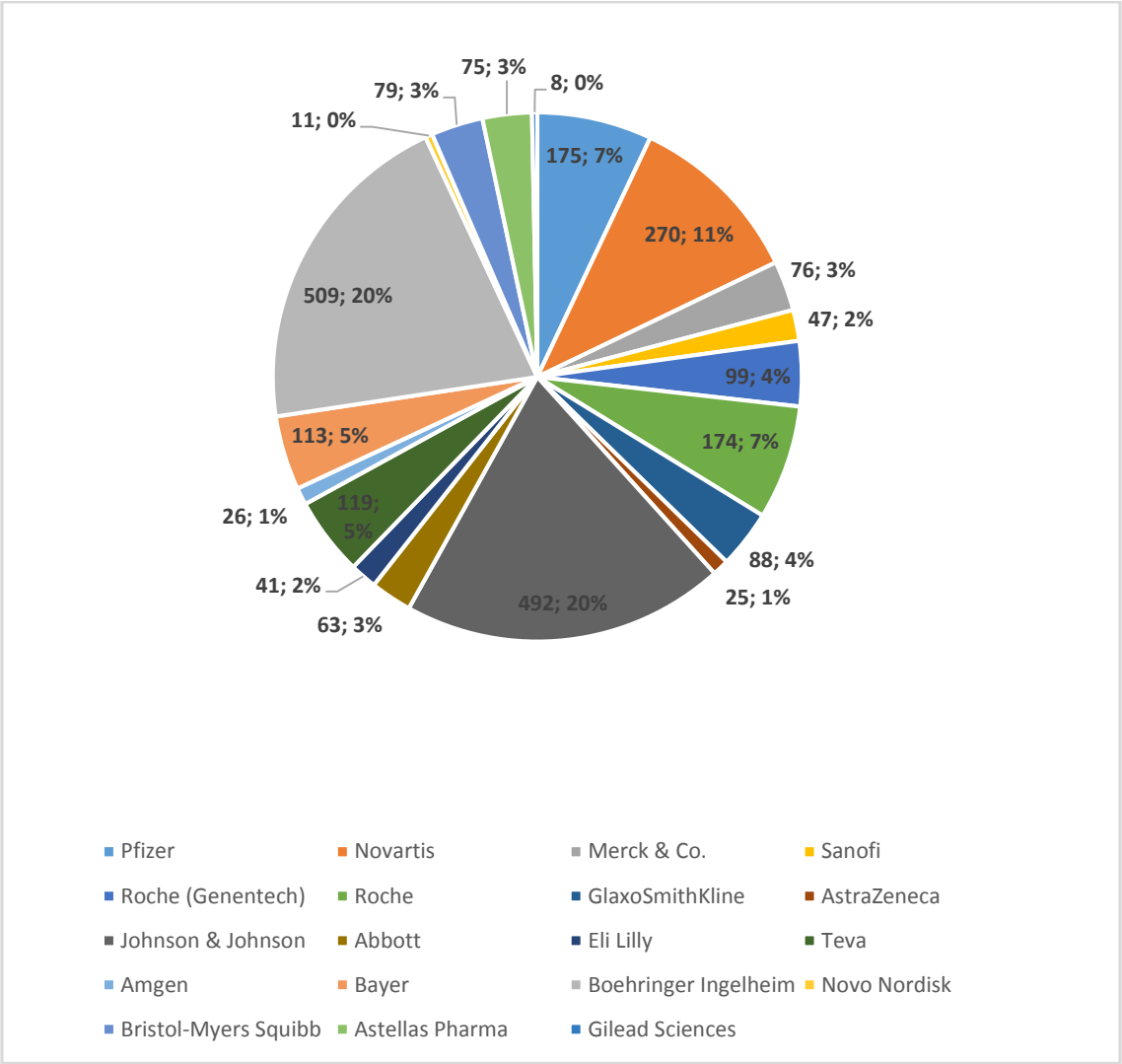
Astellas Pharma

Figure 58 – Twitter tweets “Tagxedo” (Gilead Sciences)



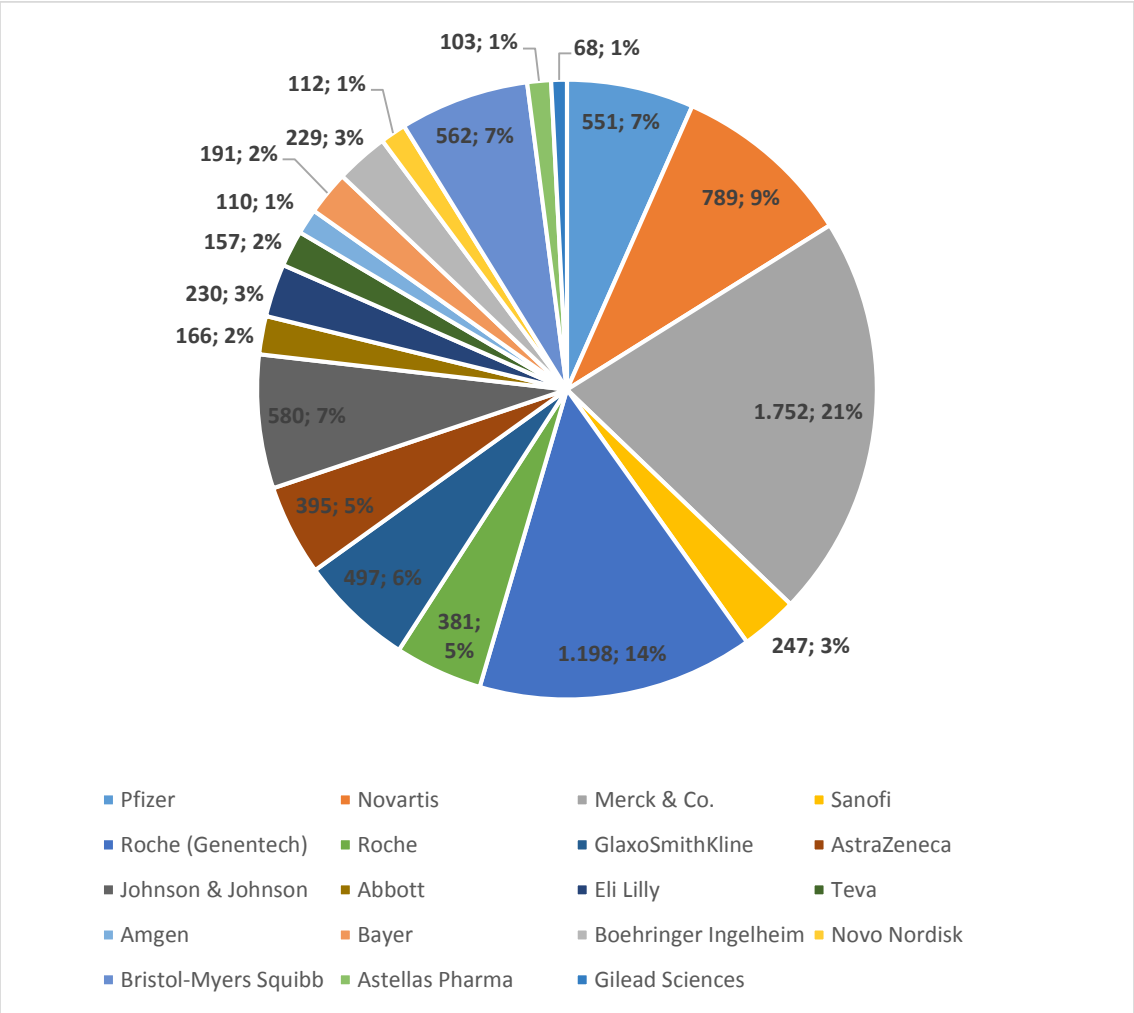
In terms of retweets, it is possible to verify through Figure 59 that the top 3 companies are the same as the case of the tweets analysis. This top 3 was responsible for 51% of the retweets registered. The company which retweeted de most was Boehringer Ingelheim with 509 retweets, corresponding to 20% of the total retweets registered, followed closely by Johnson & Johnson (492 retweets; 20%) and in third place is Novartis with 270 retweets, corresponding to 11% of total retweets. Only two companies (Novo Nordisk and Gilead Sciences) registered retweet numbers below 20.

Figure 59 – Pharmaceutical firms on Twitter: Total of retweets registered



While tweets and retweets share some similarities in terms of top performances, the mentions analysis reveals that two new companies dominate this category. Before the detailed mentions analysis, it is important to state that the number of mentions include also replies. According to Figure 60, the top 2 companies in mentions activity were Merck & Co with 1.752 mentions, representing 21% of the total number of mentions, followed by Roche (Genentech) with 1.198 (14%). These were the only companies that surpassed the 1.000 mentions number. Only one company remained (Gilead Sciences) below 100 mentions.

Figure 60 – Pharmaceutical firms on Twitter: Total of mentions registered

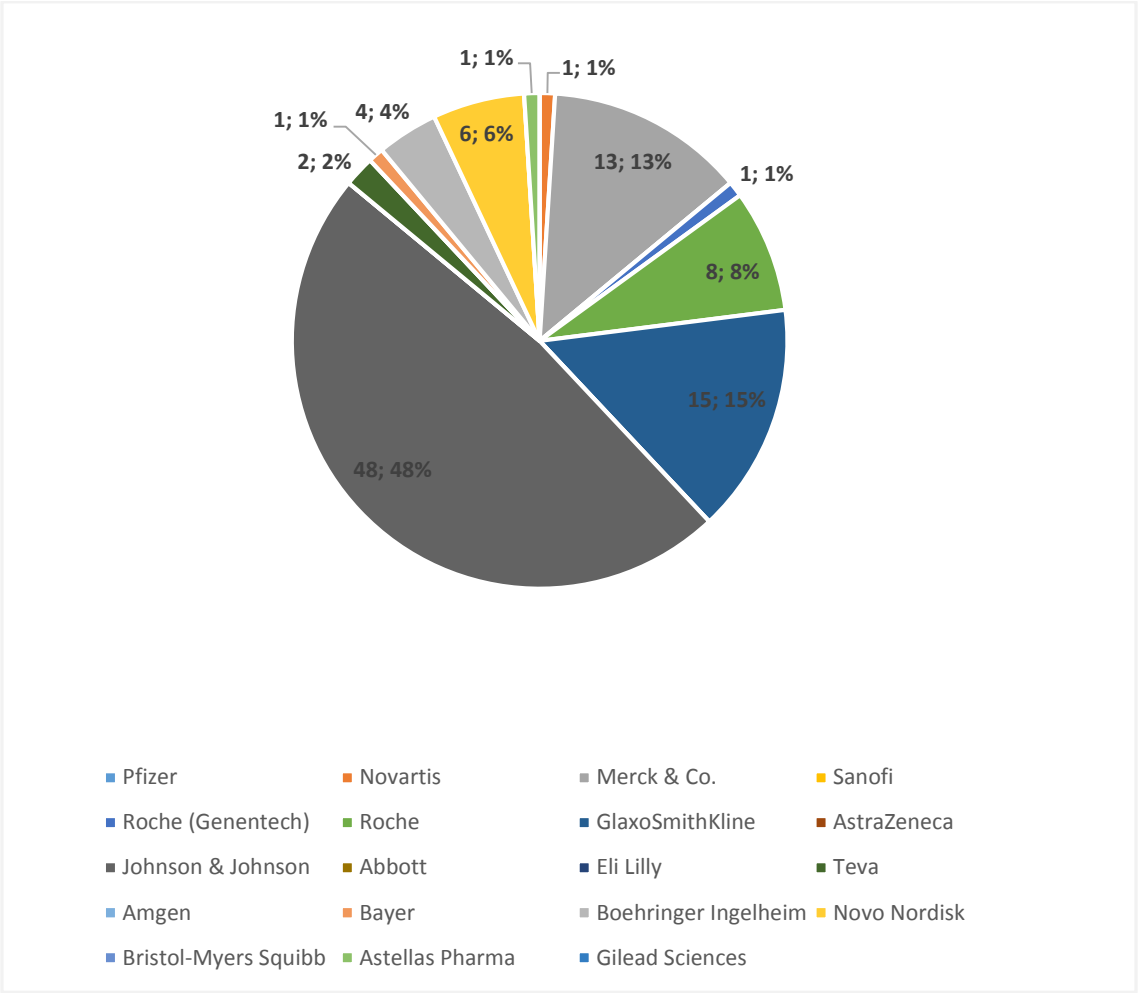


Customer service

The customer service responses reflect the specific interaction between pharmaceutical companies and their twitter users' requests. According to Figure 61, in the total period of analysis, only 11 Twitter accounts customer services have replied to their users' requests. The companies related to these Twitter accounts were Novartis, Merck & Co., Roche (Genentech), Roche, GlaxoSmithKline, Johnson & Johnson, Teva, Bayer, Boehringer Ingelheim, Novo Nordisk and Astellas Pharma.

The company most active in this category was Johnson & Johnson with 48 customer service responses, corresponding to 48% of the total responses.

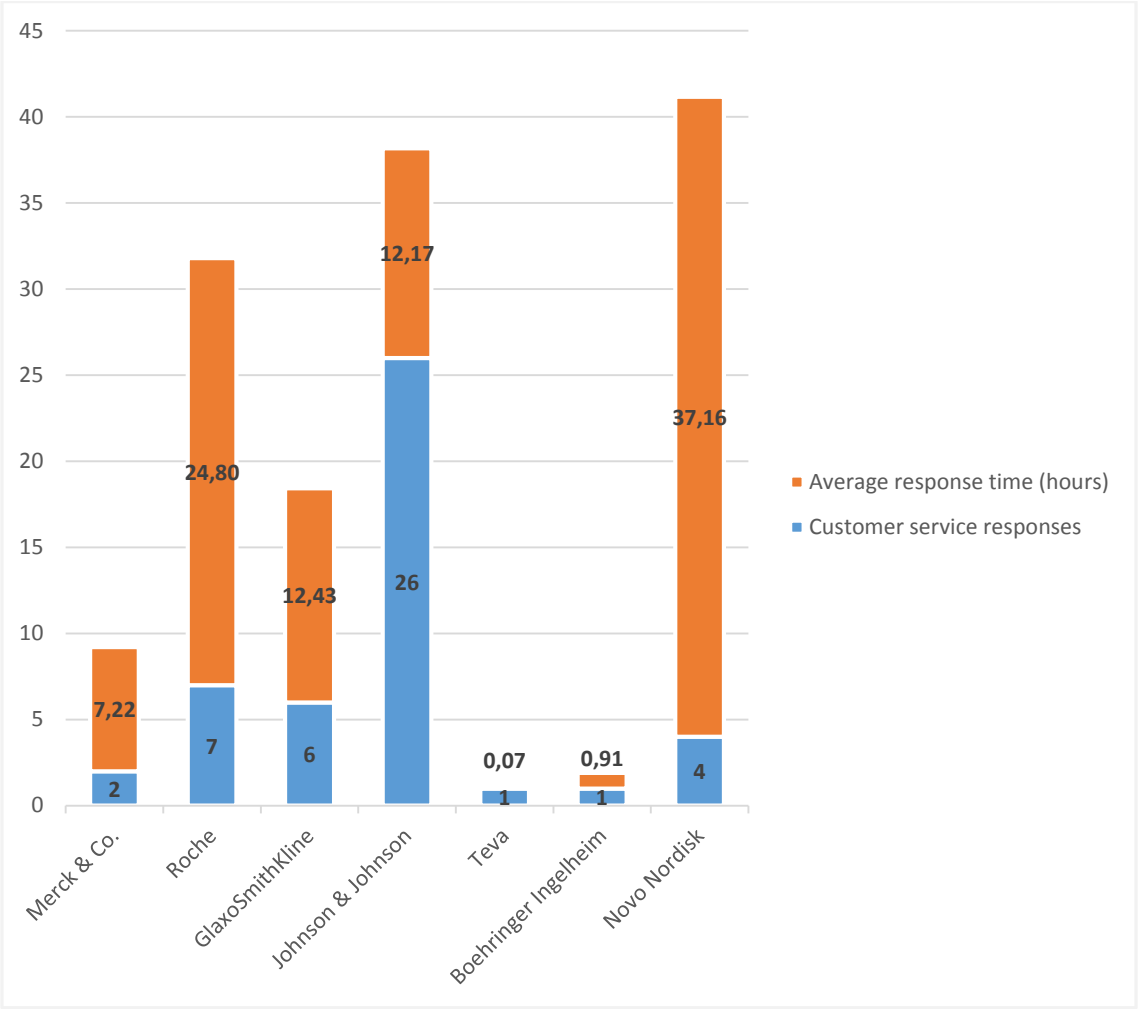
Figure 61 – Pharmaceutical firms on Twitter: Total customer service responses



Just as it is important to verify the response activity in terms of number of responses, it is also important to evaluate the quality of these responses in terms of response time. For this reason, each period was analysed in order to evaluate responses times.

Through Figure 62, it is possible to verify the average response time for each Twitter account for period 1. It is clear that the majority of companies who respond to their users take more than half a day, while Teva and Boehringer Ingelheim are the only companies to take less than one hour to respond.

