Airlines: The use of social media as a tool for customer engagement

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TABLE OF CONTENT

FIGURES

GRAPHS

TABLES

ABSTRACT

In the last years, there has been an exponential growth in technologies that facilitated the exchange of information; generating a more connected world and changing the way people make business; shortening travel times and the concept of distances between countries.

Various authors have highlighted the importance of social media use in companies to understand customers and extract meaningful information for product and service innovation. The mobile penetration has increased thanks to the new technologies that allow the creation of affordable and easy to use devices. This has changed the way people interact in social media platforms.

The development of this final project aims at analysing how airlines use social media in their customer engagement strategy. The purpose is to identify the most popular social networks and the specific content published by airlines. Analysing the content posted in the different platforms, we will create and use existing (validated in academic papers) general and airline specific KPI's to measure costumer engagement. It is important to mention that the indicators are based on data retrieved from public information available in the official social platforms.

Our results based on academic papers, interviews of experts, case studies and information retrieved from social platforms show that an adequate social media management could increase the quantity and quality of customer interactions.

SOMMARIO

Nelle ultimi anni, si è verificata una crescita esponenziale nella tecnologia che ha facilitato lo scambio di informazioni; generando un mondo più connesso e cambiando il modo in cui le persone fanno affari; accorciando le distanze di viaggio e il concetto di distanza fra paesi.

Diversi autori hanno evidenziato l'importanza di utilizzare i social media nelle aziende per comprendere i clienti ed estrarre informazioni significative per prodotti e servizi innovativi. La penetrazione del mobile è aumentata grazie alle nuove tecnologie che permettono di accedere ai dispositivi economici e facile da utilizzare, questo ha cambiato il modo in cui le persone interagiscono nelle piattaforme di social media.

Lo sviluppo di questo progetto finale ha l'obiettivo di analizzare come le compagnie aeree utilizzano i social media nelle loro strategie di customer engagement. Lo scopo è quello di individuare i più popolari social network e il contenuto specifico pubblicato dalle compagnie aeree. Si utilizza questo contenuto per misurare il customer engagement utilizzando indicatori generali e specifici sviluppati per gli autori ed esistenti (validati in altri studi academici). È importante ricordare che questi indicatori si basano su dati recuperati da achivi ed informazione pubbliche disponibili nelle piattaforme di sociali ufficiali.

I risultati sulla base di pubblicazioni academiche, interviste di esperti, casi di studi, e le informazioni recuperate dai social media mostrano che un'adeguata gestione dei social media potrebbe aumentare la quantità e qualità delle interazioni con i clienti.

1. INTRODUCTION

In previous years smartphone penetration and other mobile devices has increased thanks to new technologies that enabled companies to build easy to use and affordable devices. This has changed the way people interact, every day more connected, proactive and demanding on social platforms. The use of the social media channels has also expanded from sharing grateful moments to posting claims, demands and directly interacting with companies.

These deviations create new opportunities and threats to enterprises. As an opportunity, emerges the possibility to obtain large amount of data about customer behaviours; which could be used to generate improvements in products and services. Additionally, companies can use crowdsourcing or gamification to interact with users and create value by attaining different solutions to problems, increasing word of mouth and brand loyalty. Last but not least, they result in great tools for advertisements, promotions and managing customers relationships as social media allows companies to access and interact with large number of users and possible buyers.

On the other hand, the negative news and experiences can get viral, damaging the company's reputation and image. In addition, response time is very important as users can express their discontent at any time, making it crucial for companies to constantly monitor social channels. Directly engaging selected comments and enquiries can assist with alleviating possible situations (Simpliflying, 2015).

According to a study (NIIT Technologies), the aeronautic industry is the second industry most dedicated and committed to social media. As it is highly affected by social media channels it's interesting to analyse which are the main practices adopted by the principal airlines and how they engage with customers to build and maintain long-term relationships.

Airlines have been going through a turbulent phase, as competition in the sector and high exit barrier costs have led to a vicious circle of loses. Their profitability strongly related on their ability to perform a strong marketing strategy and create strong brand loyalty. The key of this strategy is to reach out and tap all segments of active customers and attract prospective customers (NIIT Technologies). Their solutions must be innovative and their practices could be extrapolated to other industries, which are not actively using social media in their marketing strategy to interact with their customers.

There are numerous articles and studies, which show that customer engagement strategies in airlines are improving and that in the last years they have been strongly investing on social media and online marketing. For 2015, 63% of airlines executives say that social media budget is likely to increase, 40% pretend to see an 25% increase and 19% pretend to see a 40% increase. (Airline Social media outlook

2015, Simplifying). According to an article by Bain & Company the average company spends U$S 750.000 a year but other earlier adopters spend significantly more, reaching tens of millions of dollars.

Additionally, the main objectives of the airline companies are to create customer engagement, brand loyalty, customer service and profitability. To reach these objectives, most airline companies assure they must increase their resources allocated to social media channels. The main problem appears as there is no best practice; which integrates all channels in a consistent way, generates internal value and at the same time provides a consistent and integrated experience to customers. “Social media leaders understand and appreciate the magnitude of the shift in customer empowerment and the opportunities and risks that these tools create. As a result, they approach their social media efforts differently.” (Bain&Company 2011)

On the other hand, the smartphone industry reaches 1750 million users, with the forecast that this number keeps growing, reaching 4500 million users by 2017 (emarketer, 2014). Its remarkable how the Internet access increases through the use of tablets and smartphones. Almost one third of consumers have Internet access through their cell phones, these users want comfort and mobility. Also we know that the social media platforms are changing the way that people interact, for this reason a successful social media strategy is one of the priorities for companies that operate globally.

Finally, if we specifically analyse the airline passengers, they are part of the most innovative and technologically friendly sector of society. Faithful to the tendencies described above, demanding better services and low answer times.

With this research we plan to provide an overall view about the use of social media platforms in Western airlines so as to determine actual strategies and set best practices according to customer engagement. The level of customer engagement will be measured using general and specific KPI’s that have been validated in academic papers. Public information from the most popular social platforms will be the input for the metrics followed by a qualitative analysis. In addition, this research tries to identify which factors promote the level of customer engagement. For this purpose, we gathered information from one hundred airline companies according to a rank based on the number of passengers carried by (Airline-inform, 2014) in order to determine the most popular social platforms used by these companies. A second more detailed analysis of the top twenty-five western airlines was carried out analysing only the platforms with the highest presence

From this research one can observe the flexibility and the utility that social media has as a communication tool to generate direct contact with the client and also observe the potentiality of the API that most social media have. These can be of great use for future studies not just for a company, but also to evaluate the use and impact that the competition is having using its social platforms. We expect that our results will

motivate and guide social media managers to create clear strategies to increase customer engagement and fans numbers. Facilitating decisions such as what content category, type of media and time to post. Our results show (1) that the level of customer engagement can be increased if the previous variables are selected adequately, (2) The level of customer engagement can be measured according to their actions in social media, for example: likes, shares and comments. (3) Photo and video posts are preferred to link or status posts to increment the amount of likes and shares.

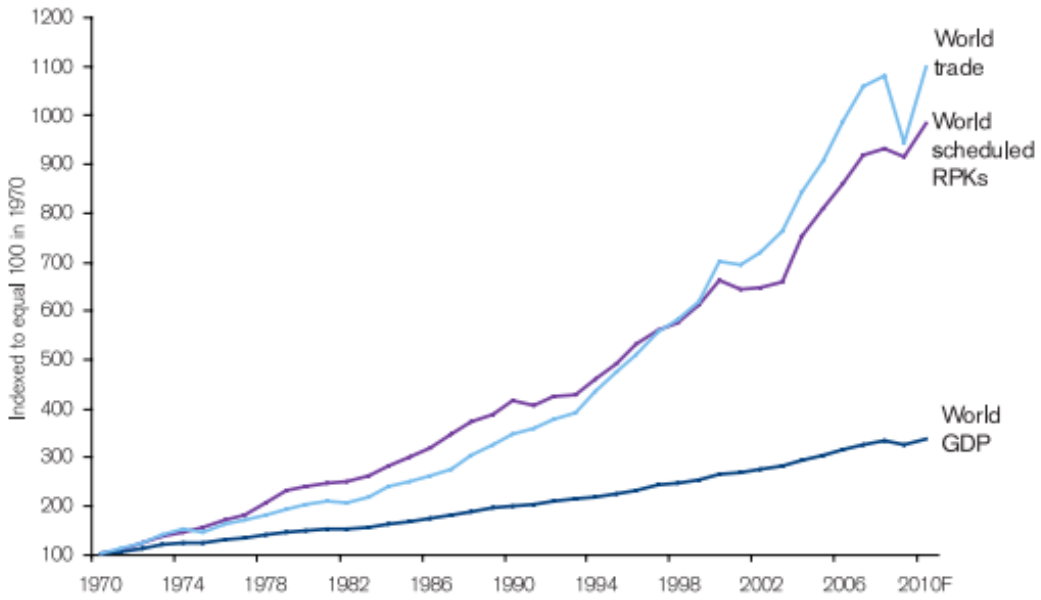
2. AIRLINES

2.1 CONTEXT

Now a days, there are more than 36.000 air routes that connect the world, 3.1 billion passengers where carried by the world airlines in 2013 and more than 50 million tons are carried by air transport annually (ATAG, 2014) on nearly 100,000 flights per day, while the real price of air travel fell by 7.4% (IATA, 2013).

Airlines have a large impact on the global economy; over 58 million people are employed worldwide in aviation and related tourism. Of which 8.7 million people work directly in the aviation industry (ATAG, 2014). If aviation were a country, it would rank 21st in the world in terms of gross domestic product (GDP), generating $606 billion of GDP per year.

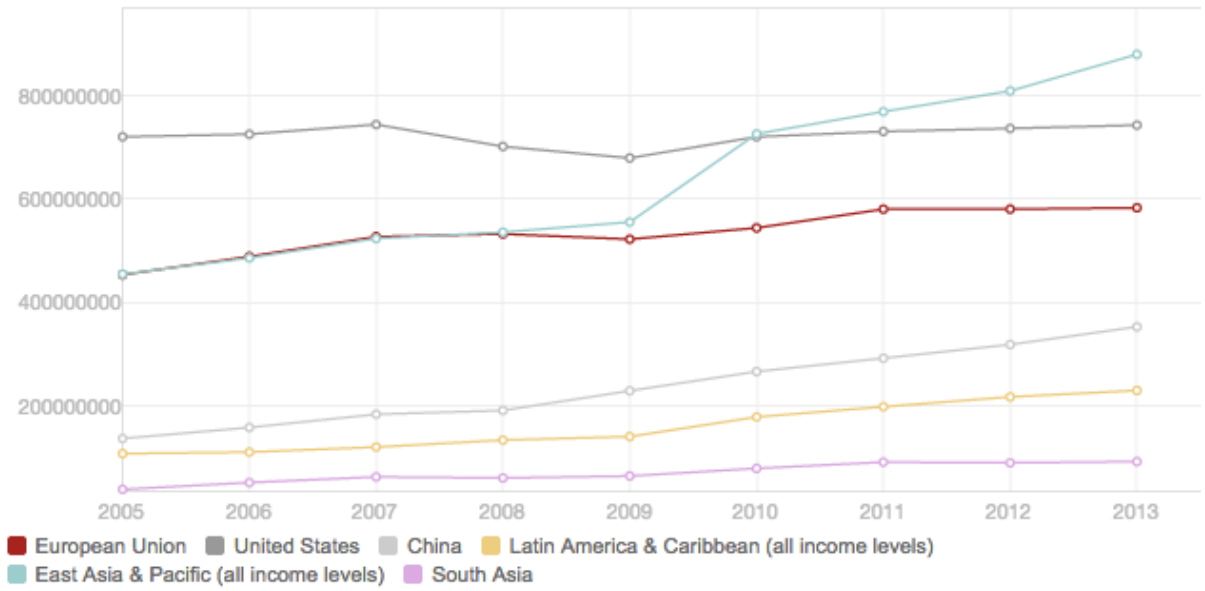
Air transport plays a primary role in promoting commerce with distant markets, investments in remote locations, boosting tourism, transports goods and people. In this way it creates value and increases the quality of living of millions of people. The following graph 1 shows examples of these changes.



Graph 1: Air travel expansión in the last 40 years. Source: ICAO, IATA,

In addition, the total air traffic forecast of the next 20 years, sets an increase of 4,1% average annual growth. More than doubling the passengers expected to travel in this year and reaching a massive 7,4 billion by 2034. We can also expect aviation to be supporting around 105 million jobs and $6 trillion in GDP. (IATA forecast 20 years, 2014)

This sector is a critical player in the economy, moreover, taking into account that the movement of people and goods around the globe has been constantly increasing. In the following graphs we can observe the increase in number of passengers per year. (Worldbank, 2015)



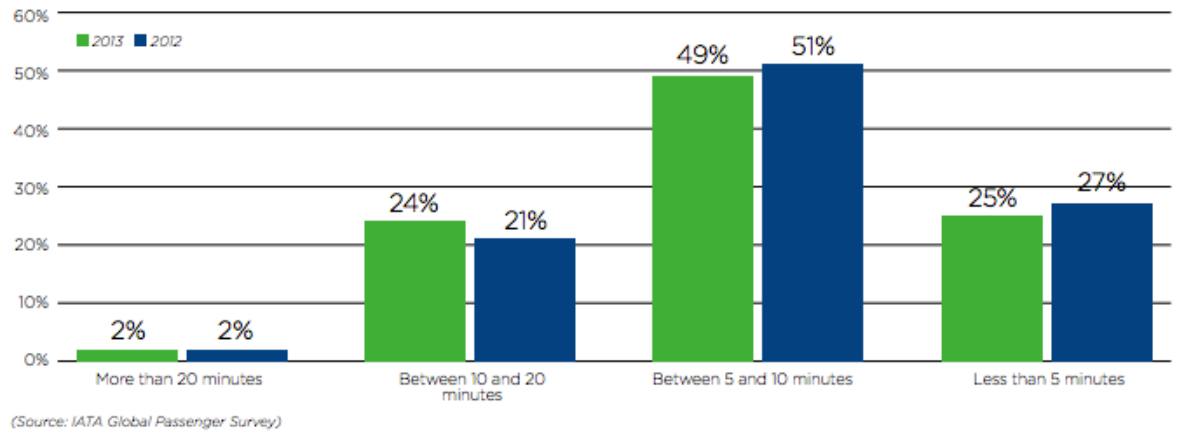
Graph 2: Passengers transported in domestic and international flights in the different geographical areas. Source: WorldBank

Therefore airlines have benefited from new customers, new connections and higher passenger frequency.

At the start, commercial aviation was property of the state and therefore they were highly regulated. In many cases, the state decided how many seats they could sell and at what price, resulting in many inefficiencies and losses. “Deregularization has opened markets first in the US (1970s), later in Europe (1980s), and then to some degree also in other regions.” (IATA, vision 2050). Companies began to have mixed capital from both state and private sectors and even completely private capital leading to a greater competition. This competition devastated many companies that operated inefficiently. Afterwards, “Costs have fallen significantly, driven by better technology and more sophisticated operational management.” (IATA, vision 2050). Despite this airlines still struggle with low margins and stakeholder’s high cost of capital.

In parallel to these problems airlines had to deal with the installed monopolies in airports, the controlled air space and practically only two aircraft manufacturers, Airbus and Boeing. Additionally, nowadays they are very much affected by external events as the variation in the price of petroleum, increasing regulations due to anti-environment contamination policies and even excessive controls against terrorism.

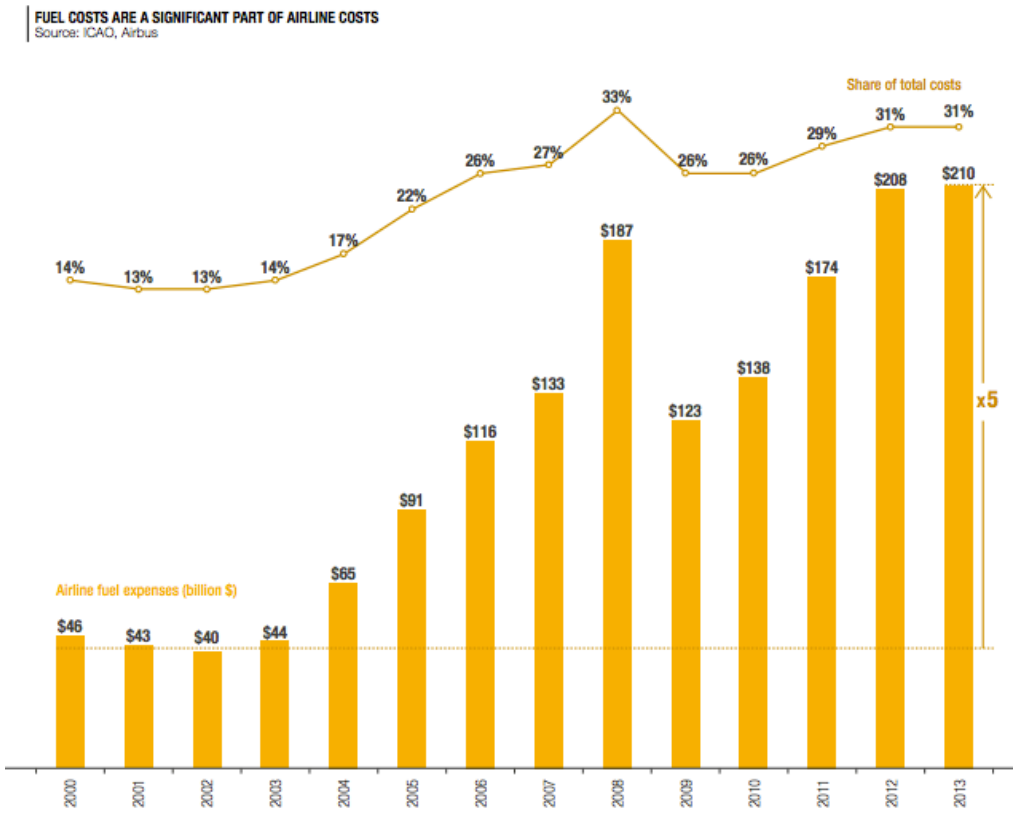
Another impact that airlines are facing is the change of customer behaviour. Initially a flight was a very important event, however nowadays it is more common and frequent. “In the course of merely ten years, low-cost airlines have transformed planes into a casual and common means of transportation, such as the car and the train.” (Nils Kernchen, 2004). Giving rise to frequent flyers, that are consumers familiarized with procedures and time schedules becoming pickier and demanding. Surveys have been launched to study what people think when facing a flight; 51% agreed that the worst part about flying were security checks and that they were willing to wait 5 to 10 minutes in queue of security lines before becoming impatient. (IATA Global passenger survey)



Graph 3: Acceptable waiting time in the security control point (Green 2013, blue 2012), Source: IATA

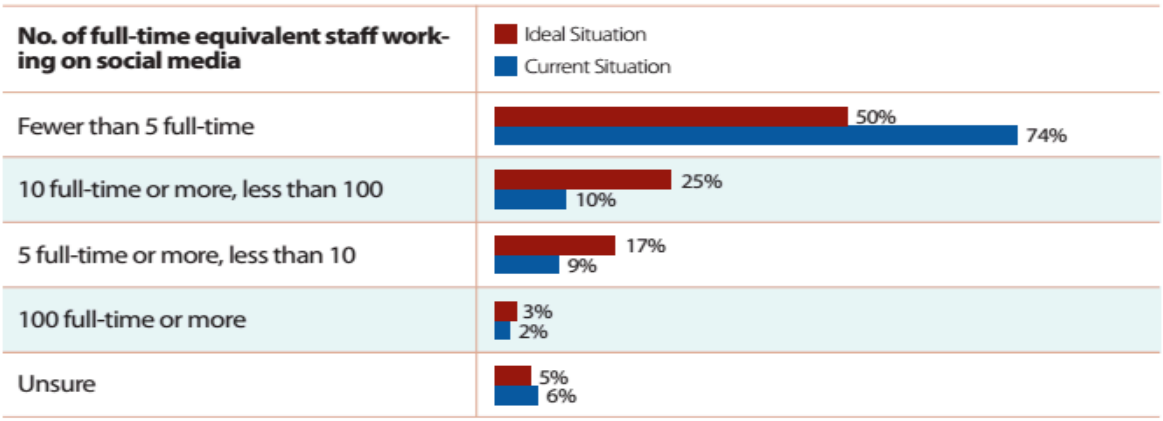
Keeping in mind this panorama of high costs and low margins it becomes very difficult to fulfil demands and captivate customer loyalty. Particularly when aspects that annoy passengers are out of airlines influence and reach.

This is the context in which airlines are progressively searching for improvements and means to be efficient and distinct. Many airlines for example, use financial options to fight variations in fuel prices given that these can result in the most outstanding cost (up to 30% of the total cost) (Airbus, 2014). They also opt for alliances or directly mergers to achieve better results by purchasing in bulk quantities.



Graph 4: Influence of the fuel in the total costs, in percentage. Source: ICAO, Airbus

Airlines apply various methods to optimize costs and increase profitability. Some of the approaches include cutting non-core operations, outsourcing activities like maintenance and ground handling, using yield management, adding new revenue sources, introducing loyalty programs and establishing alliances with global reach. (IATA, Vision 2050). One of the approaches to mitigate these problems is to look for innovative alternatives that include new technologies. Particularly those related with Internet and social media to capture mayor audiences and provide better information flow to and from companies. Many of these practices have begun with little expectations, however in the last years there have been significant cases and impacts on businesses and therefore they are becoming must have tool (figure 1).



*Figures may not add up to 100%, because of rounding.

Figure 1: Survey n=148 airline executives (Simpliflying Outlook 2015)

This research concentrates in the use of social media to understand customer engagement. Nevertheless, it is important to keep in mind that many factors are involved in the way value is created and distributed. This is illustrated in a Porters Five Forces framework created by IATA that identifies the underlying drivers of the industries profitability. (See Annex)

To better set the framework it is important to mention that the strategies of airlines vary and so do their business models. Today, there are two main business models adopted, the network carriers and the low cost carriers. The network carriers include the main and mayor airlines of the world and the low cost carriers the typical cost-saving airlines achieving inexpensive fares. The following table better highlights their differences. (Market Outlook 2014-2015, Boeing)

Category	Network Carriers	Low cost Carriers
Airports used	Main Airports	Secondary Airports
Fleets	Numerous	Single type airplanes
Alliances	Pursue	Avoided
Luggage	Always included	Charged separately
Advertisement	Not during flight	During flight
Products offered	Broad	Single

Table 1: Network vs Low Cost carriers

Another important aspect in which these business models differ is in their ideals. “The problem for traditional airlines is today that they still create services first, and sell these services through advertising without knowing if there is a need […] The key point is that low-cost airlines exanimate through market research what the customers really need. If, and only if, the research shows that there are potential customers for a service (e.g. flight route between two cities) or product, it is planned and produced. (Kils Kernchen 2004) This approach requires access to information and direct contact with customers; a mean that gathers these requirements is social media.

2.2 CUSTOMER CHANNELS

Traditionally the travel agencies were the dominant channel for airlines, they were paid by commissions, which supported prices. This channel has become less dominant as a whole and changed their role. Websites have taken most of its volumes for individual customers travelling for leisure and business. Travel agencies still remain important for corporate customers but their strategy is to lower costs.

Aggregator websites have become the dominant sales channels for lower price tickets. As they allow easy comparison of prices between airlines and increased price transparency. Some offer also package flight itineraries and lowest price guaranty. Global distribution systems (GDS) aggregate seat price and availability data from airlines and provide it to travel agencies and aggregator websites. The market is dominated by three main GDSs: Amadeus, Sabre, and Travelport. Some of

them have their own aggregator websites where they sell airline tickets directly to end customers. (IATA, vision 2050)

Airline websites: These websites intend to bypass GDS, being more attractive because of the lower ticket costs due to fewer handling steps. They also offer check-in information, seat assignment, boarding pass generation and handling frequent flyer miles, as different customer services1.

The newest direction for ticket purchase is the use of social media platforms. For now just a few have the option “Book Now” on their Facebook page but they redirect you directly to the airline’s booking website. Plans to add Facebook applications to buy on site are on course. However, social media plays a more important role today in offering users access to information that is user based. Potential clients before buying can now share experiences with hundreds of other passengers to then judge and select their carrier (Bain & Company, 2011). This is why airlines that enter social media destine many resources to control their platforms and the spread of bad reviews.

3. SOCIAL MEDIA

The purpose of this section is to review the standing academic work in the ground of social media; we will provide general definitions of the different key concepts, explain and analyse the functionalities of the existing platforms. Subsequently we will focus on the most popular media platforms Facebook and Twitter.

3.1 CONTEXT

"We talk about the quality of product and services; what about the quality of our relationships, and the quality of our communications, and the quality of our promises to each other?" (Measure What Matters, Katie Delahaye Paine, 2011). This is a question that's implicit between social interaction and businesses. Since the very beginning many have been interested in measuring the relationships of businesses with customers and society, being a key aspect for business growth and performance (Measure What Matters, Katie Delahaye Paine, 2011).

In the last years the world of public relationships has changed given that social media channels have integrated into our lives. Social media can be defined as "a group of Internet based applications that build on the ideological and technological foundations of Web 2.0 and allow the creation and exchange of user generated content" (Kaplan and Haenlein 2010, pp. 61). In other words the Web 2.0 does not mean a significant development in technology but a change in the usage patterns. For example, consumers have passed from being passive clients, to become active participants that share information, personal experiences and opinions with pairs on the social media platforms (Berthon et al. 2007, pp. 39-48). In addition an analysis done by Murugesan 2007, the Web 2.0 can be sensed as the technological platform for social media, facilitating: Web design, Responsive user interfaces and establishment of social networks of people.

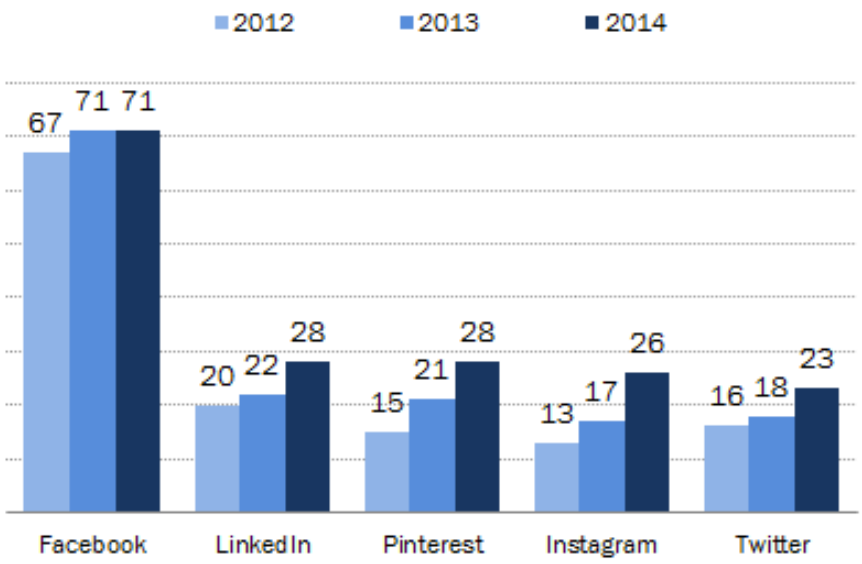
In addition, social media can be defined as "web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system." (Boyd and Ellison 2008, pp. 210)

Companies and users can foster their relationships by interacting in the social platforms; millions of people use these to share information, doubts, blame companies for bad services and expect an answer in a few minutes. (Bain & Company, 2011)

The first significant expansion of Social networks started in 2003 with LinkedIn, MySpace, and Flickr; many of which are still active now a days (Richter et al. 2011, pp. 89-103). But most certainly, the major expansion of social media started in the early 2004 when Facebook was launched. It success is mainly attributed to the fact that it uses a different approach from previous social networks, preventing the public

access to the user profile. Now a days, Facebook is the by far the largest social network with 1.3 billion active users.

As described, social networks are becoming a mainstream part of our lives, as people form different ages and background interrelate in the social media platforms. This has created an exponential growth in the number of interactions and social media usage. The following graph shows the percentage of Internet users that belong to the most popular social networks.

