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Analysis of Social Media Usage of Opera Houses Worldwide

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Master Thesis of:

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Murat

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Abstract

In a rapidly digitalizing world, almost every organization is trying to maintain a social media communication strategy to boost its reputation since social media has become an irreplaceable tool to reach and engage people. One of these organizations is the opera houses which is the focus of this study.

Opera houses are selected for this study because of their struggles to stay connected with their followers. The paper starts with the definitions of social media, reputation, and the relationship between social media and reputation. Then, a comprehensive literature review is performed to find possible methods for the measurement of social media use. After the selection of convenient methodology among the existent formulations, the social media use of each opera house is quantified. For benchmarking of opera houses, different dimensions are used such as time, social media channel, overall social media use, posting frequencies, and origin countries of the opera houses. The customer side is analyzed to observe engagement levels and obtain additional insights. The effect of global events such as the Covid-19 pandemic on social media use of opera houses is examined. According to the results of these analyses, the conditions are clarified for opera houses regarding the management of social media channels.

This study is beneficial to understand the motivations and limitations of opera houses for using social media. The analyses provide useful insights to identify the effects of various factors on the levels of social media communication and engagement while remarking possible problems and solutions.

Keywords: Opera house, social media, communication, engagement, Facebook, Instagram, Twitter

Sommario

In un mondo in rapida digitalizzazione, quasi tutte le organizzazioni stanno cercando di mantenere una strategia di comunicazione sui social media per aumentare la propria reputazione poiché i social media sono diventati uno strumento insostituibile per raggiungere e coinvolgere le persone. Una di queste organizzazioni sono i teatri d'opera che sono al centro di questo studio.

I teatri d'opera sono stati selezionati per questo studio a causa delle loro lotte per rimanere in contatto con i loro seguaci. Il documento inizia con le definizioni di social media, reputazione e relazione tra social media e reputazione. Quindi, viene eseguita una revisione completa della letteratura per trovare possibili metodi per la misurazione dell'uso dei social media. Dopo aver selezionato una metodologia conveniente tra le formulazioni esistenti, viene quantificato l'uso dei social media di ogni teatro d'opera. Per il benchmarking dei teatri d'opera, vengono utilizzate diverse dimensioni come il tempo, il canale dei social media, l'uso generale dei social media, le frequenze di pubblicazione e i paesi di origine dei teatri d'opera. Il lato cliente viene analizzato per osservare i livelli di coinvolgimento e ottenere ulteriori approfondimenti. Viene esaminato l'effetto di eventi globali come la pandemia di Covid-19 sull'uso dei social media dei teatri d'opera. In base ai risultati di queste analisi, si chiariscono le condizioni per i teatri d'opera per quanto riguarda la gestione dei canali dei social media.

Questo studio è utile per comprendere le motivazioni e i limiti dei teatri d'opera nell'utilizzo dei social media. Le analisi forniscono spunti utili per identificare gli effetti di vari fattori sui livelli di comunicazione e coinvolgimento sui social media, evidenziando possibili problemi e soluzioni.

Parole chiave: Teatro dell'opera, social media, comunicazione, coinvolgimento, Facebook, Instagram, Twitter

1.INTRODUCTION

Technological developments continue to reshape the future by changing almost every aspect of people's lives. Unquestionably, digital technologies have a significant share on this phenomenon. The range of users is incredibly wide that starts from individuals and reaches to multinational companies. The reason to utilize digital technologies may be for entertainment or business activities. Whatever the reason is, everyone is either directly using digital technologies or being affected by them.

Digital technologies can be seen in almost every area. They have quickly become essential for businesses. They strongly boost the activities related to research, development, management, manufacturing, transportation, sales, and almost every other process. As multinational companies and governments utilize digital solutions, a small boutique, or an individual trying to sell handcrafted products also benefit from digital technologies. Independently of the size or complexity of the business, they all depend on digital advancements to survive in the rapidly changing world.

There are considerable trends in digitalization. The most important developments can be listed as robotic, automation, cloud services, blockchain, internet of things, artificial intelligence, machine learning, augmented reality, and virtual reality. There are numerous studies about these topics and their areas of application are enhancing every day. As a matter of fact, the boundaries between these areas have become blurry owing to every recent development and their integration abilities with each other.