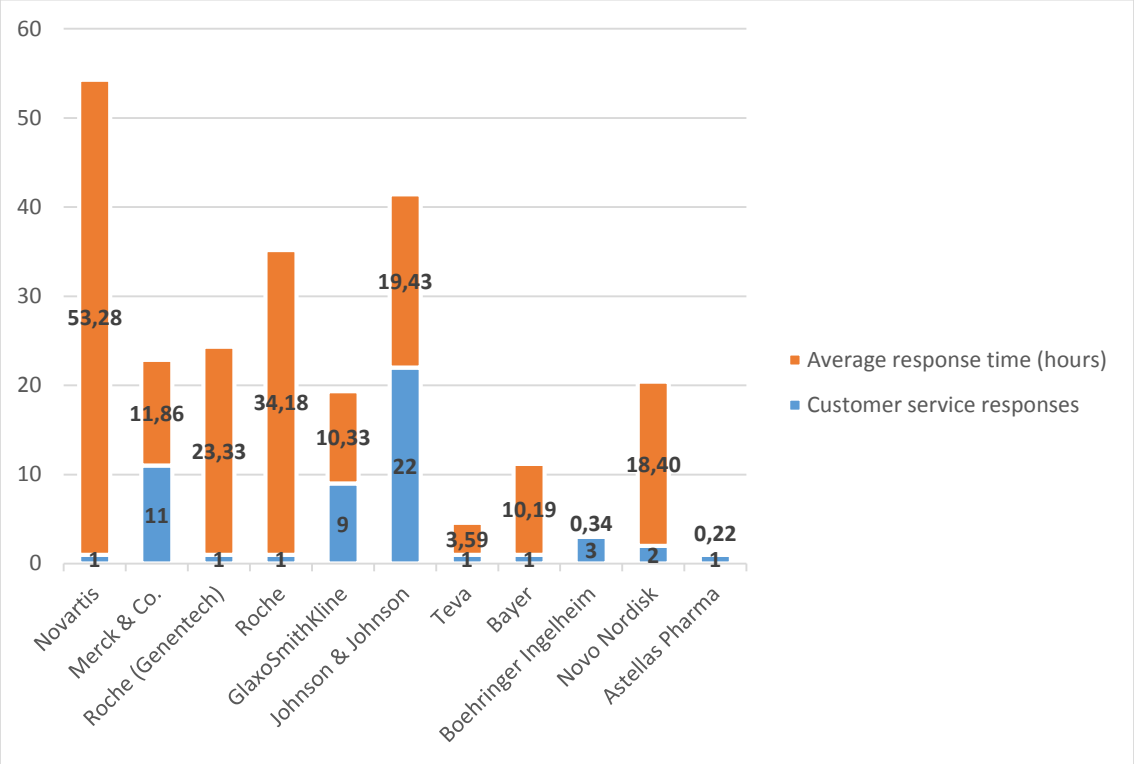
Figure 62 – Pharmaceutical firms on Twitter: Customer service responses - period 1



When analysing customer service responses in terms of response time in period 2, it is possible to verify that almost all companies take more than 10 hours to reply to their users (see Figure 63). However, the exceptions are Boehringer Ingelheim and Astellas Pharma with less than 1 hour to respond and Teva which takes about 3 and a half hours.

Interestingly, in the two periods, the only company to maintain responses in less than 1 hour was Boehringer Ingelheim. Also in the period 2, more companies have responded when comparing to period 1.

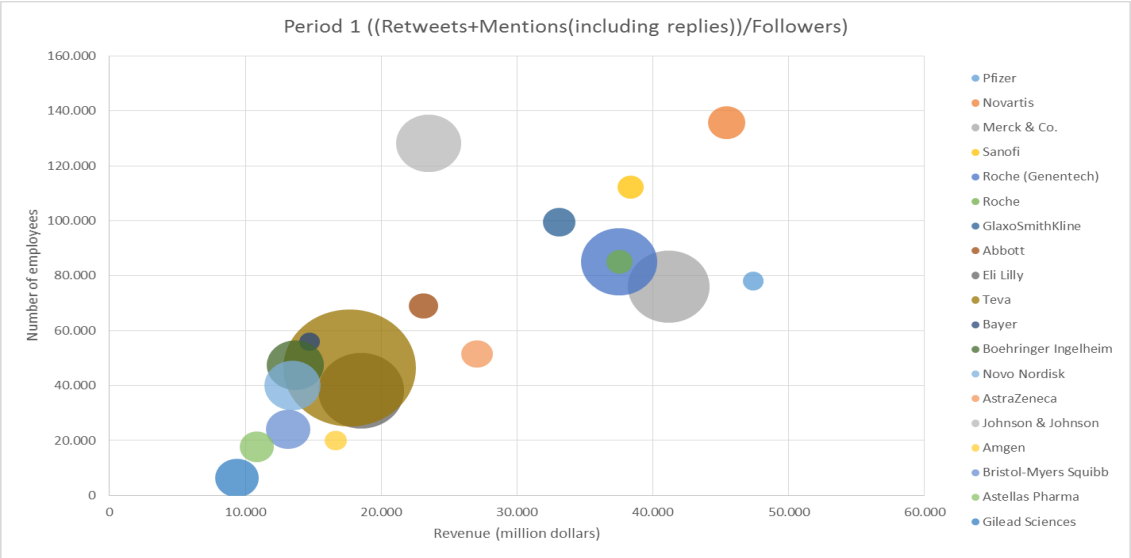
Figure 63 – Pharmaceutical firms on Twitter: Customer service responses - period 2



Engagement

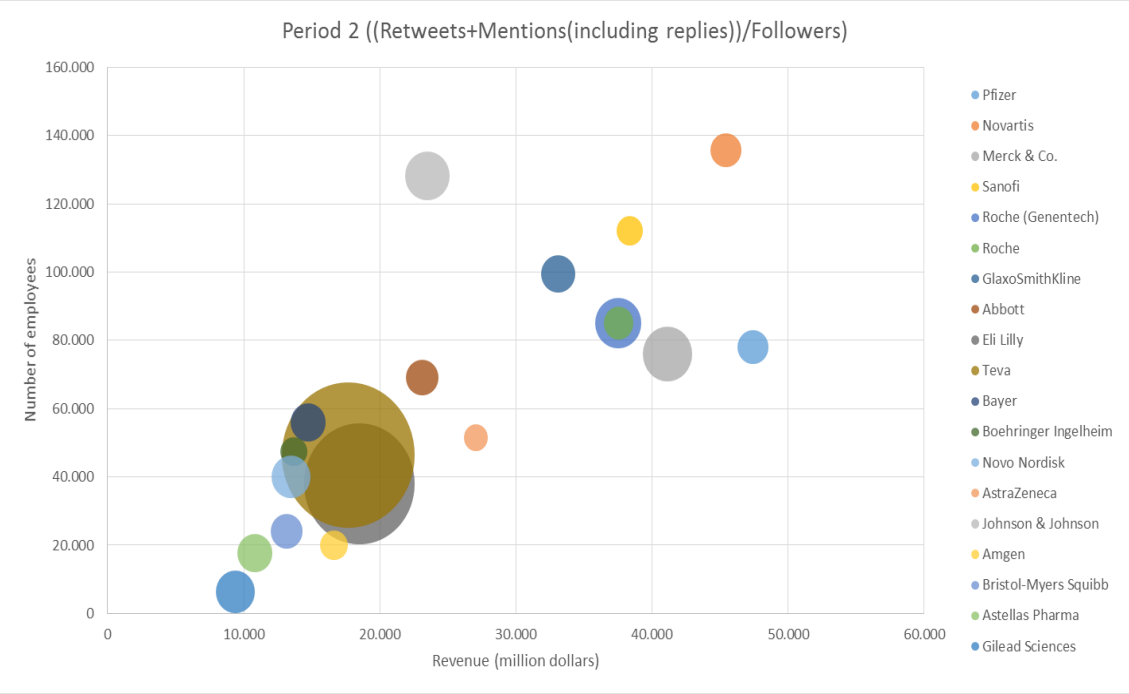
As made for Facebook analysis, we present the results for Twitter engagement considering it as (Retweets+Mentions(including replies))/Followers.

Figure 64 – Pharmaceutical firms on Twitter: Engagement rate period 1



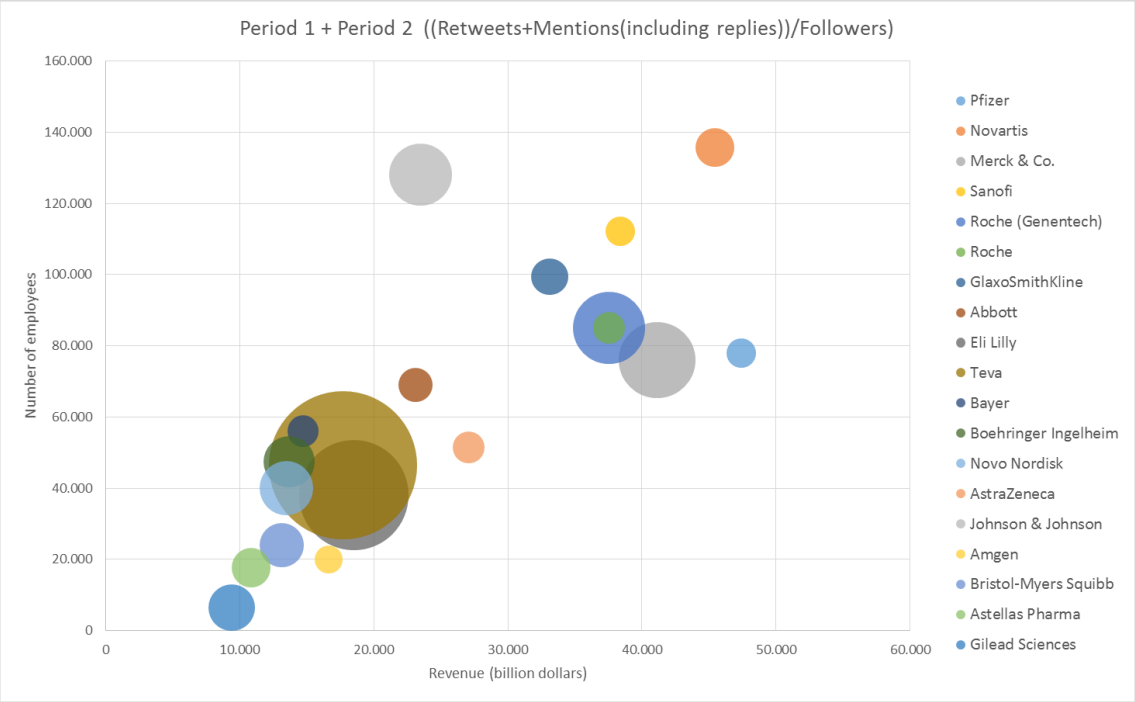
The first engagement analysis was made for the period 1 and it is demonstrated in Figure 64. According to the graphical display of this figure, the engagement rate does not increase proportionally with the company size. However, one company (Teva) seems to have a high performance when comparing to the other companies. In order to have a more robust engagement analysis, a second period of activity was assessed. According to Figure 65 a similar disproportionally is observed for period 2. While in period 1 only one company stands out from the others, in period 2 two companies (Teva and Eli Lilly) are the best performers.

Figure 65 – Pharmaceutical firms on Twitter: Engagement rate period 2



Afterwards, a total engagement analysis (period 1 + period 2) was performed adopting the same approach used for each single period. As presented in Figure 66, there is not a direct relationship between engagement and the socioeconomic data. Like the period 2 analysis, the same two companies seem to outperform when comparing to the others. However, Teva continues to have the widest engagement diameter.

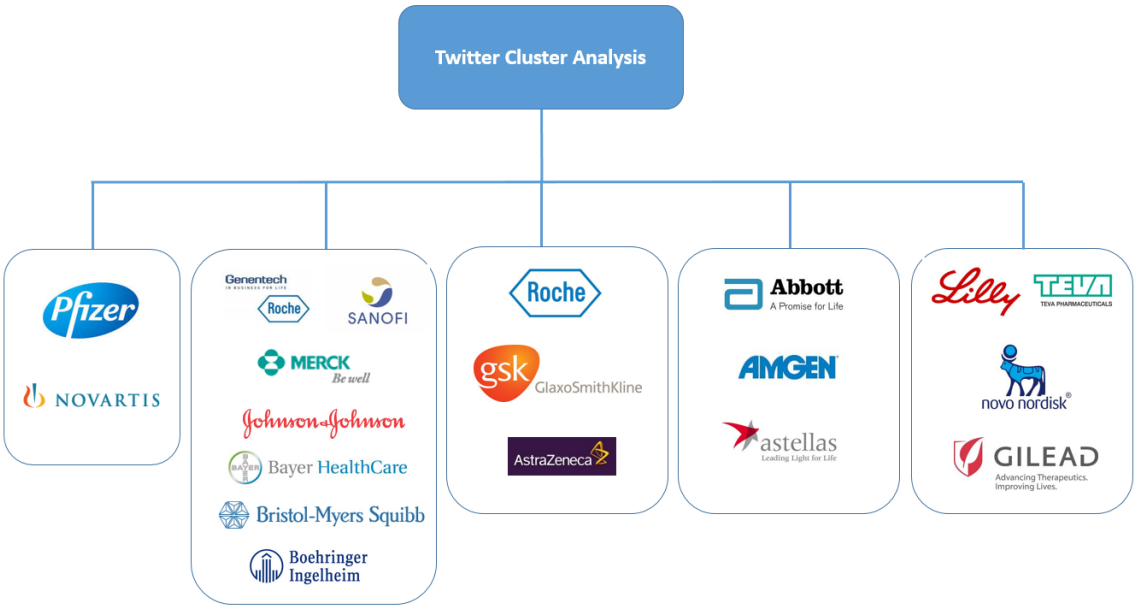
Figure 66 – Pharmaceutical firms on Twitter: Total engagement



4.2.1. Twitter cluster analysis

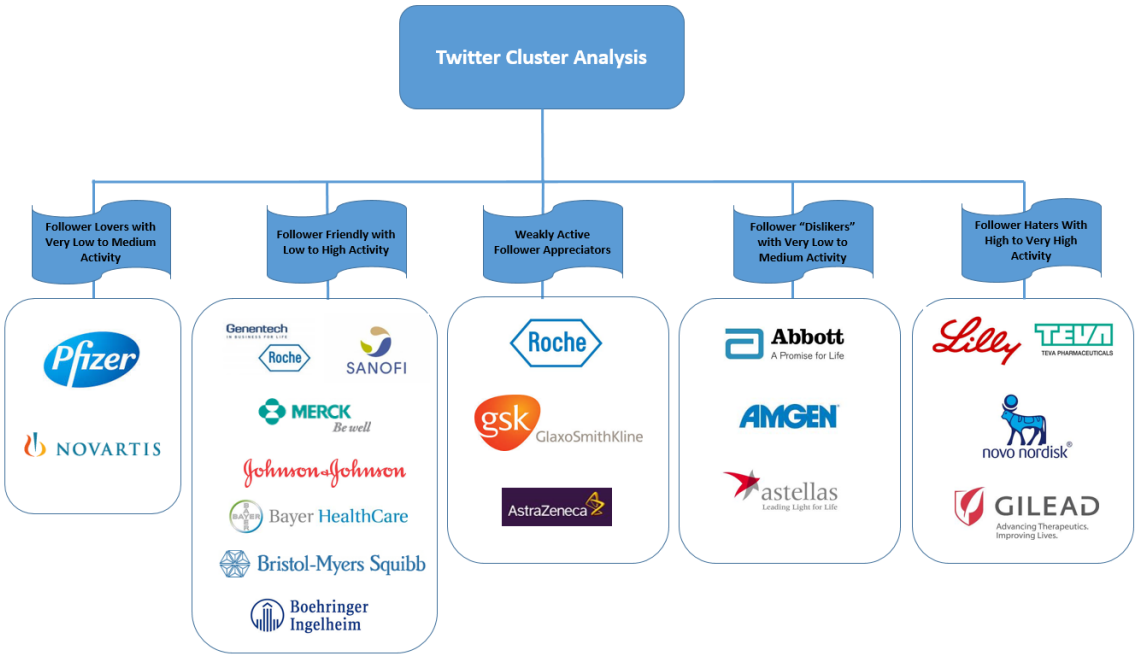
A cluster analysis was performed in order to identify each cluster on Twitter. When analysing pharmaceutical companies' presence on Twitter, five clusters were identified. Their composition is illustrated in Figure 67. Again, like in Facebook cluster analysis, the criteria for the cluster formation were the engagement data and the number of Followers (instead of the number of Fans) (see Annex VI).

Figure 67 – Twitter cluster analysis



In order to give designations to each Twitter cluster, a "Crosstabs" analysis was performed, using the two variables used in their definition (see Annex VII). According to Figure 68, the names assigned to each cluster are "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 68 – Twitter cluster analysis with defined cluster names



Each of the five clusters identified and named were subjected to a more detailed analysis in order to characterize them (see Annex IX). According to Table 13, each cluster appears to have singularities regarding each variable. The clusters have different intensities, as they are composed with companies with distinct behaviour.

Table 13 – Twitter clusters: characterization

	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	--	+++/--	++/-	--	++/--

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. YouTube data analysis

The analysis of pharmaceutical presence on YouTube revealed that 15 companies have a YouTube Channel. In Figure 69, all the 15 companies which have a YouTube account are represented. Again it is important to restate that for this analysis, the company Genentech (part of Group Roche) was included in the Roche analysis, because it is responsible for the most successful medicines of Group Roche. Also Bayer's YouTube channel was not directly related to Bayer Healthcare, so the company's symbol in Figure 69 was only related to Bayer.