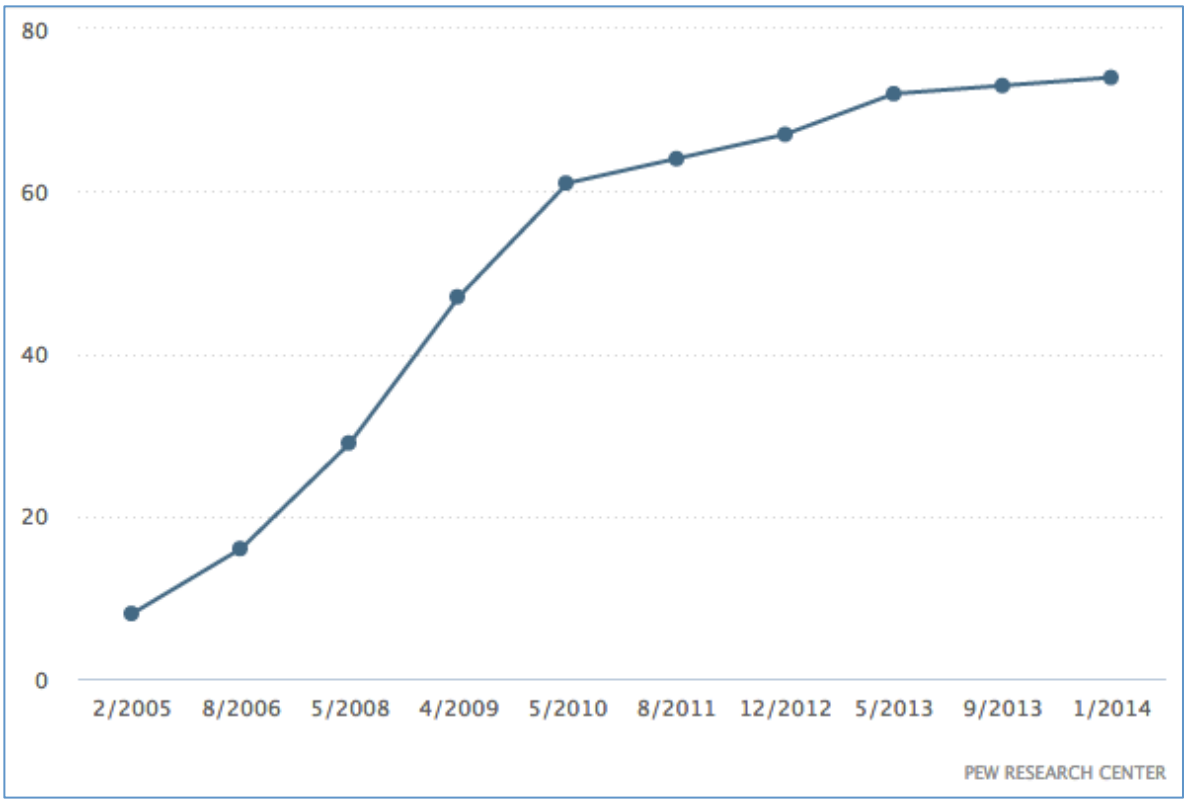


Graph 5:Social media sites 2012-2014, % of adults that use the different platforms. Source: Pew research centre.

Facebook has the largest percentage of users 71% and remained constant in its growth rate in the last year while the other social media platforms are growing at high rates.

On the graph 6, we can observe the adoption curve of social media in the last years considering the total Internet users community. Furthermore, the tendency and magnitude of growth of this graph is outstanding and gives us an idea of the development of the social platforms. Additional graphs and tables extracted from the PEW research Center (Annex) show the mobile device usage tendencies of the past years and percentage of social media usage among all adults US adults (not only the percentage which use internet).

Social media adoption considering the Internet users community



Graph 6: Percentage of Internet users that use of at least one social media platform. Source: PEW research centre

The following figure 2 shows the frequency of social media usage according to the survey carried out by Pew research center. Due to the increase in usage of mobile devices, more people have constant Internet access and make heavy use of the social networks.

Frequency of social media use (Pew research center)

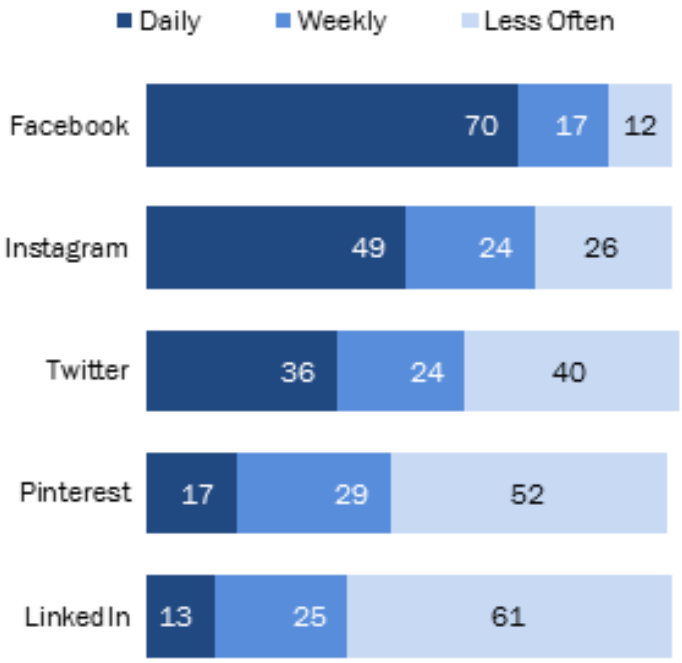


Figure 2: Social media use rate. Source: PEW research centre

The traditional means and the marketing sectors have been shifting their funds from traditional advertising towards social media channels in an exponential order. In this shift, companies have lost the control sensation they had upon their stockholders and the general public. (Measure What Matters, Katie Delahaye Paine, 2011). A research made by Gallup in 2014 about the American market shows that U.S. companies spent $5.1 billion on social media advertising in 2013, as they believe this will lever with a return on investment. However, a solid majority of American adults surveyed said that social media had no influence at all in their buying behavior.

On the other hand, customers who are fans of the company in social media platforms tend to be more loyal and therefore are more open in receiving company's information about the brand (Bagozzi and Dholakia 2006). Furthermore, some cases have been reported of an effective carefully managed advertising campaign in Facebook, which increased the consumer's frequency in the stores of the Houston Bakery chain (Dholakia and Durham, 2010). Another study showed that effectiveness in company's WOM communications could increase sales (Godes and Mayzlin, 2009).

Furthermore, according to results of a study of social media use and corporate reputation, that analyses a survey amongst customer and non-customers of an international airline, "The customer's intensity of social media use is positively related to their engagement in the airline's social media activities." Consequently this has a positive correlation with corporate reputation (Dijkmans et al, 2015). This argues that company's online activities in the social platforms are beneficial for corporate reputation.

Additionally, firms tend to integrate their digital tools to obtain a global view and avoid uncoordinated efforts throughout the different customer touch points (Bain & Company, 2011). This is achieved by gathering information from social media channels and using it as input of predefined metrics to evaluate if the company's performance is aligned with its objectives. But this can be misleading as companies may continue to treat social media as a one-way channel, focusing on how to push these platforms with their marketing agenda.

One could argue that consumers have always talked about their thoughts and desires. Social channel just make it easier to debate in a more public and widespread scale. The State of the American Consumer Report made by Gallup states that "consumers are more likely to engage with companies through social media if they believe their intentions are genuine." Consequently, to be part of the conversation, company's social media initiatives must be authentic, responsive and compelling. (Gallup, 2014)

There are numerous studies that highlight the positive effect of successful social media campaigns in customer engagement and financial benefits. On the other hand, according to our research of academic references there is just one method for

an effective evaluation of social media brand presence (Cvijikj 2012). This is partially because there are no clear goals and objectives, which define the measures and methods to be used, as well as a concrete definition of “success” (Dubach Spiegler 2011). Also, due to the relatively limited knowledge about the new communication medium rules and that marketers try to transfer the old rules of traditional advertising to social media marketing (Hoffman and Fodor, 2010).

There has been additional empirical research to investigate what factors enhance brand post popularity, results show that brand posts with vivid and interactive characteristics enhance the number of likes and that interactive brand posts enhance the number of comments (De Vries et al, 2012).

There is still a lot of controversy about the online customer engagement strategies used by companies and the potential of social media; a large majority is interested in this subject as the investments in social media are forecasted to increase to $15 billion by 2018 in the US (BIA/Kelsey). Companies will have to experiment to figure out what works best to create long lasting relationships with theirs customers, but there is potential in social media and companies can now build communities with their customers in ways that did not exist in the past.

In this context of discussion and uncertainty, is where our research adds to the debate by understanding how do airlines use social media in their customer engagement strategy.

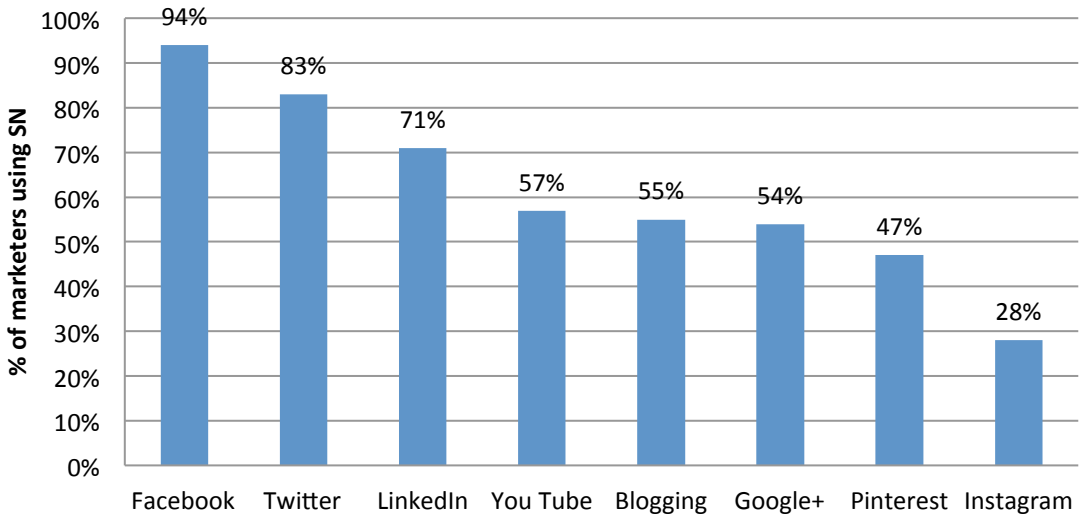
Facebook

Facebook is the most popular social network in the world, consisting of 1.3 billion active users (March 2015).

This platform started as an exclusive media for Harvard students in 2004; later in 2006 it launched a new interface that could be accessed with any email account. From a beginning, Facebook has grown exponentially and broadened its functions. The company has developed technologies that facilitate the exchange of information through different web and mobile platforms, from which users connect and share their experiences in a secure environment.

Facebook states that their mission is: "to give people the power to share and make the world more open and connected. People use Facebook to stay connected with friends and family, to discover what's going on in the world, and to share and express what matters to them." (Facebook, 2015)

According to a study made by Social examiner about the marketing industry in 2014, Facebook is the most used social network. The following graph 7 shows the percentage of marketers, which use the different social platforms in their campaigns. In addition, 54% of marketers chose Facebook as their most important platform. (Stelzner 2014)



Graph 7:Social media industry report 2014, Michael A. Stelzner

To further explain the main concepts and the use of the platform for marketing purposes we will describe the basic terminology as retrieved form the official Facebook page (Facebook glossary).

- **Profile** is the collection of the photos, stories and experiences that tell your story. Your profile also includes your personal information such as name, birthday, school you have studied, etc.
- **Like** is a way to give positive feedback and connect with things you care about. By clicking Like below a post you are letting people know that you enjoy it, as it remains visible, without leaving an actual comment. Another possibility is to like a page, this means you are connecting to the page, and you will start to see stories from the page in your News feed. These pages will also appear in your profile and you will appear on the page as the person who likes the page.
- **News feed** is the constantly updating list of stories in the middle of your home page. News Feed includes status updates, photos, videos, links, app activity and likes from people, Pages and groups that you follow on Facebook.
- **Friends** are the individuals to whom you connect in Facebook, a friend request is sent and if accepted it allows the person to see your profile and interact with you sharing content and updates.
- **Timeline** is where you can see your posts or posts you've been tagged in displayed by date. Your Timeline is also part of your profile.
- **Posts** are messages users post in their profile, they can be classified in different types: Video, photos, links or status.
- **Comments** are the specific message a user writes on a post or on a post comment.
- **Share** is a way to promote a content posted by others on your own profile wall. It is used to promote ideas and content.
- **Top stories** are stories published since you last checked News Feed that Facebook thinks you will find interesting. They may be different depending on how long it's been since you last visited your News Feed.

Facebook is free and registered users can manage their own personal space, create photo albums, share videos, create events, write notes, announce, share news and even create company profiles.

Its principal use is to share different type of information with friends and family, allowing people to keep up with the latest new and tendencies and most importantly it allows you to meet new people, promote brands, events and keep a dynamic relationship with your businesses clients. Therefore, the interaction is the most important feature because it generates traffic and allows businesses to gather greater information from a user.

3.1.1 Fan pages

Fan pages are specific profiles for businesses, companies and organizations to share their stories and connect with people. Just like personal profiles, you can customize fan pages by posting stories, hosting events, contests and more. People

can access your News Feed by just liking your page and can get updates in News Feed. In this way you can follow pages you are interested in but are not friends with.

If you want to create a fan page to represent a business, brand, organization or celebrity, you must be an official representative. This allows people to trust the page profiles as they are usually verified.

They offer unique analytic tools for businesses, brands and organizations to understand their interactions with their fans and measure how effective are their campaigns. People who have a personal profile can manage pages and a single person can manage multiple pages.

The following illustration shows the KLM brand page, it has a total of 9.1 million likes and posts regarding the airline information. These types of pages have evolved from just posting content to increasing the possibility of interaction and access to information. KLM includes a Book Now buttons, together with a response time indicator, which measures the time of response to fans questions.

Figure 3: KLM fan page Facebook

As described previously the posts can differ not only in content but in media type (Video, photo, link and status). The central part of the brand page illustration is referred as the Timeline or wall. When a person likes the page he/she automatically becomes a Fan, therefore KLM has a total 9.1 million fans.

These fans can interact with the brand page by: tagging the Brand in a wall post, pressing like on a post made by the brand, commenting on a post made by the brand, sharing the post on their profile wall and posting content in the brands page (depending on the brand policy). All these actions increase the content reach as friends of the user can see their wall post and are used to measure the level of engagement of the fans towards the brand.

We analyzed a Facebook article discussing posting tips and best practices for business, focusing on the post consistency, post targeting, post quality of photos and the review of post performance. All of these factors should be taken into account to establish a brand presence that will expand the relationship between the brand and the user, increasing engagement. Therefore, post performance should be monitored to understand the engagement level of the fan community.

There are two different methods to evaluate and review the customers interaction with the brand page: Facebook insights and Graph API.

Graph API

The Facebook Graph API provides access to information about people and pages, the interaction between them such as likes, comments, shares, etc. Every object has a specific ID number, which can be used to retrieve information using a query. For example to retrieve general content from a brad page, we can use the <PAGE_ID> referred as the brand ID.

To better explain this tool the following figure 4 shows the general information retrieved of Delta airlines. Using the general query “http://graph.facebook.com/delta”


```
  "id": "125472670805257",
  "about": "You love to travel. We love taking you there.
Our Facebook page reflects that passion. | Please click here
if you require a response to a formal complaint: http://bit.ly/T7Bl6X",
  "can_post": false,
  "category": "Travel/leisure",
        "id": "110192549061839",
        "name": "Airline"

        "id": "162914327091136",
        "name": "Travel Agency"
  "checkins": 19521,
  "founded": "1924",
  "is_community_page": false,
  "is_published": true,
  "likes": 1393362,
  "link": "https://www.facebook.com/delta",
  "location": {
     "city": "Atlanta",
     "country": "United States",
     "latitude": 33.656869073929,
     "longitude": -84.423325958495,
     "state": "GA",
     "street": "1030 Delta Blvd",
     "zip": "30320-6001"
```


Figure 4: General Query Facebook API

The information is retrieved has a JSON format and the query can be modified to collect different fields such as: number of likes, comments, shares, posts, number of fans talking about count, time of creation of comments and other information.

To access specific information about connections an authorization token is required. This is done, by allowing certain access to the users personal information. All the information related to the access token and the reach of the Graph API is explained in the Facebook developer's page. The data collection used in our investigation will be explained in the methodology section and a more detail description of the query will be provided. In the annex you can visualize the Graph API panel used.

Facebook insights

It offers fan pages an automatic gathering and display of traffic information. This section allows the administrator of the page to analyze different indicators of their page. The following images provide a clearer view of the visualization panel.

Figure 5: Facebook insights Villa Bernasconi fan page

Figure 6: Facebook insights Villa Bernasconi fan page

Finally, comparing both data collection tools used, Graph API main advantage with Facebook insights is that it can collect public information of wall posting and comments of all brand pages, own pages and the competitors pages.

Twitter

Twitter is a social network that allows users to send and receive short messages, maximum of 140 characters, called tweets. Registered users can post tweets, while non-registered users can only visualize if the account is set on public.

To understand the magnitude of this social network we can take a look at some figures, today there are 302 million active monthly users, 500 million tweets are sent per day and 80% of the active users are mobile. (Twitter home page entered 5/2015)

According to a social media marketing industry report 67% of marketers have plans to increase their activities on twitter. (Michael A. Stelzner 2014)

To better explain the platform some terms definitions will be given according to the twitter glossary of terms.

- **Timeline** is a real-time stream of Tweets. A persons own timeline for instance, is where one can see all the Tweets shared by friends and other people this individual follows.
- **Tweet** is the message of maximum 140 characters a user can post in the social network.
- **Retweet** is a Tweet that you forward to your followers. Often used to pass along news or other valuable discoveries on Twitter, Retweets always retain the original attribution.
- **Reply** is a response to another user's Tweet that begins with the @username of the person you are replying. One Replies by clicking the "reply" button next to the Tweet you would like to respond to.
- **Following** is done by subscribing to a Twitter account. Once you are following someone you can to see their Tweets as soon as they post something new. Anyone on Twitter can follow or unfollow anyone else at any time, with the exception of blocked accounts.
- **Favoring** a Tweet is used to indicate that you liked a specific Tweet. To favorite a tweet, click the star icon and the author will see that you liked it.
- **Mentioning** other users in your Tweet is done by including the @ sign followed directly by their username. It also refers to Tweets in which your @username was included.

Businesses use twitter to share information about their services, gather real-time market intelligence, and build relationships with customers, partners and influencers.

Today, twitter is widely used in customer attention and assists services. Generally businesses create a secondary twitter user focalizing in this topic, which allows an immediate and direct interaction with the customer. Just like the @DeltaAssit example illustrated below. Companies are aware of the necessity of being responsive to their customers and are acting accordingly.

Figure 7: Source: Delta Assit twitter acount

In addition, companies are using this service to engage customers through unique promotions and benefits. With twitter, companies have the potential to inform millions of followers instantly and stay updated in real time. Given all these benefits this is definitely an important platform to manage.

To collect information from twitter one can use professional software's that need a license and allow the access to sensible information. To search for information regarding the analyzed twitter accounts, we decided to use the Twitter API.

Twitter API

As described in the Facebook graph API, Twitter also allows users to access information through an API. So we decided to use this tool to collect information about the different tweets posted on the platforms.

In a similar way as Facebook API, Twitter API allows the user to recollect tweet information in a personalized manner selecting the forms that want to be retrieved. It allows accessing the tweets that have been previously indexed by the search interface.

In order to use Twitter API an authorization needs to be emitted by using a personal twitter account. Once the account is validated, one can start retrieving tweet's and replies specific information of public account in twitter.

Given that this research makes focus on Facebook, the retrieved data is used to understand the overall use of the platform.

To obtain further information about Twitter API one can enter the webpage of twitter: (https://dev.twitter.com/rest/tools/console)

Other social networks

LinkedIn

LinkedIn is the world's largest professional network with 300 million members in over 200 countries and territories around the globe.

Has the mission connect the world's professionals to make them more productive and successful. When you join LinkedIn, you get access to people, jobs, news, updates, and insights that help you be great at what you do.

LinkedIn started out in the living room of co-founder Reid Hoffman in 2002, and it officially launched on May 5, 2003.
Jeff Weiner is the CEO, and the company's management team is made up of seasoned executives from companies like Yahoo!, Google, Microsoft, TiVo, PayPal, and Electronic Arts.

LinkedIn is publicly held and has a diversified business model with revenues coming from member subscriptions, advertising sales, and talent solutions.

Google+

Google executives subsequently described Google+ as "a social layer across all of Google's services" (Google inc, 2014), allowing them to share a user's identity and interests.

In the last years it has grown tremendously reaching 540million active users. Some of its features include the ability to post photos and status updates to the public or interest based communities rather than just simply friends as in Facebook. One of the most interesting and core features of Google plus is “Circles” which enables user to organize users into groups of sharing using a drag and drop interface. For example, work themed content can be shared with only work colleagues, and one's friends and family could see more personal content and photos.

Additionally, the option to share Public or with Everyone is always available.
Google+ has also an alliance with YouTube, which allows users to access comments directly form their Gmail. It also has the “+1”button that allows people to recommend

sites, the larger the number of “+1”in one page increases its Google ranking in the search.

The Google+ profile is public and its connected with other Google services. This includes basic social networking elements such as profile photo, previous work and school history, interests, places lived and an area to post status updates.

Similar to Facebook, Google+ allows companies to create their own fan pages. This can be used by organizations, individuals and companies which publish their results and send messages to the community.

Additionally, it has a section called communities Google+ where users can associate to the different available communities according to their personal interests.

Pinterest

Pinterest is a web and mobile application company, used as a tool for people to get ideas about different projects and interests. The user can upload, save and organize images, called “Pins” or other media content such as videos known as “Pinboard”. Users can then save individual pins to one of their own boards using the "Pin It" button, with Pinboards typically organized by a central topic or theme.

Like Facebook and Twitter, Pinterest now lets marketer’s access the data collected on its users. Technology providers including Salesforce, Hootsuites, Spredfast, Percolate, Piqora, Curalate, and Tailwind are presently the only companies granted access to the data. By granting access to users data, Pinterest lets marketers investigate how people respond to products. If a product has a high number of *repins*, this generally tells the producer of the product that it is well liked by many members of the Pinterest community. Now that Pinterest lets marketers access the data, companies can view user comments on the product to learn how people like or dislike it. A 2013 study on Pinterest practices found that "repinning" was the most popular action by users, followed by *likes*, and lastly, commenting. According to Salesforce, Pinterest has become a key part of corporate digital marketing strategies (Bussiness clud news).

Youtube

YouTube is a website built to share videos, it was created in 2005 and had a huge world impact with millions of views per day. It uses Adobe flash Video technology to reproduce a large variety of user-generated videos, corporate videos, video clips, TV clips and music videos. There are also other categories such as video blogging and educational videos.

Individuals uploaded most of the content on YouTube, as it is easy to create your own channel and save your favourite videos.

Since Google bought YouTube, they started including videos in the search engines rankings. Artists, politicians and companies upload videos as advertisement, because it's possible to reach a large audience without investing in publicity. The user-content can be used to obtain information about the company's reputation, as the number of views can be recorded. YouTube has to possibility to like or unlike the videos. Allowing the user to have both positive and negative feedback.

Instagram

Instagram is an online mobile photo sharing, video sharing and social networking service which allows users to take photos and videos and share them in a variety of social platforms. As a distinctive feature it confines photos to a square shape and has different filters, which can be applied to enhance the photos, similar to Polaroid images. The maximum duration of Instagram videos is 15 seconds.

It was created in 2010 and rapidly gained popularity with over 100 million users in 2012[2] and over 300 million users in December 2014[3], after Facebook acquired it in April 2012. In 2012, it also created web profiles that allow users to use their Instagram account like a social media site. This offered users a web profile featuring a selection of recently shared photographs, biographical information, and personal details.

[2] http://www.techhive.com/article/2025801/facebooks-instagram-says-it-has-90-million-monthly-active-users.html?null
[3] http://mashable.com/2014/12/10/instagram-300-million-users/

3.2 SOCIAL MEDIA: COMPARATIVE TABLE FROM A BUSINESS POINT OF VIEW

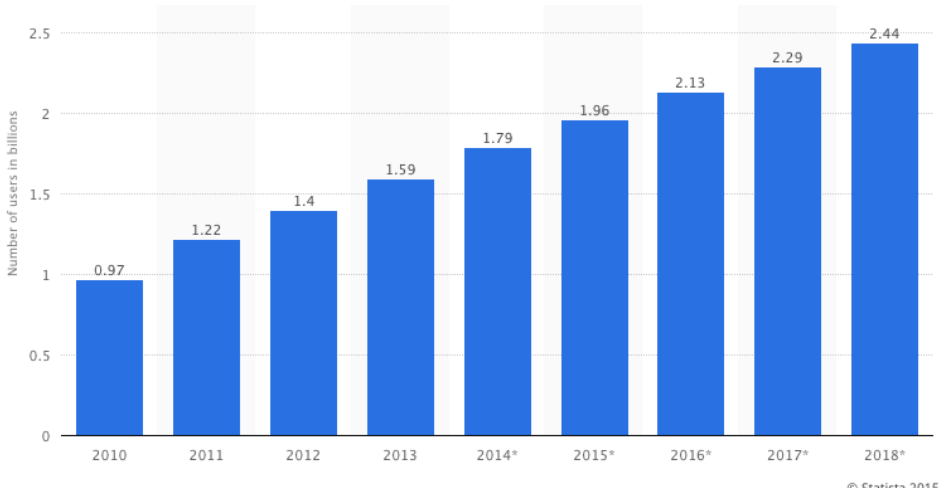
Social media	Number of users	Focus Platform	Relationship	Type of interaction	Publicity
Facebook	1.3 billion active	Share >News >Stories >Content	B2C	"Likes" "Comments", "Shares" "fans" "tags"	Facebook Ads Premium Ads Sponsored stories
Twitter	240 million active	Share >News >Stories >Content	B2C/ B2B	"Mentions" "Retweets" "Favoriting" & "following"	Promoted Tweets Promoted trends Promoted account
YouTube	+1 billion	Share >videos informative entertaining	B2C	"Like" "Dislike" "views" "subscribers"	Video Ad Reached Ad Display Ads
Google+	540 million active	Share >News >Stories >Content	B2C	"Shares" "Comments" "+1" & "add to circles"	N/A
LinkedIn	300 million	Share >News >Discussions >Enterprise >Industry	B2B	"Likes" "comments"	LinkedIn Ads
Pinterest	20 million active	Share >products >Web pages	B2C	"Likes" "comments" "Repins" (shares)	N/A
Instagram	200 million active	Share >News >Stories >Content	B2C	"Likes" "tagging" "mentioning" "comments"	N/A (Work in process)

Table 2 Source: Facebook pages, Twitter, Instagram, Pinterest, Google+, YouTube

The previous table shows some of the main characteristics of the different social media platforms. Facebook stands out with an amazing 1.3 billion of active users, however all of the platforms have millions of users making it attractive for companies. Finally, many of them have similar type of interaction possibilities, "Likes", "Comments", "shares" and "tags".

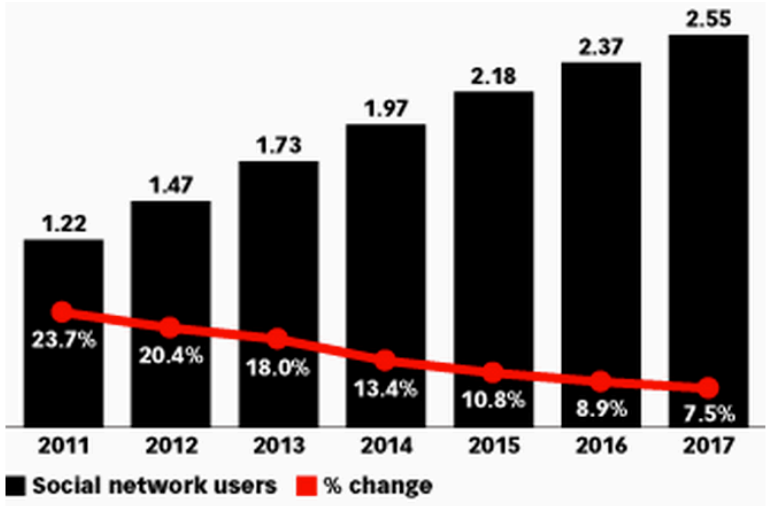
Social media forecast

There are several companies that build forecasts about social media platforms in the coming years. We added some graphs and tables that resume values and tendencies of the use of these platforms at a world scale.



Graph 8. Source: Statista 2015, eMarketer y American Marketing Asociation

Graph 8, displays the number of social media users in the world from 2010 until 2014 and then estimates the tendencies until 2018. We can visualize a positive growth tendency with a small decrease in the percentage of growth due to saturation.



Graph 9. Social Network Users Worldwide 2011-2017, billions and % change Source: eMarketer, April 2013.

[Note graph 9: Internet users that use some social media platform al least once per week from any type of device]

Graph 9 illustrates the number of social media users with a forecast from 2014 until 2017. Also on the chart one can evaluate the reduction of the relative growth between years. For a more detailed analysis one can observe table 3, which disaggregates the growth between region and the most important countries of each region.