Digital technologies have also become strongly integrated with daily life. The main factor is the technology itself. Technological change is a megatrend since technology has become easily accessible. While the technology is considered as a luxury at first, it is transforming into a commodity. Beside from organizations, the digital advancements are gladly adopted by individuals. The use of personal computers, mobile phones, tablets, smartwatches, and wearable technologies increased dramatically in the last years. Even for the simplest tasks, people prefer to use these devices. People have become one with their technologies and they are connected to the internet for almost whole day. It can be surely said that a lot of people became addicted. There is an element that strongly boosts the use of these technologies and

attracts more people every day. It also changed the behaviors of the people and created this high attraction power that can be almost considered as addiction. This phenomenon is nothing but social media.

Social media grew into an enormous sector with the help of the digitalization trend. Although they started as entertainment-oriented platforms, they currently serve for various purposes. Most of the individuals use social media to stay online and enjoyment is the first reason. They are creating connections with their families, friends, colleagues, and sometimes strangers. They also became a new source to follow news and current events thanks to their easy access, the high volume of content, and internationality. Social media is also quite useful if an individual wants to raise awareness about some issues. While a part of the social media consists of individual users, there are also other actors that benefit from the advantages of social media. The incredible amount of data that they create each second became the main source for studies. Researchers, companies, and even governments use these data to create insights about society. Owing to these data and the ability to access specific segments of social media, it occurred a major source for the advertisement sector. Almost every awareness movement starts on social media.

Today, being present on social media is a great opportunity and, in fact, a necessity for the organizations. It is valid for every kind of organization such as companies, foundations, institutions, government agencies, and non-governmental organizations. Among the various communication channels, social media is one of the owned channels which gives control to the organizations. In this way, they can create awareness that is convenient to their desires and plans. They can also strengthen the bonds with their current followers. As a result, they can protect and increase their reputations. At this point, communication strategies become involved. Organizations should make a significant effort on communication and be careful while choosing their strategies since they directly affect their reputation. After ensuring the correct steps, social media can be the most effective communication tool for organizations.

2. LITERATURE

2.1. Digitalization and Social Media

Before stressing the importance of social media and communication strategies, it is appropriate to start with the definitions and current trends. Since the beginning of history, humans developed technologies to make easier the communication starting the use of the telegraph and continuing with current digital technologies (Edosomwan *et al.*, 2011). Communication was always significant for societies and preserved this value by changing shapes with every technological development. Today, social media which also includes the network ability is one of the most popular communication tools. It is defined as the services created by using the web applications and provide to the users the feature to create their own full or limited visible profiles within a system (Boyd and Ellison, 2007). While some definitions use the word of the network such as the previous definition, there are also many definitions that use the word of networking which is associated with the intention the create connections, especially with strangers.

As a common approach, people used the internet only as consumers in the early periods. For instance, people were using the internet to read or watch something before, but the current trend is creating, sharing, and discussing content with others as it creates the social media phenomenon which is directly related to a firm's reputation (Kietzmann *et al.*, 2011). With this change of behavior on account of internet usage, the importance of networking is increasing every day. Many networking sites have been launched in the 1990s. In the late 1990s, the popularity of the internet increased as the users have the ability to create and upload content and the first social network site "Six Degrees" became active in 1997 (Dewing, 2010). Besides the other social network sites, blogging services such as "Blogger" and software applications like "Napster" also have been created in this period (Edosomwan *et al.*, 2011). However, it can be said that the foundation of the current and modern social media relies on the Web 2.0 advancement. The term Web 2.0 has been construed to explain the change of the use of the World Wide Web for both software developers and end-users, and the total number of both sides and interaction between them significantly increased as it is seen in Figure 2.1. With this change, the Web has been redefined as a platform

that all users are able to modify the content and applications in a collaborative and participatory behavior instead of individually created and uploaded compositions (Kaplan and Haenlein, 2010). Thanks to these advancements, many social media channels that currently lead the market on account of engagement emerged such as LinkedIn in 2013, Facebook in 2014, and YouTube in 2015 (Junco, Heiberger and Loken, 2010).