Figure 69 – Pharmaceutical firms analysed on YouTube

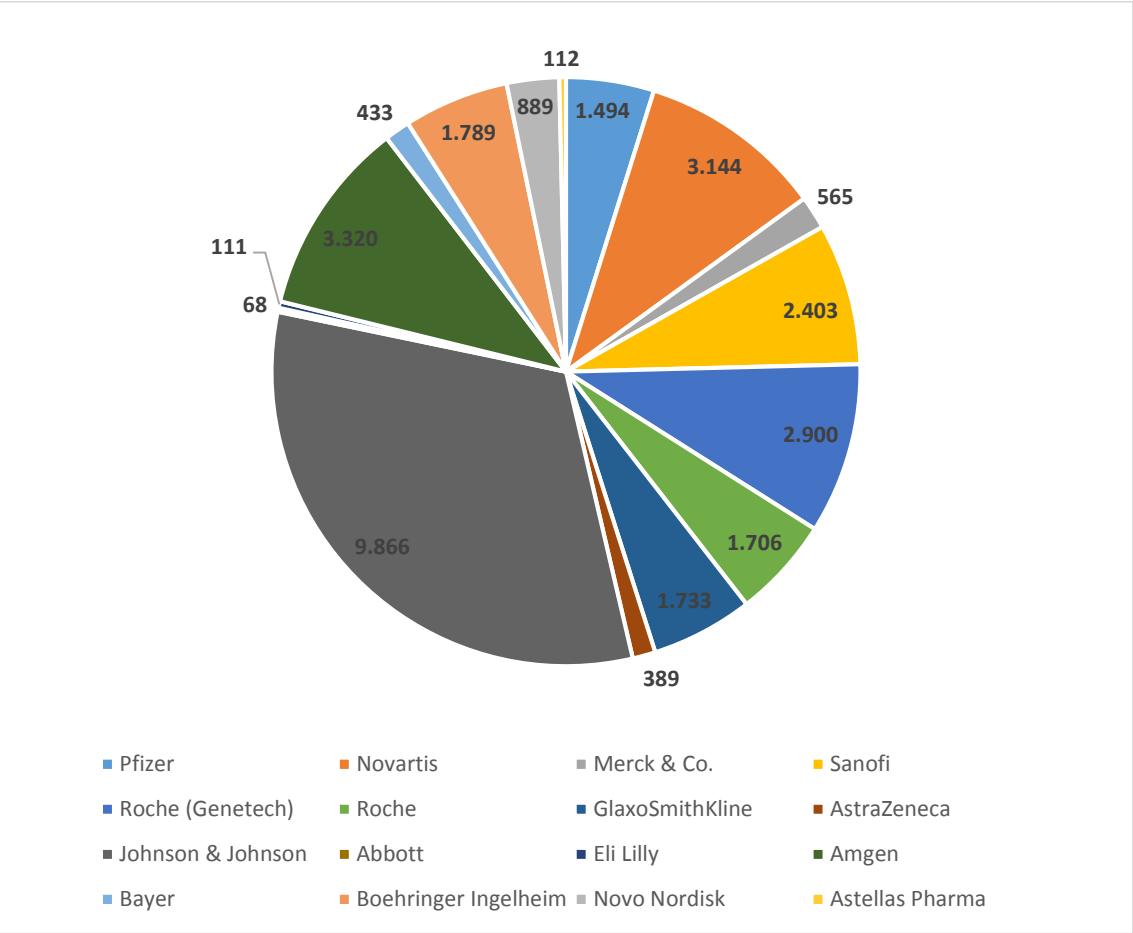
* Genentech was included because it is part of Group Roche, and it is accountable for the most successful medicines of Group Roche

Subscribers

The subscribers are an important part of the activity of YouTube channels because they receive notifications for each new video. For this reason, it is important to analyse this parameter.

According to Figure 70, the number of subscribers for each company can vary between 68 and 9.866 subscribers. One remarkable standout in the subscribers' analysis is the dominance of Johnson & Johnson, registering the highest number of subscribers while the second biggest company is Amgen with only 3.320 subscribers. Also six companies registered a number of subscribers inferior to 1.000.

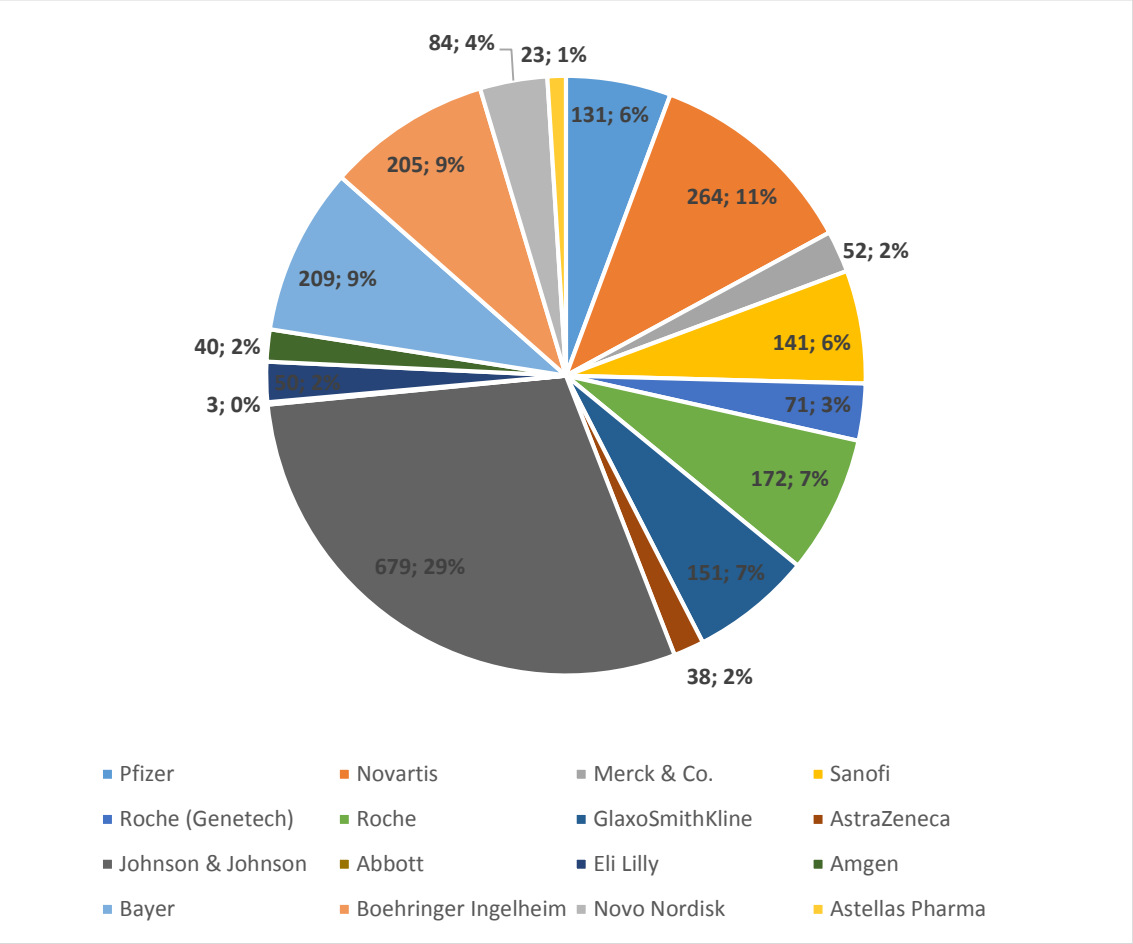
Figure 70 – Pharmaceutical firms analysed on YouTube: Number of subscribers



Videos and their views

Videos are tools of choice to share information on YouTube channels. Through Figure 71, it is possible to analyse the video distribution in each YouTube channel. Johnson & Johnson takes the lead in this category with 679 videos, corresponding to 29% of the total number of registered. For the other YouTube channels the number of videos can vary between 264 and 3 videos.

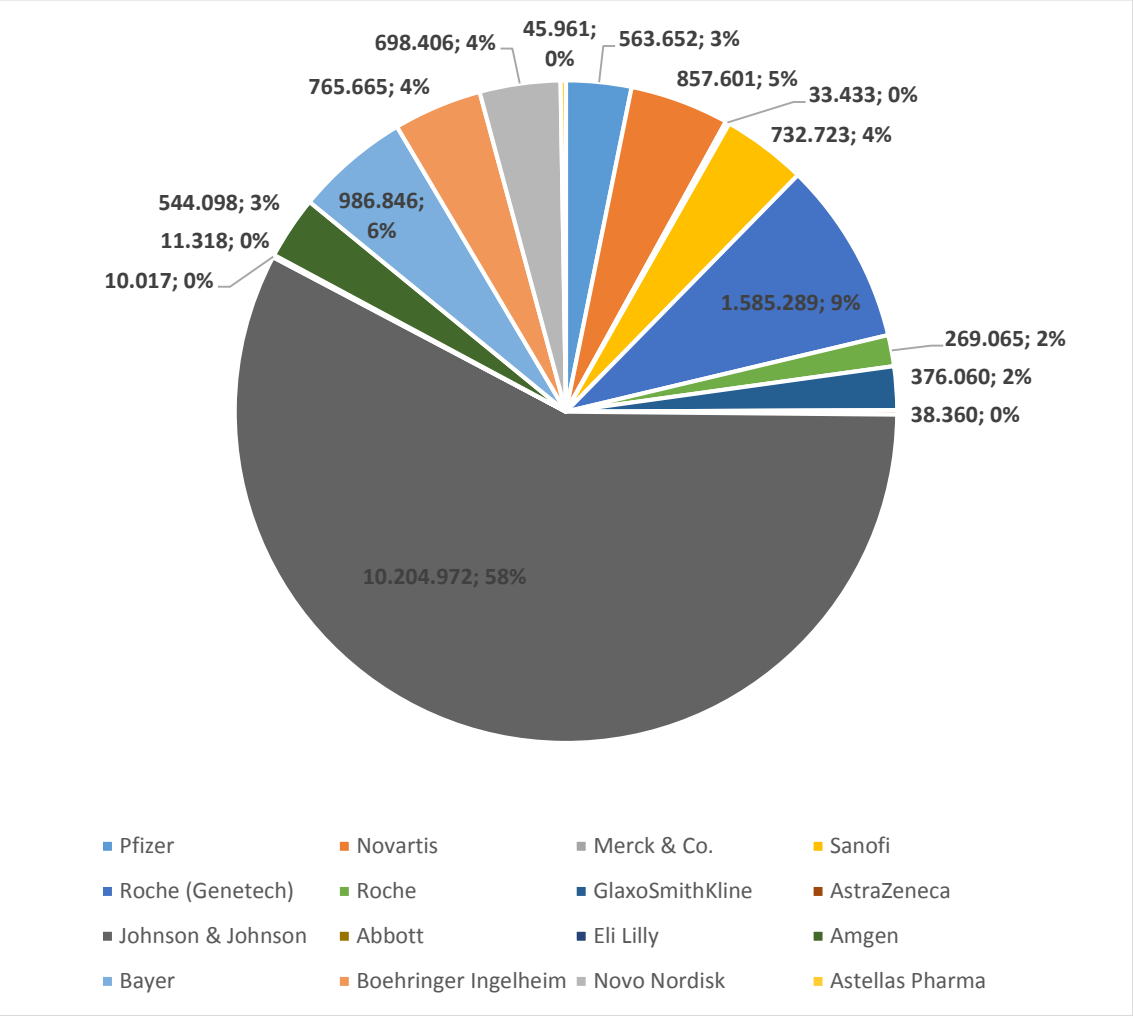
Figure 71 – Pharmaceutical firms analysed on YouTube: Number of videos



When analysing, through Figure 72, the number of views in each YouTube channel, clearly one company stands out from the others.

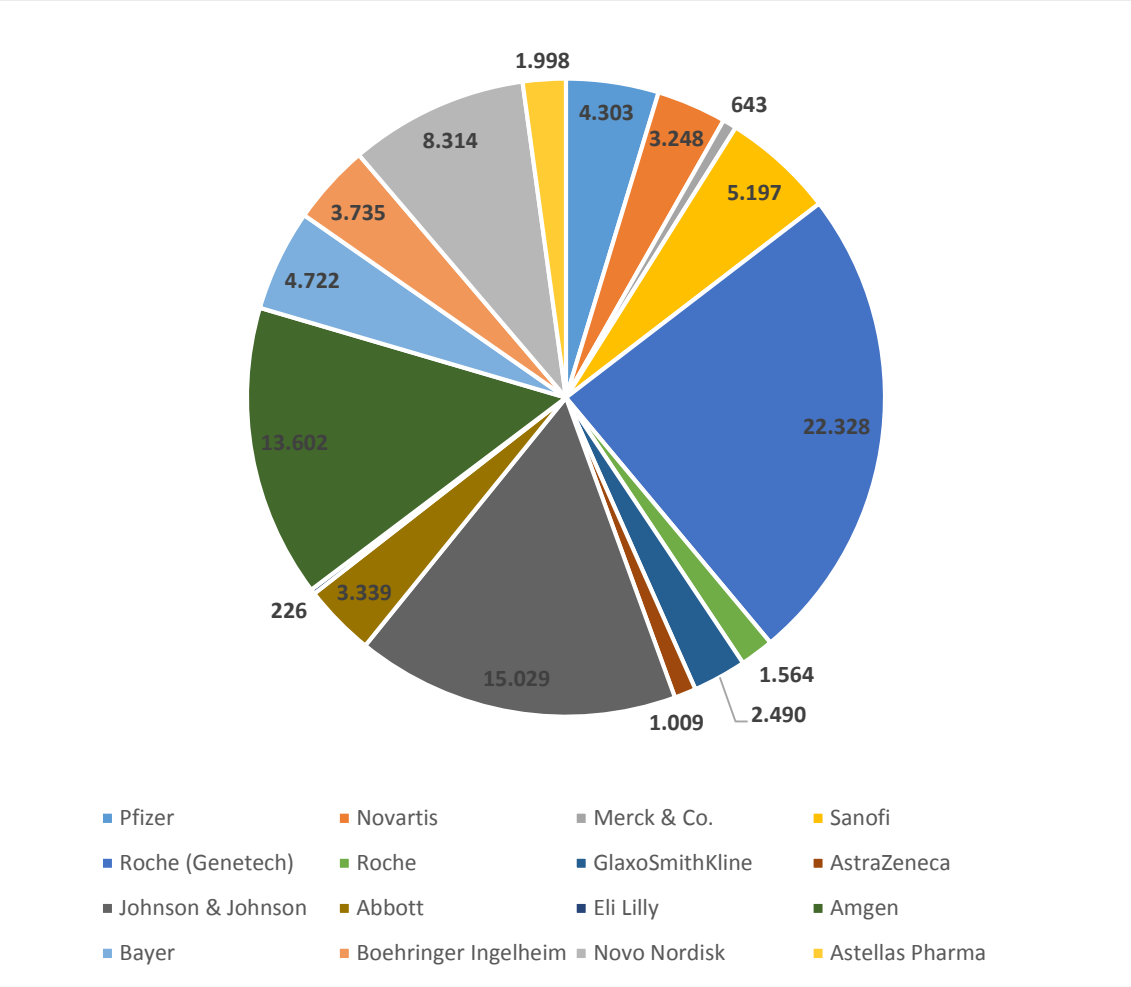
Johnson & Johnson is the outperformer in this category with 10.204.972 views, resulting in 58% of total number of views registered. The other YouTube channels register views numbers between 10.017 and 1.585.289 views. However, when analysing views per each video the scenario changes dramatically.

Figure 72 – Pharmaceutical firms analysed on YouTube: Video views



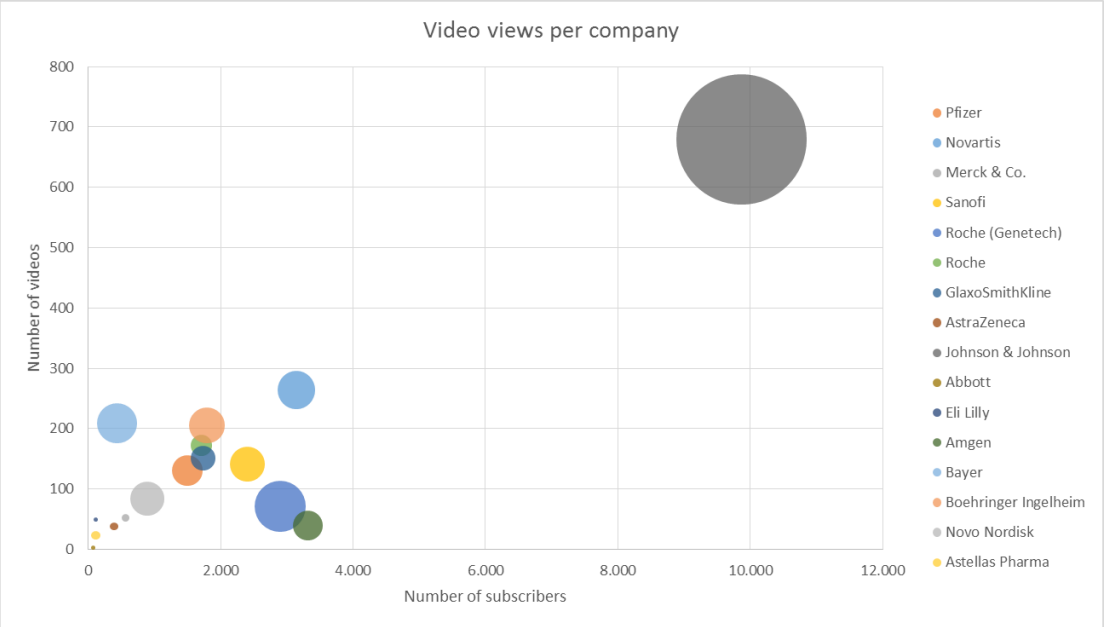
According to Figure 73, the number of views for each video is clearly more homogenous when comparing the data from Figure 72. The leading company is now Roche (Genentech) with 22.328 views per videos, followed by Johnson & Johnson with 15.029, and a third YouTube channel emerges (Amgen) with 13.602. The other companies vary between 226 and 8.314 views per video.