Social media users by region and country 2011-2017. [Millions]

	2011	2012	2013	2014	2015	2016	2017
Asia-Pacific	**501.6**	**632.6**	**777.0**	**906.6**	**1,018.3**	**1,129.6**	**1,231.5**
—China*	256.5	307.5	366.2	414.5	451.6	491.0	525.4
—India	54.8	87.3	127.5	168.7	209.1	246.7	282.9
—Indonesia	34.4	52.2	67.2	79.3	89.3	99.7	109.9
—Japan	39.9	45.0	48.2	51.0	52.7	54.4	55.7
—South Korea	20.7	22.9	24.7	26.0	27.0	27.8	28.6
—Australia	9.3	10.4	11.4	12.4	13.3	14.2	15.0
—Other	86.0	107.3	131.8	154.6	175.2	195.7	214.0
Latin America	**151.6**	**182.7**	**216.9**	**246.6**	**280.2**	**302.6**	**324.4**
—Brazil	56.1	66.2	78.3	88.3	97.8	104.2	110.0
—Mexico	24.8	31.8	38.4	44.5	49.9	55.1	60.2
—Argentina	14.1	15.9	17.8	19.5	21.2	22.1	22.9
—Other	56.5	68.7	82.4	94.3	111.3	121.2	131.3
Middle East & Africa	**123.2**	**164.3**	**209.8**	**248.6**	**287.3**	**324.8**	**358.1**
North America	**163.6**	**174.2**	**181.2**	**187.9**	**193.8**	**198.8**	**203.7**
—US	147.4	157.3	163.5	169.5	174.9	179.4	183.8
—Canada	16.1	16.9	17.7	18.5	18.9	19.4	19.9
Western Europe	**142.5**	**159.7**	**174.2**	**185.8**	**194.5**	**202.3**	**208.6**
—Germany	25.7	29.2	32.4	34.7	36.5	38.1	39.4
—UK	27.3	30.2	32.1	33.9	35.0	36.0	36.7
—France	20.0	22.0	23.7	25.1	26.0	26.9	27.7
—Italy	15.8	18.2	20.0	21.6	22.8	23.7	24.7
—Spain	15.5	17.5	19.5	21.2	22.6	23.9	24.9
—Netherlands	9.9	10.8	11.7	12.1	12.6	13.0	13.2
—Sweden	4.9	5.4	5.9	6.2	6.5	6.7	6.9
—Norway	2.8	3.0	3.3	3.5	3.6	3.7	3.8
—Denmark	2.6	2.9	3.1	3.3	3.5	3.7	3.8
—Finland	2.5	2.7	3.0	3.2	3.3	3.4	3.5
—Other	15.6	17.8	19.6	21.1	22.2	23.2	24.0
Central & Eastern Europe	**137.2**	**154.7**	**173.6**	**189.8**	**202.6**	**213.4**	**223.3**
—Russia	48.7	54.3	60.5	65.5	69.2	72.4	75.0
—Other	88.4	100.4	113.2	124.3	133.4	141.0	148.3
Worldwide	**1,219.6**	**1,468.1**	**1,732.7**	**1,965.3**	**2,176.8**	**2,371.4**	**2,549.7**

Table 3 Source: eMarketer, April 2013.

[Note table 3: internet users that use social media at least once per month from any kind of device. The overall percentage sum may not add up due to rounding up].

Finally, taking into consideration a forecast made by eMarketers, we consider that the fan pages growth of the different airlines will have a median greater or equal than the one forecasted by the different studies, as people that fly are the sector which makes more use of the social media platforms.

4. CUSTOMER ENGAGEMENT

Posting content is a necessary activity for social media management but it is not a trivial activity, posting the right content is the key to engage customers. If no one is engaging with the content then what is the point? Engaging customers is what really matters in social media and this is what gives added value. Thus, understanding and measuring it, is the first step to a successful social media management.

Customer engagement has become a very popular term to use and appears frequently when researching social media. Along our study we encountered different definitions and approaches when referring to this term.

- *"consumer's intrinsic motivation to interact and cooperate with community members" (Algesheimer, 2005)*
- *The intensity of an individual's participation and connection with the organization's offerings and activities initiated by either the customer or the organization. (Vivek, Beatty, and Morgan 2010)*
- *Customers' behavioral manifestation toward a brand or firm, beyond purchase, resulting from motivational drivers such as word-of-mouth activity, recommendations, helping other customers, blogging, writing reviews. (Van Doorn, 2010).*

These are just some of many definitions form various authors. However, even though they differ in the exact choice of words, the bottom line to all of them is that customer engagement is equivalent to some kind of action between customer and organization.

The main advantage of social media is that no matter the company's magnitude it is possible to talk, respond and promote directly to customers. In other words, it allows companies to interact with their customers. As explained in the social media chapter, each platform grants organizations similar interaction possibilities differing sometimes just in their terminology. For example the Facebook shares or Twitters retweets.

The first important step is to define what is important, what the company is looking for with its presence in social media. This way they can set appropriate KPIs to track and measure for later making decision on what and when to post; and to understand the impact of those decisions in the level of engagement. Companies will have to find out what content, features and interactions will increase customer engagement. Yet, given the broad ways to interact with a company through social networks it is necessary to have not only one KPI but a combination of different metrics. According to our study we believe these KPIs should be guided towards understanding engagement.

To better understand the importance of customer engagement, we will explain a model of branding components and relationship with social media (Jansen and Zhang 2009). From the figure below, it can be seen that brand knowledge, which may be affected by social media content, fosters brand awareness and brand image. Also positive customer experiences will increase word of mouth communications that if, correctly managed through social media, can influence brand trust and brand satisfaction. Finally, the creation of social media strategies that raise brand knowledge and brand relationship could increase sales.

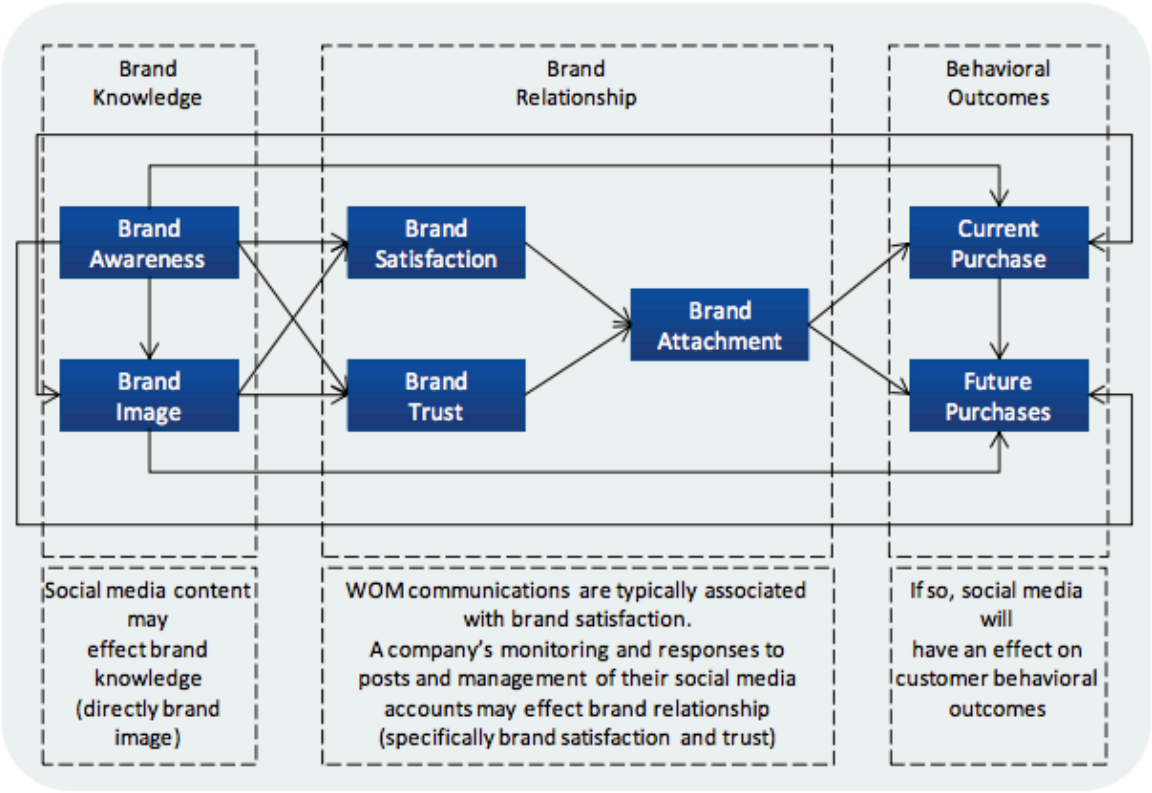


Figure 8: [General model of branding components and relationship with social media (adopted and generalized for social media from Jansen and Zhang 2009, by Pletikosa Cvijikj, 2012]

According to an article posted by (Forbes, 2014), customer engagement is highly correlated with revenues and profits and in the future it will become a key metric of business performance. This is given to the fact that engagement is an accurate measure of customer perception and is a primary indicator of customer loyalty. Additionally, a study that analyses the customer experience and engagement in retail (People Metrics, 2008), posted in its key findings that "companies with high levels of Customer Engagement perform better financially than companies with low levels of Customer Engagement."

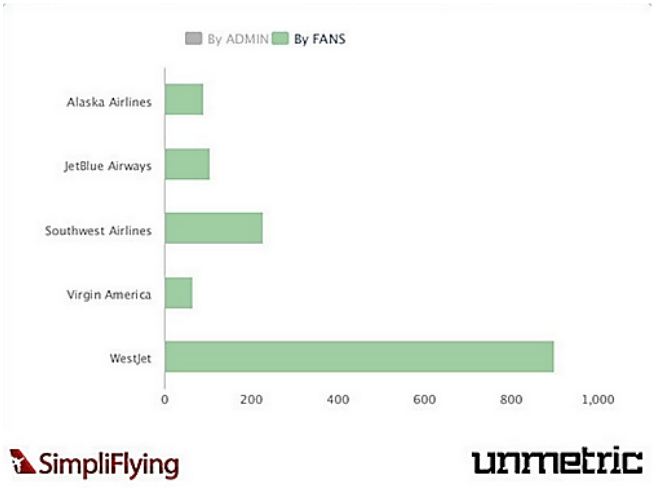
4.1 SUCCESS CASES

Case studies are used in many disciplines for teaching purposes to show and explore real world situations. The examples evidence existing work done by airline companies on social media illustrating the impact that social media has, their diverse use and effects on customer engagement.

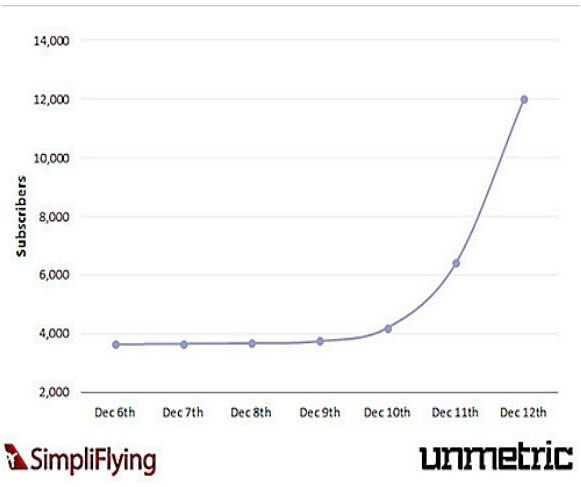
Westjet Christmas miracle

Westjet took it out of the park when talking about application of social media for marketing campaigns; this Canadian airline surprised the world with its initiative.

In the holiday season, Westjet placed a booth containing a life-size screen which turned on when a passenger scanned his boarding pass. This activated the screen and a Santa Claus appeared asking the passenger what they wanted for Christmas. Passengers at this point asked for many things from underwear to Tv sets. Nobody at this point believed that this was all about to become real. The employees where taking note from the audio of the booth and during the flight of the passengers they went off into a frenzy to buy all of what was asked. When the passengers arrived to their destination their luggage was not the only thing that was waiting for them, they had presents wrapped and tagged with their names according to what they had asked for.



Graph 10. Source: Simpliflying



Graph 11. Source: Simpliflying

Where does social media enter in this amazing stunt? This was documented and edited into a video that was then uploaded on YouTube. Richard Bartrem, Westjet's vice president of communications and community relations, told Forbes magazine that they had expected approximately 800.000 views from the video. But just days after the video went online it had 13 million views and had been seen in more than 200 countries and made the news in the UK, Japan, Poland and Malaysia. He then added "For a traditional commercial, you could spend well into the mid-six figures for the production alone," he says. While WestJet won't disclose how much it spent on the video, Bartrem calls it "a mere fraction" of that. And that's before the ad buys, which, he says, could normally run well into the millions."

According to a case study of this campaign: “The average engagement score that WestJet received in the last 30 days is 120. This was calculated by the number of Likes, Comments, Shares and Estimated Impressions each of its posts got. The post about the Christmas Miracle video saw an engagement score of over 1,700, 14 times more engaging than the average WestJet post and a staggering 35 times more engaging than the sector average engagement score of 50.

Before the video, WestJet was getting an average of 15 fan posts a day. After the video, well, just take a look at the chart below, which shows how many fan posts WestJet has received in comparison to other airlines in the past week.”

Jetblue “Cheeps”

Jetblue airline has given twitter an unique use, they have created a specific twitter account @JetblueCheeps to provide followers updates of last minute deals. They post last minute flights every Tuesday that are offered for a limited amount of time and limited availability.

"We noticed that our main Twitter page was working very well," said Tara Carson, manager-consumer promotions at JetBlue. "And we wanted to evolve that account into a Cheeps page where we could really communicate special deals and offers."

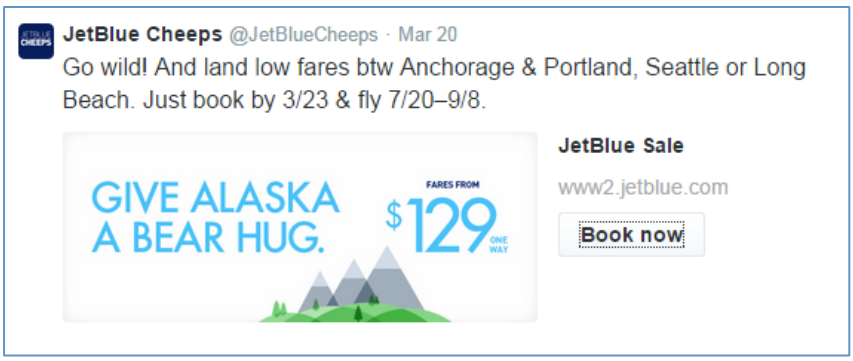


Figure 9: Source: JetblueCheeps Twitter

As it can be observed that the offer comes in the format of a friendly language “Go Wild” including a picture and a direct link to Book the flight.

“Ms. Carson wouldn't divulge the number of ticket sales the site has helped generate but she said, "We are absolutely selling tickets" through the Cheeps page. You don't have to be a follower to take advantage of the offers, which they post once a week on Tuesdays and are available until 6 P.M. that day or until all of the available tickets are sold. The offers link to a landing page that highlights exactly where the Cheeps are located within the route system and on what dates.”

This use of Twitter helps fill capacity of unfilled flights, it increases the user traffic, it increases revenue and tells the company what consumers want and what they like, therefore becoming a very powerful tool.

Southwest Airlines "Singers and Rappers"

It is surely difficult to be more creative than Southwest Airlines and their talented employees. Some fly attendants give the flight instructions telling jokes or rapping which improves the flight experience and flyers mood. Passengers have registered these performances and loaded them on YouTube and different social media on their own, some of them becoming viral and achieving more than one million views.

This is definitely evidence of customer engagement, in which the airline has not uploaded the videos but the passengers have taken the time to register and upload them generating the traffic and chatter surrounding Southwest Airlines.

Use of social media in other sectors

Other industries also exploiting social media and it is relevant to describe them to further emphasize the importance of social media and display the new needs of customers. The cases briefly mentioned were selected because they are diverse from the airline industry like Entertainment or because they are very traditional like Religious figures.

An everyday increasing reality is the amount of Tv or radio shows that include hashtags during their programming to interact with their audience.

Some tweets even change the content of the show when in real time tweets or Facebook comments are read, discussed by the hosts on the show or even used to rank. For example, on Football matches in Argentina a hashtag is displayed on screen near the end of the match where audience can write the name of the player they think was the best of the match. The votes are then ranked and as a result this player receives in some cases a prize and a special interview. On the other hand, radio programs announce a hashtag with a specific topic allowing the gathering of listeners' opinions and ideas. The interesting fact is that this interaction is only sometimes rewarded by prizes. This evidences that viewers and listeners don't do it for the reward but for the sense of belonging and recognition.

Social media surely breaks boundaries and customs penetrating into a very traditional sector as religion. In 2012, a twitter account was set up by the pope, @Pontifex, has almost 6 million followers. The account is set up to spread positive messages to further connect with their followers. The pope is not the only world leader with twitter but also many presidents like Cristina Kirchner and Barack Obama have their accounts.

As one can conclude social media is very well intertwined with our daily activities, our surroundings and it has reached multiple sectors due to its flexibility in use. These are some of the factors that made social media establish itself as a valuable source of information.

5. METHODOLOGY

In this research the empirical study can be subdivided into two stages. In the first stage, a preliminary analysis was carried out in order to determine which social media platforms were most diffused along the airlines in their online marketing strategy. Subsequently, a more detailed analysis of the top 25 western airlines was carried out in order to understand the use that these airlines are giving to the social media platforms.

On our first analysis, we selected 100 airlines according to the number of passengers carried in 2013. The ranked list was obtained from an online marketing agency in their annual inform “Airlines-informs” (2014) and the data was then verified using public postings made by the airlines. To understand the usage of the different social media platforms, a matrix was build with the airlines placed in rows and social media platforms placed in columns. The social networks studied for this purpose where the following: Facebook, Twitter, LinkedIn, YouTube, Google+, Instagram, Pinterest, Foursquare, Tumblr, VK, Weibo and blogs.

The results were used to select the most popular platforms, which were then analyzed with further detail to fulfill the purpose of this investigation: how airlines use social media as a tool for customer engagement.

Aligned with the social media section which has academic sources and sector reports, the data gathered shows that the social media platforms that are most diffused are Facebook and Twitter.

Although Twitter is the second mostly used social media, the public data we were able to retrieve using API’s was limited and was not sufficient to calculate more complex indicators that would give us more feedback about customer engagement in order to reach empirical driven conclusions. Therefore we focused on Facebook and used basic indicators for Twitter, such as #tweets, # followers, #following, etc.

To retrieve the data to carry out the second stage of the investigation, customer engagement, the top 25 western airlines were selected out of the original 100 airlines according to the number of passengers carried per year. We decided to analyze western airlines given the similarities in the use of the social media platforms and overall demographics. Additionally, most of the eastern airlines analyzed in the preliminary research to determine the use of social media platforms did not have a Facebook fan page or a Twitter account, or if an account was present the community manager did not post or interact with the fans. For these reasons we decided to analyze the main western airlines; we also included Aerolineas Argentinas to add a home country airline (table 4).

Ranking	Airline	Country	UTC + Offset	#Passengers carried in Millions (2013)
1	Delta	USA	-4	164,7
2	Southwest	USA	-5	133,2
3	United	USA	-5	90,3
4	American Airlines	USA	-5	87
5	Ryanair	Ireland	1	81,7
6	Lufthansa	Germany	2	76,3
7	EasyJet	UK	1	60,8
8	US Airways	USA	-4	56,8
9	Turkish	Turkey	1	48,3
10	Air France	France	2	47,8
11	Emirates	UAE	4	44,5
12	British	UK	1	40
13	TAM	Brazil	-3	37,4
14	GOL	Brazil	-3	36,3
15	AirCanada	Canada	-4	35,8
16	ExpressJet	USA	-4	33
17	Airberlin	Germany	2	31,5
18	JetBlue	USA	-4	30,5
19	LAN	Chile	-4	29,5
20	SkyWest Airlines	USA	-4	27,1
21	KLM	Netherlands	2	26,6
22	SAS	Sweden	2	25,4
23	Avianca	Colombia	-5	24,6
24	Alitalia	Italy	2	24
25	Qantas	Australia	10	22,6
26	AR	Argentina	-3	8,4

Table 4 Source Airlines-Informs

5.1 FACEBOOK: DATA COLLECTION

To collect the information that feeds the predefined KPIs of this study we used the online application of Facebook “Graph API”.

“Graph API is the primary way to get data in and out of Facebook’s platform. It's a low-level HTTP-based API that you can use to query data, post new stories, manage ads, upload photos and a variety of other tasks that an app might need to do.” (Facebook, 2015) These are the steps we followed to search and collect the information:

1. Enter https://developers.facebook.com/tools/explorer/

2. This product usually requires the use of an access token which is generated by login into your own Facebook account.
3. With this token you can now submit a query.
4. The information will be showed in JSON format.
5. The data was then converted from JSON format to CSV values.
6. The CSV data is imported in Excel.
7. The information is analyzed to calculate the KPIs.
8. Note: Not all the information needed to calculate the predefined KPIs was available through Graph API. So, a manual search through the Facebook profiles was made.

When following the methodology to access the data of the different airlines we had some problems with the information available. Graph API could not access the latest post of some of the top airlines previously selected, only post that had more than one year of creation were retrieved using the tool. In order to maintain the methodology we decided not to analyze the Facebook pages with this type of problem, as they could also contain other type of errors and a manual retrieval would not allow us to calculate all the KPI's needed to later compare. Also some of the airlines had a no Facebook strategy or a no post strategy. The following table 5 resumes the airlines that a post analysis could not be carried.

Airline	Country	Reason
Ryanair	Ireland	No Facebook strategy
Skywest Airlines	USA	No Facebook strategy
US Airways	USA	Same social media platform as AA
TAM	Brazil	No post strategy
Air France	France	Problems when downloading info using Graph API
SAA	Sweden	Problems when downloading info using Graph API
Avianca	Colombia	Problems when downloading info using Graph API

Table 5 Airlines with Facebook API download problems

Therefore, the dataset used for this study consists of 40 posts with all the respective comments from 19 airlines. Adding up a total 760 posts, 62.701 comments, 2.510.989 likes and 191.843 shares.

The list of the selected Facebook pages, along with their macro characteristics such as, number of fans and growth rate is posted in the results section, together with the analysis of the customer engagement level.

5.2 INDICATORS

In order to measure the level of customer engagement on a Facebook fan page a wide variety of indicators of different sources were gathered. These indicators include the most important variables that generate diverse stimuli and reactions among the page fans.

Some variables can be controlled by airlines according to their strategy, for example:

a) Media Type: Photo, video, link or status. – This post information is given by the graph API tool.
b) Content category: -the posts are manually classified according to the defined criteria.
c) Timing: days, hours. - This information is given automatically by the graph API tool.

On the other hand, the fans reaction to the different posts done by the airlines cannot be controlled. For example:

a) Number of Likes per post: a manual revision of the post is carried out and the number of likes registered.
b) Number of comments per post: -This information is given by the graph API tool.
c) Number of shares per post:-This information is given by the graph API tool.

All these variables are used to create and calculate the different indicators that are detailed ahead in the investigation.

5.2.1 Content categorization

As the classification of posts into specific topics resulted into too many groups, hence making the statistical analysis hard, we used a content categorization for a more general topic representation. In order to assign categories we used a previous study as a start framework (Pletikosa Cvijikj and Michahelles, 2011). These categories are expressed in (table 6).

Post Category	Abbr.	Content type(s)	Example
Advertisement	AD	Advertisements Special (price) offers Coupons	*"Spice up your breakfast with our new Cinnamon Streusel Cakes, available now in single serve!" (Original)*
Engagement Booster	EB	Asking for feedback Teasers	*"Fill in the blank: Today would be perfect if _____." (Original)*

Post Category	Abbr.	Content type(s)	Example
Contest	CO	Facebook contests External contests	*"Want tickets to the Super Bowl? Turn on your webcam and grab your Doritos & Pepsi MAX for your chance to win!" (Original)*
Fans No	FN	Number of fans reached	*"Thanks to everyone for helping us get to 3million fans!" (Original)*
Story	ST	External events Non-brand related stories	*"Natascha Badmann wins her first Ironman Triathlon Championship [...]"(Original)*
Facebook App	FA	References/redirection to Facebook apps	*"You're one in a million. Show us why here [...] fb.drpepper.com [...]" (Original)*

On a second stage, we also modified some of the categories using another study (Evaluation Framework for Social Media Brand Presence, Pletikosa Cvijikj, 2011). Categories summarized in Table 7.

Post Category	Explanation	Example
Product(s) announcement	Announcement of new product launch.	*"4 neue ok.- Schokoladentafeln sind da!" (Original)* *"4 new ok.- chocolate bars are here!" (English translation)*
Information	Information regarding a sales location, number of page fans, etc.	*"Heute eröffnen in Egg und Altstätten zwei k kiosk Shops mit einer Auswahl an ok.- Produkten. Viel Spass beim Einkaufen!" (Original)* *"Two k kiosk Shops opened today in Egg and Altstätten with a selecion of ok.- products. Have fun shopping!" (English translation)*
Designed question	Posts in form of questions with a goal to engage users in a dialog.	*"Ist es ok, nie erwachsen zu werden?" (Original)* *"Is it ok never to grow up?" (English translation)*
Questioner	Using the Facebook Poll to obtain answers on a specific question.	*"Unter dem Reiter "Polls/Quizzes+" gibt es eine neue Umfrage zum Thema "ok.- Vanille-Glacé". Wäre cool wenn ganz viele von euch kurz mitmachen! Danke." (Original)* *"There is a new questioner under the tab "Polls/Quizzes+" on a topic "ok.- Vanilla ice-cream". It would be cool when lots of you would participate" (English translation)*

Post Category	Explanation	Example
Competition	Posts related to competition, i.e. announcements, rules, winners, etc.	*"Hallo ok.- Star! Zeigt uns mit einem * vor Eurem Zitat dass Ihr auf die Bildschirme wollt."* *"Hello ok.- star! Show us with a * before your post that you want to appear on the display" (English translation)*
Advertisement	Advertisement of existing products (mostly used in a form of photo post).	*"ok.- Produkte, 5 new photos" (Original)* *"ok.- products, 5 new photos" (English translation)*
Statement	Posts in form of statement, stating opinion on certain topic.	*"Das der liebe Petrus momentan Sonne und Regen verwechselt ist nicht ok.-" (Original)* *"The fact that sun and rain are changing at the moment is not ok.-" (English translation)*

From the lists of categories above, the post category Story (ST) was further divided into:

- **External Story** (EST) makes reference to non-brand related stories such as: places, people, festivals, news and events.
- **Own Story** (OST) as the stories where the Airline brand is related such as airline history, inspiring comments related to the airline, greetings and airplane photo included.

The **Information** (IN) category was expanded and includes: service information, technical features, flight changes, strikes, prizes & nominations, new destinations and mileage programs.

Other two categories where added to the classification: Social (SO) referring to community service and sorrow statements; and environmental (EN) referring to CO2 emissions and savings in energy consumption and overall contamination. But we decided to unify them into a single category, Social (SO) given that there were not enough posts in the environmental category.

Summary table of the post categories used for the analysis

Post category	Explanation	Example
Advertisement (AD)	Advertisements, offers, price discounts	"Don't miss out on our worldwide sale. Book by April 22, 2015 and enjoy sale fares when you book at http://spr.ly/61824AV6"
Engagement	Asking for feedback	"Our new boarding music is all the buzz on

Boost (EB)	Teasers	BuzzFeed. Let us know what you think of the new jams. http://bit.ly/BoardingMusicBF"
Contest (CO)	Facebook contest External contest	"This isn't a pop quiz. Graduate from AAdvantage University and enter for a chance to win 2 First Class tickets anywhere we fly. Learn more at: http://bit.ly/1EadUQM"
Information (IN)	Service information Technical features	"Cleared for takeoff. Yesterday we celebrated the inaugural flight of our Dreamliner to Chicago O'Hare International Airport. Welcome to the family!" "On March 28, we'll begin moving Dividend Miles accounts into the #AAdvantage program. Please remember this transition will take several days. Learn more at: http://bit.ly/AAdvantage2015"
Social (SO)	Community service Sorrow letters CO2 emissions Energy savings	"Our thoughts and prayers are with those affected by the earthquakes in Nepal. Please join us in supporting the Red Cross by donating funds or miles. We'll reward your generosity with an AAdvantage mile offer: http://bit.ly/AARedCross" "Over the next four years we'll be adding more than 170 low-emission aircraft. #KeepClimbing"
Own Story (OST)	Airline history Greetings	"Flying the Blue Skies with Piedmont Airlines. #OurHeritage #TBT" "Talk about a Koala-ty time onboard!"
External Story (EST)	Places, people, festivals News, events	"All the information you need with just a glance at your wrist. We now support the Apple Watch. Learn more at: http://bit.ly/AAMobile15"

Table 8: Summary table of the post categories used for the analysis

5.2.2 Posting Time

To understand when should a post be shared, we differentiated between workdays and weekend as a factor that might influence the engagement level.

Furthermore, the time of posting was also taken into consideration for the analysis and added as another variable (**Hour of day,** the post was created). It should be pointed out that Graph API query returned the time of creation of each post and comment in the UTC time zone format, so we searched airline where the airline headquarters were located and calculated the offset from the UTC time zone (Table 9). In this way we could aggregate and compare the post time creation of the different airlines.

Airline	Country	UTC + Offset
Delta	USA	-4
Southwest	USA	-5
United	USA	-5
AA	USA	-5
Ryanair	Ireland	1
Lufthansa	Germany	2
EasyJet	UK	1
US Airways	USA	-4
Turkish	Turkey	1
Air France	France	2
Emirates	UAE	4
British	UK	1
TAM	Brazil	-3
GOL	Brazil	-3
AirCanada	Canada	-4
ExpressJet	USA	-4
Airberlin	Germany	2
JetBlue	USA	-4
LAN	Chile	-4
SkyWest Airlines	USA	-4
KLM	Netherlands	2
SAS	Sweden	2
Avianca	Colombia	-5
Alitalia	Italy	2
Qantas	Australia	10
AR	Argentina	-3

Table 9: Offset from the UTC time zone

5.2.3 Measuring engagement (KPI's)

As described previously in the social media section, Facebook allows users to post, like, comment and share the posts that are created on the brand page Wall. These types of interactions can be used as a measure of engagement, using public available information as opposed to Facebook insights.