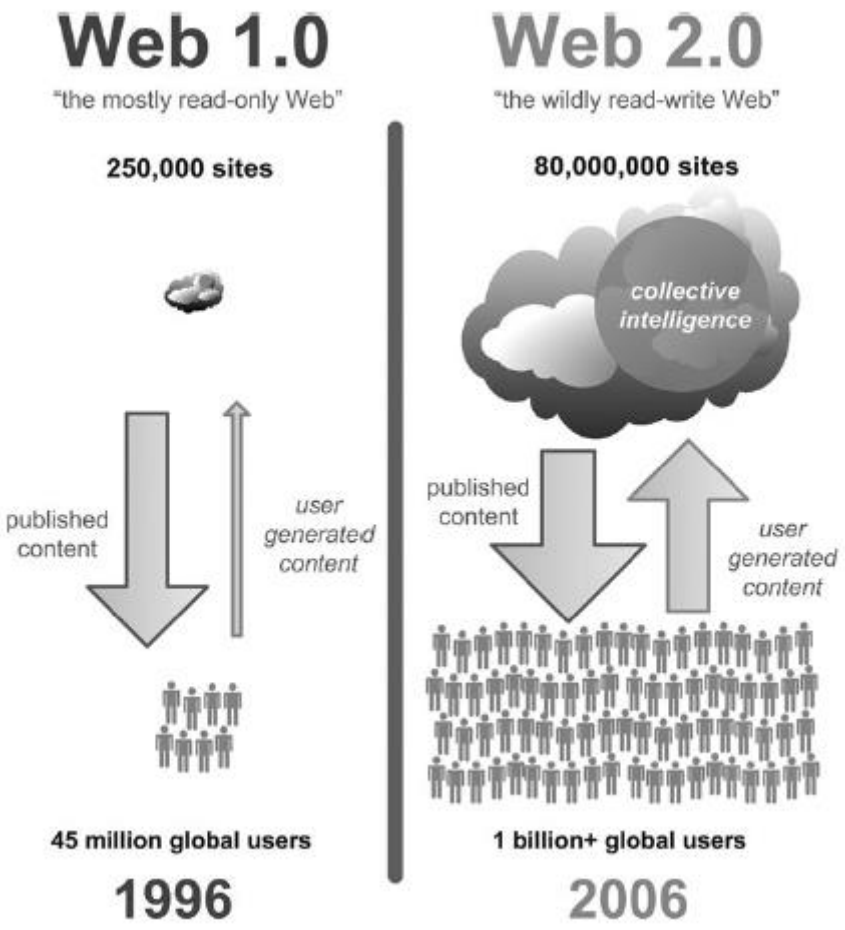

Figure 2.1 : Transition into Web 2.0 (Argenti and Barnes, 2009)

The world is experiencing megatrends such as globalization, urbanization, and technological changes that completely change various aspects of life. One of the most considerable trends is digitalization. For a first impression, digitalization may be considered heavily related to data and the growing trend of Big Data that includes the acquiring the information through the internet and analysis via cloud processes (Gray

and Rumpe, 2015). Yet, digitalization is a sociotechnical phenomenon that refers to the use and adoption of digital technologies in more extensive individual, organizational and societal frameworks with the ability to radically change the businesses and societies (Legner, Hess and Matt, 2017). The magnitude of the digital world can be seen in Figure 2.2. According to data of April 2020, there are 5.16 billion unique mobile phone users with a strong penetration of 66% in points of the total population. 59% of the total population is using the internet. Finally, there are 3.81 billion active social media users and this value is equal to nearly half of the world population with penetration of 49%. At this point, it may be important to underline the difference between digital and social media. Today, every social media channel has a digital platform based on web or mobile applications. Yet, being digital does not guarantee to become a social media. There are two characteristics to consider for distinguishing the social media. First, social media requires participation. At least, the obligation to create a profile ensures a minimum level of participation. Second, social media involves interaction arise from its participation nature that can be built among friends, colleagues, or strangers (Harvey, 2014).