Figure 73 – Pharmaceutical firms analysed on YouTube: Views per video



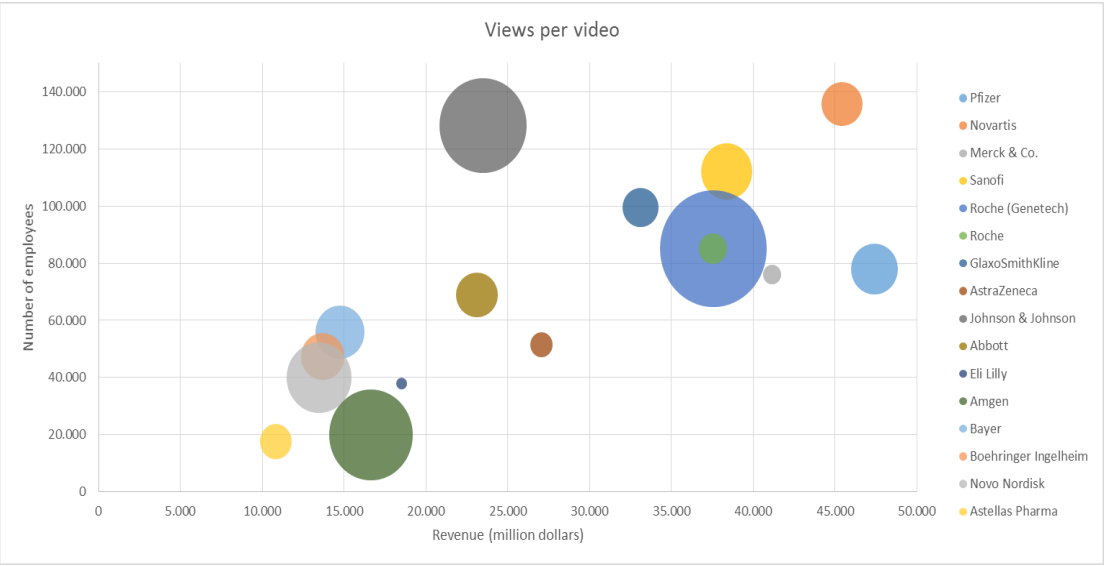
To establish a relationship between the number of views, videos and subscribers, Figure 74 was produced. According to the displayed data, it seems that, in general the number of views increases in a form of clusters with the increase of subscribers and videos.

Figure 74 – Pharmaceutical firms analysed on YouTube: Video views per firm



Another interesting analysis is to compare the number of views per video with the socioeconomic data of each company. According to Figure 75, there is not a proportional growth of video views with the increase of the company's size.

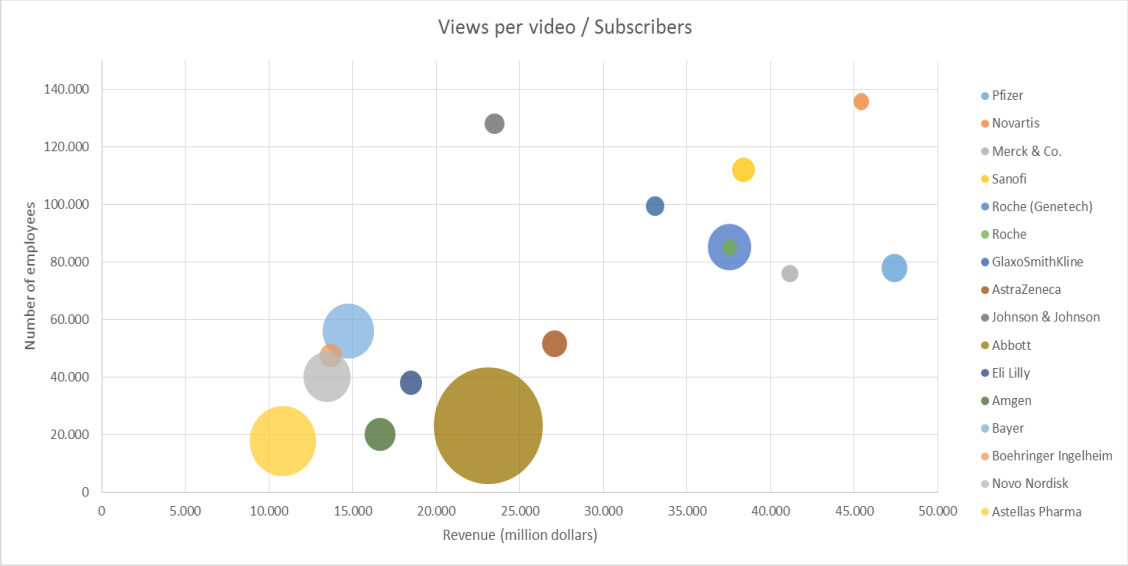
Figure 75 – Pharmaceutical firms analysed on YouTube: Views per video / Socioeconomic data



Engagement

The engagement rate for YouTube channels was defined as: Views per video/Subscribers. According to Figure 76, the engagement rate seems to decrease with the increase of companies' revenue and number of employees (without proportionality), but there is not a strong association between these variables.

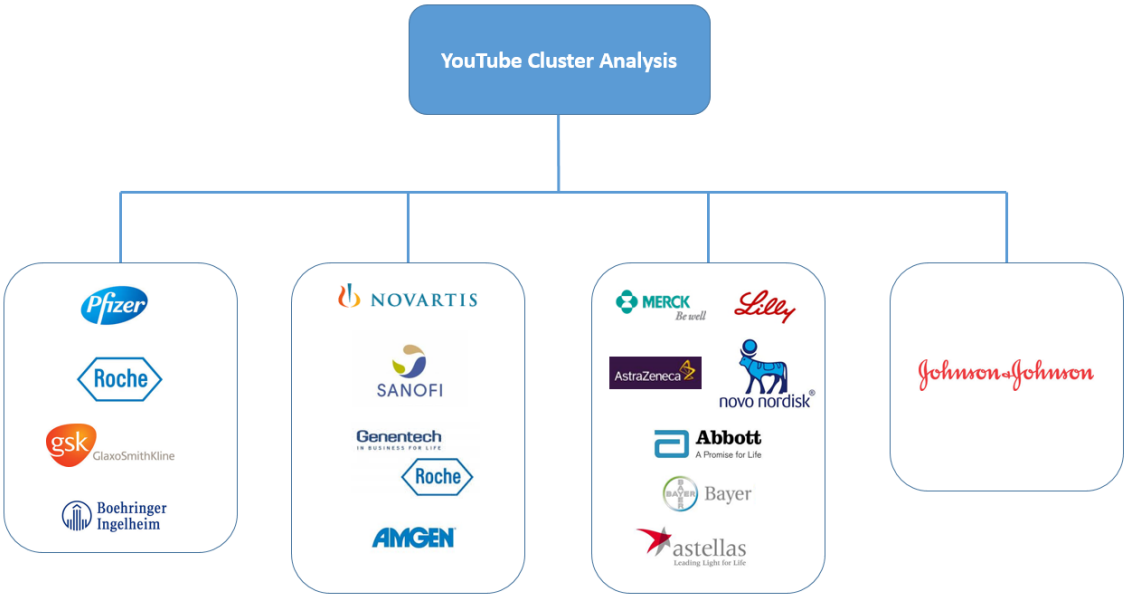
Figure 76 – Pharmaceutical firms analysed on YouTube: Engagement by firm



4.3.1. YouTube cluster analysis

Pharmaceutical companies' YouTube channels were also subjected to a cluster analysis identical to the ones performed for Facebook and Twitter. As presented in Figure 77, four clusters were identified using the "Hierarchical Cluster Analysis" of SPSS software (Annex VI).

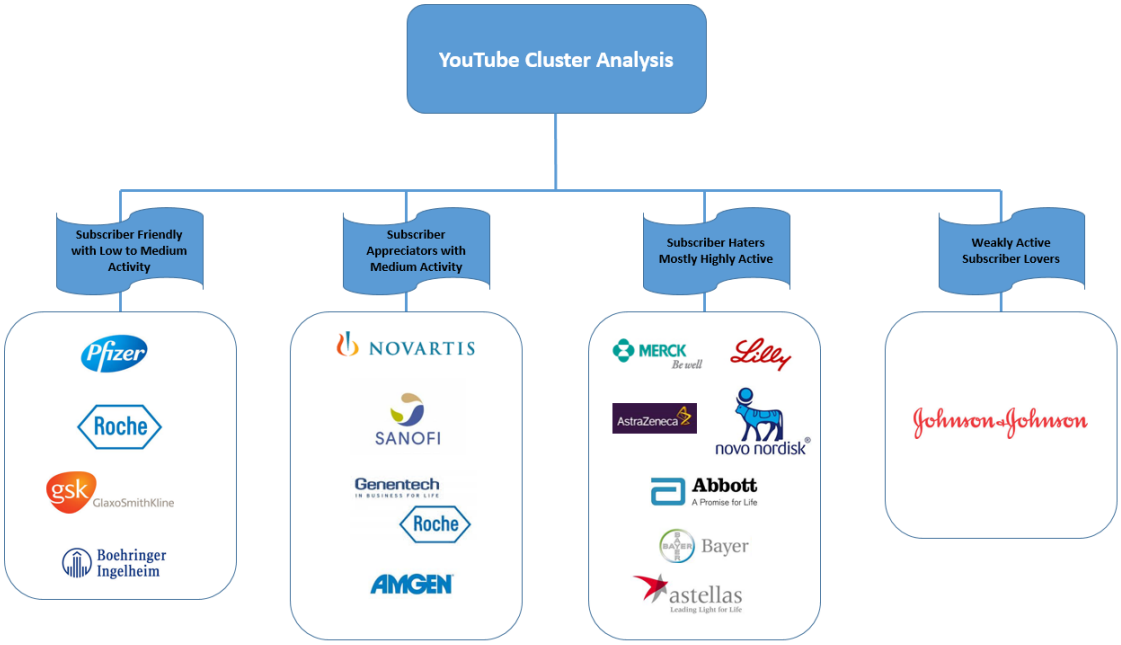
Figure 77 – YouTube cluster analysis



As made for Facebook pages and Twitter accounts, another analysis was performed with the objective of assigning designations to each cluster. With the crossing of the variables "Engagement "and "Number of Subscribers", it was possible to designate names to each cluster (see Annex VII).

The results are displayed in Figure 78. The names assigned were "Subscriber Friendly with Low to Medium Activity", Subscriber Appreciators with Medium Activity", "Subscriber Haters Mostly Highly Active" and Weakly Active Subscriber Lovers".

Figure 78 – YouTube cluster analysis with defined cluster names



In order to analyse in detail each cluster, another "Crosstabs" analysis was performed, using several variables (see Annex X). According to Table 14, the clusters have differentiated activity between them and are not homogeneous because they can have companies that perform well in a variable and companies that perform poorly in the same variable.

Table 14 – YouTube clusters: characterization

YouTube	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	+/--	+++/-	+/--	++

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. Selected social media overview

In this section, the three assessed social media platforms are subjected to an integrated analysis. The first important analysis is the evolution of pharmaceutical companies' social media presence. In Table 15, there is a description of the social media platforms used by selected pharmaceutical companies in 2011 and 2014. The data of 2011 were provided by Shankar and Li (2014) while the 2014 data were retrieved during this research.

Table 15 – Evolution of pharmaceutical companies' presence on Facebook, Twitter and YouTube

Company	Revenue 2010[a] (million)	Revenue 2012[b] (million)	2011[a]			2014		
Pfizer	$58.523	$47.404	Yes	Yes	Yes	Yes	Yes	Yes
Novartis	$44.420	$45.418	Yes	Yes	Yes	Yes	Yes	Yes
Merck & Co.	$39.811	$41.143	Yes	Yes	Yes	Yes	Yes	Yes
Sanofi	$37.403	$38.370	Yes	Yes	Yes	Yes[c]	Yes	Yes
GlaxoSmithKline	$36.156	$33.107	Yes	Yes	Yes	Yes	Yes	Yes
AstraZeneca	$32.515	$27.064	Yes	Yes	Yes	Yes[c]	Yes	Yes
Johnson & Johnson	$22.396	$23.491	Yes	Yes	Yes	Yes	Yes	Yes
Eli Lilly & Co.	$21.685	$18.509	Yes	Yes	Yes	Yes	Yes	Yes
Abbott Laboratories	$19.984	$23.199	Yes	Yes	Yes	Yes[e]	Yes	Yes[e]
Bristol-Myers Squibb	$19.484	$13.155	No	Yes	Yes	No	Yes	No
Teva	$16.121	$17.681	Yes	Yes	Yes	Yes	Yes[d]	No
Takeda Pharma	$14.829	$15.173	No	Yes	No	No	No	No
Bayer Schering	$14.485	$14.734	Yes	Yes	Yes	Yes	Yes	Yes
Boehringer-Ingelheim	$12.883	$13.686	Yes	Yes	Yes	Yes	Yes	Yes
Astellas	$11.161	$10.835	Yes	Yes	Yes	No	Yes[c]	Yes[c]
Daiichi-Sankyo	$10.794	$11.019	No	Yes	Yes	No	No	No
Gilead Sciences	$7.390	$9.398	No	Yes	Yes	No	Yes	No

Note:
(a) Top 20 pharmaceutical companies based on 2010 revenues and their social media presence. Source: Table 6
(b) Raking and 2012 revenues based on Pharmaceutical Executive's 50 top pharmaceutical companies (http://www.imsconsultinggroup.com/deployedfiles/consulting/Global/Content/How%20We%20Help/Strategy%20&%20Portfolio/PharmExec-pharma50.pdf)
(c) Social media platforms dedicated to USA population
(d) Twitter account dedicated to Spanish population
(e) Facebook page dedicated to jobs (Careers) while YouTube channel is dedicated to interns enrolled on an internship

The data displayed in the table above shows that larger pharmaceutical companies did not change their presence, but the companies below Eli Lilly & Co reveal that they

are abandoning some social media platforms. The Japanese companies Takeda and Daiichi-Sankyo have abandoned completely the three assessed platforms while Astellas is not in the same situation because Astellas USA possesses a Twitter account and a YouTube channel. YouTube appears to be the most abandoned social media platform.

An integrated analysis of digital engagement was also performed. Through Table 16 it is possible to verify the different levels of engagement in each of the three social media platforms analysed. According to the displayed data, the two best performing companies on Facebook are Boehringer Ingelheim and Eli Lilly while on Twitter the first place is taken by Teva and in second place continues Eli Lilly. On YouTube two different companies (Abbott and Astellas) are in the top 2.

Table 16 – Ranking of digital engagement on Facebook, Twitter and YouTube

Ranking		Score		Score		Score
1	Boehringer Ingelheim	0,078	Teva	18,170	Abbott	49,103
2	Eli Lilly	0,074	Eli Lilly	9,971	Astellas Pharma	17,842
3	Roche	0,041	Merck & Co.	4,840	Bayer	10,905
4	Merck & Co.	0,038	Roche (Genentech)	4,238	Novo Nordisk	9,352
5	Roche (Genentech)	0,038	Johnson & Johnson	3,252	Roche (Genentech)	7,699
6	Teva	0,025	Novo Nordisk	2,425	Amgen	4,097
7	Sanofi	0,015	Boehringer Ingelheim	2,122	Pfizer	2,880
8	Novartis	0,015	Gilead Sciences	1,782	AstraZeneca	2,595
9	GlaxoSmithKline	0,013	Bristol-Myers Squibb	1,603	Sanofi	2,163
10	Novo Nordisk	0,009	Astellas Pharma	1,257	Boehringer Ingelheim	2,088
11	Pfizer	0,007	Novartis	1,253	Eli Lilly	2,039
12	Abbott	0,007	GlaxoSmithKline	1,130	Johnson & Johnson	1,523
13	Bayer	0,006	Abbott	0,984	GlaxoSmithKline	1,437
14	AstraZeneca	0,005	Roche	0,830	Merck & Co.	1,138
15			AstraZeneca	0,824	Novartis	1,033
16			Bayer	0,817	Roche	0,917
17			Sanofi	0,730		
18			Pfizer	0,728		
19			Amgen	0,640		
20						

In order to associate the level of engagement with the revenue of pharmaceutical companies, Table 17 was produced. It shows that smaller companies in terms of revenue seem to perform better, but there is no clear association between the amount of revenue and the level of engagement in the three platforms. It is also clear that the level of

engagement does not increase with the increase of revenue (this conclusion was also taken in the previous individual graphical representation of engagement for each platform).

Table 17 – Ranking of digital engagement by revenue on Facebook, Twitter and YouTube

Ranking Engagement		Raking Revenue[a] (2012)		Raking Revenue[a] (2012)		Raking Revenue[a] (2012)
1	Boehringer Ingelheim	15	Teva	11	Abbott	9
2	Eli Lilly	10	Eli Lilly	10	Astellas Pharma	19
3	Roche	5	Merck & Co.	3	Bayer	14
4	Merck & Co.	3	Roche (Genentech)	5	Novo Nordisk	16
5	Roche (Genentech)	5	Johnson & Johnson	8	Roche (Genentech)	5
6	Teva	11	Novo Nordisk	16	Amgen	12
7	Sanofi	4	Boehringer Ingelheim	15	Pfizer	1
8	Novartis	2	Gilead Sciences	20	AstraZeneca	7
9	GlaxoSmithKline	6	Bristol-Myers Squibb	17	Sanofi	4
10	Novo Nordisk	16	Astellas Pharma	19	Boehringer Ingelheim	15
11	Pfizer	1	Novartis	2	Eli Lilly	10
12	Abbott	9	GlaxoSmithKline	6	Johnson & Johnson	8
13	Bayer	14	Abbott	9	GlaxoSmithKline	6
14	AstraZeneca	7	Roche	5	Merck & Co.	3
15			AstraZeneca	7	Novartis	2
16			Bayer	14	Roche	5
17			Sanofi	4		
18			Pfizer	1		
19			Amgen	12		
20						

Note:
(a) Raking and 2012 revenues based on Pharmaceutical Executive's 50 top pharmaceutical companies (http://www.imsconsultinggroup.com/deployedfiles/consulting/Global/Content/How%20We%20Help/Strategy%20&%20Portfolio/PharmExec-pharma50.pdf)

When analysing the level of engagement with the number of employees, the same conclusions of Table 17 were taken. According to Table 18, there is no association between the number of employees and the level of engagement. Therefore, the level of engagement does not increase with the increase of the workforce (again, the same conclusion was also taken in the previous individual graphical representation of engagement for each platform).