To design the specific KPI's we searched for different academic papers and practitioner sources, the whole list of indicators analyzed in posted in the annex. We then further analyzed the indicators to select the ones that where more significant for our engagement measurement research. The final classification is divided into two main groups.

- **Specific indicators**: analyze the characteristics and content of each post.
- **Global indicators:** analyze the company's fan pages from a broader perspective.

Specific KPIs

Academic Sources

KPI proposed	Formula	Name of Authors	Journal title	Paper Title	Year of publication	Coments suitability
P3	(# of likes per post/ # of fans)*1000	Enrique Bonso´n and Melinda Ratkai	Online information review	A set of metrics to assess stakeholder engagement and social legitimacy on a corporate Facebook page	2012	Dividing by the number of fans we can compare engagement in the long run and between FB pages
C3	(# of comments per post/# of fans)*1000	Enrique Bonso´n and Melinda Ratkai	Online information review	A set of metrics to assess stakeholder engagement and social legitimacy on a corporate Facebook page	2012	Dividing by the number of fans we can compare engagement in the long run and between FB pages
V3	(#Shares per post/ # of fans)*1000	Enrique Bonso´n and Melinda Ratkai	Online information review	A set of metrics to assess stakeholder engagement and social legitimacy on a corporate Facebook page	2012	Dividing by the number of fans we can compare engagement in the long run and between FB pages
ID	Time of last interaction of a post- Time of post creation	Irena Pletikosa Cvijikj & Florian Michahelles	Information Management	Online Engagement Factors on Facebook Brand Pages	2013	This indicators shows the time interval of the interaction, so it could be used by the company to choose an appropiate posting strategy.

Table 10: Academic Sources – Specific KPIs

Global indicators

Academic sources

Global KPIs

KPI proposed	Formula	Name of authors	Journal title	Paper Title	Year of publication	Comments suitability
Growth rate	(#Fans(t2)- #Fans(t1))/ #Fans(t1) [for: t1 beggiing & t2 end]	Irena Pletikosa Cvijikj, Florian Michahelles	Information Management	Online Engagement Factors on Facebook Brand Pages	2013	Used to analyse the change in the # of followers in theperiod of analysis.
% of possitive comments	Analysis of NL comments to see the percentage of positive ones	Lisette de Vries & Sonja Gensler & Peter S.H. Leeflang	Journal of interactive marketing	Popularity of Brand Posts on Brand Fan Pages: An Investigation of the Effects of Social Media Marketing	2012	This analysis will give an idea of the mood of the fans(positive-negative).
Velocity of a conversation	Time to answer to customers	Jan H. Kietzmann, Kristopher Hermkens, Ian P. McCarthy, Bruno S. Silvestre	Business Horizons	Social media? Get serious! Understanding the functional building blocks of social media	2011	Usefull to undestand the rapidness to answer to users comments.

Table 11:Academic Sources - Global KPIs

KPI porposed	Formula	Name of the report/website	Link to the report	Year of publication	Comments about the suitability of the indicator
Number of people talking/ # Fans	Number of people talking	Facebook page 2012	http://jbis.cafe24.com/data/7_PACIS2013_Workshop_ITmgmt.pdf	2012	Information retreived using Graph Api and could be used to create further indicator such as (# people talking / # fans)
Number of days to post do NL posts	Number of days to create 40 posts analyzed	This reasearch		2015	Shows the frecuency of posting, the total number of posts analyzed may change. Info from Graph API

Table 12: Academic Sources – Global KPIs (cont)

Specific indicators

Practitioner sources

Variable (Acronym)	Description	Values	Type	Source
MT	Media type	Photo, video, link, status	Independent	Graph API
CC	Content category	Table X summary of categories	Independent	Manual
DW	Day of week	Monday, Tuesday,…., Sunday	Independent	Graph API
HD	Hour of day	0,1,2,….,23	Independent	Graph API

P3	1000*#Likes/#fans	Numerical	Dependent	Manual Facebook
C3	1000*#comment /#fans	Numerical	Dependent	Graph API
V3	1000*#shares/#fans	Numerical	Dependent	Graph API
ID	Interaction Duration	Numerical	Dependent	Graph API

Table 13: Practitioner Sources - Specific KPIs

Note: As we consider P3, C3 and V3 for one post at a time the number of posts to divide will be also equal to one. For this reason we eliminated the number of posts from the equation.

Global indicators

Variable (Acronym)	Description	Values	Type	Source
GR	Growth rate	Numerical	Dependent	Graph API
PC	% of positive comments	Numerical	Dependent	Manual
VC	Velocity of conversation	Numerical	Independent	Graph API
PTR	People talking rate	Numerical	Dependent	Graph API
ND	Number of days to post 40 posts	Numerical	Independent	Graph API

Table 14: Practitioner Sources – Global KPIs

5.2.4 Comments: sample size

According to the central limit theorem, a population can be approximated using a normal distribution and its possible to apply the concept of confidence interval in order to derive the sample size. The following formula was applied in order to calculate the sample size to be representative of the population.

- *m* represents the estimated simple size needed to estimate the proportion P of a large population.
- *n* is the sample adjusted to the size of the population N

$$m = \frac{z_{\alpha/2}^2 \hat{p}(1-\hat{p})}{e^2} \qquad n = \frac{m}{1 + \frac{m-1}{N}}$$

For our case we selected an alpha (α) of 5%, a probability of $\frac{1}{3}$ given that the comments can be possitive, negative or neutral; and an error e of 10%. The calculus below is more strict and takes a probability of $\frac{1}{2}$ (possibilities can only be positive or negative)

$$m = \frac{1.96^2 * \frac{1}{2} * \frac{1}{2}}{0.1^2} = 96$$

As the m value depends on the amount of comments generated by page fans during the 40 posts of each airline (Ni), the simple size n was determined. But given that most values were close to one hundred, we decided to take a constant sample size **n=100**.

The comment selection was random using the excel function random() to eliminate correlation with the type of post.

5.3 KRUSCAL WALLIS: POPULATION DIFFERENCES

Finally, to analyse the data retrieved we decided to use the Kruskal-Wallis test. This is a non-parametric test method to determine if the groups of data come form the same population. It establishes a null hypothesis that the datasets come form the same population. With the data you calculate the $K_{observed}$ and compare it with K_{critic}, if $K_{observed} > K_{critic}$ the null hypothesis gets rejected. In this way one can assure that the datasets come from different populations, with a certain probability alpha of making a mistake.

For all those cases where the null hypothesis was rejected, histograms were constructed for each of the different indicators (TimeId, P3, V3 y C3). In this way, the distributions of each population could be visualized. The different graphs take the value of the ranking resulting from implementing the Kruscal-Wallis test. *(Note: The value 1 is the best value in the rank, therefore a small bar represents indicators with higher values.)*

For this analysis the data for ExpressJet was not included in the population given its reduced number of fans that generated atypical values (out-layers) for the specific indicators.

The test were done using the complement of Excel XLSTAT developed by IBM

5.4 TWITTER: DATA COLLECTION

The collection of information for Twitter was done by using the application called Twitter API.

Twitter API is similar to Facebook Graph API, but with fewer possibilities to personalize the search and therefore less information could be collected from Twitter. For this reason, 40 Tweets or replies of the airlines were collected. (Until the 16th of June, day the data was collected.)

For this project Twitter API was used following the following steps, similar to those used for Facebook Graph API.

1. Enter https://dev.twitter.com/rest/tools/console
2. Enter with personal Twitter account (user + password)
3. Accept terms and conditions (Required to obtain the authorization necessary to execute a search.)

4. Search the information through a query that could be personalized according to the wanted data. (Results from the search were given in a JSON format.)
5. The search was done to obtain 40 Tweets or replies until the 16th of June.
6. The data was then transformed from JSON format to CSV, using the page www.json-csv.com.
7. Then the data was downloaded and imported to Excel
8. Data was then filtered and analyzed.

These steps were followed to obtain all the data from the selected 26 airline's Twitter accounts. In the process 6 airlines presented problems when converting the data from JSON to CSV.

Airline	Country	Reason
Avianca	Colombia	Problems converting data
Expresssjet	USA	Problems converting data
Jetblue	USA	Problems converting data
US Airways	USA	Problems converting data
Easyjet	UK	Problems converting data
Lufthansa	Germany	Problems converting data

Table 15: JSON to CSV conversion issues

5.4.1 Twitter Indicators

The following table describes the twitter basic indicators that are used to analyze and classify the data in the result section.

Variable (Acronym)	Description	Values	Type	Source
#Tweets	Tweets posted by airline	Numerical	Independent	Manual
#Following	#People they follow	Numerical	Independent	Manual
#Followers	#People that follow the account	Numerical	Independent	Manual
#Tweet _Count	#Tweets retrieved for study	Numerical	Independent	Graph API
#Days	Days to publish 40 tweets	Numerical	Independent	Graph API

Retweet count	# of Retweets for the 40 tweets retrieved	Numerical	Dependent	Graph API
Favorite count	# of Favorites for the 40 tweets retrieved	Numerical	Dependent	Graph API
Replies	# of tweets that where a response to a customer tweet	Numerical	Dependent	Graph API
Tweets Propios	# of self-generated tweets	Numerical	Dependent	Graph API
Otra TW secondary	Having a secondary Account	Yes / No	Independent	Manual

6. RESULTS

In this section the results from the study using the methodology previously described are presented.

6.1 MATRIX: AIRLINES / SOCIAL MEDIA

The next matrix (table 16) presents which social media platforms are used by the airlines. The rows of this matrix corresponds to the top one hundred airlines according to the passengers transported in 2014 and the columns the different social media platforms. The intersections were filled with "1" if the airline used that social media and "0" if they did not.

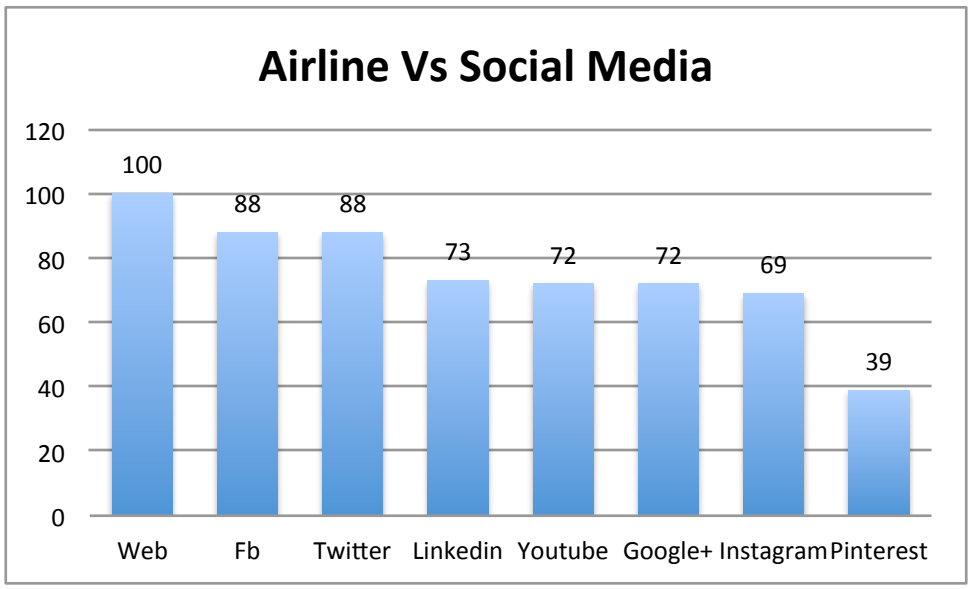
Note: The search concentrated on the main social media platforms. However, the results presented are a summary of the original matrix and it does not show the following platforms: Vk, Weibo, Tumblr, blogs, Foursquare due to space and little relevance.

	Airline	Web	Fb	Twitter	Linkedin	Youtube	Google+	Instagram	Pinterest
1	Delta Air Lines	1	1	1	1	1	1	1	1
2	Southwest Airlines	1	1	1	1	1	1	1	1
3	United Airlines	1	1	1	1	1	0	1	0
4	American Airlines	1	1	1	1	1	1	1	1
5	Ryanair	1	0	1	1	1	0	0	0
6	China Eastern Airlines	1	1	1	0	0	0	1	1
7	Lufthansa	1	1	1	1	1	1	1	1
8	China Southern Airlines	1	0	1	1	0	0	1	1
9	EasyJet	1	1	1	1	1	1	1	1
10	US Airways	1	1	1	1	1	0	0	0
11	Air China	1	1	1	0	0	0	0	0
12	Turkish Airlines	1	1	1	1	1	1	1	1
13	Air France	1	1	1	1	1	1	1	1
14	All Nippon Airways	1	1	1	1	0	1	1	1
15	Emirates	1	1	1	1	1	1	1	1
16	British Airways	1	1	1	1	1	1	1	1
17	TAM Linhas Aereas	1	1	1	1	1	1	0	0
18	GOL	1	1	1	0	1	1	0	0
19	Air Canada	1	1	1	1	1	1	1	1
20	Lion Air	1	0	0	1	0	0	1	0
21	ExpressJet Airlines	1	1	0	1	0	0	0	0
22	Air Berlin	1	1	1	1	1	1	1	0
23	JetBlue Airways	1	1	1	1	1	1	1	0
24	LAN Airlines	1	1	1	1	1	1	1	0

25	SkyWest Airlines	1	0	1	0	0	0	0	0
26	KLM	1	1	1	1	1	1	1	1
27	SAS Scandinavian Airlines	1	1	1	1	1	1	1	1
28	Saudia	1	1	1	1	1	1	1	1
29	Avianca	1	1	1	1	1	0	0	0
30	Japan Airlines	1	1	1	1	0	0	0	0
31	Alitalia	1	1	1	1	1	1	0	0
32	Shenzhen Airlines	1	0	0	0	0	0	0	0
33	Korean Air	1	1	1	0	1	1	1	1
34	Qantas	1	1	1	1	1	1	1	1
35	AirAsia	1	1	1	1	1	1	1	1
36	Thai Airways	1	1	1	0	1	1	1	0
37	Cathay Pacific	1	1	1	1	1	1	1	1
38	Aeroflot	1	1	1	0	1	1	1	0
39	Norwegian	1	1	1	1	1	1	1	0
40	Alaska Airlines	1	1	1	1	1	1	1	0
41	Garuda Indonesia	1	1	1	1	1	1	1	0
42	Qatar Airways	1	1	1	1	0	1	1	1
43	Virgin Australia	1	1	1	1	1	1	1	1
44	IndiGo	1	1	1	1	0	0	0	0
45	Singapore Airlines	1	1	1	1	1	1	1	0
46	Xiamen Airlines	1	0	0	0	0	0	0	0
47	WestJet Airlines	1	1	1	1	1	1	1	1
48	Envoy	1	0	0	0	0	0	0	0
49	Malaysia Airlines	1	1	1	1	1	1	1	0
50	Jet Airways	1	1	1	1	1	1	1	0
51	Vueling Airlines	1	1	1	1	1	1	1	1
52	JetStar Airways	1	1	1	1	1	1	1	0
53	Pegasus Airlines	1	1	1	1	0	0	1	0
54	Sichuan Airlines	1	0	0	0	0	0	0	0
55	Hainan Airlines	1	1	1	1	0	0	0	0
56	Swiss	1	1	1	1	1	1	1	0
57	Air India	1	1	1	1	0	1	1	0
58	Aeromexico	1	1	1	0	1	1	1	0
59	Asiana Airlines	1	1	1	0	0	0	0	0
60	Vietnam Airlines	1	1	0	0	1	0	0	0

61	CeBu Pacific Air	1	1	1	0	1	1	1	0
62	Shandong Airlines	1	0	0	1	0	0	0	0
63	Wizz Air	1	1	1	1	0	1	0	0
64	Air New Zealand	1	1	1	1	1	1	1	1
65	Azul	1	1	1	1	1	1	0	0
66	SpiceJet	1	1	1	1	1	1	0	1
67	Transaero	1	1	1	0	1	0	1	0
68	Spirit Airlines	1	0	1	1	0	1	0	0
69	China Airlines	1	0	0	0	0	0	0	0
70	Etihad Airways	1	1	1	1	1	1	1	0
71	Austrian Airlines	1	1	1	1	1	1	1	0
72	TAP Portugal	1	1	1	1	1	1	1	1
73	Frontier Airlines	1	1	1	1	1	1	1	0
74	Iberia	1	1	1	1	0	1	1	1
75	Thomson Airways	1	1	1	0	1	1	0	0
76	Thai AirAsia	1	1	1	0	1	0	1	0
77	Spring Airlines	1	1	0	1	0	0	1	0
78	Hawaiian Airlines	1	1	1	1	1	1	1	0
79	Aer Lingus	1	1	1	1	1	1	1	1
80	Egyptair	1	1	1	1	1	1	1	0
81	Finnair	1	1	1	0	1	1	0	0
82	Germanwings	1	1	1	1	1	1	1	0
83	Volaris	1	1	1	1	1	1	1	1
84	Air Europa	1	1	1	1	1	1	1	1
85	UTair	1	1	0	0	0	0	1	0
86	Interjet	1	1	1	1	1	1	1	1
87	EVA Air	1	1	1	1	1	1	1	0
88	AirAsia	1	1	1	1	1	1	1	1
89	Copa Airlines	1	1	1	1	1	1	1	1
90	Anadolu Jet	1	1	1	0	1	1	1	0
91	Allegiant Air	1	1	1	1	1	1	0	0
92	South African Airways	1	1	1	0	1	1	0	1
93	S7 Airlines	1	1	1	1	1	1	1	0
94	Philippine Airlines	1	1	1	0	0	1	0	0
95	Condor	1	1	1	0	1	0	1	1
96	Monarch Airlines	1	1	1	1	1	1	0	1
97	Flydubai	1	1	0	1	1	1	1	0
98	Skymark Airlines	1	0	1	0	0	0	0	0
99	Transavia Airlines	1	1	1	0	1	1	1	1
100	Virgin America	1	1	1	1	0	1	1	1
	Total	100	88	88	73	72	72	69	39

Table 16: Airline vs Social Media



6.2 GLOBAL INDICATORS: AIRLINES INDIVIDUALLY

Airline	Fans 16.6.2015	#Days Post (ND)	Growth Rate	#Comments	n	Neutral	Negative	Positive
KLM	9.174.522	34	0,61%	8405	95	31%	11%	58%
Turkish	6.609.681	37	2,33%	1274	89	50%	9%	41%
LAN	4.857.278	34	1,13%	3504	93	46%	11%	43%
Southwest	4.601.213	42	0,74%	6480	95	48%	12%	40%
Emirates	4.527.627	42	1,69%	10226	95	40%	7%	53%
GOL	2.387.435	62	1,37%	9318	95	57%	14%	29%
AA	1.853.362	55	0,67%	3566	94	45%	27%	28%
Lufthansa	1.823.049	42	0,42%	5260	94	55%	20%	25%
British	1.831.321	57	1,38%	1813	91	48%	8%	44%
Delta	1.411.644	49	0,73%	3024	93	37%	26%	37%
Alitalia	1.253.788	63	0,62%	194	64	47%	31%	22%
JetBlue	1.029.260	29	0,47%	1404	90	34%	12%	54%
AirCanada	993.452	34	0,30%	939	87	43%	36%	21%
United	794.909	121	0,65%	1628	91	32%	52%	16%
Qantas	674.585	87	1,74%	2600	93	47%	16%	37%
AR	628.988	134	1,76%	998	88	56%	12%	32%
EasyJet	343.320	43	2,27%	864	86	46%	29%	25%
Airberlin	290.518	344	0,87%	1073	88	58%	12%	30%
Promedio	**2.504.775,11**	**73**	**1,10%**	**3.476**		**46%**	**19%**	**35%**

Table 17: Global Indicators: Airlines Individually

Different indicators global indicators were analyzed for each airline. The results are presented in table 17 in descending order according to the number of fans. It can be observed that the airlines with higher ranking have higher percentage of positive comments. Furthermore, the results show that 46% of the analyzed comments are neutral, 35% positive and 19% negative. Most negative comments came from unsatisfied customers that manifested their discontent through this social media platform possibly to not only express their complaint but to obtain a faster reply from the airline.

On the other hand, during a period of two months the amount of fans were observed and from the beginning to the end and an average 1.1% increase was observed. Additionally, the airlines took on average of 73 days to publish 40 posts. (Data: 40 posts extracted until the 15th of May of 2015).

6.3 VofC (VELOCITY OF CONVERSATION)

The responses of the airlines to the comments generated by the fans were also analyzed. For this analysis, the study took into account the comments generated in the last 20 posts. Table 18 shows the main findings of this analysis and the different strategies of response can be observed.

Airlines	Comments	Replies	Reply	VC	SD	Min	Max
			[%]	[hh:mm:ss]			
GOL	2216	1244	56%	1:32:00	4:32:00	00:00:01	54:33:00
LAN	1410	747	53%	5:41:00	15:25:00	00:00:07	277:37:00
KLM	5189	2608	50%	1:01:00	10:00:00	00:00:18	371:00:00
Southwest	2017	457	23%	8:44:00	10:37:00	00:01:15	47:56:00
Alitalia	204	36	18%	4:18:00	7:01:00	00:00:39	24:27:00
United	1484	214	14%	1:59:00	5:20:00	00:03:59	56:09:00
JetBlue	966	104	11%	0:52:36	0:55:49	00:01	04:38
EasyJet	314	20	6%	16:27:00	27:54:00	00:04:53	96:26:00
Airberlin	1140	53	5%	8:09:00	14:07:00	00:00:48	76:39:00
AR	357	16	4%	16:21:00	10:35:00	00:02	36:31:00
Delta	1833	71	4%	10:22:00	16:47:00	00:00:57	69:20:00
Turkish	866	22	3%	6:08:00	8:15:00	0:04:01	25:37:00
AA	2018	23	1%	29:32:00	73:51:00	00:00:28	230:10:00
Lufthansa	4328	49	1%	3:18:00	5:27:00	00:05	20:37
British	948	8	1%	1:48:00	3:39:00	00:09:09	10:49
Emirates	2699	16	1%	6:56:00	6:27:00	00:01:42	16:24
Qantas	762	3	0%	NA	NA	NA	NA
AirCanada	548	1	0%	NA	NA	NA	NA
ExpressJet	41	0	0%	NA	NA	NA	NA

Table 18: Velocity of Conversation

The colors of the table represent different strategies. The airlines marked in green follow a strategy to reply the comments made in each post (%Reply > 10%) in this category GOL, LAN and KLM can be found with %reply > 50% and on the other end the ones marked in pink follow a strategy to not reply (%Reply = 0%) such as Qantas, Aircanada and ExpressJet. Comparing the number fans from each category it was observed that the ones with higher %replies have a higher % of followers. (Average number of fans: Green =3.4M, White = 2.1M and Pink = 0.8M)

Viewing the velocity of conversation the data show an average response in 3:26:48 for the airlines marked in green, 11:00:07 for the one marked in white (hh:mm:ss). Among the top airlines KLM and GOL have an average of 1:00:00 and 1:32:00.

It is reasonable to understand that to reply to a higher percentage of comments and with a low response time it is necessary to dispose of many resources to the social media area; but at the same time it is important to consider the importance of maintaining a good communication with your fans and reduce the possibility of viralization of negative comments by giving a quick response. In a more thorough analysis this trade off should be analyzed to determine the adequate number of resources to be destined to the social media department.

6.4 DESCRIPTIVE STATISTICS: AIRLINES INDIVIDUALLY

Rank/#fans	Airline	Country	# Posts Analysis	Analysis FB (Yes=1;No=0)	Date 1st post	Date last post	#Days to post
1	KLM	Holland	40	1	14/05/15	10/04/15	34
2	Turkish	Turkey	40	1	14/05/15	07/04/15	37
3	Air France	France	-	-	-	-	-
4	LAN	Chile	40	1	14/05/15	10/04/15	34
5	Southwest	USA	40	1	14/05/15	02/04/15	42
6	Emirates	UAE	40	1	14/05/15	02/04/15	42
7	TAM	Brazil	-	1	-	-	-
8	GOL	Brazil	40	1	14/05/15	13/03/15	62
9	American Airlines	USA	40	1	14/05/15	20/03/15	55
10	Lufthansa	Germany	40	1	17/04/15	06/03/15	42
11	British	UK	40	1	14/05/15	18/03/15	57
12	Avianca	Colombia	-	-	-	-	-
13	Delta	USA	40	1	14/05/15	26/03/15	49
14	Alitalia	Italia	40	1	08/05/15	06/03/15	63
15	JetBlue	USA	40	1	13/05/15	14/04/15	29
16	AirCanada	Canada	40	1	14/05/15	10/04/15	34
17	SAS	Sweden	-	-	-	-	-
18	UNITED	USA	40	1	15/05/15	14/01/15	121
19	Qantas	Australia	40	1	14/05/15	16/02/15	87
20	AR	Argentina	40	1	14/05/15	31/12/14	134
21	EasyJet	UK	40	1	14/05/15	01/04/15	43
22	Airberlin	Germany	40	1	13/05/15	03/06/14	344
23	**ExpressJet**	**USA**	**40**	**1**	**14/05/15**	**13/02/15**	**90**
24	Ryanair	Ireland	-	-	-	-	-

25	US Airways	USA	-	-	-	-	-	
26	SkyWest Airlines	USA	-	-	-	-	-	

(Cont.)

Rank/#fans	Airlines	#Fans (23/5/2015)	#Likes	#Shares	#Comments	P3	V3	C3	ID average[days]
1	KLM	9.118.604	386.943	43.094	8.405	1,06	0,12	0,02	9,35
2	Turkish	6.459.348	211.127	4.768	1.274	0,82	0,02	0	6,49
3	Air France	5.053.860	-	-	-	-	-	-	-
4	LAN	4.803.072	127.623	4.984	3.504	0,66	0,03	0,02	2,21
5	Southwest	4.567.481	91.024	19.543	6480	0,5	0,11	0,04	12,36
6	Emirates	4.452.465	556.872	37.987	10.226	3,13	0,21	0,06	15,52
7	TAM	2.823.321	-	-	-	-	-	-	-
8	GOL	2.355.182	493.169	16.315	9.318	5,23	0,17	0,1	21,25
9	American Airlines	1.841.056	131.007	5950	3.566	1,78	0,08	0,05	21,90
10	Lufthansa	1.815.379	117.122	22.468	5260	1,61	0,31	0,07	15,64
11	British	1.806.352	95.986	6620	1.813	1,33	0,09	0,03	7,02
12	Avianca	1.654.699	-	-	-				
13	Delta	1.401.419	94.168	4.716	3.024	1,68	0,08	0,05	14,65
14	Alitalia	1.246.049	7.194	549	194	0,14	0,01	0	7,69
15	JetBlue	1.024.404	23.822	2.633	1.404	0,58	0,06	0,03	4,55
16	AirCanada	990.453	20.661	2.048	939	0,52	0,05	0,02	7,18
17	SAS	824.380	-	-	-				
18	UNITED	789.775	18.676	1.177	1.628	0,59	0,04	0,05	53,91
19	Qantas	663.080	49.867	11.494	2600	1,88	0,43	0,1	3,74
20	AR	618.113	30.635	3.206	998	1,24	0,13	0,04	5,05
21	EasyJet	335.716	7.017	783	864	0,52	0,06	0,06	6,33
22	Airberlin	288.002	46.144	3.399	1.073	4,01	0,3	0,09	33,46
23	**ExpressJet**	**5.308**	**1.841**	**109**	**131**	**8,67**	**0,51**	**0,62**	**2,68**
24	Ryanair	-	-	-	-	-	-	-	-
25	US Airways	-	-	-	-	-	-	-	-
26	SkyWest Airlines	-	-	-	-	-	-	-	-

Table 19: Descriptive statistics: Airlines individually

Table 19 summarizes additional indicators of the airlines ordered according to the number of fans. From the data it can be seen that ExpressJet is positioned last with 5308 fans, very far from the next airline, Airberlin, that has 288.000 fans. Due to this particularity the specific indicators P3, V3 and C3 described in the methodology section that use the input of number of fans result in atypical values. For example: P3 = 8.67 for ExpressJet when the average of the airlines without ExpressJet is P3 = 1.51 and SD: 2.78. For this reason, it was considered an out-layer and it was not considered in the data set of the specific indicators. However, it was considered for

the analysis of media type used and the content category given that the number of fans did not have influence in this data set.

6.4.1 Distribution: Content category

The next table 20 shows the percentage of the 40 posts classified according to the category they belong. The color scale is applied for each airline (row), to indicate the preference of each airline in their posting content category. From this table we can observe how some airlines have an evident strategy to communicate certain content.