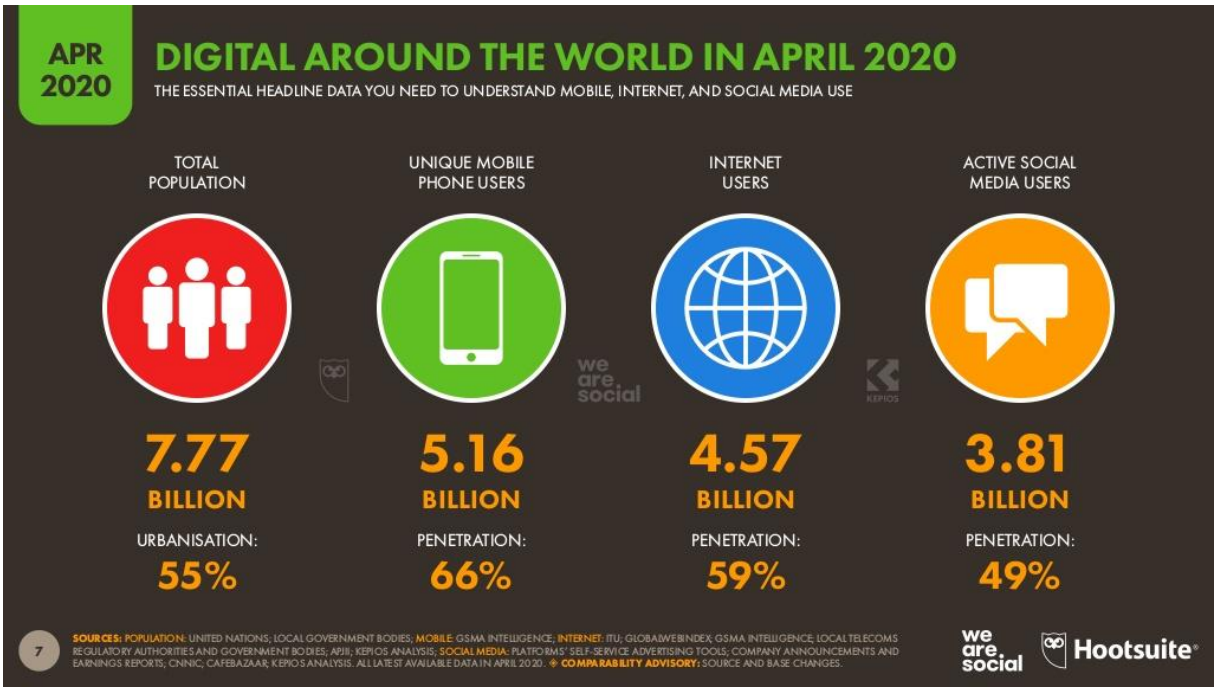

Figure 2.2 : Digital statistics around the world (Kemp, 2020)

Not only the penetration is high with regards to social media use, but also it is a still growing sector. The growth on the social media use and the close relation between social media and mobile users can be seen in Figure 2.3. According to these data, annual growth in the total number of social media users is +8.7%. To illustrate the magnitude of this value, this share means 304 million new users annually. The percentage of total social media users accessing via mobile is seen as 99%. It means that almost every social media user is accessing their accounts by using mobile. The same report also has information about the total number of active users for different channels. These data are crucial since this study will focus on three channels which are Facebook, Instagram, and Twitter. According to the recent statistics, Facebook has 2.49 billion monthly active users making it the most-used social platform of the world. Instagram has currently 1 billion monthly active users while Twitter follows these platforms with 386 million users (Kemp, 2020).