Table 18 – Ranking of digital engagement by employees on Facebook, Twitter and YouTube

Ranking Engagement		Raking Employees[a]		Raking Employees[a]		Raking Employees[a]
1	Boehringer Ingelheim	11	Teva	12	Abbott	8
2	Eli Lilly	14	Eli Lilly	14	Astellas Pharma	19
3	Roche	5	Merck & Co.	7	Bayer	9
4	Merck & Co.	7	Roche (Genentech)	5	Novo Nordisk	13
5	Roche (Genentech)	5	Johnson & Johnson	2	Roche (Genentech)	5
6	Teva	12	Novo Nordisk	13	Amgen	18
7	Sanofi	3	Boehringer Ingelheim	11	Pfizer	6
8	Novartis	1	Gilead Sciences	20	AstraZeneca	7
9	GlaxoSmithKline	4	Bristol-Myers Squibb	17	Sanofi	3
10	Novo Nordisk	13	Astellas Pharma	19	Boehringer Ingelheim	11
11	Pfizer	6	Novartis	1	Eli Lilly	14
12	Abbott	8	GlaxoSmithKline	4	Johnson & Johnson	2
13	Bayer	9	Abbott	8	GlaxoSmithKline	4
14	AstraZeneca	10	Roche	5	Merck & Co.	7
15			AstraZeneca	10	Novartis	1
16			Bayer	9	Roche	5
17			Sanofi	3		
18			Pfizer	1		
19			Amgen	12		
20						

Note:
(a) For further detail see Annex V (Table 23)

Another important observation is the fact that it seems that each company does not share the same digital engagement strategy (see Figure 79). Through the cluster analysis, companies were assigned to different clusters in each platform.

However, it seems that Eli Lilly shares some similarities between Facebook and Twitter digital engagement strategy. Using Table 16, the same scenario is observed. Firms do not achieve the same engagement raking in all the social media platforms under analysis.

Figure 79 – Overview of the digital strategy on Facebook, Twitter and YouTube

From all of the above statistical results, we can infer that social media strategy differs in this group of pharmaceutical firms, resulting in different engagements levels in Facebook, Twitter and YouTube.

CHAPTER 5 – FINAL CONSIDERATIONS

In the last 10 years, social media took over the online world, connecting more people, firms and brands. However, there are a number of industries that are still lacking in social media exposure and interaction with costumers. The question that remains unanswered is what leads to a greater firms' investment in social media and in which media?

In the pharmaceutical industry, social media is a tool that is in fact used to communicate with consumers. However, not all pharmaceutical companies have a Facebook page, Twitter account or YouTube channel. In fact, only a reduced number of the pharmaceutical companies analysed is in the three social media platforms simultaneously. Also it seems that smaller pharmaceutical companies are leaving some social media platforms. These observations could be a result of an absence of official guidance in the use of such platforms associated with difficulty to calculate return on investment in the same platforms.

The analysis of the activity of pharmaceutical companies on social media revealed that in the several parameters studied for each social media platform there were diverse settings of scenarios, with some companies performing better than others in one parameter but with a poor performance in others. Also some companies appeared almost non-active in such platforms. Moreover, when analysing the ultimate indicator of activity (engagement raking), smaller companies leaded the raking. However, there is not an association between a good performance in this raking with the size of the companies in terms of revenue and employees. This suggests that other factors could influence digital engagement, and therefore they should be evaluated in future researches. Regarding their digital engagement strategy, pharmaceutical companies do not use the same strategy between the three social media platforms analysed. The clusters analysis showed that in general pharmaceutical companies behave differently in Facebook, Twitter and YouTube, as they were distributed to clusters/segments, presenting different characteristics among these platforms.

Social media in the pharmaceutical environment is clearly taking the first steps. This is leading to an increase of researchers' curiosity and work in this field. However, the number of publications regarding this thematic is small and it does not provide, in

detail, the elements composing the activity of pharmaceutical companies on social media. The only study which refers to a detailed classification of this activity is a non-published article of 2014 from a private institution.

Therefore, the research developed in this document provides a comprehensive overview of pharmaceutical marketing communication strategies and enhances the knowledge regarding communication through social media in this specific sector. In this way, it offers a literature review up-to-date which can deliver valuable insights to other researchers.

Another valuable contribution of this research is the fact that it provides an innovative conceptual model and methodology that can be replicated in future studies. The analysis of the social media activity of pharmaceutical companies on Facebook, Twitter and YouTube provides a first separated and detailed evaluation of how these companies behave on social media. With this analysis, the literature will benefit of an extensive overview of the topic of this research, while the firm's management can see if their companies are having an outstanding performance when comparing to their competitors.

When developing a research in an emergent domain in society, several limitations can arise because the literature does not provide full support regarding several essential elements, such as a robust methodology, previously tested by other fellow researchers. In this way, the methodology developed in this research presents several limitations related to its innovative nature, but it also represents a path for future researches.

The methodology adopted in this research allows identifying the social media websites of the selected pharmaceutical companies. However, its process does not guarantee that all the websites are related to healthcare and if so some can be classified as official websites and others unofficial (because of the absence of social media indication in the company's main website). In order to avoid possible mistakes in this field, future researchers must contact the enterprises involved in the study to make sure which are the official social media websites. Also the inclusion of Genentech in Roche analysis can be deceiving as the first one has its own activity (revenue and employees). Consequently, future researchers must take extra caution when evaluating this type of inclusions. Furthermore, in the methodology used, only the 20 top pharmaceutical companies were analysed. However, to have a bigger understanding of the situation of the social media used by pharmaceutical companies, future researchers must try to analyse

a larger sample of companies, and therefore transforming their research into one that can be extrapolated to the reality of the pharmaceutical industry.

The data gathering for this research also presents limitations. These data were collected resorting to private companies which have tools that can retrieve data from social media websites. However, the data retrieved in Facebook and Twitter have some limitations because these tools are for free. Simplymeasured.com tools for Facebook only allow data from a period of two weeks and social media websites with more than 250.000 likes cannot be analysed (Johnson & Johnson's Facebook page was not analysed due to this last restriction). For Twitter, only a period of seven days can be analysed each time and customer service analysis is limited to 100.000 followers. To have a robust analysis that can clearly represent the reality of social media situation for pharmaceutical companies, future researchers must choose gathering methods that offer no limitations, as it is the paid Simplymeasuared.com tools.

The multi-faced communication in the virtual world has recognized consequences besides its connectivity benefits. Pharmaceutical firms are challenged to adopt an increasing digital presence, following social media major trends. Therefore, this work is a small step towards the knowledge of the full potential of social media to this sector and it leaves clues to future researches.

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ANNEXES

Annex I – Research of pharmaceutical companies' social media

Table 19 – Research of pharmaceutical companies' social media

Ranking[a]	Company	Revenue[a] (million)	Website address	Facebook reference on the website	Twitter reference on the website	YouTube reference on the website
1	Pfizer	$47.404	www.pfizer.com	Yes	Yes	Yes
2	Novartis	$45.418	www.novartis.com	Yes	Yes	Yes
3	Merck & Co.	$41.143	www.merck.com	Yes	Yes	Yes
4	Sanofi	$38.370	www.sanofi.com[b]	No	Yes	Yes
5	Roche	$37.542	www.roche.com	Yes	Yes	Yes
6	GlaxoSmithKline	$33.107	www.gsk.com	Yes	Yes	Yes
7	AstraZeneca	$27.064	www.astrazeneca.com[c]	No	Yes	Yes
8	Johnson & Johnson	$23.491	www.jnj.com	Yes	Yes	Yes
9	Abbott Laboratories	$23.119	www.abbott.com	Yes	Yes	Yes
10	Eli Lilly	$18.509	www.lilly.com	Yes	Yes	Yes
11	TEVA	$17.681	www.tevapharm.com[d]	Yes	No	No
12	Amgen	$16.639	www.amgen.com	No	Yes	Yes
13	Takeda	$15.173	www.takeda.com	No	No	No
14	Bayer	$14.734	www.healthcare.bayer.com[e]	Yes	No	No
15	Boehringer Ingelheim	$13.686	www.boehringer-ingelheim.com	Yes	Yes	Yes
16	Novo Nordisk	$13.478	www.novonordisk.com	Yes	Yes	Yes
17	Bristol-Myers Squibb	$13.155	www.bms.com	No	Yes	No
18	Daiichi-Sankyo	$11.019	www.daiichisankyo.com	No	No	No
19	Astellas Pharma	$10.835	www.astellas.com[f]	No	No	No
20	Gilead Sciences	$9.398	www.gilead.com	No	Yes[g]	No

Note:
(a) Raking and 2012 revenues based on Pharmaceutical Executive's 50 top pharmaceutical companies (http://www.imsconsultinggroup.com/deployedfiles/consulting/Global/Content/How%20We%20Help/Strategy%20&%20Portfolio/PharmExec-pharma50.pdf)
(b) On www.sanofi.us, there is a reference for Sanofi US on Twitter and Facebook
(c) On www.astrazeneca-us.com/about-us/social-media, there is a reference for AstraZeneca US on Twitter and Facebook
(d) On www.tevagenericos.es there is a reference of a Twitter account that is dedicated to TEVA Spain
(e) On www.bayer.com/en/socialmedia.aspx there is a list of the social media channels, but on the www.healthcare.bayer.com (the Bayer Healthcare division) there is only a reference of the Facebook page
(f) On www. astellas.us there is a reference to Astellas Pharma US Twitter and YouTube account
(g) http://www.gilead.com/twitter-guidelines

Annex II – Pharmaceutical companies' Facebook pages links

Table 20 – Pharmaceutical companies' Facebook pages links

Ranking[c]	Company	Revenue[c] (million)	
1	Pfizer	$47.404	https://www.facebook.com/Pfizer
2	Novartis	$45.418	https://www.facebook.com/novartis
3	Merck & Co.	$41.143	https://www.facebook.com/MerckBeWell
4	Sanofi[a]	$38.370	https://www.facebook.com/sanofiUS
5	Roche[b]	$37.542	https://www.facebook.com/RocheCareers (Facebook page dedicated to careers) https://www.facebook.com/Genentech (Part of Roche Group)
6	GlaxoSmithKline	$33.107	https://www.facebook.com/GSK
7	AstraZeneca[a]	$27.064	https://www.facebook.com/AstraZenecaUSCommunityConnections
8	Johnson & Johnson	$23.491	https://www.facebook.com/jnj
9	Abbott	$23.119	https://www.facebook.com/AbbottCareers (Facebook page dedicated to careers)
10	Eli Lilly	$18.509	https://www.facebook.com/elililllyandco
11	Teva	$17.681	https://www.facebook.com/tevapharm
12	Amgen	$16.639	-
13	Takeda	$15.173	-
14	Bayer	$14.734	https://www.facebook.com/healthcare.bayer
15	Boehringer Ingelheim	$13.686	https://www.facebook.com/boehringeringelheim
16	Novo Nordisk	$13.478	https://www.facebook.com/novonordisk
17	Bristol-Myers Squibb	$13.155	-
18	Daiichi-Sankyo	$11.019	-
19	Astellas Pharma	$10.835	-
20	Gilead Sciences	$9.398	-

Note:
(a) Facebook pages dedicated to USA population
(b) Genentech was included because it is part of Group Roche, and it is accountable for the most successful medicines of Group Roche
(c) Raking and 2012 revenues based on Pharmaceutical Executive 50 Top Pharmaceutical companies (http://www.imsconsultinggroup.com/deployedfiles/consulting/Global/Content/How%20We%20Help/Strategy%20&%20Portfolio/PharmExec-pharma50.pdf)

Annex III – Pharmaceutical companies' Twitter accounts links

Table 21 – Pharmaceutical companies' Twitter accounts links

Ranking[d]	Company	Revenue[d] (million)	
1	Pfizer	$47.404	https://twitter.com/pfizer
2	Novartis	$45.418	https://twitter.com/novartis
3	Merck & Co.	$41.143	https://twitter.com/merck
4	Sanofi	$38.370	https://twitter.com/sanofi
5	Roche[a]	$37.542	https://twitter.com/roche https://twitter.com/genentech (Part of Roche Group)
6	GlaxoSmithKline	$33.107	https://twitter.com/gsk
7	AstraZeneca	$27.064	https://twitter.com/astrazeneca
8	Johnson & Johnson	$23.491	https://twitter.com/JNJCares
9	Abbott	$23.119	https://twitter.com/AbbottNews
10	Eli Lilly	$18.509	https://twitter.com/EliLillyCo
11	Teva[b]	$17.681	https://twitter.com/teva_es
12	Amgen	$16.639	https://twitter.com/amgen
13	Takeda	$15.173	-
14	Bayer	$14.734	https://twitter.com/BayerHealthCare
15	Boehringer Ingelheim	$13.686	https://twitter.com/boehringer
16	Novo Nordisk	$13.478	https://twitter.com/novonordisk
17	Bristol-Myers Squibb	$13.155	https://twitter.com/BMSNEWS
18	Daiichi-Sankyo	$11.019	-
19	Astellas Pharma[c]	$10.835	https://twitter.com/astellasus
20	Gilead Sciences	$9.398	https://twitter.com/GileadSciences

Note:
(a) Genentech was included because it is part of Group Roche, and it is accountable for the most successful medicines of Group Roche
(b) Twitter account dedicated to Spanish population
(c) Twitter account dedicated to USA population
(d) Raking and 2012 revenues based on Pharmaceutical Executive 50 Top Pharmaceutical companies (http://www.imsconsultinggroup.com/deployedfiles/consulting/Global/Content/How%20We%20Help/Strategy%20&%20Portfolio/PharmExec-pharma50.pdf

Annex IV – Pharmaceutical companies' YouTube channels links

Table 22 – Pharmaceutical companies' YouTube channels links

Ranking[c]	Company	Revenue[c] (million)	YouTube
1	Pfizer	$47.404	https://www.youtube.com/user/Pfizernews
2	Novartis	$45.418	http://www.youtube.com/user/Novartis/
3	Merck & Co.	$41.143	http://www.youtube.com/user/Merck
4	Sanofi	$38.370	http://www.youtube.com/user/sanofiaventisTVen/
5	Roche[a]	$37.542	http://www.youtube.com/user/roche https://www.youtube.com/user/Genentech (Part of Roche Group)
6	GlaxoSmithKline	$33.107	http://www.youtube.com/user/GSKvision
7	AstraZeneca	$27.064	http://www.youtube.com/user/astrazeneca
8	Johnson & Johnson	$23.491	http://www.youtube.com/user/JNJhealth
9	Abbott	$23.119	http://www.youtube.com/user/abbottinternship (Dedicated to Interns)
10	Eli Lilly	$18.509	http://www.youtube.com/user/EliLillyandCompany
11	Teva	$17.681	-
12	Amgen	$16.639	http://www.youtube.com/user/Amgen
13	Takeda	$15.173	-
14	Bayer	$14.734	https://www.youtube.com/user/BayerGroup
15	Boehringer Ingelheim	$13.686	http://www.youtube.com/user/boehringeringelheim
16	Novo Nordisk	$13.478	http://www.youtube.com/user/novonordisk
17	Bristol-Myers Squibb	$13.155	-
18	Daiichi-Sankyo	$11.019	-
19	Astellas Pharma[b]	$10.835	http://www.youtube.com/user/AstellasUS
20	Gilead Sciences	$9.398	-

Note:
(a) Genentech was included because it is part of Group Roche, and it is accountable for the most successful medicines of Group Roche
(b) YouTube channel dedicated to USA population
(c) Raking and 2012 revenues based on Pharmaceutical Executive 50 Top Pharmaceutical companies (http://www.imsconsultinggroup.com/deployedfiles/consulting/Global/Content/How%20We%20Help/Strategy%20&%20Portfolio/PharmExec-pharma50.pdf

Annex V – Pharmaceutical companies' employees

Table 23 – Pharmaceutical companies' employees

Ranking[a]	Company	Revenue[a] (million)	Website address	Employees[b]
1	Pfizer	$47.404	www.pfizer.com	78.000
2	Novartis	$45.418	www.novartis.com	135.696
3	Merck & Co.	$41.143	www.merck.com	76.000
4	Sanofi	$38.370	www.sanofi.com	112.128
5	Roche	$37.542	www.roche.com	85.080
6	GlaxoSmithKline	$33.107	www.gsk.com	99.451
7	AstraZeneca	$27.064	www.astrazeneca.com	51.500
8	Johnson & Johnson	$23.491	www.jnj.com	128.100
9	Abbott Laboratories	$23.119	www.abbott.com	69.000
10	Eli Lilly	$18.509	www.lilly.com	38.000
11	TEVA	$17.681	www.tevapharm.com	46.400
12	Amgen	$16.639	www.amgen.com	20.000
13	Takeda	$15.173	www.takeda.com	31.225
14	Bayer	$14.734	www.bayer.com	56.000
15	Boehringer Ingelheim	$13.686	www.boehringer-ingelheim.com	47.400
16	Novo Nordisk	$13.478	www.novonordisk.com	40.000
17	Bristol-Myers Squibb	$13.155	www.bms.com	24.000
18	Daiichi-Sankyo	$11.019	www.daiichisankyo.com	30.000
19	Astellas Pharma	$10.835	www.astellas.com	17.649
20	Gilead Sciences	$9.398	www.gilead.com	6.400

Note:
(a) Raking and 2012 revenues based on Pharmaceutical Executive 50 Top Pharmaceutical companies (http://www.imsconsultinggroup.com/deployedfiles/consulting/Global/Content/How%20We%20Help/Strategy%20&%20Portfolio/PharmExec-pharma50.pdf)
(b) Number of employees retrieved from company's website, annual report or from the Wikipedia website