Rank	Airline	EST	OST	IN	AD	EB	SO	CO
1	Delta	13%	8%	28%	20%	5%	18%	10%
2	Southwest	33%	13%	15%	20%	8%	5%	8%
3	United	38%	13%	25%	3%	18%	5%	0%
4	American Airlines	8%	30%	33%	15%	5%	3%	8%
6	Lufthansa	28%	18%	15%	8%	3%	30%	0%
7	EasyJet	30%	0%	30%	28%	13%	0%	0%
9	Turkish	45%	35%	10%	3%	5%	0%	3%
11	Emirates	8%	43%	38%	0%	10%	3%	0%
12	British	48%	28%	15%	0%	10%	0%	0%
14	GOL	53%	13%	3%	30%	3%	0%	0%
15	AirCanada	40%	33%	15%	3%	8%	0%	3%
16	ExpressJet	28%	53%	10%	0%	8%	3%	0%
17	Airberlin	38%	30%	3%	5%	23%	3%	0%
18	JetBlue	48%	13%	0%	23%	15%	0%	3%
19	LAN	18%	0%	20%	10%	48%	0%	5%
21	KLM	20%	60%	10%	0%	10%	0%	0%
24	Alitalia	23%	30%	20%	18%	8%	3%	0%
25	Qantas	30%	40%	13%	0%	15%	0%	3%
26	Aerolíneas Argentinas	5%	15%	43%	33%	0%	0%	5%

Table 20: Distribution Content category

Delta, for example, has its posts distributed among all the content categories, unlike KLM that concentrates its posts in the “own story” category (OST – 60%) or Aerolineas Argentinas that posts mainly in the “information” category (IN – 43%) and

"advertisement (AD – 33%). It is important to highlight that the whole data set of 40 posts per airline resulted that the percentages of the content category "contest" (CO) is null.

Furthermore, analyzing in particular Lufthansa, a high number of posts were observed regarding the victims of the tragedy of Germanwings that occurred during the period of analysis. These posts entered the category of social (SO) and represent a 30% of their total posts. This detail was taken into consideration in a subsequent analysis because it altered the values of the specific indicators TimeID, P3, C3 and V3.

6.4.2 Distribution: Media type

Following the same logic of the content category table, in table 21 the distribution of the post's media type can be observed. In this case, it is remarkable that all the airlines post are mainly of the photo media type. The exception is Qantas that distributes its publications in photos and videos and KLM that posts with links. The usage of status is minimum in all of the airlines.

Rank	Airline	Photo	Video	Link	Status
1	DELTA	93%	8%	0%	0%
2	Southwest	60%	28%	10%	3%
3	United	83%	3%	13%	3%
4	AA	75%	8%	10%	8%
6	Lufthansa	65%	13%	3%	20%
7	EasyJet	58%	25%	18%	0%
9	Turkish	73%	28%	0%	0%
11	Emirates	75%	25%	0%	0%
12	British	93%	8%	0%	0%
14	GOL	88%	13%	0%	0%
15	AirCanada	78%	10%	8%	5%
16	ExpressJet	68%	0%	25%	8%
17	Airberlin	80%	8%	8%	5%
18	JetBlue	65%	20%	15%	0%
19	LAN	68%	10%	8%	15%
21	KLM	50%	8%	43%	0%

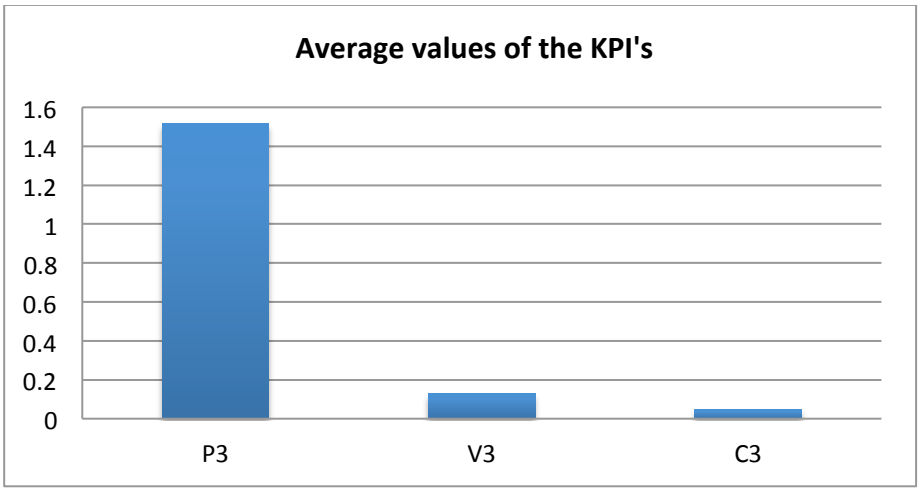
24	Alitalia	90%	5%	0%	5%
25	Qantas	48%	45%	8%	0%
26	AR	95%	5%	0%	0%

Table 21: Distribution Media Type

6.5 DESCRIPTIVE STATISTICS: AIRLINE SET

In this section the analysis will be done taking the whole data set of the airline posts as a group, to detect the general pattern lying in the data.

6.5.1 Specific indicators



Graph 12: Specifirc Indicators - Average Value of the KPIs

From the graph above it can be observed that fans tend to give a "like" ((P3: M=1,516; SD=2,78) more often than "share" (V3: M=0,1279; SD=0,48) and "comment" (C3: M=0,047; SD=0,080).

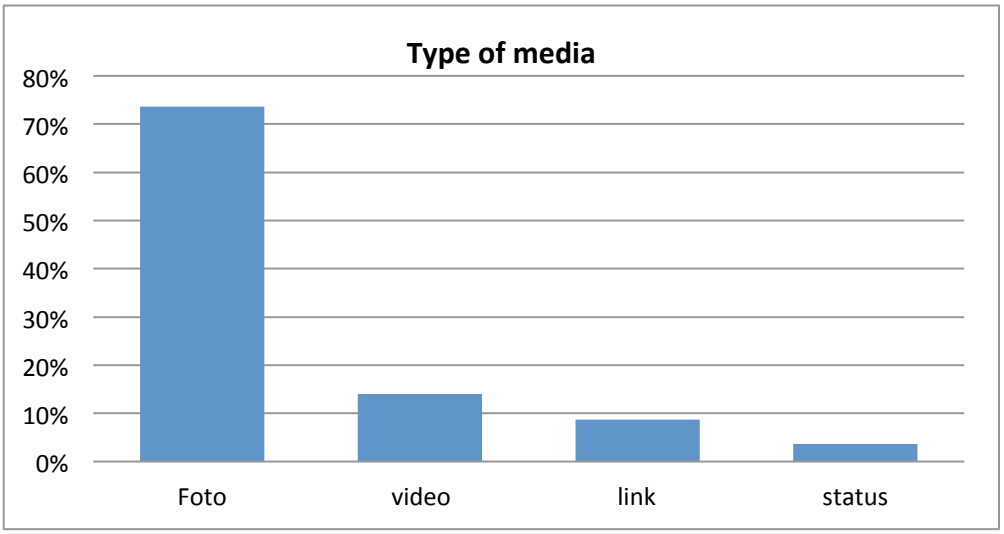
On the other hand, the duration of the interaction was: ID: M=331:25:04; SD=4561:00:18. In the annex the details can be found and table 22 summarizes the statistical characteristics of the KPI's.

[WO express jet]	P3	V3	C3	ID
Mean	1,516001285	0,127919476	0,047065021	331:25:04
Min	0	0	0	0:00:00
Max	38,10390206	9,29299632	1,166658565	4561:00:18
Var	2,781723295	0,480391734	0,08065825	42:14:01
Median	0,627385226	0,033517556	0,021777438	96:00:00

Table 22: KPI statistics

6.5.2 Type of media

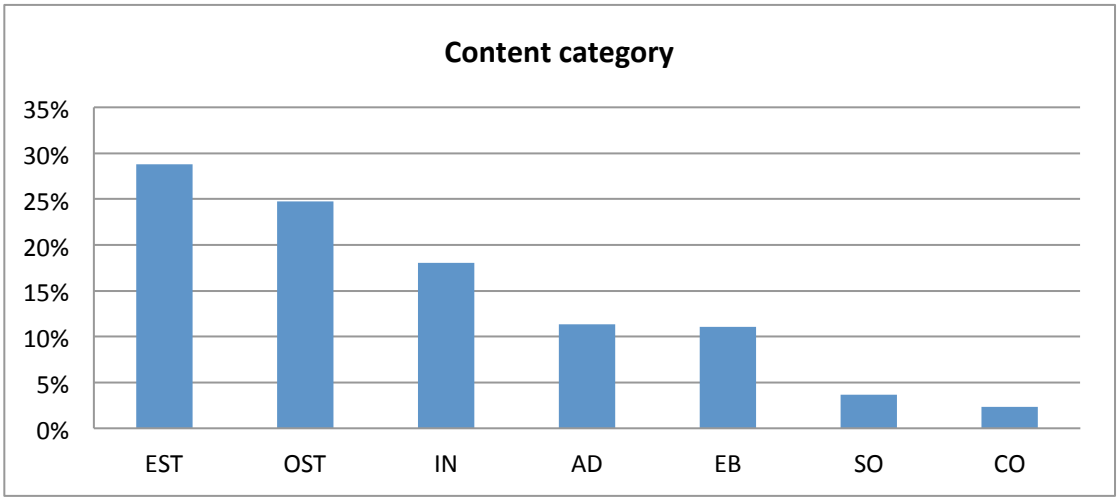
Graph 13 shows the preference of the type of media usage for the posts. 74% of the posts are photos, followed video 14%, link 9% and status 4%.



Graph 13: Type of Media

6.5.3 Content category

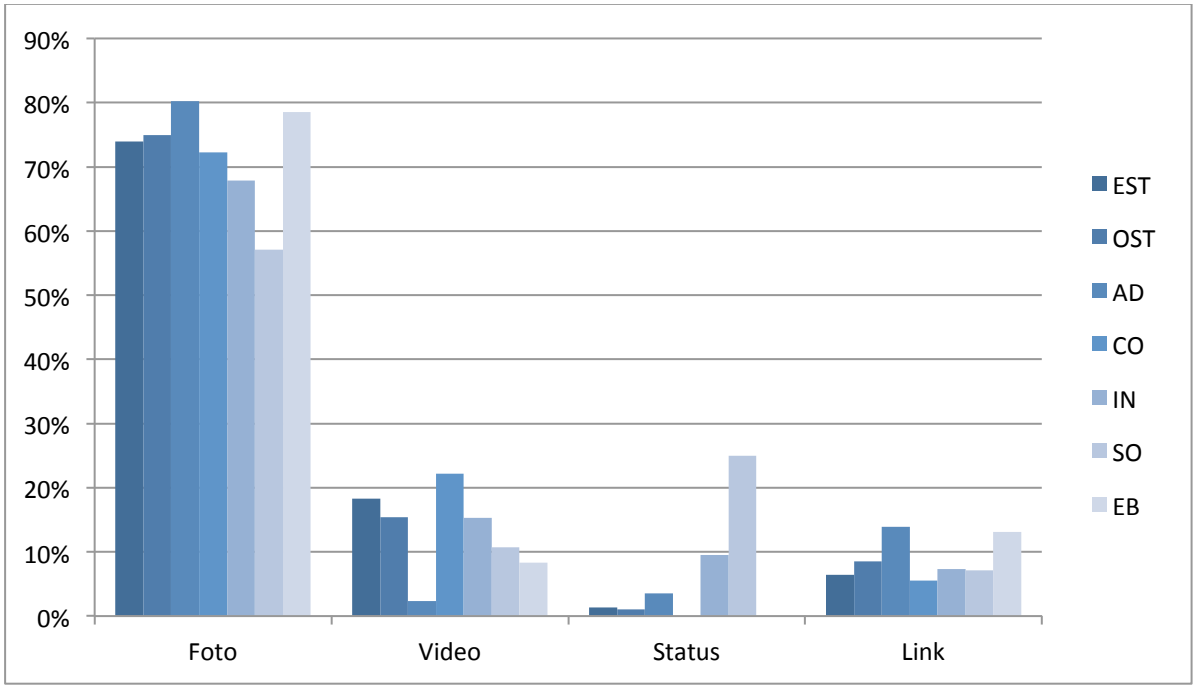
In this case the content category (Graph 14) it can be observed that the highest posting category is EST 29% and the lowest CO 2%. If EST (external story) and OST (own story) are considered as part of the same family (Story) they account for a substantial part of the posts.



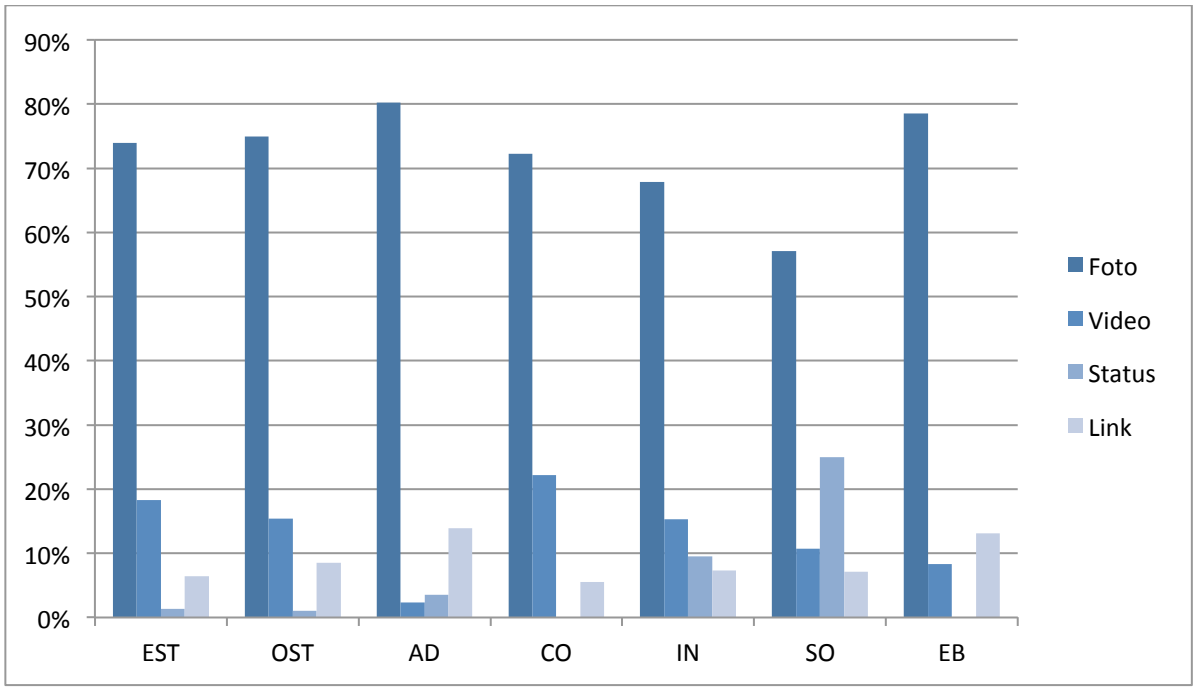
Graph 14: Content Category

6.5.4 Joint distribution

Graph 15 and 16 show the distribution when combining the type of media and content category. This highlights the preferred content category depending on the selected media type and vice versa the preferred media type according to the content category.



Graph 15: Joint Distribution

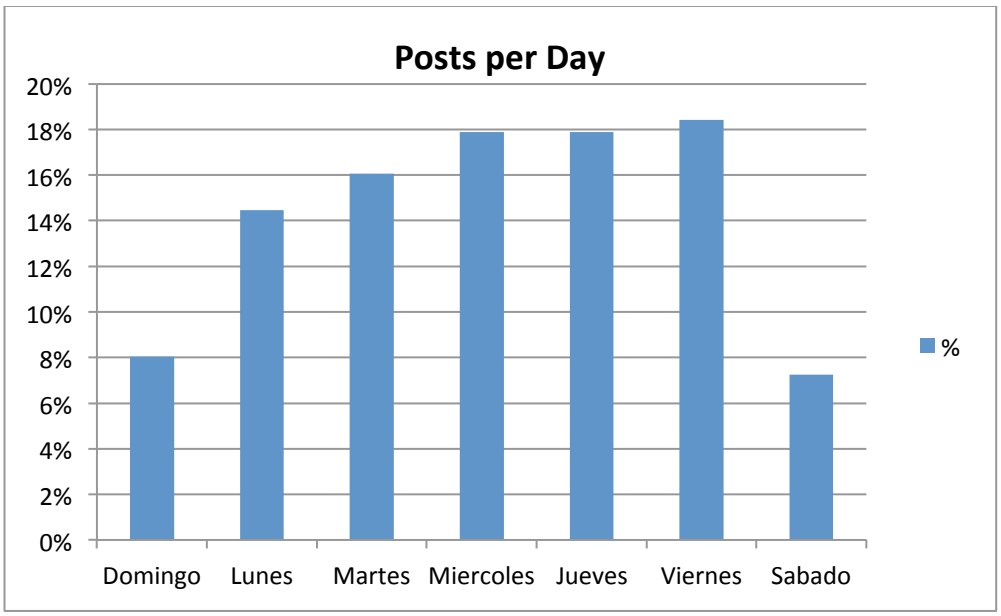


Graph 16: Joint Distribution (cont)

6.5.5 Time analysis

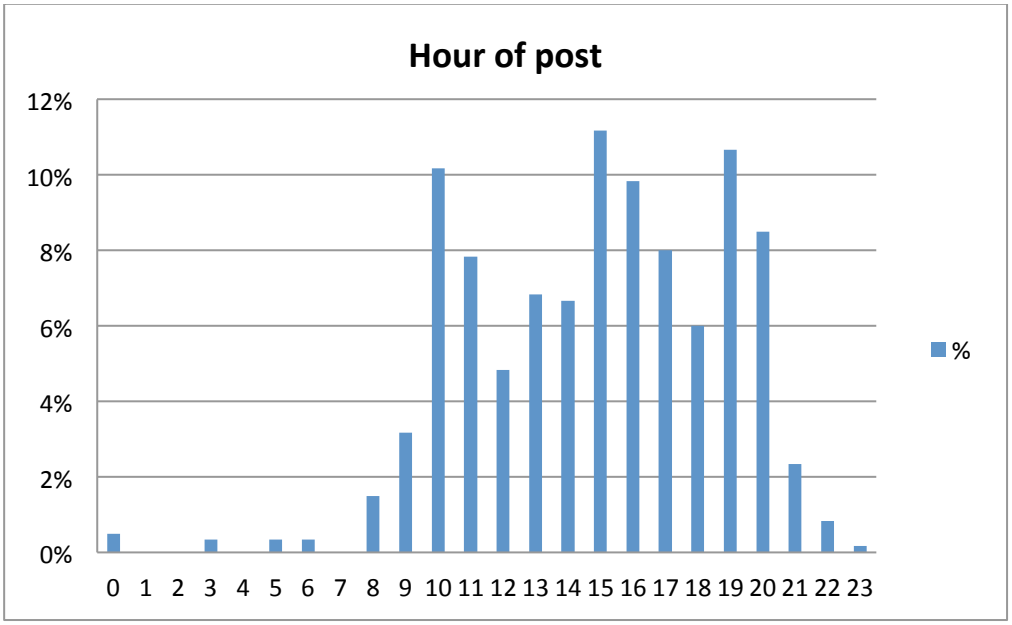
Another important aspect to understand how airlines use social media is to analyze the time patterns of the posts.

Posting day



Graph 17: Post per day distribution

Posting hour



Graph 18: Post per hour distribution

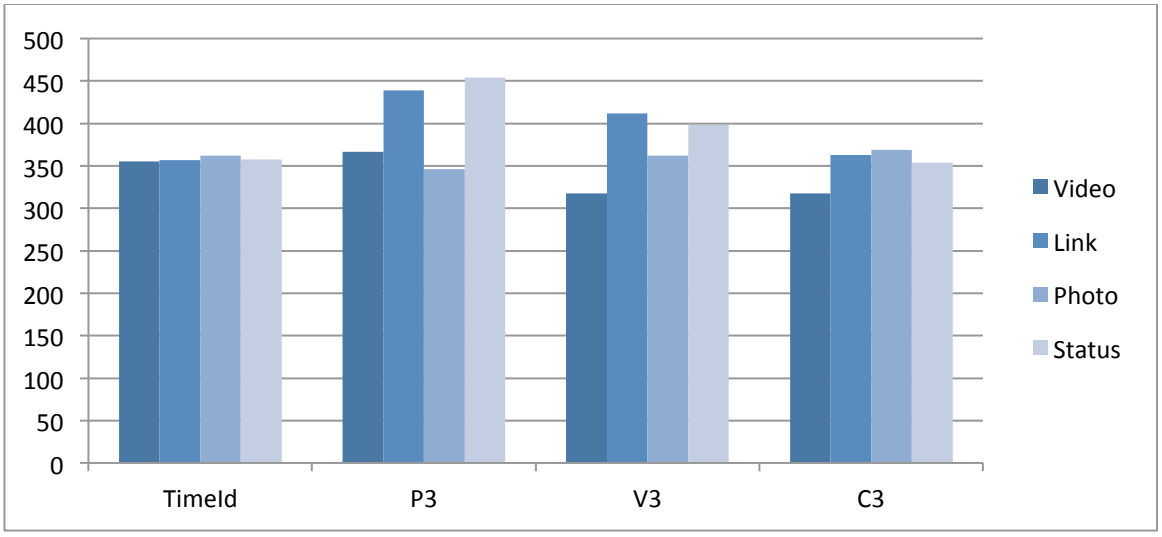
From both graph 17 and 18, it can be observed that the majority of the posts have been published on workdays and working hours. From the graph that shows the hour of the post we can differentiate two periods high hours (HH = 9 to 20 hrs) and low hours (LH = 21 hrs to 8 hrs.)

6.6 STATISTICS: KRUSCAL WALLIS

As described in the methodology, this section presents the results of the Kruscal-Wallis tests done to verify, if there is a significant statistical difference between the populations of the indicators TimeId, P3, V3, C3 when classified by media type, category type, day of post and time of post.

6.6.1 Media type

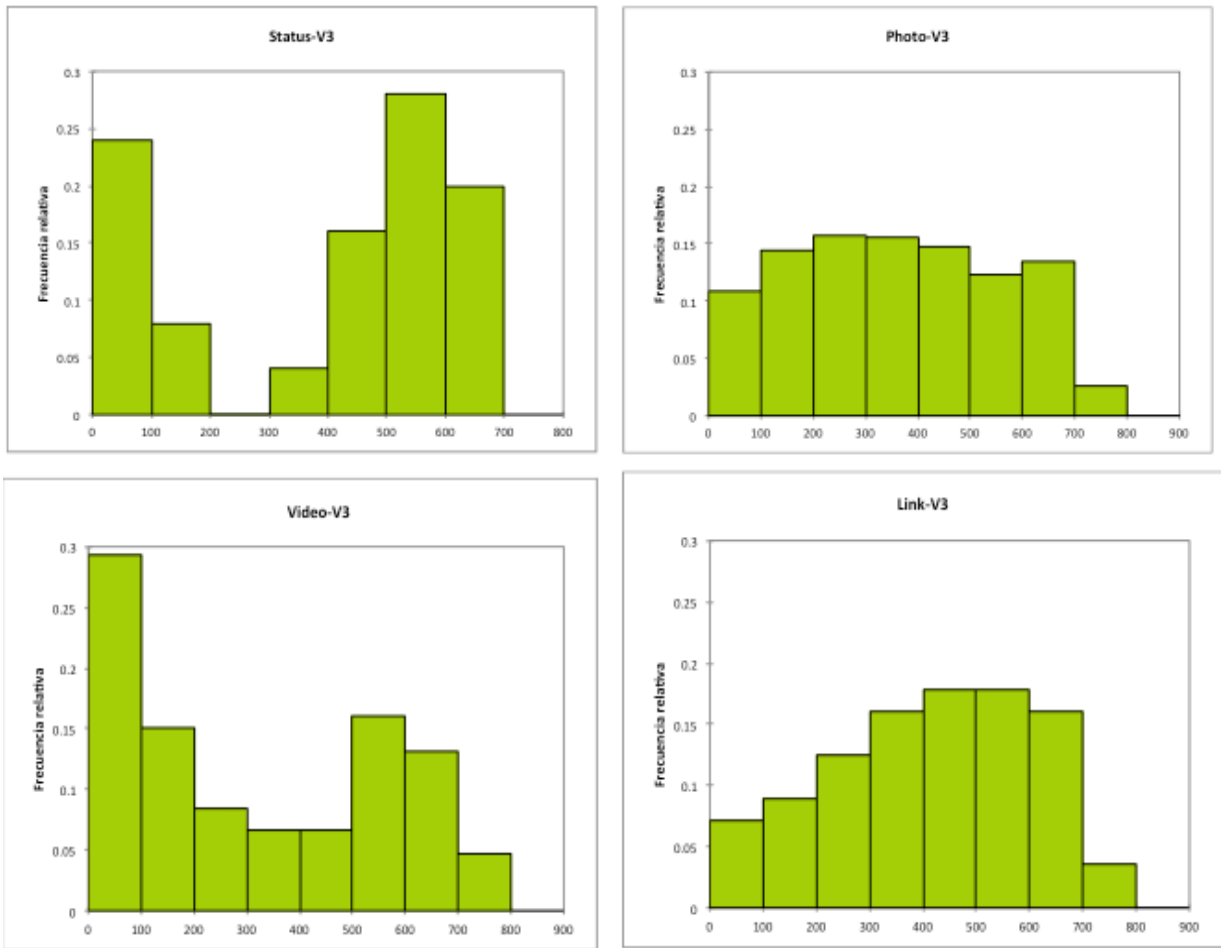
The test of Kruscal-Wallis showed that there is an important reaction of the customer to the stimuli of the media type. The results for this test where positive for P3 Xˆ2(3, N=720)=15,51, p<0.01) and V3 Xˆ2(3, N=720)=15,51, p<0.05) and no difference when testing TimeId or C3. The following graph 19 shows the average ranking using this test for the different media types.



Graph 19: Kruscal Wallis – Media type

The following histograms correspond to those populations for which the Kruscal-Wallis test was positive and therefore represented a significant difference.

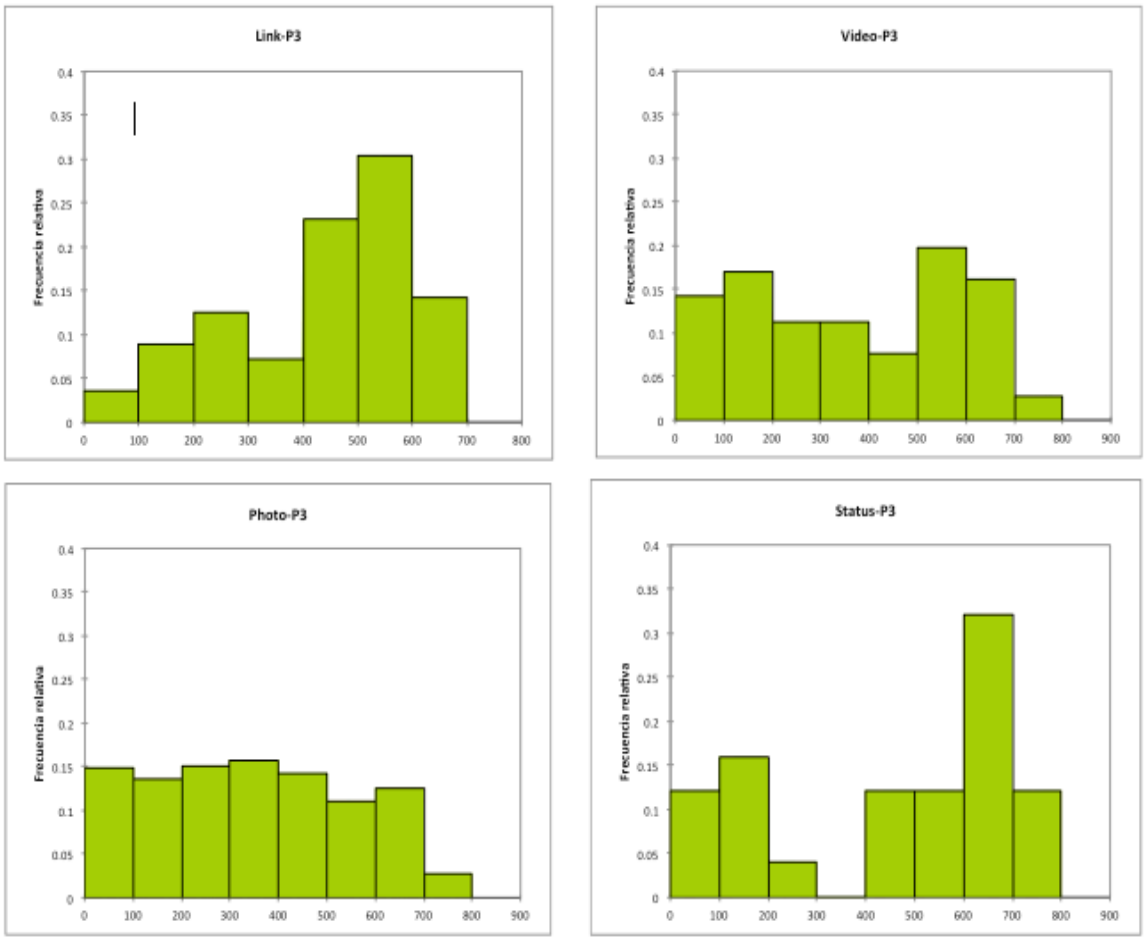
Histograms for V3 according to different media types



Graph 20: Media Type - V3 KPI Histograms

From these histograms it is possible to visualize that when the media type chosen was video, there was an increase in the amount of “shares” and when the media type chosen was a link the amount of “shares” was reduced. The “status” population is divided in what could be two populations; this could be explained given the posts related to condolences, published by Lufthansa and Airberlin that occurred during the period of analysis, which had a greater number of shares.