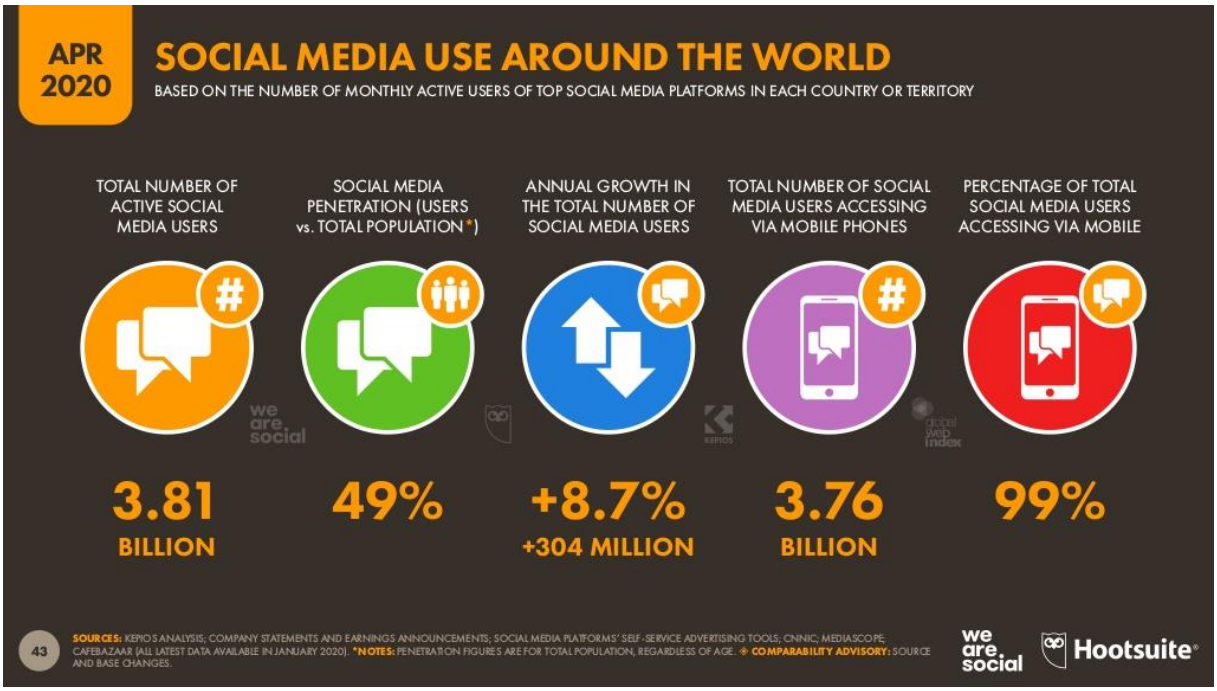

Figure 2.3 : Statistics about social media use (Kemp, 2020)

2.2. Social Media and Communication

Not only the number of users but also the number and types of social media channels are rapidly increasing every day. There are different social media platforms that target different segments and provide different features. Organizations should be aware of the trends and choose the correct platforms for their communication strategies. Before arguing the communication, it can be useful to explain the types of social media at this point. The term social media is a combination of different types that also includes the older channels such as newspapers and radio, and it can be classified into nine groups according to their characteristics as seen in Table 2.1 (Gundecha and Liu, 2012).

Table 2.1 : Types of social media

Types	**Characteristics**
Online social networking	Users have the ability to create their own profile pages with chatting, sharing, and other features while they reach people (Cross, 2014).
Blogging	Blogs can be defined as online journals that support the addition of multimedia to enrich the ideas of the owner (Weber, 2011).
Microblogging	A microblog may be a word, phrase, or number that can be considered as a status update (Evans, 2012).
Wikis	They are the websites in which the content easily can be added, modified, or removed by users (Weber, 2011).
Social news	The content of these platforms is created, shared, and selected by a community of users (Koukaras, Tjortjis and Rousidis, 2020).
Social bookmarking	Social bookmarking is a tool with addition, editing, and removing features of bookmarks of web documents by users (Noll and Meinel, 2007).

Media sharing	They provide the ability to share a photo, audio, and video formatted media (Constantinides and Fountain, 2008).
Opinion, reviews, and ratings	The subjective comments of users about a product, service, business, or places are collected and published in these platforms (Koukaras, Tjortjis and Rousidis, 2020).
Answers	In these platforms, people are able to post questions and answer or react to others' questions (Li, 2010)

The variety of social media platforms are escalating for each class. Different movements affect this diversity. In some cases, the current players that have niche services with specific objectives change their scope and increase their range. Yet, the new entrants are easily seen in this sector since the entry barriers are not too high. For sure, there are market leaders on account of the total numbers of users. However, the increase in the digitalization trend and simplicity of accessing technology provide new entrants great benefits. In Table 2.2, some of the most known examples can be seen for each class of social media.