Annex VI – Hierarchical Cluster Analysis

Figure 80 – Facebook Hierarchical Cluster Analysis

Case Processing Summary[a]

Cases					
Valid		Missing		Total	
N	Percent	N	Percent	N	Percent
14	82,4	3	17,6	17	100,0

a. Ward Linkage

Agglomeration Schedule

Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	1	7	38088,000	0	0	6
2	5	11	221100,503	0	0	8
3	3	8	1588958,505	0	0	7
4	4	12	3135999,005	0	0	7
5	2	15	7265937,006	0	0	9
6	1	16	21780307,74	1	0	11
7	3	4	38783559,99	3	4	8
8	3	5	99709186,76	7	2	10
9	2	10	181997253,4	5	0	12
10	3	6	288578511,4	8	0	12
11	1	17	3280909848	6	0	13
12	2	3	7288445062	9	10	13
13	1	2	3,820E+10	11	12	0

Cluster Membership

Case	4 Clusters
1:Pfizer	1
2:Novartis	2
3:Merck & Co.	3
4:Sanofi	3
5:Roche (Genentech)	3
6:Roche	3
7:GlaxoSmithKline	1
8:AstraZeneca	3
10:Abbott	2
11:Eli Lilly	3
12:Teva	3
15:Bayer	2
16:Boehringer Ingelheim	1
17:Novo Nordisk	4

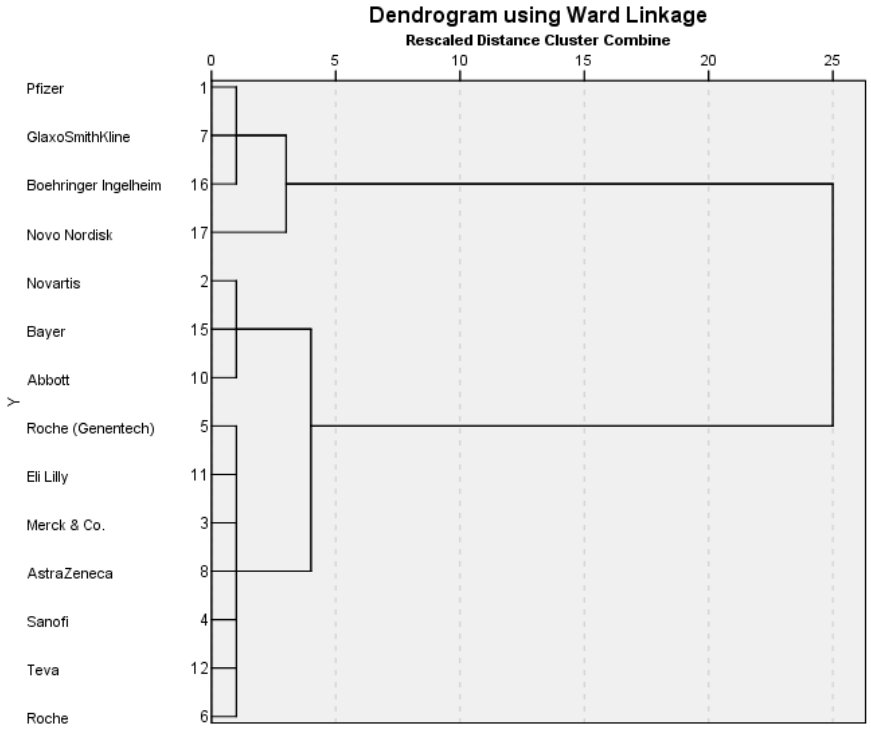


Figure 81 – Twitter Hierarchical Cluster Analysis

Case Processing Summary[a]

Cases					
Valid		Missing		Total	
N	Percent	N	Percent	N	Percent
19	90,5	2	9,5	21	100,0

a. Ward Linkage

Agglomeration Schedule

Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	4	18	31752,380	0	0	9
2	3	15	183560,974	0	0	9
3	17	21	509185,681	0	0	8
4	7	8	852806,228	0	0	14
5	11	12	1571640,342	0	0	8
6	9	16	3218753,481	0	0	10
7	10	13	5234785,540	0	0	11
8	11	17	11737428,74	5	3	15
9	3	4	18672753,75	2	1	12
10	5	9	25781748,86	0	6	12
11	10	20	69651444,99	7	0	15
12	3	5	131948244,2	9	10	16
13	1	2	247681142,3	0	0	17
14	6	7	407796146,5	0	4	16
15	10	11	856111797,4	11	8	18
16	3	6	1721724117	12	14	17
17	1	3	5853049379	13	16	18
18	1	10	1,303E+10	17	15	0

Cluster Membership

Case	5 Clusters
1:Pfizer	1
2:Novartis	1
3:Merck & Co.	2
4:Sanofi	2
5:Roche (Genentech)	2
6:Roche	3
7:GlaxoSmithKline	3
8:AstraZeneca	3
9:Johnson & Johnson	2
10:Abbott	4
11:Eli Lilly	5
12:Teva	5
13:Amgen	4
15:Bayer	2
16:Boehringer Ingelheim	2
17:Novo Nordisk	5
18:Bristol-Myers Squibb	2
20:Astellas Pharma	4
21:Gilead Sciences	5

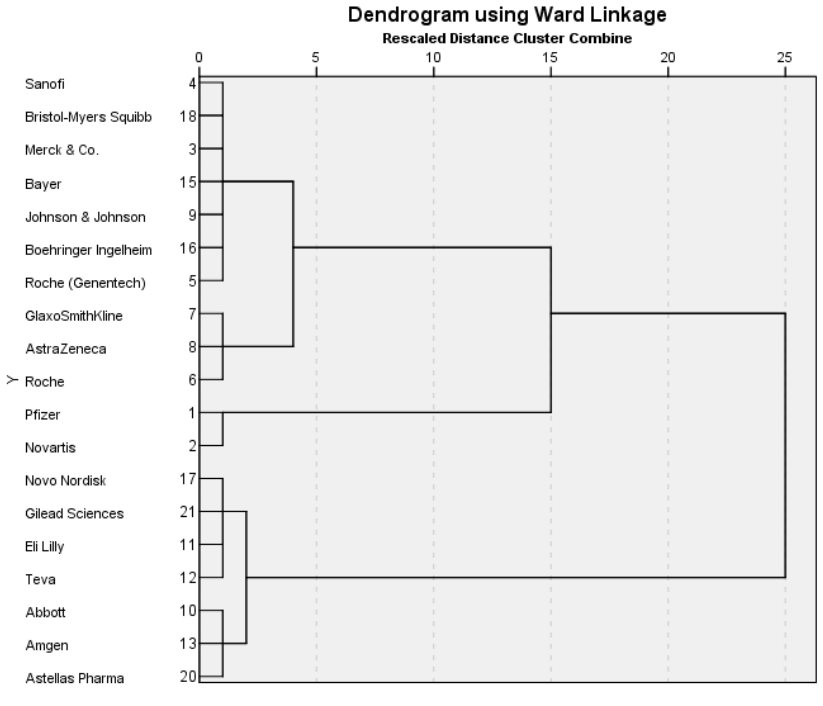


Figure 82 – YouTube Hierarchical Cluster Analysis

Case Processing Summary[a]

Cases					
Valid		Missing		Total	
N	Percent	N	Percent	N	Percent
16	76,2	5	23,8	21	100,0

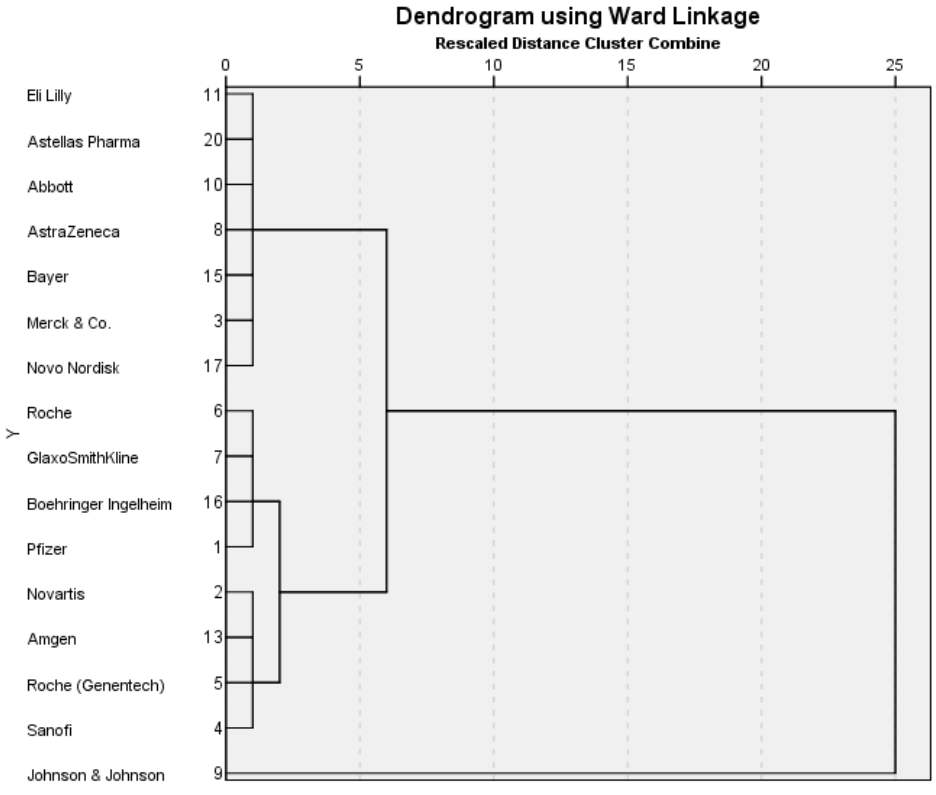
a. Ward Linkage

Agglomeration Schedule

Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	11	20	125,363	0	0	4
2	6	7	489,998	0	0	5
3	8	15	1492,524	0	0	7
4	10	11	3776,481	0	1	11
5	6	16	6997,201	2	0	8
6	2	13	22489,894	0	0	9
7	3	8	38321,557	0	3	10
8	1	6	84699,359	0	5	13
9	2	5	158199,598	6	0	12
10	3	17	294747,939	7	0	11
11	3	10	677158,632	10	4	14
12	2	4	1064164,067	9	0	13
13	1	2	4245674,547	8	12	14
14	1	3	18360822,21	13	11	15
15	1	9	85495192,63	14	0	0

Cluster Membership

Case	4 Clusters
1:Pfizer	1
2:Novartis	2
3:Merck & Co.	3
4:Sanofi	2
5:Roche (Genentech)	2
6:Roche	1
7:GlaxoSmithKline	1
8:AstraZeneca	3
9:Johnson & Johnson	4
10:Abbott	3
11:Eli Lilly	3
13:Amgen	2
15:Bayer	3
16:Boehringer Ingelheim	1
17:Novo Nordisk	3
20:Astellas Pharma	3



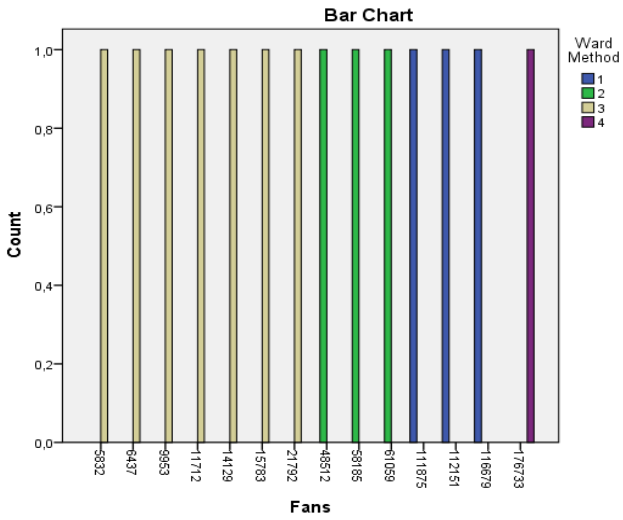
Annex VII – Crosstabs Cluster Analysis (bivariate)

Figure 83 – Facebook Crosstabs Cluster Analysis (Fans and Engagement)

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Fans * Ward Method	14	82,4%	3	17,6%	17	100,0%
Engagement * Ward Method	14	82,4%	3	17,6%	17	100,0%

Fans * Ward Method

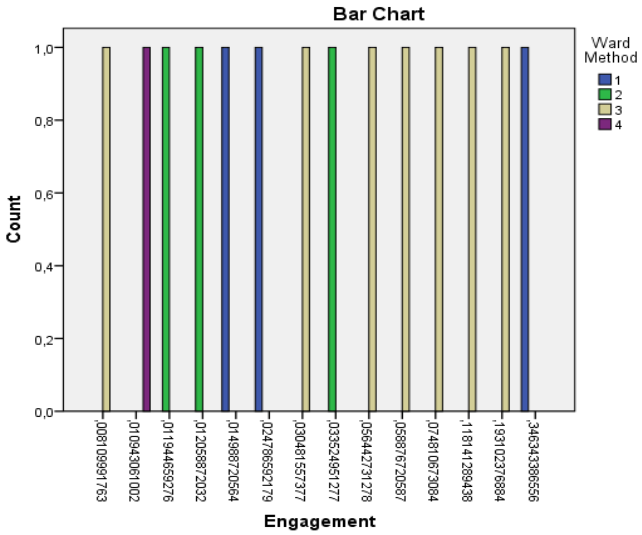


Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	42,000[a]	39	,342
Likelihood Ratio	33,468	39	,720
Linear-by-Linear Association	1,602	1	,206
N of Valid Cases	14		

a. 56 cells (100,0%) have expected count less than 5. The minimum expected count is ,07.

Engagement * Ward Method



Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	42,000[a]	39	,342
Likelihood Ratio	33,468	39	,720
Linear-by-Linear Association	,615	1	,433
N of Valid Cases	14		

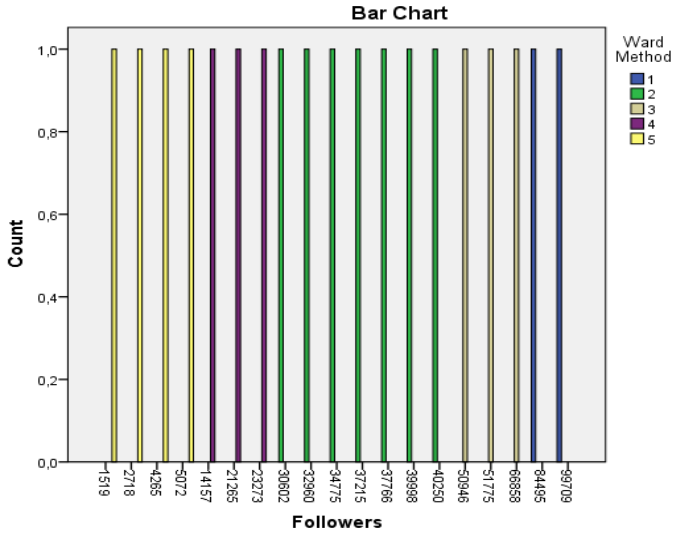
a. 56 cells (100,0%) have expected count less than 5. The minimum expected count is ,07.

Figure 84 – Twitter Crosstabs Cluster Analysis (Followers and Engagement)

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Followers * Ward Method	19	90,5%	2	9,5%	21	100,0%
Engagement * Ward Method	19	90,5%	2	9,5%	21	100,0%

Followers * Ward Method

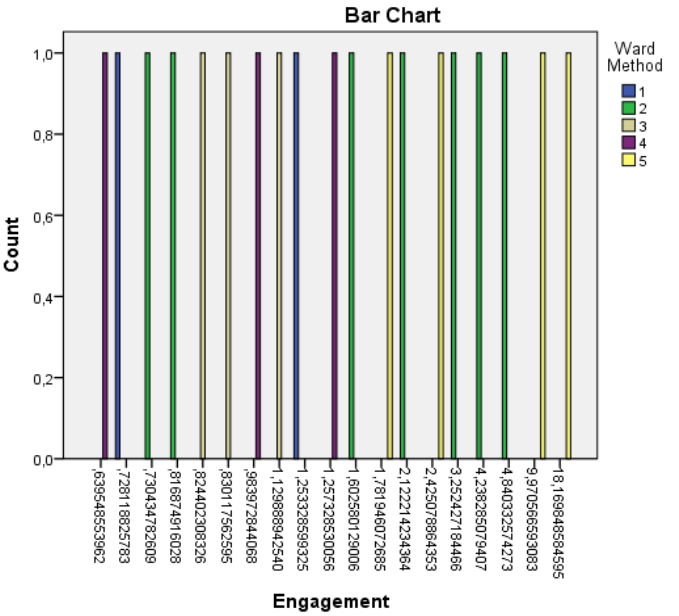


Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	76,000[a]	72	,351
Likelihood Ratio	57,600	72	,891
Linear-by-Linear Association	11,679	1	,001
N of Valid Cases	19		

a. 95 cells (100,0%) have expected count less than 5. The minimum expected count is ,11.