Histograms for P3 according to different media types

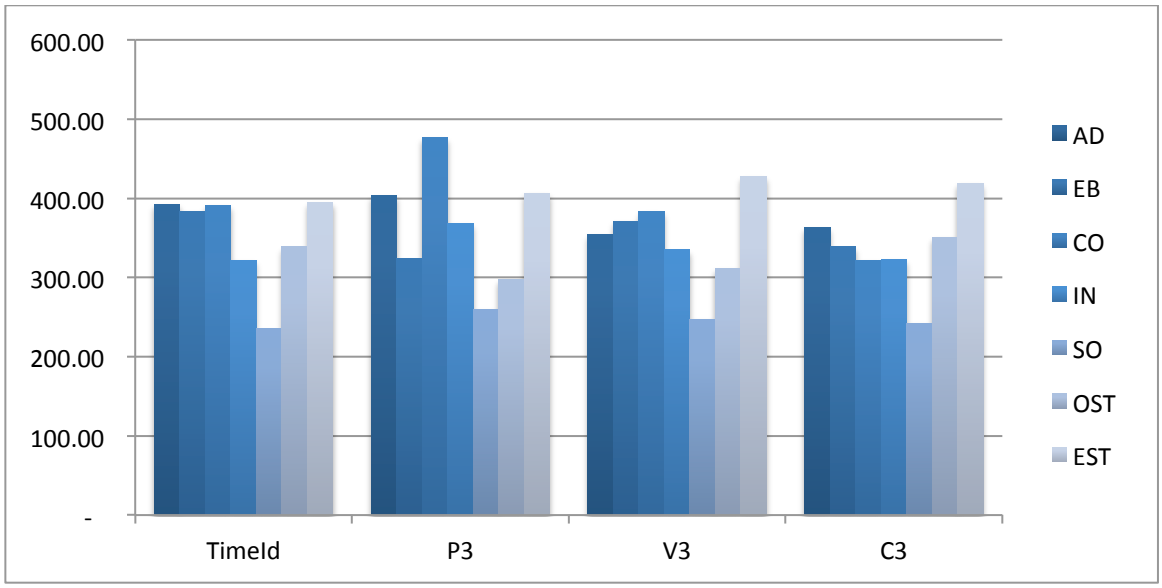


Graph 21: Media Type - P3 KPI histograms

From the above we can conclude that if the media type is a link the values of P3 tend to be the lowest of all the categories. When analyzing Status, it can be observed that it could be representing to different populations due to what was mentioned previously for the values of V3. Media types photo and video, have a higher frequency in the first values but have a more constant value in all ranges.

6.6.2 Content category

Graph 22 shows the results of the Kruscal-Wallis test done for the specific indicators according to the content category, in which the category social SO, has a predominant values.



Graph 22: Kruscal Wallis – Contenta Category

When investigating this category, it was detected that from a total of 28 posts classified as social SO, 16 where condolence messages of the airlines towards the families of the victims of the crashed plane of German Wings. Therefore, the values for all the indicators: TimeId, P3, V3, C3 resulted to be higher than all the rest. (Table 23)

This "sub-content" of social does not depend of the airline, but on extraordinary and random events, therefore this posts where removed from the analysis to have a better representation of daily occurrences.

This modification was done only for the content category analysis, given that they represent a 57% of the sample. Nonetheless, this values are meaningful and it is recommended when a random event occurs to publish such posts because the do increase interaction with users.

Table 23 (GW) details the removed posts of the sample and the same table shows the values of this posts that when compared to the rest demonstrate that are much higher.

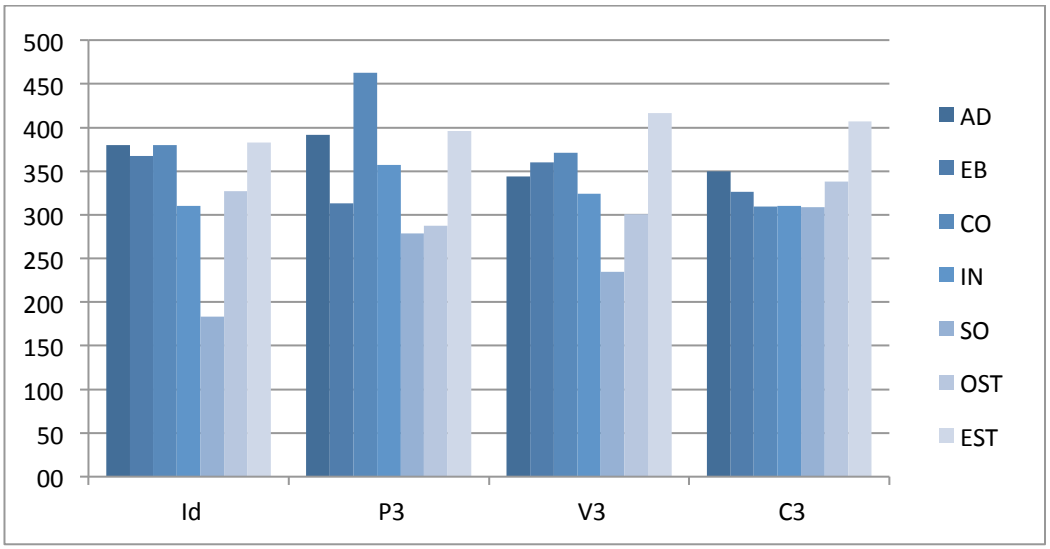
Airline	Message detail	Media type	TimeId	P3	V3	C3
Airberlin	Condolence GW	status	43,29	38,10	4,83	1,17
Airberlin	Condolence GW	status	183,87	4,53	0,41	0,31
LUFTHANSA	Condolence GW	Photo	12,47	3,81	0,32	0,12
LUFTHANSA	Condolence GW	status	2,74	3,28	0,72	0,27
LUFTHANSA	Condolence GW	video	45,83	2,56	0,18	0,12
LUFTHANSA	Condolence GW	Photo	46,87	2,07	0,23	0,12
LUFTHANSA	Condolence GW	link	22,40	1,97	-	0,06
LUFTHANSA	Condolence GW	status	3,34	1,84	0,60	0,18
LUFTHANSA	Condolence GW	video	10,87	1,82	0,24	0,12
LUFTHANSA	Condolence GW	Photo	6,37	1,38	0,00	0,03

LUFTHANSA	Condolence GW	status	4,27	1,17	0,13	0,16
LUFTHANSA	Condolence GW	Photo	26,08	0,67	0,10	0,04
LUFTHANSA	Condolence GW	Photo	25,36	0,50	0,06	0,02
Alitalia	Condolence GW	status	0,75	0,43	0,02	0,01
LUFTHANSA	Condolence GW	status	27,76	0,31	0,03	0,03
AA	Condolence GW	status	3,23	0,19	0,01	0,01
EMIRATES	Normal posts	Photo	20,32	21,82	0,80	0,11
DELTA	Normal posts	Photo	4,49	2,09	0,13	0,06
DELTA	Normal posts	Photo	15,69	1,87	0,17	0,04
DELTA	Normal posts	Photo	11,77	1,72	0,06	0,03
UNITED	Normal posts	Photo	20,18	1,49	0,12	0,01
DELTA	Normal posts	Photo	28,55	1,08	0,09	0,04
DELTA	Normal posts	Photo	9,65	1,03	0,04	0,03
DELTA	Normal posts	Photo	16,08	0,84	0,04	0,04
DELTA	Normal posts	Photo	21,58	0,45	0,02	0,02
SOUTHWEST	Normal posts	Link	9,23	0,40	0,41	0,02
UNITED	Normal posts	video	55,22	0,27	0,07	0,02
SOUTHWEST	Normal posts	Photo	23,63	0,09	0,00	0,00

Table 1: Social post KPI values

Content category [modified]

Now the test resulted positive for all the indicators, C3 $X^{2}(6, N=704)=24,17$, $p<0.0005$), V3 $X^{2}(6, N=704)=38,84$, $p<0.0001$), P3 $X^{2}(6, N=704)=39,74$, $p<0.0001$) and TimeId $X^{2}(6, N=704)=23,95$, $p<0.001$). The following graph shows the values of the different categories.



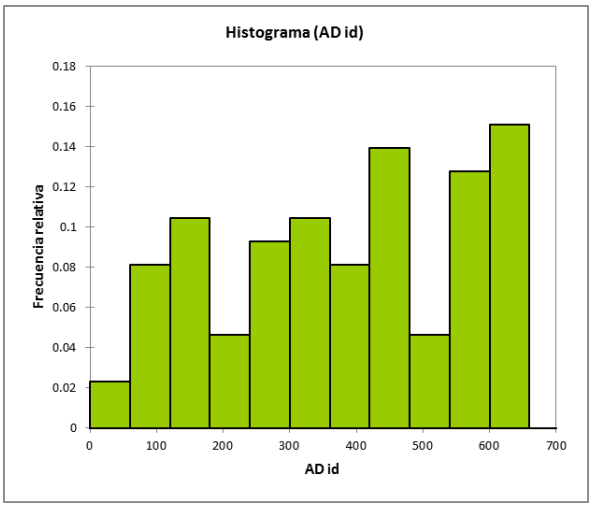
Graph 23: Kruscal Wallis – Content Category [modified]

Graph 23 represents the samples with the SO modifications, showing a more balanced set of values. However, SO is still the category with the highest values for each indicator, nonetheless it is important to keep in mind that given the

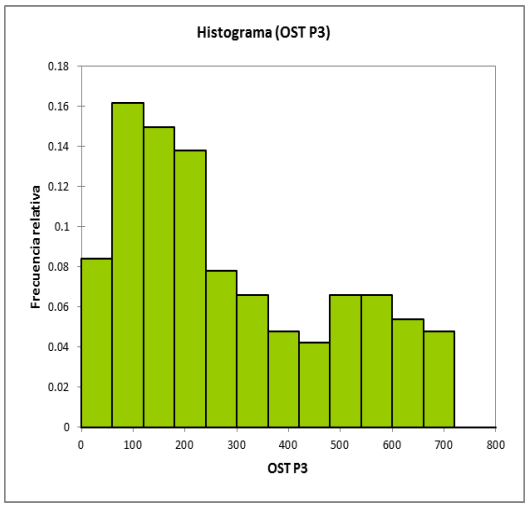
modifications the sample size is composed of only 12 post and therefore the average is not very representative.

Histograms: Content category

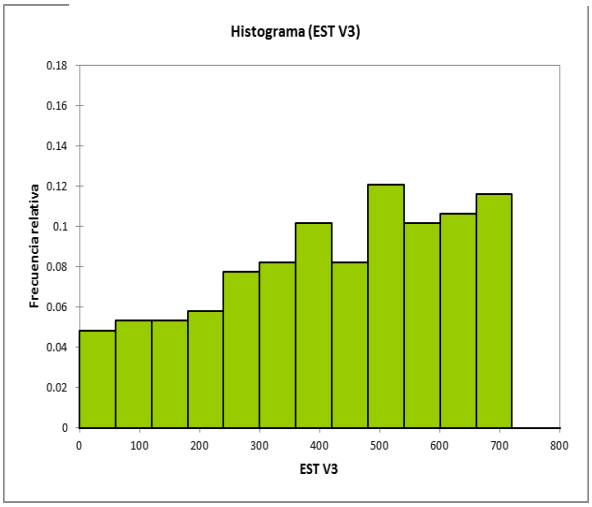
The Kruscal-Wallis tests where positive for all the indicators, so to be more synthetic only one histograms for each indicator is shown in this section, the rest of the histograms are present in the annex.



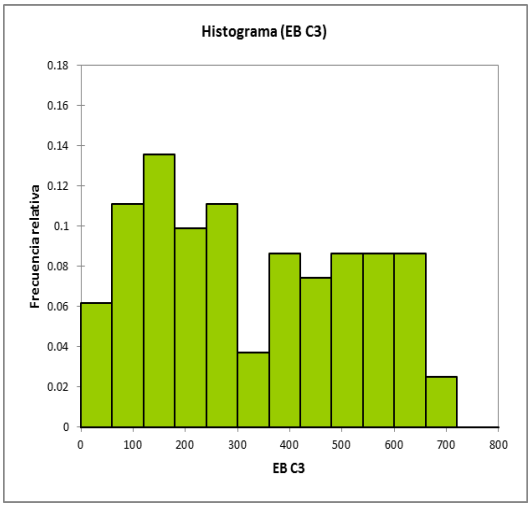
Graph 24: TimeId AD Histogram



Graph 25:P3 OST Histogram



Graph 26: V3 EST Histogram



Graph 27: EB C3 Histogram

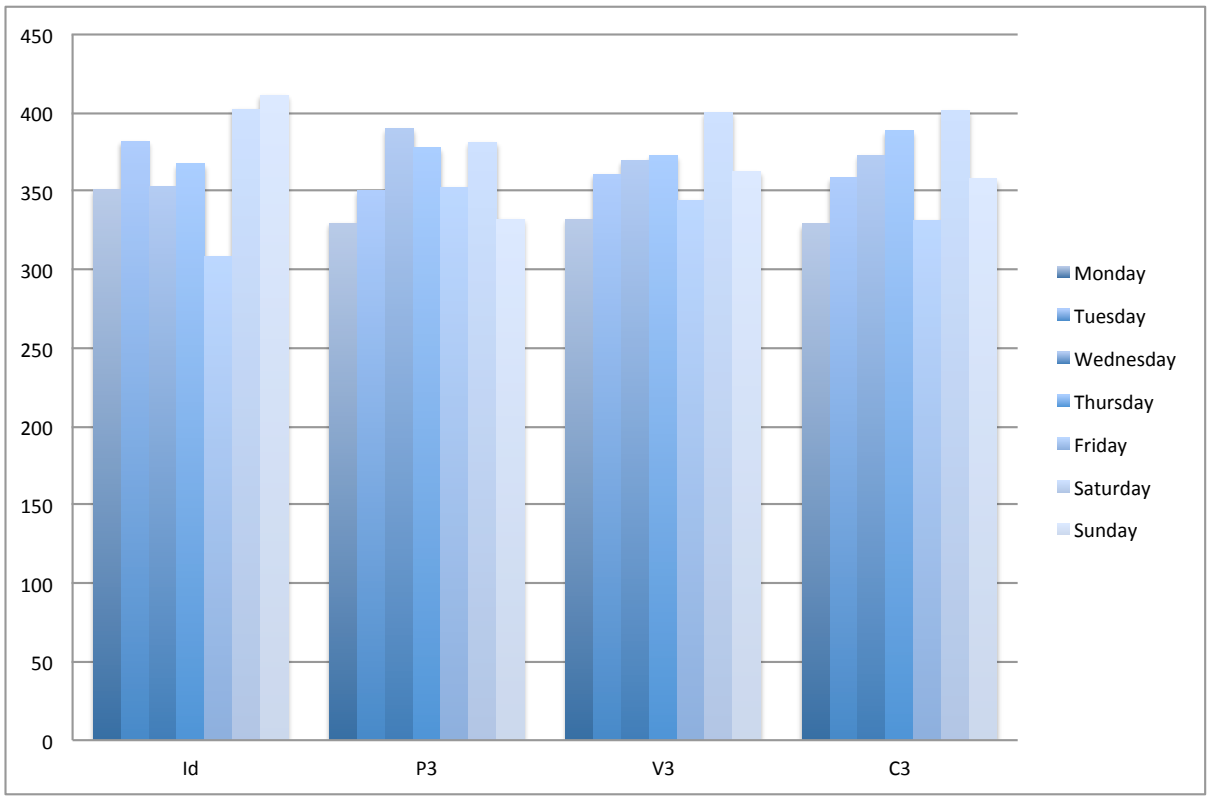
From the histogram AD-TimeId (graph24) and the histogram EST-V3 (graph 26), it can be observed that the distributions tend to low values for these indicators. This means, that the interaction TimeId when the post is an advertisement is short, which is logical given that offers usually last a short amount of time. On the other hand, according to the data, the amount of shares is lower when the content category is

EST. Additionally, histograms OST-P3 (graph 25) and EB (graph 27), show higher interaction. This can be attributed to the fact that followers “like” own stories of the airlines that they follow and engagement booster increase the number of comments as they tend to encourage such a reaction. (ex.: What do you think of our new planes?)

6.6.3 Day of post

The previous analysis was repeated but this time taking into account the different days of the week. The results of the Kruscal-Wallis test show a significant difference for the indicator TimeId Xˆ2(6, N=720)=15,61, p<0.05) and no significant difference for the other indicators (P3, V3 y C3).

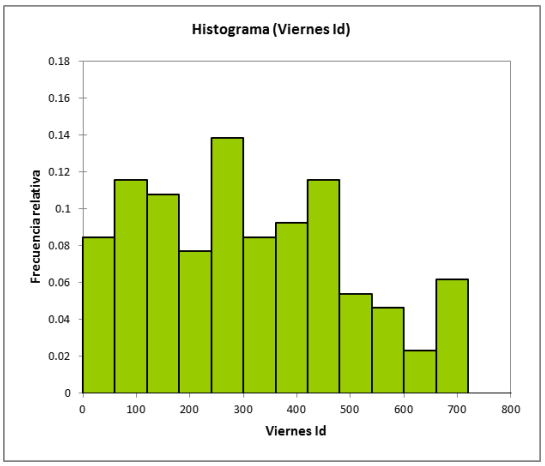
The next graph shows the average ranking values of the posting days according to each indicator.



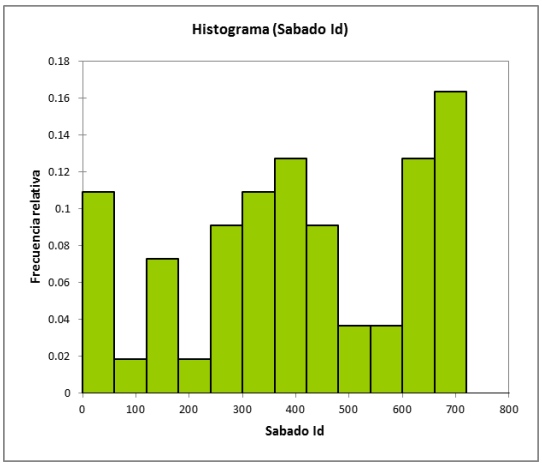
Graph 28: Kruscal Wallis – Day of Post

To visualize the results and their distribution, we graphed the different histograms for those indicators that resulted positive in the Kruscal-Wallis test.

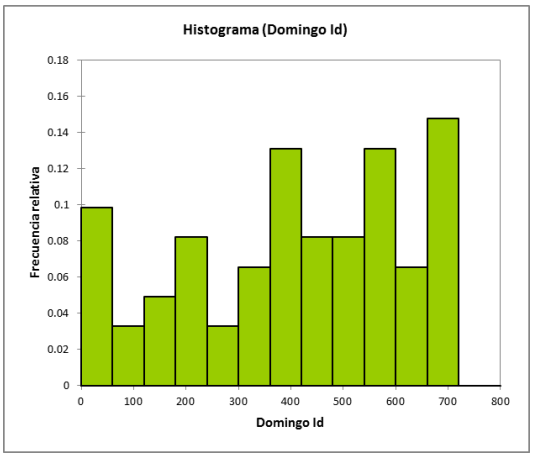
Histograms I: Day of post TimeId



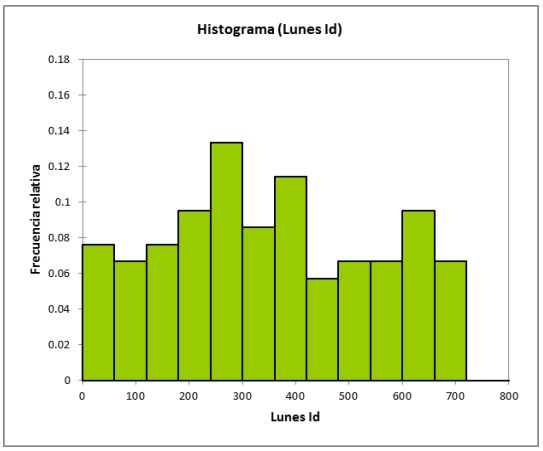
Graph 32: TimeID Friday Histogram



Graph 32: TimeID Saturday Histogram



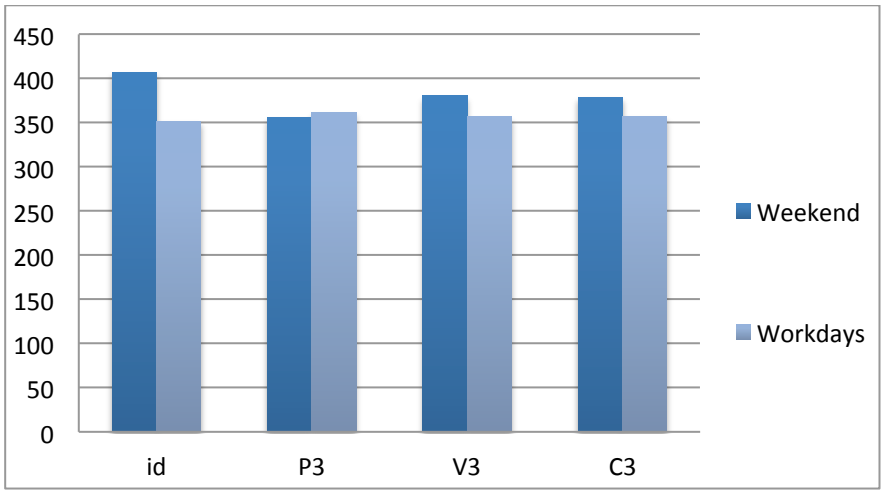
Graph 32: TimeID Sunday Histogram



Graph 32: TimeID Monday Histogram

It can be seen from the histograms that Monday (graph 31) and Friday (graph29) have the longest post interaction duration and that posts done on Saturday (graph 30) and Sunday (graph 32) have lower time interaction duration, however this difference is not statistically significant.

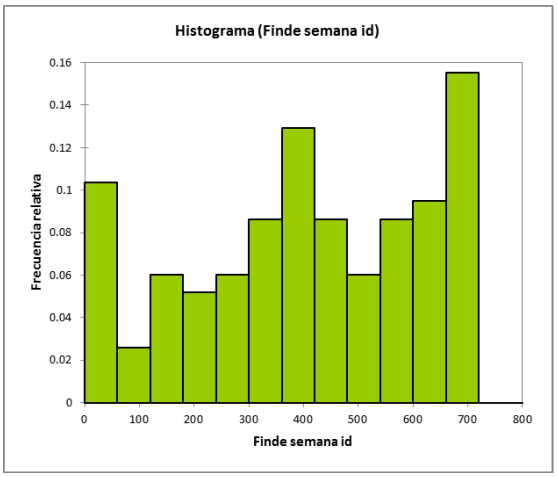
On a second phase, the Kruscal-Wallis test was done grouping work days and weekends. The results where positive for TimeId con $X^{2}(1, N=720)=6,92$, $p<0.001$), graph 33 shows the average values of the ranking.



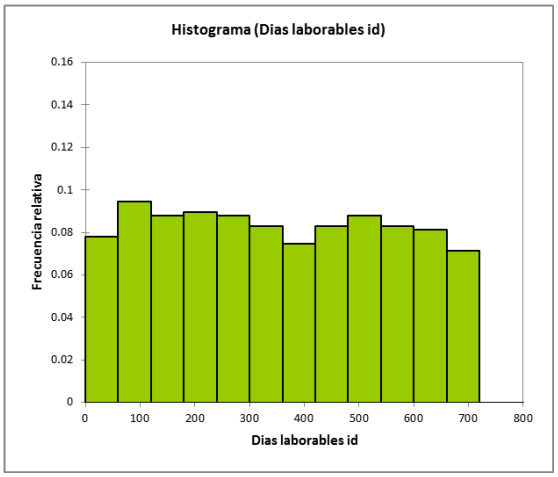
Graph 33: Kruscal Wallis – Work Days

The following histograms show the rankings of the sample made from the variable work days and weekends for the indicator TimeId.

Histograms II: Day of post TimeId



Graph 35: TimeId Weekend Histogram



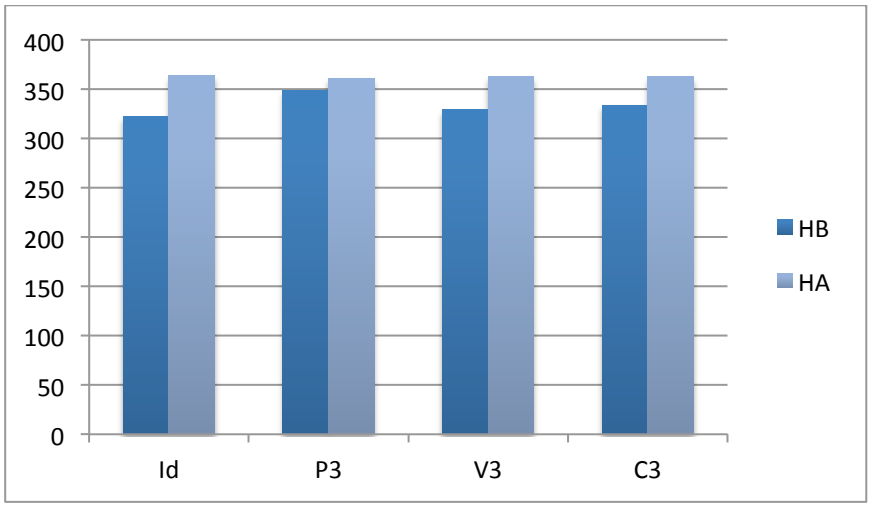
Graph 34: TimeID WorkDays Histogram

These histograms highlight how the duration of the posts is lower on the weekend (graph 34) compared to work days (graph 35).

6.6.4 Time of post

To determine the time of post we grouped the hours according to the frequency of posts. Forming hour A [HA: 9-20hs] hour B [HB: 21-8hs]. Then these groups were compared using the Kruscal-wallis test. The results were negative and resulted in no

statistical difference in any of the indicators. Graph 36 shows the ranking values for the mentioned periods.



Graph 36: Kruscal Wallis – Time of Post

6.7 TWITTER ANALYSIS

Airlines	#Tweets	#Following	#Followers	Tweet count	#días	retweet _count	favorite _count	Replies	Tweets propios	Otra TW secundaria
Delta	10.900	1.098	920.000	40	8	332	417	33	7	si
Southwest	57.200	19.800	1.820.000	40	0	0	3	40	0	no
United	401.000	35.000	625.000	40	0	0	0	40	0	no
Ryanair	37.600	229	137.000	40	0	2	9	39	1	no
Turkish	3.804	49	646.639	40	14	1276	4642	0	40	si
Air france	85.800	9.818	137.000	40	0	2	4	40	0	no
Emirates	492	29	429.000	33	40	2524	3552	10	30	si
British	236.000	31.200	631.000	40	0	0	6	40	0	no
Tam	188.590	13.535	791.997	40	0	5	10	40	0	no
Gol	14.356	14.456	393.927	40	15	160	365	16	24	si
AirCanada	147.000	9.557	279.000	40	0	20	5	37	3	no
airberlin	12.151	4.995	44.141	40	2	3	5	40	0	no
LAN	66.926	9.588	25.223	40	14	77	46	10	30	si
Skywest	304	281	2.303	40	124	163	134	23	17	no
KLM	523.509	49.743	1.664.924	40	0	1	3	40	0	no
SAS	14.700	151	65.700	40	1	6	8	37	3	no
Alitalia	7.604	785	80.659	40	0	30	49	38	2	no
Qantas	65.992	5.394	253.595	40	0	13	38	39	1	no
Aerolineas	24.165	59	195.536	40	1	89	41	31	9	no
AA	820.000	54.500	1.060.000	40	0	1	4	40	0	no

Table 23: Twitter Analysis

Finally for the Twitter analysis, 40 tweets of each airline where retrieved as a sample size for which we counted the “retweets_count” and “favorite_count” using the twitter API. This tool also allowed us to distinguish between “own” tweets and “reply” tweets, it is important to keep this in mind because these two types of tweets generated significant differences. According to the analysis made, the higher the “own” tweets posted the higher the retweet_count and favorite_count.

Airlines that possess two different twitter accounts, one destined to post content called “primary” and a “secondary” account to respond to users requests, have had better results in the established indicators compared to the ones that have only one account. This is due to the fact that the ones with two accounts can focus the “primary” account to publish content related to the company that is more appealing for the users, which will consequently interact more. Examples of these airlines are Delta, Turkish, Emirates, GoI and LAN. This can be seen in table 23, where the collected data is summarized.

The exception is Skywest but it was considered as an out-layer given that to publish 40 tweets it took them 124 days, evidencing that they are not actively using the platform.

Analyzing the airlines that only have one account, it can be seen that the vast majority generated the 40 tweets on the same day. This is due to the fact, that most of the tweets were replies to questions asked by users. This is also the reason why these airlines have low favorite_count and retweet_count values.