Table 2.2 : Examples of each social media type

Types	**Examples**
Online social networking	Facebook, LinkedIn
Blogging	Business Insider, WordPress
Microblogging	Twitter, Tumblr
Wikis	Wikipedia, Wikihow
Social news	Digg, Slashdot, Reddit
Social bookmarking	Delicious, StumbleUpon
Media sharing	YouTube, Instagram, Flickr
Opinion, reviews, and ratings	Yelp, Zomato, TripAdvisor
Answers	Yahoo! answers, WikiAnswers

Social media is an effective tool in both internal and external communication for organizations. It can be useful for each department such as marketing, sales, and R&D. Different types of social media have different utilization ways and objectives with regards to communication. Since the focus of this paper is external communication, it is more convenient to briefly explain that side. To illustrate, the type of blog provides features such as tracking the customer suggestions, comments, and feedback, and the possibility to cooperate with selected customers. Wikis provide users to describe their experiences and add any information that would be beneficial for future users. Microblogs are quite useful to provide fast information and reflect the news. Finally, social networks have the greatest benefits for communication since the organization profiles can be created, fan pages can be formed, the interaction with the individual users is possible and promotional events can be applied (Szwajca, 2017). Communication is essential since people's thoughts on a company are formed on three levels and the use of social media directly affects the last level. The first level of opinions depends on personal experiences while second level opinions are formed of what friends and colleagues talk about companies. Subsequently, third level opinions are shaped with mass media information (Bromley, 2000). The integration of social media into a business can significantly enhance the success of the companies. According to a McKinsey report, it increases the awareness with 25%, consideration with 19%, conversion with 17%, and loyalty with 20% (Bughin, Chui and Miller, 2009).

2.3. Relationship Between Social Media Communication and Reputation

One of the main benefits of social media is its strong relationship with corporate reputation. Social media communication is an essential instrument to protect and boost reputation. To better understand this relation, it would be useful to start with the definition of corporate reputation. Corporate reputation is the collection that is built by evaluations of various stakeholders about the company (Fombrun, 1996). Additionally, reputation is likely to be misused with a similar context. Although the company identity, desired identity, and company image seem to have similar meanings, they are the key elements constructing the corporate reputation as seen in Figure 2.4 (Chun, 2005).

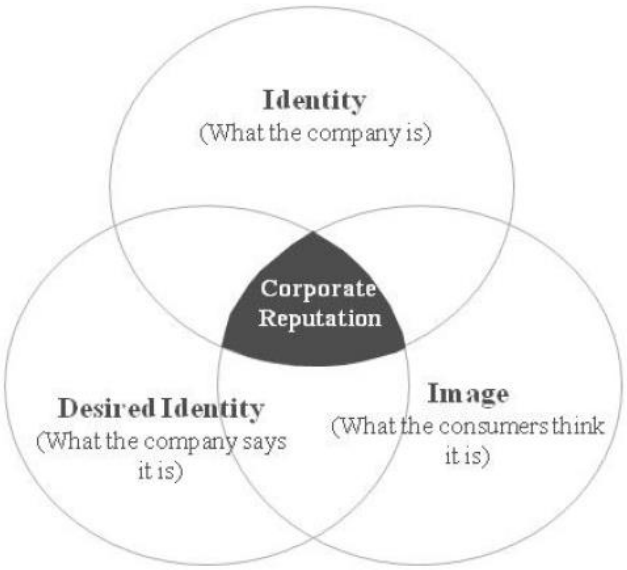

Figure 2.4 : Pillars of corporate reputation (Grutzmacher, 2011).

Some definitions stress the significance of the communication effort on account of stakeholders' evaluations. Any type of communication that includes information about the company or its actions forms a basis for the stakeholder evaluation (Gotsi and Wilson, 2001). Since social media significantly changed the way of the communication and behaviors of the customers, the organizations must certainly give attention to this channel. To establish control over reputation, companies should update their business strategies with an extended focus on communication (Argenti and Barnes, 2009). Researches show that communication affects the corporate reputation because a firm can explain its objectives and activities to the stakeholders for a better understanding of the firm and this can result in much more positive company evaluation and increasing reputation (Bunting and Lipski, 2000).