Engagement * Ward Method



Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	76,000[a]	72	,351
Likelihood Ratio	57,600	72	,891
Linear-by-Linear Association	3,376	1	,066
N of Valid Cases	19		

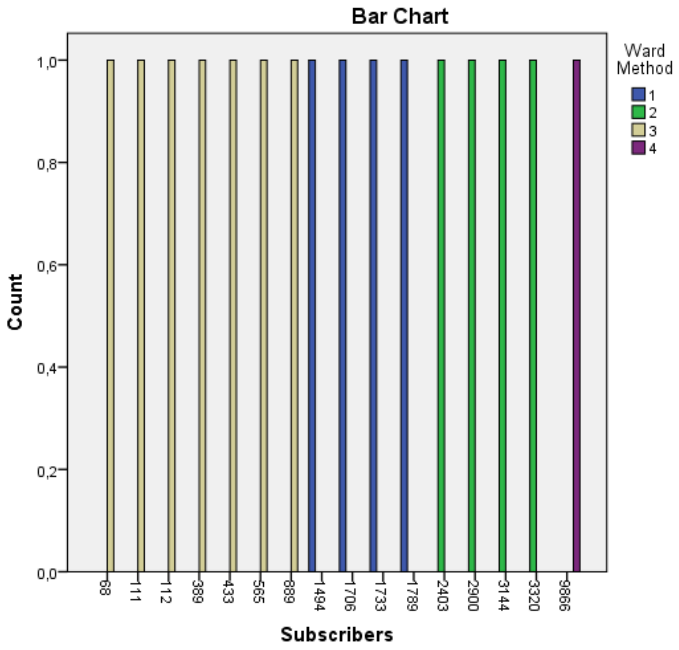
a. 95 cells (100,0%) have expected count less than 5. The minimum expected count is ,11.

Figure 85 – YouTube Crosstabs Cluster Analysis (Subscribers and Engagement)

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Engagement * Ward Method	16	76,2%	5	23,8%	21	100,0%
Subscribers * Ward Method	16	76,2%	5	23,8%	21	100,0%

Subscribers * Ward Method

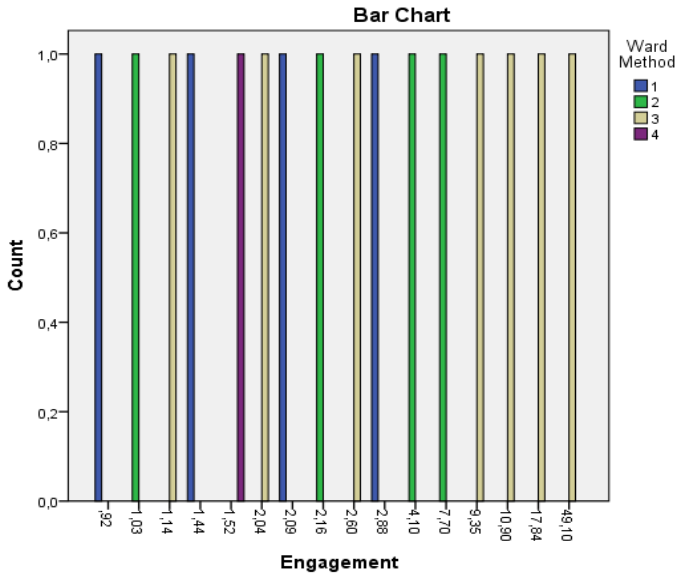


Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	48,000[a]	45	,352
Likelihood Ratio	39,299	45	,711
Linear-by-Linear Association	,457	1	,499
N of Valid Cases	16		

a. 64 cells (100,0%) have expected count less than 5. The minimum expected count is ,06.

Engagement * Ward Method



Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	48,000[a]	45	,352
Likelihood Ratio	39,299	45	,711
Linear-by-Linear Association	1,386	1	,239
N of Valid Cases	16		

a. 64 cells (100,0%) have expected count less than 5. The minimum expected count is ,06.

Annex VIII – Facebook Crosstabs Cluster Analysis (multivariate)

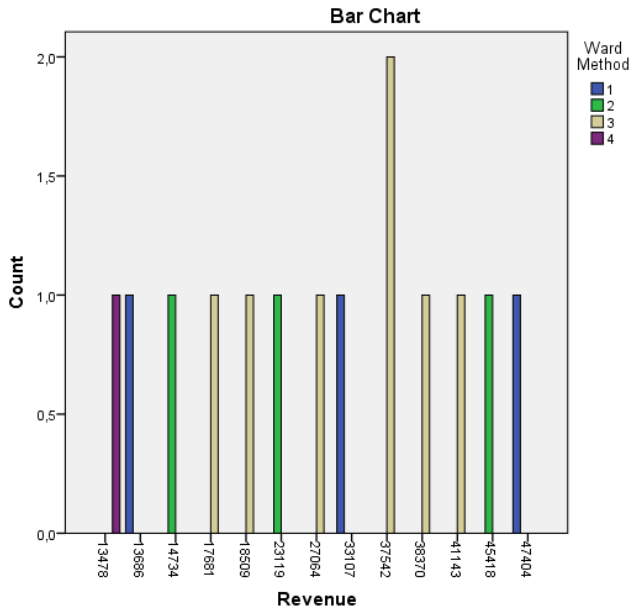
Figure 86 – Facebook Crosstabs Cluster Analysis (Case Processing Summary)

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Revenue * Ward Method	14	82,4%	3	17,6%	17	100,0%
Employees * Ward Method	14	82,4%	3	17,6%	17	100,0%
Brand Post * Ward Method	14	82,4%	3	17,6%	17	100,0%
Shares (Brand Post) * Ward Method	14	82,4%	3	17,6%	17	100,0%
Post Likes (Brand Post) * Ward Method	14	82,4%	3	17,6%	17	100,0%
Comments (Brand Post) * Ward Method	14	82,4%	3	17,6%	17	100,0%
User Posts * Ward Method	14	82,4%	3	17,6%	17	100,0%

Figure 87 – Facebook Crosstabs Cluster Analysis (Revenue)

Revenue * Ward Method



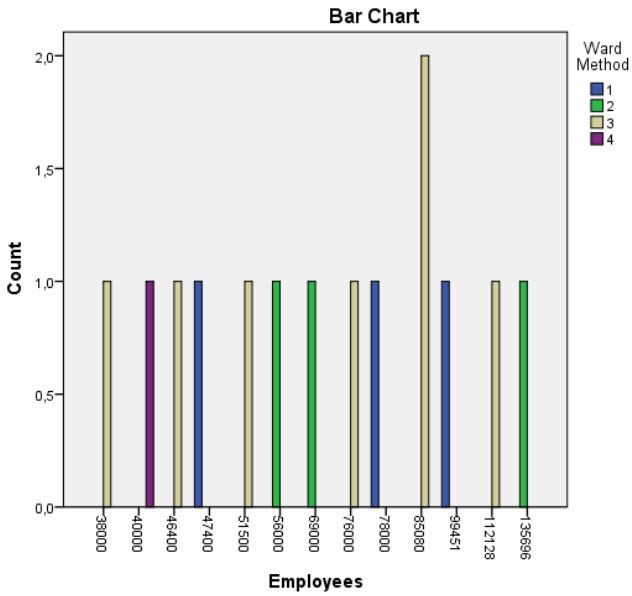
Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	42,000[a]	36	,227
Likelihood Ratio	33,468	36	,590
Linear-by-Linear Association	,351	1	,554
N of Valid Cases	14		

a. 52 cells (100,0%) have expected count less than 5. The minimum expected count is ,07.

Figure 88 – Facebook Crosstabs Cluster Analysis (Employees and Brand posts)

Employees * Ward Method

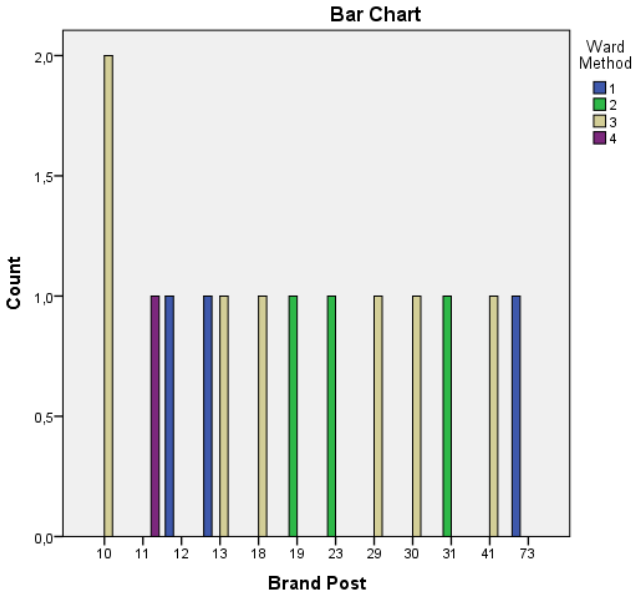


Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	42,000[a]	36	,227
Likelihood Ratio	33,468	36	,590
Linear-by-Linear Association	,800	1	,371
N of Valid Cases	14		

a. 52 cells (100,0%) have expected count less than 5. The minimum expected count is ,07.

Brand Post * Ward Method



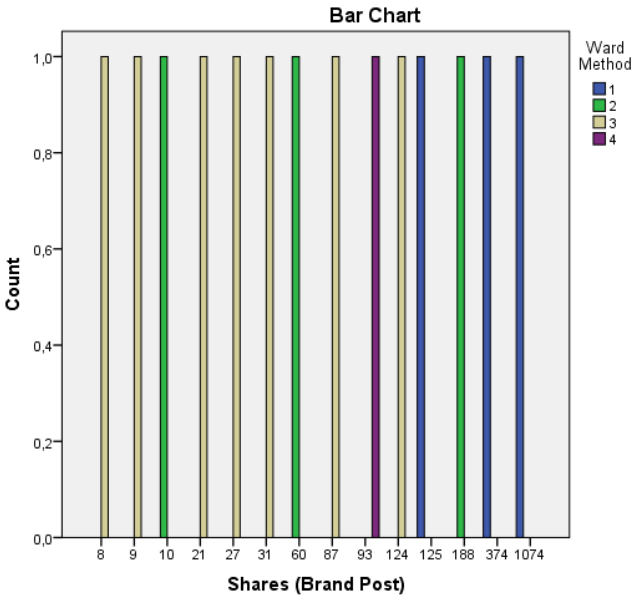
Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	38,667[a]	33	,229
Likelihood Ratio	30,695	33	,582
Linear-by-Linear Association	1,370	1	,242
N of Valid Cases	14		

a. 48 cells (100,0%) have expected count less than 5. The minimum expected count is ,07.

Figure 89 – Facebook Crosstabs Cluster Analysis (Shares of Brand posts and Likes of Brand posts)

Shares (Brand Post) * Ward Method

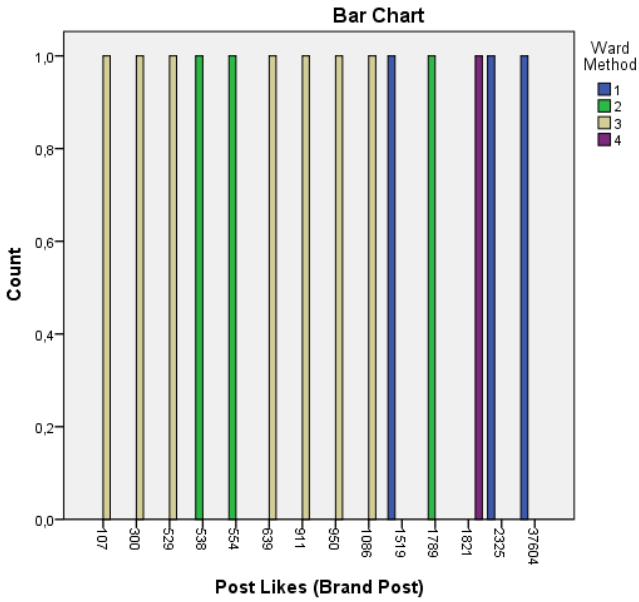


Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	42,000[a]	39	,342
Likelihood Ratio	33,468	39	,720
Linear-by-Linear Association	4,595	1	,032
N of Valid Cases	14		

a. 56 cells (100,0%) have expected count less than 5. The minimum expected count is ,07.

Post Likes (Brand Post) * Ward Method



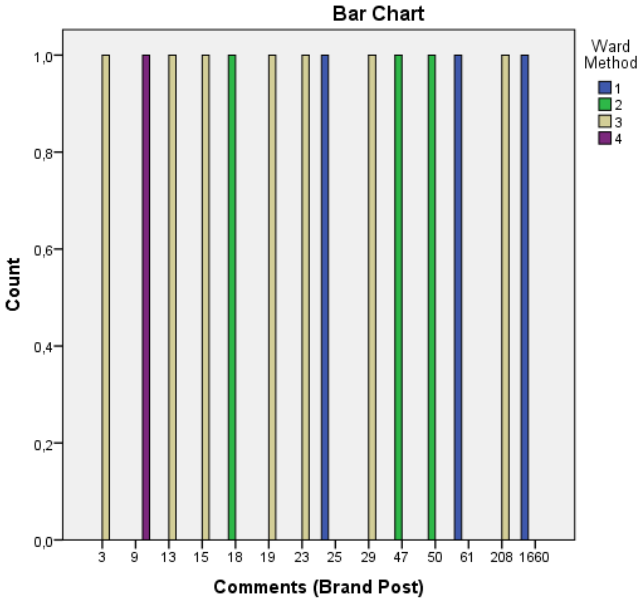
Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	42,000[a]	39	,342
Likelihood Ratio	33,468	39	,720
Linear-by-Linear Association	2,755	1	,097
N of Valid Cases	14		

a. 56 cells (100,0%) have expected count less than 5. The minimum expected count is ,07.

Figure 90 – Facebook Crosstabs Cluster Analysis (Comments of brand posts and User posts)

Comments (Brand Post) * Ward Method

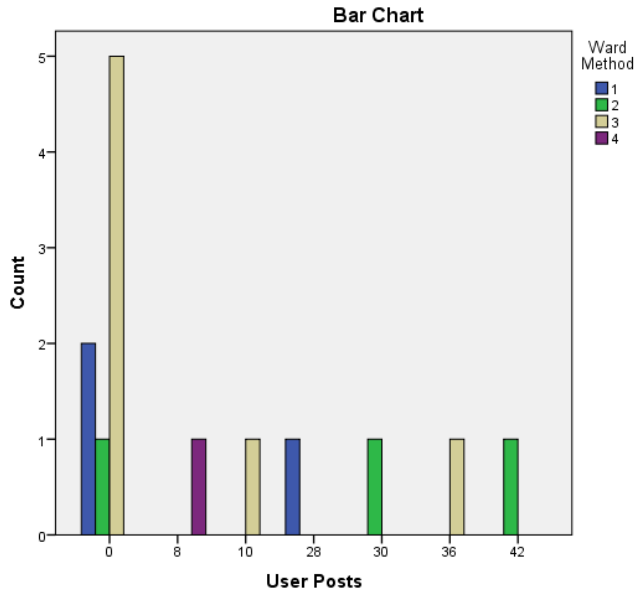


Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	42,000[a]	39	,342
Likelihood Ratio	33,468	39	,720
Linear-by-Linear Association	2,547	1	,110
N of Valid Cases	14		

a. 56 cells (100,0%) have expected count less than 5. The minimum expected count is ,07.

User Posts * Ward Method



Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	27,167[a]	18	,076
Likelihood Ratio	19,063	18	,388
Linear-by-Linear Association	,362	1	,547
N of Valid Cases	14		

a. 28 cells (100,0%) have expected count less than 5. The minimum expected count is ,07.

Annex IX – Twitter Crosstabs Cluster Analysis (multivariate)

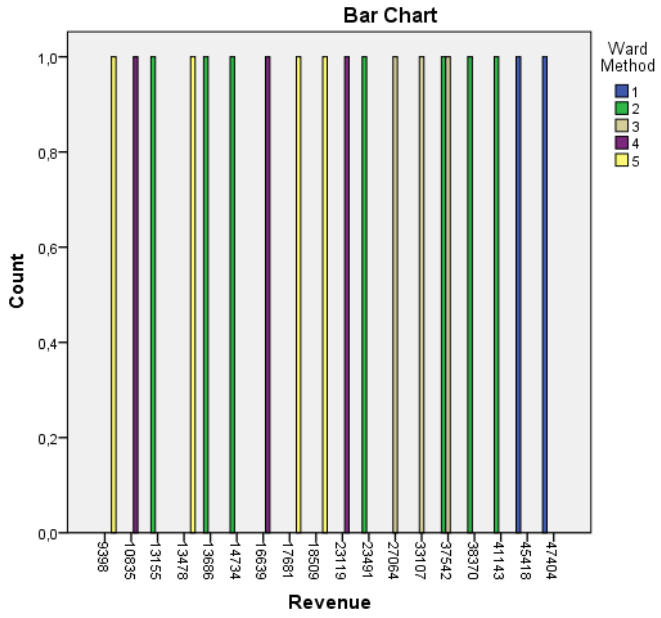
Figure 91 – Twitter Crosstabs Cluster Analysis (Case Processing Summary)

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Revenue * Ward Method	19	90,5%	2	9,5%	21	100,0%
Employees * Ward Method	19	90,5%	2	9,5%	21	100,0%
Tweets (Lifetime) * Ward Method	19	90,5%	2	9,5%	21	100,0%
Tweets * Ward Method	19	90,5%	2	9,5%	21	100,0%
Retweets * Ward Method	19	90,5%	2	9,5%	21	100,0%
Mentions across profiles (include replies) * Ward Method	19	90,5%	2	9,5%	21	100,0%
Customer Service Responses * Ward Method	19	90,5%	2	9,5%	21	100,0%

Figure 92 – Twitter Crosstabs Cluster Analysis (Revenue)

Revenue * Ward Method



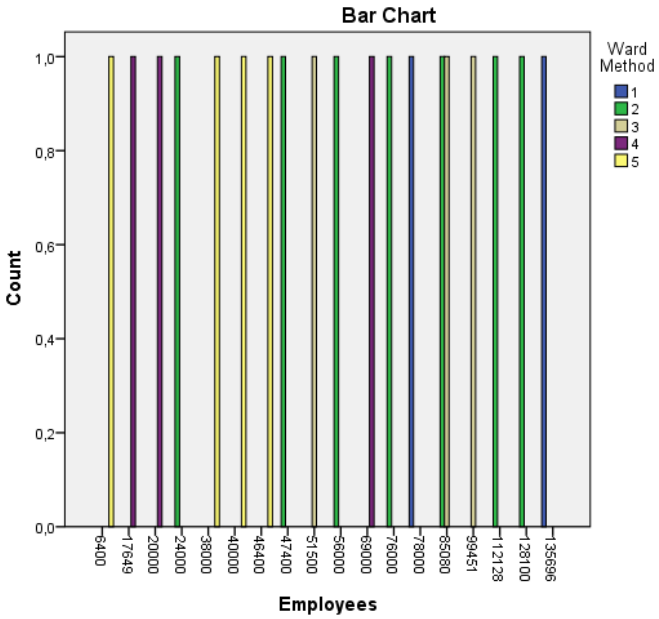
Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	71,476[a]	68	,363
Likelihood Ratio	54,827	68	,876
Linear-by-Linear Association	7,329	1	,007
N of Valid Cases	19		

a. 90 cells (100,0%) have expected count less than 5. The minimum expected count is ,11.