Ultimately, it can be concluded that the level of interaction of the users using twitter depends on the type of content that is published, being “own” tweets the ones that generate higher interaction. Additionally, the replies to the users doubts have almost no interaction given that the objective of the reply is to answer a specific doubt ending the interaction and being appealing only for the person that wrote the question.

6.8 COMPARATIVE DISCUSSION

The main findings that differentiate the two social media platforms analyzed are the following.

Comparison	Facebook	Twitter
Official accounts	>1	1
AVG posting time (for 40 posts)	73	5
Main content categories	EST & OST	Answer to requests & CO
Highest engagement categories	OST, EB, SO	OST
Main media type	Photo	Status
Strategies	Long term relationships	Immediate Support

From a number of accounts point of view, Facebook had one official account per region, this allowed each airline to generate specific content according to their customers customs. (For the sake of this research analysis, only the headquarters country page was analyzed). On the other hand, the majority of the studied airlines had only one twitter account. The focus of this account was on replying to customer’s requests on a 24hs timeframe. However, some did have an additional account that allowed airlines to have a similar strategy as Facebook and focusing on generating

engagement content, such Own and External stories.

Analyzing the average posting time to complete the total of 40 posts or tweets studied in the data set, Facebook took 73 days to post and twitter took 5 days to tweet. In a further analysis, when clustering the data from of the airlines that participated the most on social media, the average posting time was reduced, approximately 40 days for Facebook and 5 hours for twitter.

The main content categories for the analyzed social media platforms were also a point of difference. Facebook posted Own and External stories and Twitter content was mainly replies to customer requests. Therefore, it could be concluded that the strategy for the use of Facebook and Twitter are different. Given the content category posted on the social media platforms, Facebook if focused on long term relationships and Twitter is focused on giving immediate support, short term relationships.

7. CONCLUSION

This project investigates and analyzes how airlines use social media in their customer engagement strategy.

The first part of the project details the most relevant aspects of the airlines and social media. On the one hand, we have the description and context of the airlines, their relevant factors, their role in the economy and current use of social media. On the other hand, the description of the different social media platforms, the terminologies used, the impact on customs, the broad applications and evolution. Additionally, we described what was understood in different literary works by customer engagement and described various success cases that evidence the use of social media by the airlines, their different applicability, effects on customers and the positive impact for the airline. Cases, that can help guide future campaigns.

With the gathered information from different academic sources, thesis, interviews, articles, books and testimonies as a basis we then performed our own empirical study, to view and exhibit the connection between airlines and social media. Therefore, a methodology was created and detailed to collect the information that the airlines generate in their social media platforms. The study focuses on the most popular platforms: Facebook and Twitter. This information was then processed, verified and then used to determine the values of different indicators previously defined. The goal of the indicators was to facilitate the quantification and interpretation of the data. Finally, to verify if significant differences existed in the samples of each indicator a Kruscal-Wallis test was performed TimeId, P3, V3, C3 according to media type, content category, day of post and time of post.

As mentioned in the results section, the first conclusion from the data was that the most popular social media platforms among the top 100 airlines were Facebook and Twitter. Both are used in 88 of the 100 airlines observed, fact that concurs with different studies of various sources that state that these are the most popular platforms.

A further, more detailed analysis of the interaction of the top 26 airlines with their followers, using the information generated in Facebook and Twitter, with the objective to detect patterns in the behavior of the airlines individually and as a sector.

The global indicators reflect that the airlines with higher amount of fans have the higher percentage of positive comments. From the total sample of comments analyzed the results show that 46% of the comment where neutral, 35% positive y 19% negative. Furthermore, an increase of 1,10% of the fans was registered in a two-month period and it took on average 73 days to post the 40 analyzed posts. In addition, the measure of velocity of conversation highlighted some airlines such as GOL, LAN and KLM for which reply to comments where above 50% of all comments received.

Observing the values of the specific indicators P3, V3, C3 referred to the amount of likes, shares and comments, it was noticed that fans give a “like” (P3: M=1,516; SD=2,78) more frequently compared to “share” (V3: M=0,1279; SD=0,48) and “comment” (C3: M=0,047; SD=0,080). Besides, the indicator TimeId resulted to have an interaction of (ID: M=331:25:04 y SD=4561:00 :18).

The sample data taken shows that there is a preference in using photos when airlines post, representing a total of 74% photo posts. This could be related to the facility, time and cost to generate this type of media compared to producing a video. The Kruscal-wallis test resulted positive in the media type sample for the indicators P3 and V3. Analyzing the histograms it resulted that when the type of media was a video, the amount of shares and likes was the highest, followed by photos; and when the media type was a link the amount of shares and likes was the lowest.

To analyze the content of the posts the following categories where defined: AD (advertisement), EB (engagement boost), CO (contest), IN (information), SO (social), OST (own story) y EST (external story). The data shows a marked tendency of the airlines to publish EST (29%) and OST (25%) content and very infrequently publishing CO (2%). To analyze the different distributions histograms where built. From the histogram AD-TimeId and the histogram EST-V3, it could be observed that the distribution tends to low values for the indicators using this contents. Meaning, that the duration of the interaction when the post was an advertisement was short, that correlates to reality because offers tend to be for limited periods. Additionally, according to the data the users barely share the post if the airline post was EST. On the other hand the histograms OST-P3 and EB-C3, presented higher values for the indicators, therefore higher interaction. Users tend to like the airlines own stories, expected fact because they are fans of the airline and the engagement boosters had greater amount of comments, as they tend to request this type of reaction from the user. (ex: What do you think of our planes?). The indicators V3 and TimeId are to be mentioned, because they are very high for the category social, but this could be bias because the sample size is very small.

Also, the time of post and day of the post where analyzed with Kruscal-Wallis test and graphed. The time frame with higher posting frequency was between 09:00 and 20:00, which is expected because they are usual office hours. However, the Kruscal-Wallis test was negative and therefore shows no significant statistical difference between the samples.

On the other hand, the posting day was analyzed, presenting an increase in the amount of posts from Monday (14%) to Friday (18%) and a decrease on weekends, Saturday (7%) and Sunday (8%). Additionally, a Kruscal-Wallis test was done by grouping the different days of the week and resulted positive for the indicator TimeId. From the corresponding histograms it could be seen that the posts made on Monday

and Friday had longer interaction than the ones made on Saturday or Sunday, however the difference was small.

From the Twitter data, it could be concluded that the airlines that had more than one account had a greater interaction per posted tweet, such where the cases for Delta and Emirates. This could be related to the fact of having more than one account, In this way the airline could orientate the traffic of questions to a secondary account, having the primary account to publish content that generates user interaction. It's to be expected, that a tweet to answer a user request will have less interaction, less retweets and less favorite count than a tweet that has a photo, video or link that stimulate interaction.

Summarizing, this project investigates and analyzes how airlines use social media in their customer engagement strategy. The empirical study considers the variables (a) media type, (b) content category, (c) time of post and (d) day of post, which were analyzed using indicators in order to understand and draw the following conclusions for the management of the social platforms Facebook and Twitter: (1) The level of customer engagement can be increased if the variables a, b, c, d are selected adequately, (2) The level of customer engagement can be measured according to their actions in social media, for example: likes, shares, comments and TimeId. (3) Select photo and video posts before posting link or status posts to increment the amount of likes and shares, (4) Posting OST can increase the amount of likes, posting EB increases the amount of comments and SO generates high levels of interaction, (5) Posting on Friday can increase the interaction time of the post, (6) Replying to comments in a reasonable time lapse can decreases the negative mouth to mouth.

From this research one can observe the flexibility and the utility that social media has as a communication tool to generate direct contact with the client and also observe the potentiality of the API that most social media have. These can be of great use for future studies not just for a company, but also to evaluate the use and impact that the competition is having using its social platforms.

To conclude, social media are tools with great potential, but these require of a thought out and planned strategic management to be aligned with the objectives and company policies, otherwise it could turn to be unproductive. We expect that our results motivate the social media managers to create clear strategies to increase customer engagement and fans numbers.

Finally, we would like to highlight that this empirical study is focused on airlines and takes as a data set 26 airlines, 760 posts of Facebook and 800 tweets. Additionally, this investigation mainly analyses Facebook and leaves a methodology that can be used for future investigations.

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9. ANNEX

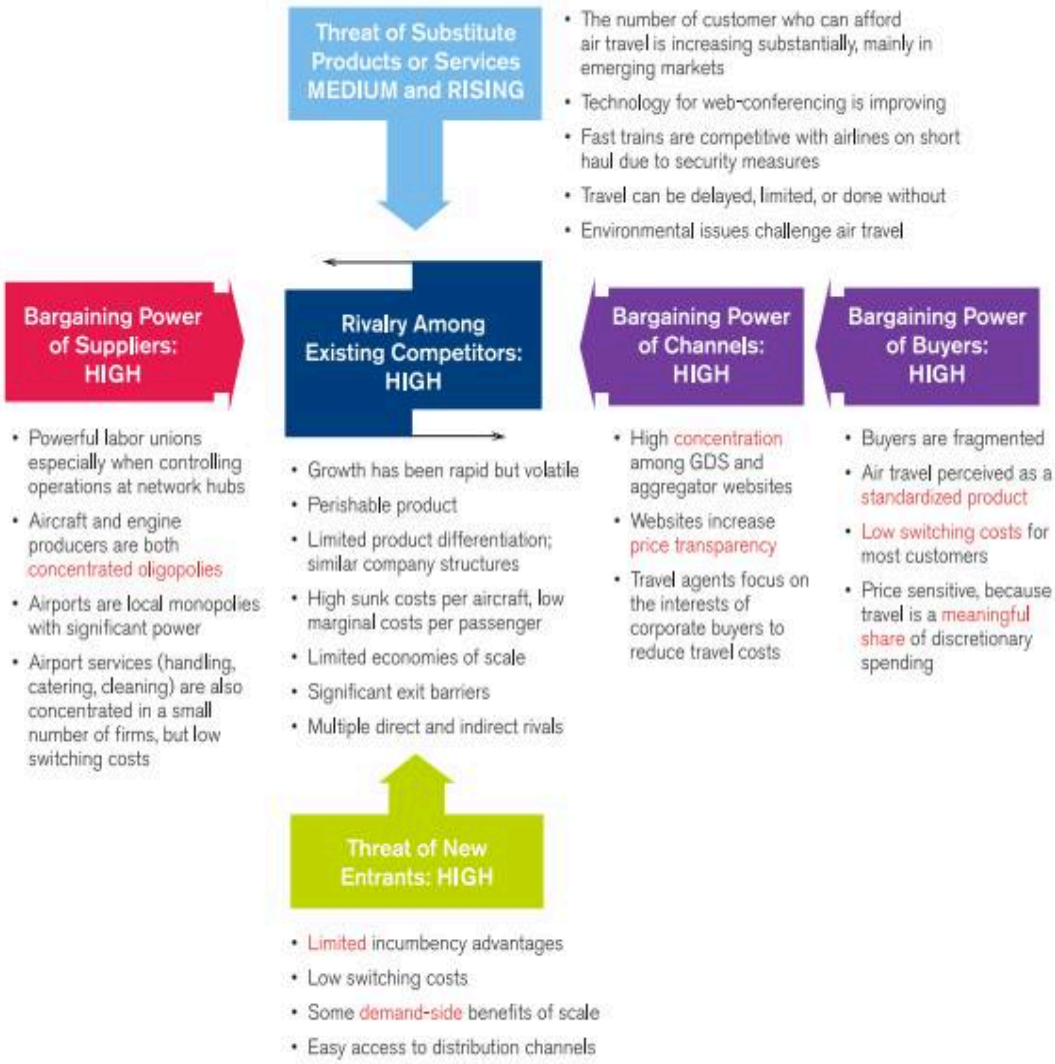

Chart 34: Five Forces in the airline industry
Source: Michael Porter

Figure 1. Source: IATA. International Air Transport Association. forecast 20 years

Social media users among all adults

Among all American adults ages 18+, the % who use the following social media sites

Facebook	58
LinkedIn	23
Pinterest	22
Instagram	21
Twitter	19

Source: Pew Research Center's Internet Project September Combined Omnibus Survey, September 11-14 & September 18-21, 2014. N=2,003 adults in the U.S. ages 18+.

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Figure 2: Social Media Users among all adults

Instagram users

Among online adults, the % who use Instagram

	2013	2014
All internet users	*17%*	*26%**
Men	15	22*
Women	20	29*
White, Non-Hispanic	12	21*
Black, Non-Hispanic	34	38
Hispanic	23	34*
18-29	37	53*
30-49	18	25*
50-64	6	11*
65+	1	6*
High school grad or less	16	23*
Some college	21	31*
College+ (n= 685)	15	24*
Less than $30,000/yr	18	28*
$30,000-$49,999	20	23
$50,000-$74,999	15	26*
$75,000+	16	26*
Urban	22	28
Suburban	18	26*
Rural	6	19*

Source: Pew Research Center's Internet Project September Combined Omnibus Survey, September 11-14 & September 18-21, 2014. N=1,597 internet users ages 18+. The margin of error for all internet users is +/- 2.9 percentage points. 2013 data from Pew Internet August Tracking Survey, August 07 – September 16, 2013, n= 1,445 internet users ages 18+.

Note: Percentages marked with an asterisk (*) represent a significant change from 2013. Results are significant at the 95% confidence level using an independent z-test.

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Figure 4: Instagram Users

Twitter users

Among online adults, the % who use Twitter

	2013	2014
All internet users	*18%*	*23%**
Men	17	24*
Women	18	21
White, Non-Hispanic	16	21 *
Black, Non-Hispanic	29	27
Hispanic	16	25
18-29	31	37
30-49	19	25
50-64	9	12
65+	5	10*
High school grad or less	17	16
Some college	18	24
College+ (n= 685)	18	30*
Less than $30,000/yr	17	20
$30,000-$49,999	18	21
$50,000-$74,999	15	27*
$75,000+	19	27*
Urban	18	25*
Suburban	19	23
Rural	11	17

Source: Pew Research Center's Internet Project September Combined Omnibus Survey, September 11-14 & September 18-21, 2014. N=1,597 internet users ages 18+. The margin of error for all internet users is +/- 2.9 percentage points. 2013 data from Pew Internet August Tracking Survey, August 07 – September 16, 2013, n= 1,445 internet users ages 18+.

Note: Percentages marked with an asterisk (*) represent a significant change from 2013. Results are significant at the 95% confidence level using an independent z-test.

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Figure 3: Twitter Users

LinkedIn users

Among online adults, the % who use LinkedIn

	2013	2014
All internet users	*22*	*28%**
Men	24	28
Women	19	27*
White, Non-Hispanic	22	29*
Black, Non-Hispanic	30	28
Hispanic	13	18
18-29	15	23*
30-49	27	31
50-64	24	30
65+	13	21*
High school grad or less	12	12
Some college	16	22
College+	38	50*
Less than $30,000/yr	12	15
$30,000-$49,999	13	21*
$50,000-$74,999	22	31
$75,000+	38	44
Employed	27	32*
Not employed	12	21*
Urban	23	32*
Suburban	26	29
Rural	8	14

Source: Pew Research Center's Internet Project September Combined Omnibus Survey, September 11-14 & September 18-21, 2014. N=1,597 internet users ages 18+. 2013 data from Pew Internet August Tracking Survey, August 07 – September 16, 2013, n= 1,445 internet users ages 18+.

Note: Percentages marked with an asterisk (*) represent a significant change from 2013. Results are significant at the 95% confidence level using an independent z-test.

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Figure 5: Linkedin Users

Pinterest users

Among online adults, the % who use Pinterest

	2013	2014
All internet users	*21%*	*28%**
Men	8	13*
Women	33	42*
White, Non-Hispanic	21	32*
Black, Non-Hispanic	20	12
Hispanic	18	21
18-29	27	34
30-49	24	28
50-64	14	27*
65+	9	17*
High school grad or less	17	22
Some college	20	30*
College+ (n= 685)	25	32*
Less than $30,000/yr	15	22*
$30,000-$49,999	21	28
$50,000-$74,999	21	30
$75,000+	27	34*
Urban	19	25
Suburban	23	29*
Rural	17	30*

Source: Pew Research Center's Internet Project September Combined Omnibus Survey, September 11-14 & September 18-21, 2014. N=1,597 internet users ages 18+. 2013 data from Pew Internet August Tracking Survey, August 07 – September 16, 2013, n= 1,445 internet users ages 18+.

Note: Percentages marked with an asterisk (*) represent a significant change from 2013. Results are significant at the 95% confidence level using an independent z-test.

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Figure 6: Pinterest Users

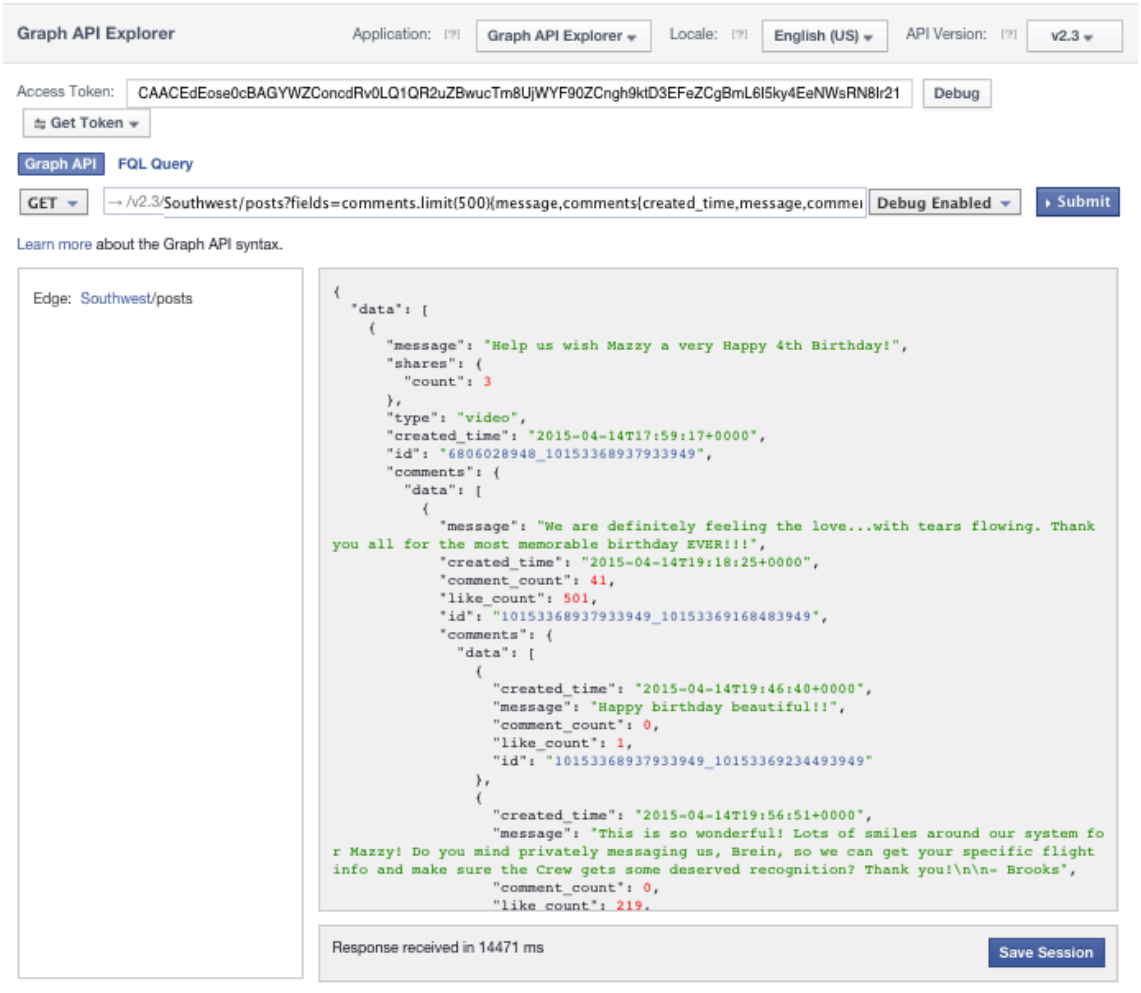


Figure 16. Interface Graph API

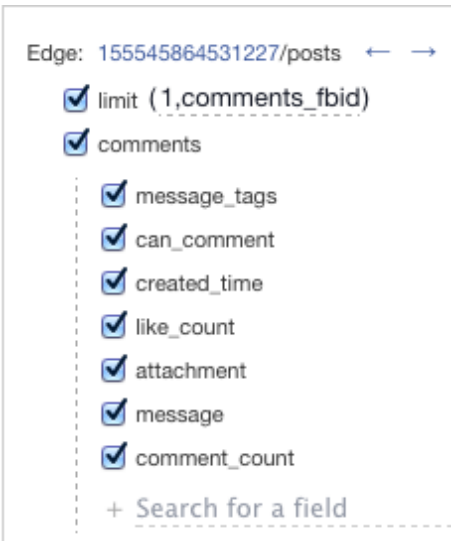


Figure 17. Query Graph API

Name	Sign	Formula	Measures
Popularity	P1	Number of posts liked/total posts	Percentage of posts that have been liked
	P2	Total likes/total number of posts	Average number of likes per post
	P3	(P2/number of fans) × 1000	Average number of likes per post per 1000 fans
Commitment	C1	Number of posts commented/total posts	Percentage of the total posts that have been commented
	C2	Total comments/total posts	Average number of comments per post
	C3	(C2/number of fans) × 1000	Average number of comments per post per 1000 fans
Virality	V1	Number of posts shared/total posts	Percentage of the total posts that have been shared
	V2	Total shares/total posts	Average number of shares per post
	V3	(V2/number of fans) × 1000	Average number of shares per post per 1000 fans
Engagement	E	P3+C3+V3	Stakeholder engagement index

Table 24. Facebook metrics for stakeholder engagement (Bonsón & Ratkai, 2013).

KPI proposed	Formula	Type of social media (Fb or Tw)	Name of authors	Journal title	Paper Title	Year of publication
P3	(P2/ # of fans)*1000	Fb	Enrique Bonso´n and Melinda Ratkai	Online information review	A set of metrics to assess stakeholder engagement and social legitimacy on a corporate Facebook page	2012
C3	(C2/# of fans)*1000	Fb	Enrique Bonso´n and Melinda Ratkai	Online information review	A set of metrics to assess stakeholder engagement and social legitimacy on a corporate Facebook page	2012
V3	(V2/ # of fans)*1000	Fb	Enrique Bonso´n and Melinda Ratkai	Online information review	A set of metrics to assess stakeholder engagement and social legitimacy on a corporate Facebook page	2012
E	P3+C3+V3	Fb	Enrique Bonso´n and Melinda Ratkai	Online information review	A set of metrics to assess stakeholder engagement and social legitimacy on a corporate Facebook page	2012
P3*	(P2/ # of followers)*1000	Tw	Modified version of Enrique Bonso´n and Melinda Ratkai			2015
C3*	(C2/# of followers)*1000	Tw	Modified version of Enrique Bonso´n and Melinda Ratkai			2015
V3*	(V2/ # of followers)*1000	Tw	Modified version of Enrique Bonso´n and Melinda Ratkai			2015
% of possitive comments	Analysis of NL comments to see the percentage of positive ones	Fb & Tw	Lisette de Vries & Sonja Gensler & Peter S.H. Leeflang	Journal of interactive marketing	Popularity of Brand Posts on Brand Fan Pages: An Investigation of the Effects of Social Media Marketing	2012
Growth rate	(#Fans(t2)- #Fans(t1))/ #Fans(t1) [for: t1 be	Fb & Tw	Irena Pletikosa Cvijikj, F	Information Manager	Online Engagement Factors on Facebook	2013
Interaction duration	Time of last interacion of a post- Time of post creation	Fb	Irena Pletikosa Cvijikj, F	Information Manager	Online Engagement Factors on Facebook	2013
Post per fan	# of posts(in period)/ # of fans	Fb	Irena Pletikosa Cvijikj, F	Information Manager	Online Engagement Factors on Facebook	2013
Velocity of a conversation	Time to answer to customers	Fb & Tw	Jan H. Kietzmann, Kris	Business Horizons	Social media? Get serious! Understanding	2011
P1	(# of posts with likes/ total posts)	Fb	Enrique Bonso´n and Melinda Ratkai	Online information review	A set of metrics to assess stakeholder engagement and social legitimacy on a corporate Facebook page	2012
P2	(total likes/ Total # of posts)	Fb	Enrique Bonso´n and Melinda Ratkai	Online information review	A set of metrics to assess stakeholder engagement and social legitimacy on a corporate Facebook page	2012
C1	(# of posts with comments)	Fb	Enrique Bonso´n and Melinda Ratkai	Online information review	A set of metrics to assess stakeholder engagement and social legitimacy on a corporate Facebook page	2012
C2	(total commments/ Total # of posts)	Fb	Enrique Bonso´n and Melinda Ratkai	Online information review	A set of metrics to assess stakeholder engagement and social legitimacy on a corporate Facebook page	2012
V1	(# of posts with shares)	Fb	Enrique Bonso´n and Melinda Ratkai	Online information review	A set of metrics to assess stakeholder engagement and social legitimacy on a corporate Facebook page	2012
V2	(Total shares / total # of posts)	Fb	Enrique Bonso´n and Melinda Ratkai	Online information review	A set of metrics to assess stakeholder engagement and social legitimacy on a corporate Facebook page	2012
BuzzRank Interaction rate	((#likes*1 + # of comments*2 + # of shares*3)/#fans)*100	Fb	Kay Peters, Yubo Chen, Andreas M. Kaplan, Björn Ognibeni, Koen Pauwels	Journal of interactive marketing	A Framework and Guidelines for Managing	2013
Δ Fans	(# fans end of month- #of fans beginning of month)	Fb	Kay Peters, Yubo Chen, Andreas M. Kaplan, Björn Ognibeni, Koen Pauwels	Journal of interactive marketing	A Framework and Guidelines for Managing	2013
Talk about monthly unique users	number provided by facebook analytics	Fb	Kay Peters, Yubo Chen, Andreas M. Kaplan, Björn Ognibeni, Koen Pauwels	Journal of interactive marketing	A Framework and Guidelines for Managing	2013
Talk about monthly fan ratio	Talk about/number of fans	Fb	Kay Peters, Yubo Chen, Andreas M. Kaplan, Björn Ognibeni, Koen Pauwels	Journal of interactive marketing	A Framework and Guidelines for Managing	2013
Number of fans interaction	(posting, comments, likes and shares)	Fb	Kay Peters, Yubo Chen, Andreas M. Kaplan, Björn Ognibeni, Koen Pauwels	Journal of interactive marketing	A Framework and Guidelines for Managing	2013
Number of fans at the end of the month	number of fans	Fb & Tw	Kay Peters, Yubo Chen, Andreas M. Kaplan, Björn Ognibeni, Koen Pauwels	Journal of interactive marketing	A Framework and Guidelines for Managing	2013

Table 25. Indicators academic sources

KPI proposed	Formula	Type of social media (Fb or Tw)	Name of authors	Journal title	Paper Title	Year of publication
P1*	(# of tweets with favorites/ total tweets)	Tw	Modified version of Enrique Bonso´n and Melinda Ratkai			2015
P2*	(total favorites / Total # of tweets)	Tw	Modified version of Enrique Bonso´n and Melinda Ratkai			2015
C1*	(# of tweets with comments)	Tw	Modified version of Enrique Bonso´n and Melinda Ratkai			2015
C2*	(total commments/ Total # of tweets)	Tw	Modified version of Enrique Bonso´n and Melinda Ratkai			2015
V1*	(# of tweets with retweets)	Tw	Modified version of Enrique Bonso´n and Melinda Ratkai			2015
V2*	(Total retweets / total # of tweets)	Tw	Modified version of Enrique Bonso´n and Melinda Ratkai			2015
Δ Followers*	(# followers end of month- #of followers beginning of month)	Tw	Modified version of Enrique Bonso´n and Melinda Ratkai			2015
Vividness	See table 1 /(Vividness reflects the richness of a brand post's formal features; in other words, it is the extent to which a brand post stimulates the different senses)	Fb & Tw	Lisette de Vries & Sonja Gensler & Peter S.H. Leeflang	Journal of interactive marketing	Popularity of Brand Posts on Brand Fan Pages: An Investigation of the Effects of Social Media Marketing	2012
Interactivity	See table 1(Interactivity is defined as "the degree to which two or more communication parties can act on each other, on the communication medium, and on the messages and the degree to which such influences are synchronized" (Liu and Shrum 2002, p. 54).	Fb & Tw	Lisette de Vries & Sonja Gensler & Peter S.H. Leeflang	Journal of interactive marketing	Popularity of Brand Posts on Brand Fan Pages: An Investigation of the Effects of Social Media Marketing	2012
Like rate	# Likes/ # fans	Fb	Irena Pletikosa Cvijikj, F	Information Manager	Online Engagement Factors on Facebook	2013
Comment rate	#comments/ #fans	Fb	Irena Pletikosa Cvijikj, F	Information Manager	Online Engagement Factors on Facebook	2013
Share Rate	#shares/ #fans	Fb	Irena Pletikosa Cvijikj, F	Information Manager	Online Engagement Factors on Facebook	2013
Strength	the number of times you are mentioned	Social media sites	Jan H. Kietzmann, Kris	Business Horizons	Social media? Get serious! Understanding	2011
Sentiment	#of positive mentions/ # of negative mentions	Social media sites	Jan H. Kietzmann, Kris	Business Horizons	Social media? Get serious! Understanding	2011
Passion	# different users talking about you/ total # of times you are mentioned	Social media sites	Jan H. Kietzmann, Kris	Business Horizons	Social media? Get serious! Understanding	2011
customer service	percentage of problems resolved	Fb & Tw	Jan H. Kietzmann, Kris	Business Horizons	Social media? Get serious! Understanding	2011
customer input	Number of suggestions for improving a product or service	Fb & Tw	Jan H. Kietzmann, Kris	Business Horizons	Social media? Get serious! Understanding	2011
Sentiment analysis categories	http://ir.cs.georgetown.edu/publications/downloads/Twitter_power-_Tweets_as_electronic_word_of_mouth.pdf	TW	Bernard J. Jansen, Min	JOURNAL OF THE A	Twitter Power: Tweets as Electronic Word	2009

Table 26. Indicators academic sources

KPI porposed	Formula	Type of social media (Fb or Tw)	Name of the authors	Name of the report/website	Link to the report	Year of publication
Average month engagement Fb	((likes+comments+shares)/#posts)/Δ Fans)*100	Fb	Sergio Villaveces	youngmarketing.co	http://www.youngmarketing.co/como-medir-impacto-estrategia-redes-sociales-kpi/	2014
Average month engagement TW	((favorites+comments+retweets)/#tweets)/Δ Followers)*100	Tw	Sergio Villaveces	youngmarketing.co	http://www.youngmarketing.co/como-medir-impacto-estrategia-redes-sociales-kpi/	2014
Page views	Number of page views	Tw		www.analytics.twitter.com	http://jbis.cafe24.com/data/7_PACIS2013_Workshop_ITmgmt.pdf	entered 4/2015
Retweet ratio	# Tweets/# of retweets	Tw		www.analytics.twitter.com	http://jbis.cafe24.com/data/7_PACIS2013_Workshop_ITmgmt.pdf	entered 4/2015
New followers	# new followers	Tw		www.analytics.twitter.com	http://jbis.cafe24.com/data/7_PACIS2013_Workshop_ITmgmt.pdf	entered 4/2015
Tweets impresions		Tw		www.analytics.twitter.com	http://jbis.cafe24.com/data/7_PACIS2013_Workshop_ITmgmt.pdf	entered 4/2015
Feedback Rate	(#Likes+#Comments)/ #Impressions	Fb		Facebook page 2012	http://jbis.cafe24.com/data/7_PACIS2013_Workshop_ITmgmt.pdf	2012
Page visits	Where here count using graph API	Fb		Facebook page 2012	http://jbis.cafe24.com/data/7_PACIS2013_Workshop_ITmgmt.pdf	2012
Number of peopl	Number of people talking	Fb		Facebook page 2012	http://jbis.cafe24.com/data/7_PACIS2013_Workshop_ITmgmt.pdf	2012
Returns visits	The average number of times a user returns to a site or application over a specific time period	Fb & Tw		www.iab.net	http://www.iab.net/media/file/SocialMediaMetricsDefinitionsFinal.pdf	2009
Interaction Rate	The proportion of users who interact with an ad or application	Fb & Tw		www.iab.net	http://www.iab.net/media/file/SocialMediaMetricsDefinitionsFinal.pdf	2009
Engagement Rate	(#likes + #comments)/ # impressions	Fb	Patrick J. Powers	http://patrickjpowers.com/how-to-measure-the-engagement-rates-of-facebook-content/		2011
Number of days to post do NL posts	count number of days between the 50 posts analyzed	Fb & Tw	Calvo Juan Francisco, Regusci Ignacio			
Engagement rate Tw	((# replys + #retweets)/ # followers)*100	Tw		http://www.socialbakers.com/blog/467-formulas-revealed-the-facebook-and-twitter-engagement-rate	http://e-collection.library.ethz.ch/eserv/eth:6460/eth-6460-02.pdf	
Reply to fans comments (or Tweets)	Yes or No	Fb & Tw	Calvo Juan Francisco, Regusci Ignacio			
Engagement Rate Fb	((#likes + #comments+ #shares)/ # fans)*100	Fb		http://www.socialbakers.com/blog/467-formulas-revealed-the-facebook-and-twitter-engagement-rate	http://e-collection.library.ethz.ch/eserv/eth:6460/eth-6460-02.pdf	
Time to respond to fans comments (or tweets)	Average time to answer	Fb & Tw	Calvo Juan Francisco, Regusci Ignacio			
Number of destionations	Number of diferent destinations	Fb & Tw	Calvo Juan Francisco, Regusci Ignacio			
Number of passengers carried	Number of passengers carried	Fb & Tw	Calvo Juan Francisco, Regusci Ignacio			
Additional applications	See any additional applications of the social platforms (Ex. Buy for facebook or special twitter to respond to customer demands)	Fb & Tw	Calvo Juan Francisco, Regusci Ignacio			
Tweets per day	Average tweets per day	Tw	Calvo Juan Francisco, Regusci Ignacio	https://manageflitter.com/search/account		
Year created	Number of years the account was created	Fb & Tw	Calvo Juan Francisco, Regusci Ignacio	https://manageflitter.com/search/account		
Twitter efficiency	number of retweets per 100 followers	Tw	Calvo Juan Francisco, Regusci Ignacio			
Profile privacy	Public or private	Fb	Calvo Juan Francisco, Regusci Ignacio			
Followers also follow	Related brands followed in sample	Tw	Calvo Juan Francisco, Regusci Ignacio			
Fans aso like	Related brands liked in sample	Fb	Calvo Juan Francisco, Regusci Ignacio			

Table 27. Indicators “practitioner sources”

[ALL]	P3	V3	C3	ID
Mean	1,892573541	0,148206664	0,077061242	317:20:37
Min	0	0	0	0:00:00
Max	38,10390206	9,29299632	4,898266767	4561:00:18
SD	3,452331562	0,509974455	0,282163264	41:48:13
Median	0,685995996	0,035029673	0,022851915	96:00:00

[WO express jet]	P3	V3	C3	ID
Mean	1,516001285	0,127919476	0,047065021	13,81
Min	0	0	0	0:00:00
Max	38,10390206	9,29299632	1,166658565	4561:00:18
Var	2,781723295	0,480391734	0,08065825	42:14:01
Median	0,627385226	0,033517556	0,021777438	96:00:00

Table 28. Indicators descriptive values

Type	Type	%
Photo	560	74%
video	106	14%
link	66	9%
status	28	4%
Total	760	1

Table 29. Media type results

Type	Type	Likes	Average likes/post	Shares	Shares/post
Photo	560	1898188	**3390**	93579	**167**
video	106	472607	**4459**	83628	**789**
link	66	100124	**1517**	7100	**108**
status	28	39979	**1428**	7536	**269**
Total	760	2.510.898,00		191.843,00	

Type	Type	Comments	Average Comments/post	Time Id AVG
Photo	560	43343	**77**	12,99
video	106	12380	**117**	12,63
link	66	4103	**62**	12,80
status	28	2875	**103**	21,11
Total	760	62.701,00		

Table 30. Indicators descriptive values

Content Category [ALL]	Media Type	Quantity	%
AD	Photo	69	80%
AD	video	2	2%
AD	status	3	3%
AD	link	12	14%
EB	Photo	66	79%
EB	video	7	8%
EB	status	0	0%
EB	link	11	13%
CO	Photo	13	72%
CO	video	4	22%
CO	status	0	0%
CO	link	1	6%
IN	Photo	93	68%
IN	video	21	15%
IN	status	13	9%
IN	link	10	7%
SO	Photo	16	57%
SO	video	3	11%
SO	status	7	25%
SO	link	2	7%
OST	Photo	141	75%
OST	video	29	15%
OST	status	2	1%
OST	link	16	9%
EST	Photo	162	74%
EST	video	40	18%
EST	status	3	1%
EST	link	14	6%
Total		760	

Table 31. Content category results

Variable	Observations	Obs. w/lost data	Obs. w/o lost data	Min	Max	Mean	SD
Lunes Id	130	25	105	3.000	692.500	351.048	200.041
Martes id	130	16	114	19.000	692.500	381.811	208.840
Miercoles Id	130	1	129	7.000	692.500	352.942	206.654
Jueves Id	130	4	126	2.000	692.500	367.425	217.881
Viernes Id	130	0	130	1.000	692.500	308.700	189.977
Sabado Id	130	75	55	4.000	692.500	402.364	218.889
Domingo Id	130	69	61	12.000	692.500	411.270	211.298

Table 32. Kruscal wallis Time ID : Day

Variable	Observations	Obs. w/lost data	Obs. w/o lost data	Min	Max	Mean	SD
Finde semana id	604	488	116	4.000	692.500	407.047	214.037
Dias laborables id	604	0	604	1.000	692.500	351.560	205.728

Table 33. Kruscal wallis Time ID: Weekend

Variable	Observations	Obs. w/lost data	Obs. w/o lost data	Min	Max	Mean	SD
AD id	207	121	86	25.000	649.000	379.581	188.194
CO id	207	189	18	51.000	594.000	380.167	168.919
EB id	207	126	81	1.000	649.000	367.531	225.468
EST id	207	0	207	6.000	649.000	382.942	198.391
IN id	207	74	133	7.000	649.000	310.263	196.166
OST id	207	40	167	4.000	649.000	327.144	193.957
SO id	207	195	12	28.000	437.000	183.000	110.740

Table 34. Kruscal wallis Time ID: Content category

Variable	Observations	Obs. w/lost data	Obs. w/o lost data	Min	Max	Mean	SD
AD P3	207	121	86	8.000	699.000	391.302	215.463
CO P3	207	189	18	139.000	699.000	462.778	171.646
EB P3	207	126	81	5.000	675.000	313.037	181.601
EST P3	207	0	207	4.000	698.000	395.913	195.885
IN P3	207	74	133	12.000	699.000	357.203	203.993
OST P3	207	40	167	2.000	699.000	287.311	199.180
SO P3	207	195	12	1.000	626.000	278.333	178.440

Table 35. Kruscal wallis P3: Content category

Variable	Observations	Obs. w/lost data	Obs. w/o lost data	Min	Max	Mean	SD
AD C3	207	121	86	13.000	674.000	349.767	214.094
CO C3	207	189	18	24.000	667.000	309.333	223.001
EB C3	207	126	81	6.000	674.000	326.383	198.991
EST C3	207	0	207	2.000	704.000	406.908	194.203
IN C3	207	74	133	1.000	700.000	310.135	202.882
OST C3	207	40	167	3.000	700.000	338.132	199.248
SO C3	207	195	12	62.000	658.000	308.417	159.442

Table 36. Kruscal wallis C3: Content category

Variable	Observations	Obs. w/lost data	Obs. w/o lost data	Min	Max	Mean	SD
AD V3	207	121	86	9.000	685.000	343.733	199.722
CO V3	207	189	18	107.000	667.000	371.000	174.915
EB V3	207	126	81	13.000	673.000	360.136	192.488
EST V3	207	0	207	3.000	685.000	416.618	196.309
IN V3	207	74	133	1.000	681.000	324.368	200.230
OST V3	207	40	167	2.000	685.000	300.617	203.160
SO V3	207	195	12	16.000	658.000	234.917	181.833

Table 35. Kruscal wallis V3: Content category

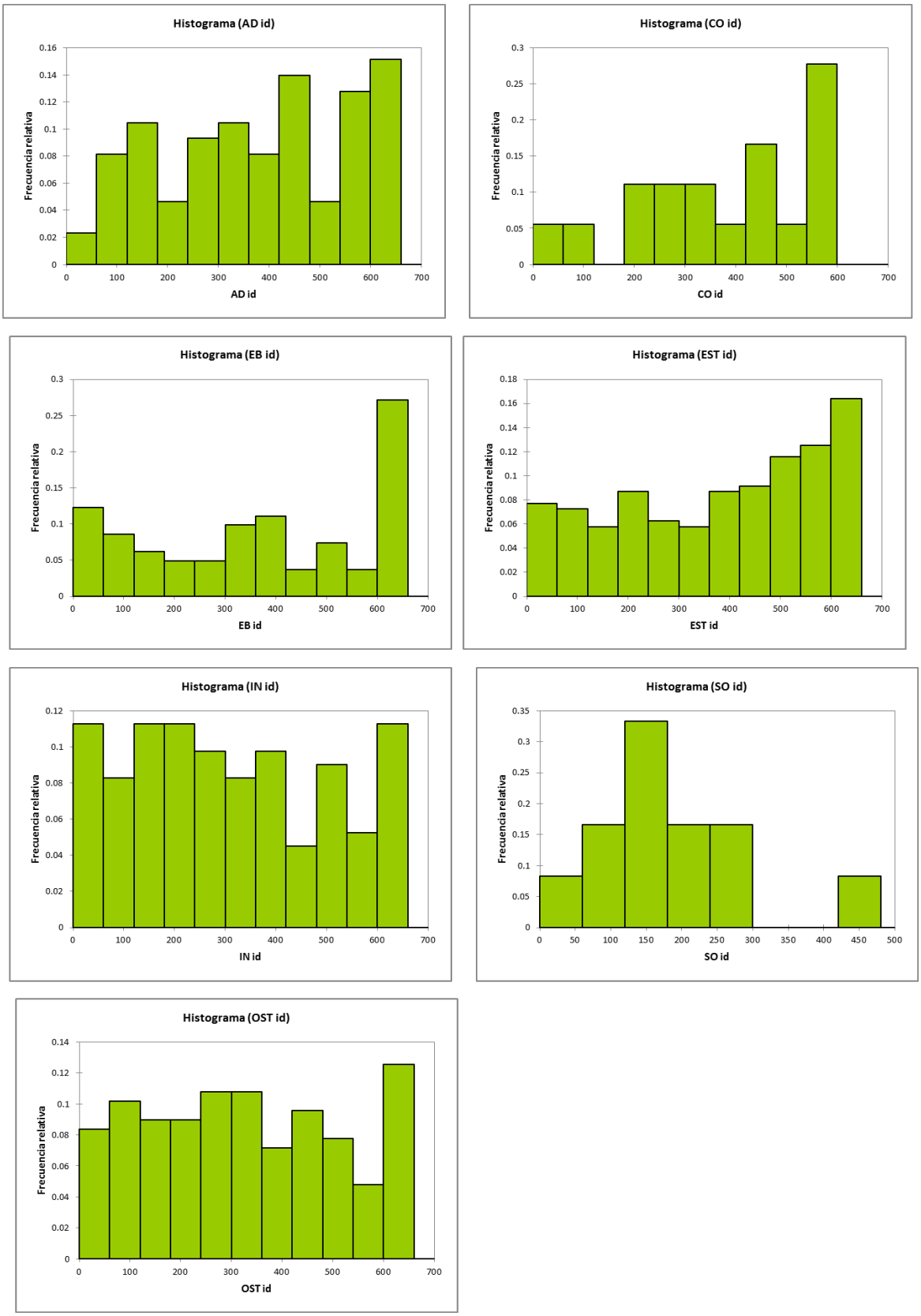


Figure 29. Histograms Time ID

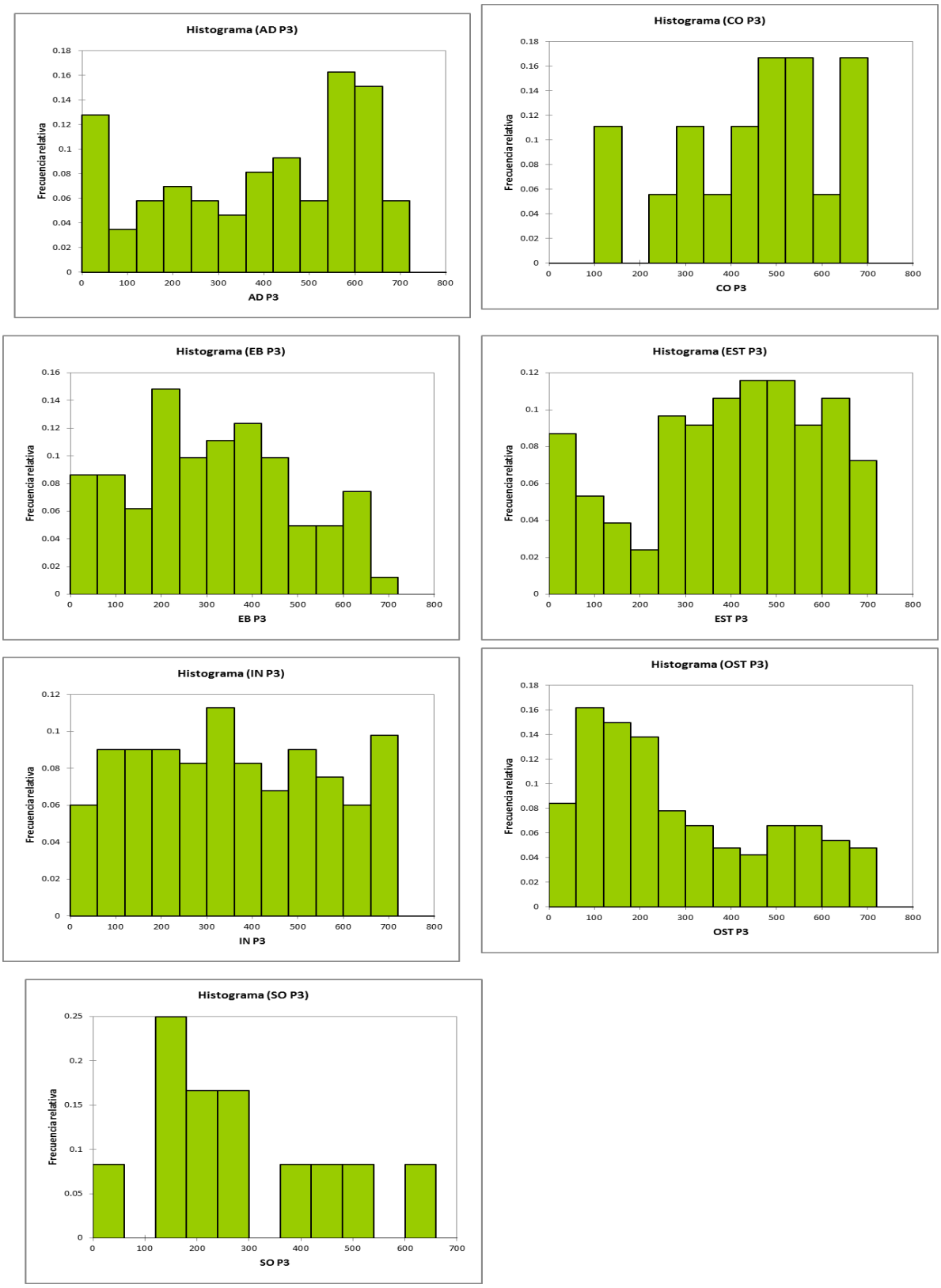
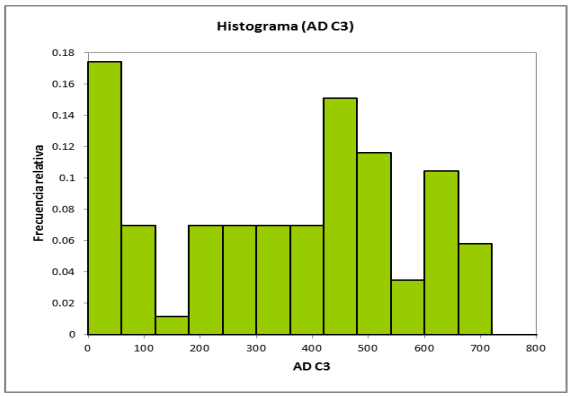
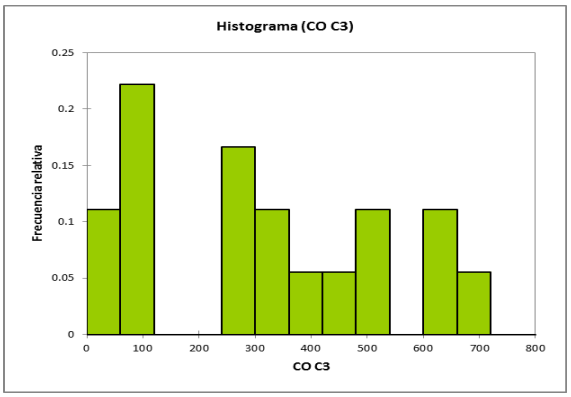
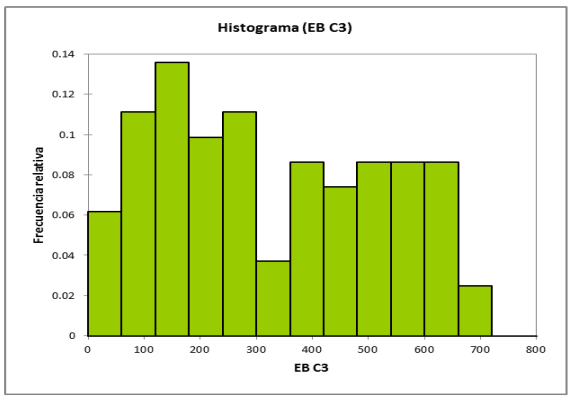
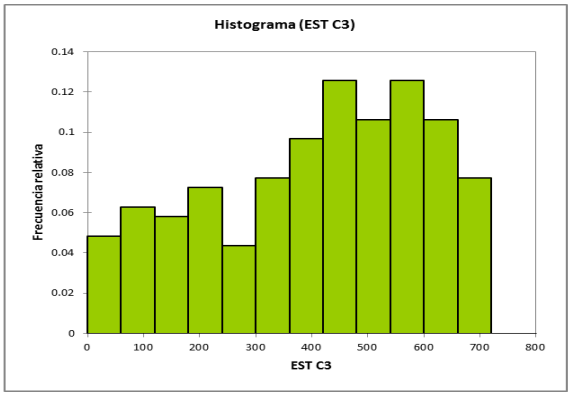


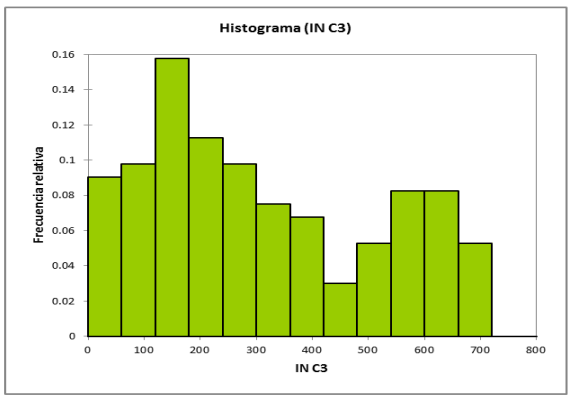
Figure 30. Histograms P3

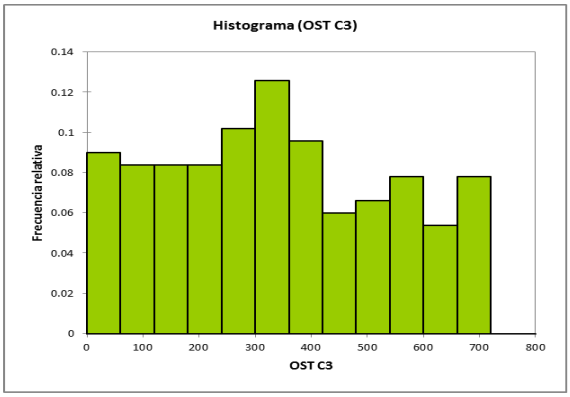












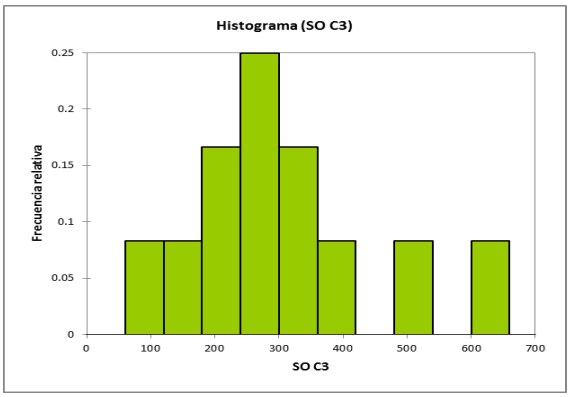
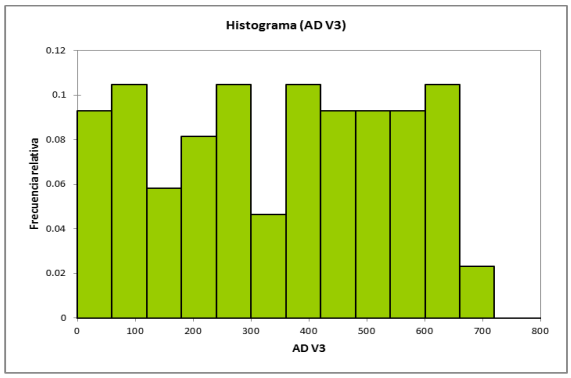
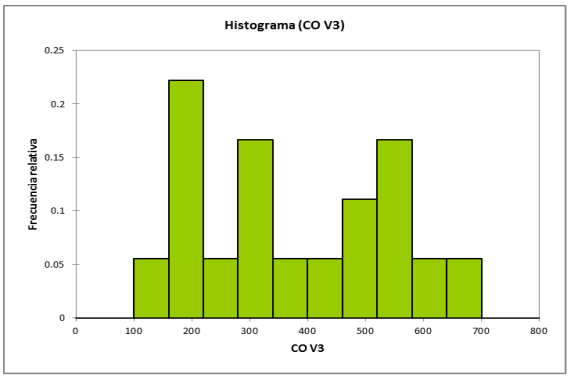
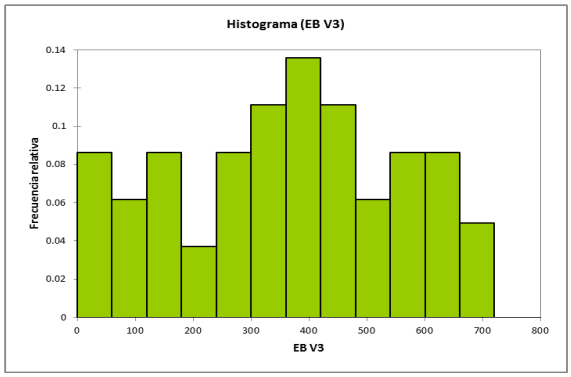
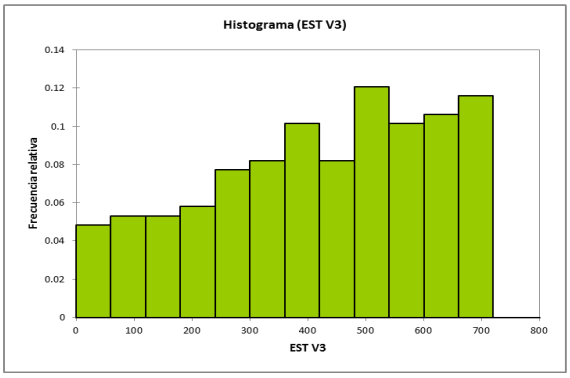


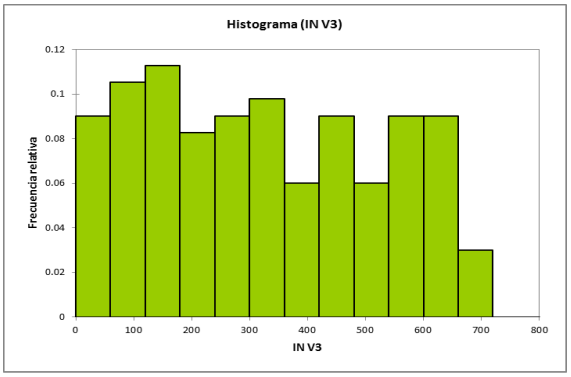
Figure 31. Histograms C3

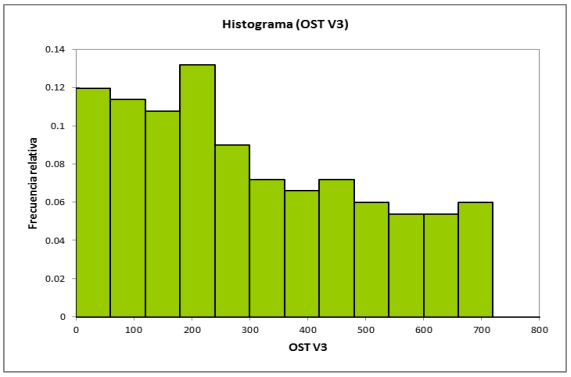












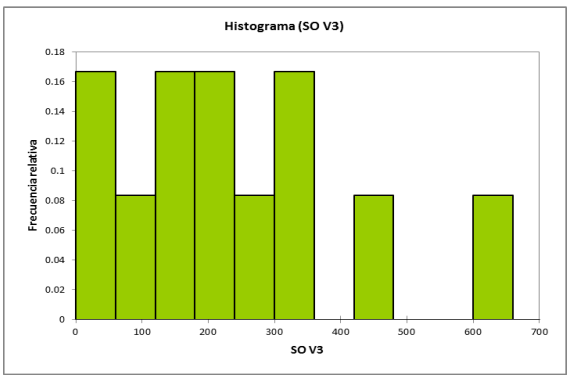


Figure 32. Histograms V3