Figure 93 – Twitter Crosstabs Cluster Analysis (Employees and Tweets (Lifetime))

Employees * Ward Method

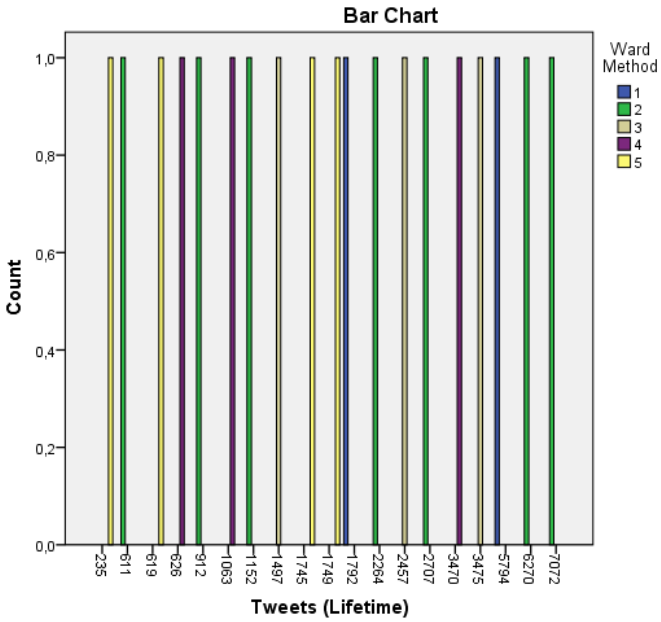


Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	71,476[a]	68	,363
Likelihood Ratio	54,827	68	,876
Linear-by-Linear Association	7,278	1	,007
N of Valid Cases	19		

a. 90 cells (100,0%) have expected count less than 5. The minimum expected count is ,11.

Tweets (Lifetime) * Ward Method



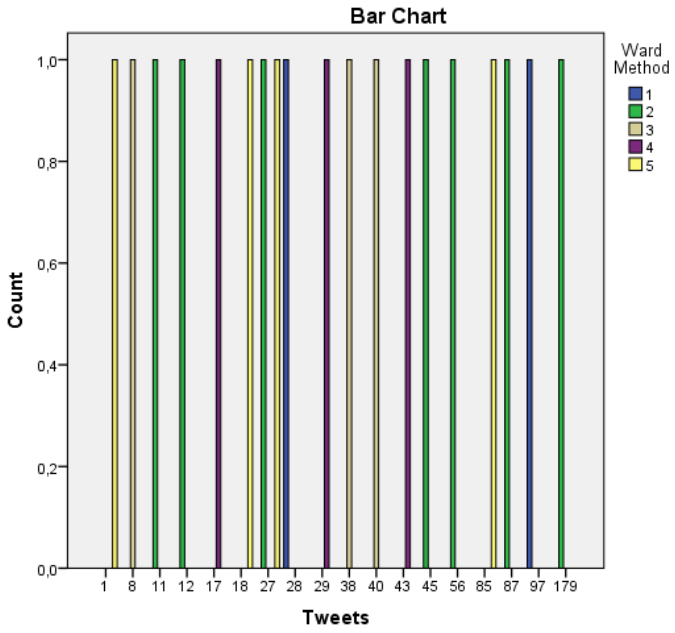
Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	76,000[a]	72	,351
Likelihood Ratio	57,600	72	,891
Linear-by-Linear Association	3,631	1	,057
N of Valid Cases	19		

a. 95 cells (100,0%) have expected count less than 5. The minimum expected count is ,11.

Figure 94 – Twitter Crosstabs Cluster Analysis (Tweets (Periods) and Retweets)

Tweets * Ward Method

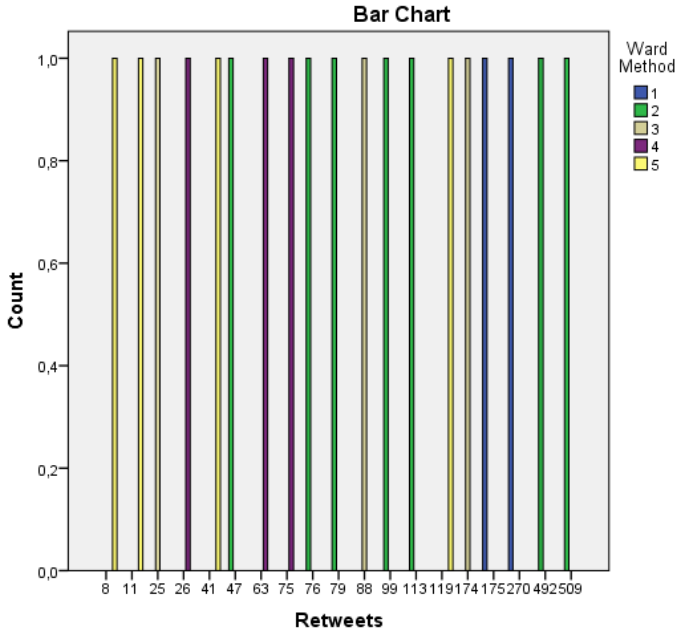


Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	72,268[a]	68	,339
Likelihood Ratio	54,827	68	,876
Linear-by-Linear Association	1,628	1	,202
N of Valid Cases	19		

a. 90 cells (100,0%) have expected count less than 5. The minimum expected count is ,11.

Retweets * Ward Method



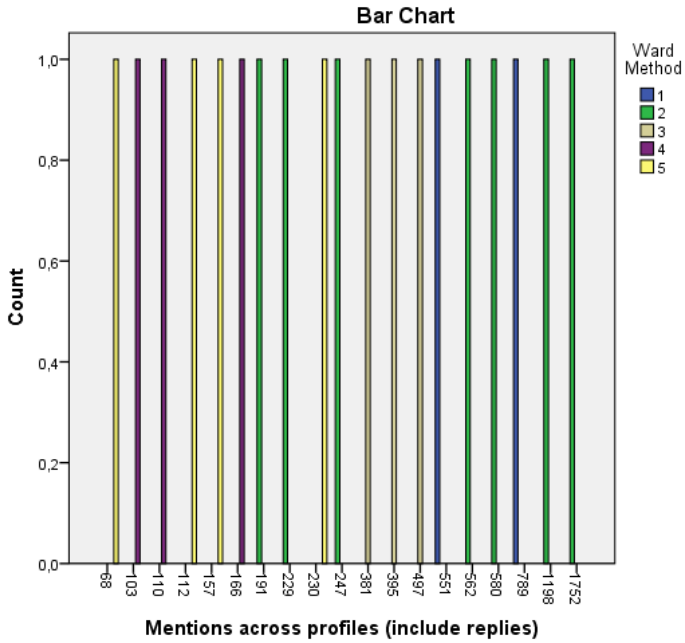
Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	76,000[a]	72	,351
Likelihood Ratio	57,600	72	,891
Linear-by-Linear Association	4,428	1	,035
N of Valid Cases	19		

a. 95 cells (100,0%) have expected count less than 5. The minimum expected count is ,11.

Figure 95 – Twitter Crosstabs Cluster Analysis (Mentions with replies and Customer Service Responses)

Mentions across profiles (include replies) * Ward Method

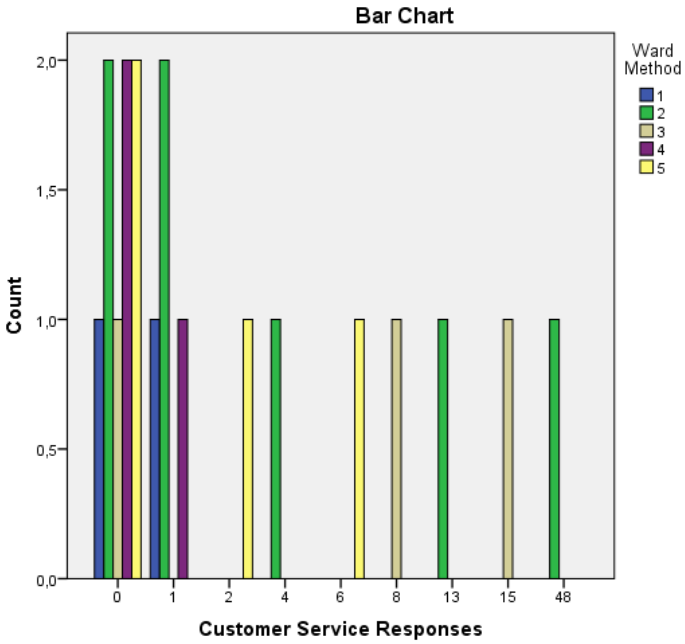


Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	76,000[a]	72	,351
Likelihood Ratio	57,600	72	,891
Linear-by-Linear Association	5,660	1	,017
N of Valid Cases	19		

a. 95 cells (100,0%) have expected count less than 5. The minimum expected count is ,11.

Customer Service Responses * Ward Method



Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	26,860[a]	32	,724
Likelihood Ratio	24,329	32	,832
Linear-by-Linear Association	,624	1	,430
N of Valid Cases	19		

a. 45 cells (100,0%) have expected count less than 5. The minimum expected count is ,11.

Annex X – YouTube Crosstabs Cluster Analysis (multivariate)

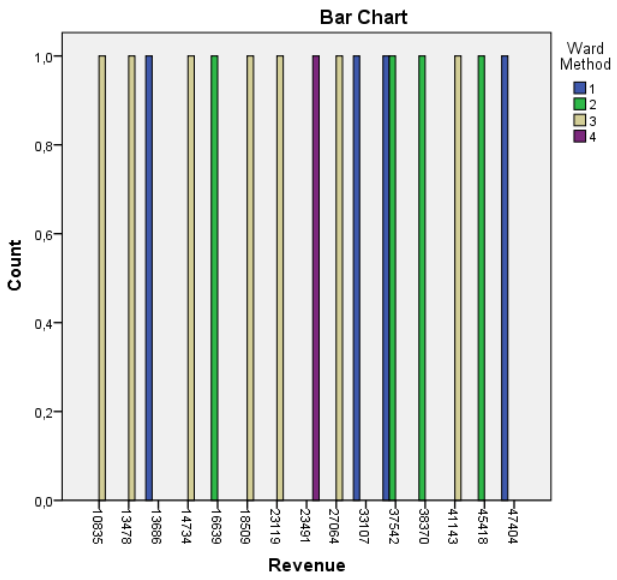
Figure 96 – YouTube Crosstabs Cluster Analysis (Case Processing Summary)

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Revenue * Ward Method	16	76,2%	5	23,8%	21	100,0%
Employees * Ward Method	16	76,2%	5	23,8%	21	100,0%
Total Views * Ward Method	16	76,2%	5	23,8%	21	100,0%
Videos * Ward Method	16	76,2%	5	23,8%	21	100,0%
Total Views / Videos * Ward Method	16	76,2%	5	23,8%	21	100,0%

Figure 97 – YouTube Crosstabs Cluster Analysis (Case Processing Summary)

Revenue * Ward Method



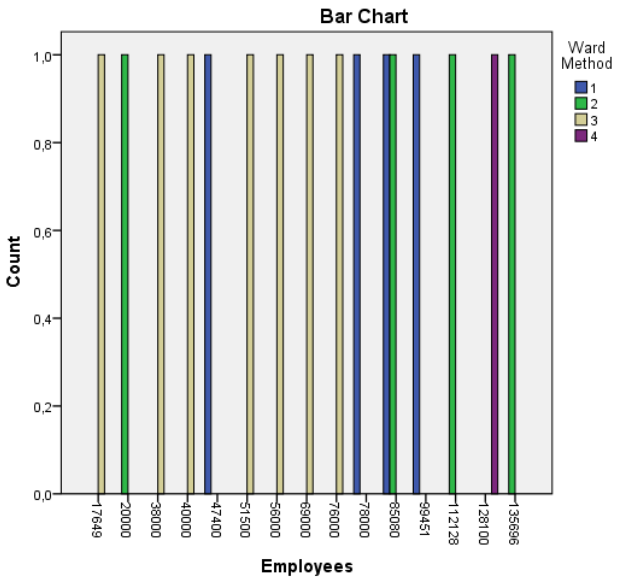
Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	44,000[a]	42	,387
Likelihood Ratio	36,527	42	,709
Linear-by-Linear Association	2,640	1	,104
N of Valid Cases	16		

a. 60 cells (100,0%) have expected count less than 5. The minimum expected count is ,06.

Figure 98 – YouTube Crosstabs Cluster Analysis (Employees and Total Views)

Employees * Ward Method

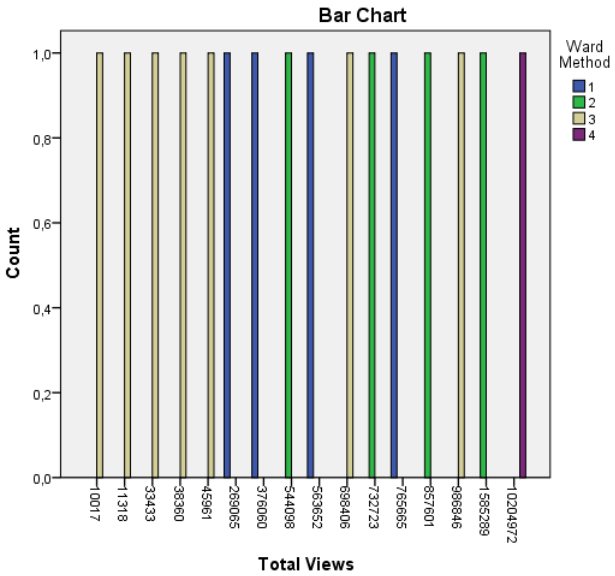


Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	44,000[a]	42	,387
Likelihood Ratio	36,527	42	,709
Linear-by-Linear Association	,222	1	,638
N of Valid Cases	16		

a. 60 cells (100,0%) have expected count less than 5. The minimum expected count is ,06.

Total Views * Ward Method



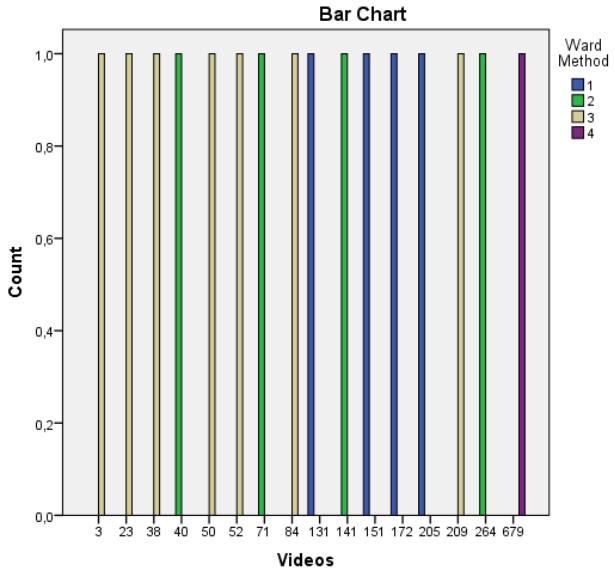
Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	48,000[a]	45	,352
Likelihood Ratio	39,299	45	,711
Linear-by-Linear Association	2,653	1	,103
N of Valid Cases	16		

a. 64 cells (100,0%) have expected count less than 5. The minimum expected count is ,06.

Figure 99 – YouTube Crosstabs Cluster Analysis (Videos and Views per Video)

Videos * Ward Method

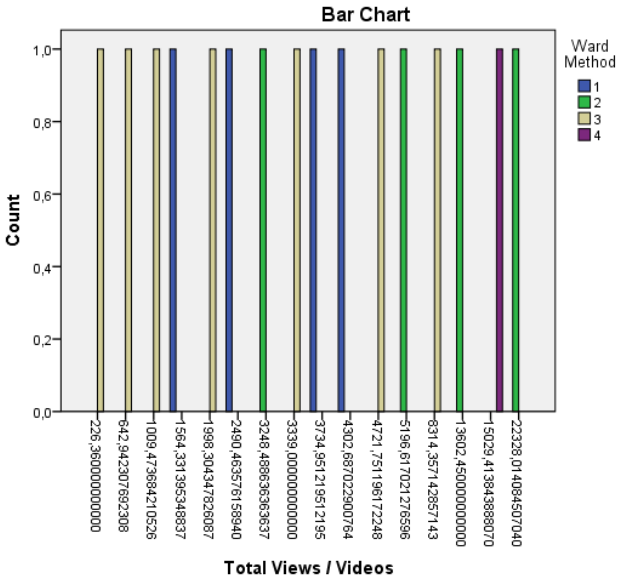


Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	48,000[a]	45	,352
Likelihood Ratio	39,299	45	,711
Linear-by-Linear Association	,539	1	,463
N of Valid Cases	16		

a. 64 cells (100,0%) have expected count less than 5. The minimum expected count is ,06.

Total Views / Videos * Ward Method



Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	48,000[a]	45	,352
Likelihood Ratio	39,299	45	,711
Linear-by-Linear Association	,178	1	,673
N of Valid Cases	16		

a. 64 cells (100,0%) have expected count less than 5. The minimum expected count is ,06.