With the rise of technology, also modern concepts of reputation have been defined. One of them is media reputation which refers to the sum of evaluations of an organization shown in media (Deephouse, 2000). Another classification is more important for this study since social media is the main factor. The reputation in the modern age can be classified into two groups in terms of the environment. While the traditional one is called as offline reputation or real-world reputation, the one arisen with the technology is titled online reputation or digital reputation that represents the total of the online views of stakeholders about the organization (Jankauskaite and

Urboniene, 2016). Before the social media and intensive use of the internet, controlling the communication process was easier for the organizations since the flow was mainly one-directional. However, social media created a world of interaction, and stakeholders can easily interact and communicate with each other and spread their messages (Floreddu and Cabiddu, 2016). As a result, companies' reputations can be rapidly affected both positively and negatively. This creates a great opportunity but also an enormous risk to ensure an online reputation for the organizations.

After the discussion of social media with regards to communication and reputation, it can be clearly said that being present on and utilize from social media is essential for organizations as seen in Figure 2.5. One of the main issues is how to start the communication process and manage social media. The first step for organizations should be content creation and sharing on social media in order to control their reputation (Jankauskaite and Urboniene, 2016). They should use their profile pages as information hubs for their activities but they need to be careful about these announcements since the content is the key to social media and they will look like only a notice board without content (Tuten, 2008).

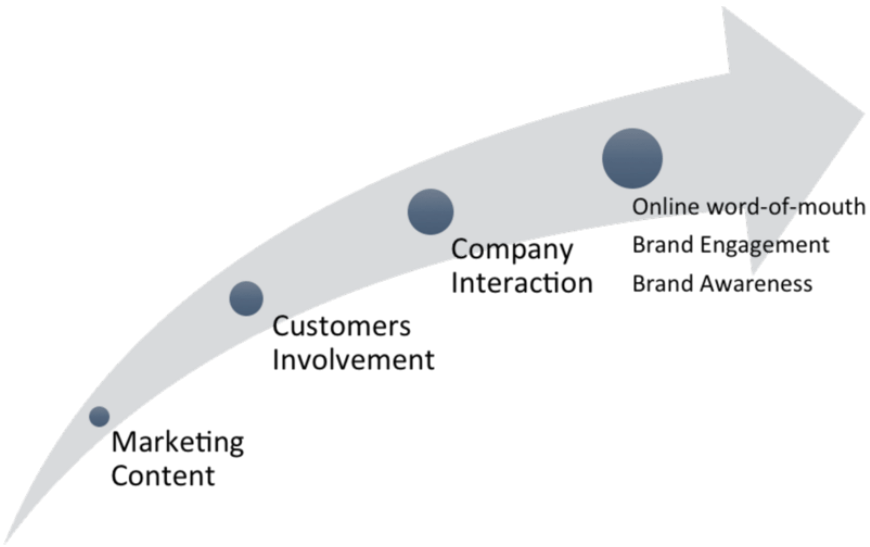

Figure 2.5 : Brand reputation through marketing (Li, 2016)

2.4. The Case of Opera Houses

The focus of this study is the examination and benchmarking of the communication strategies of opera houses around the world. There are studies about institutions from the cultural sector but the number of studies about opera houses is quite limited. The reason for the choice of opera houses is their extremely competitive environment and their struggles to engage with people. The point of origin of this competition is not only due to the organizations from the cultural sector but also extraordinarily developed leisure and entertainment sectors, and the new technologies and marketing applications are promoting this competitive environment every day (Suzić, Karlíček and Stříteský, 2016). With increasing technology, new ways of marketing are emerging. Organizations can use social networking sites to reach their stakeholders if they understand their behaviors on the use of social media, and eventually, they will utilize from different social media channels to connect with the stakeholders to satisfy their expectations (Waters *et al.*, 2009). A study conducted in the US shows that 97.9% of the museums create posts with cross-platform content showing that they use different social media channels to reach every user especially for the ones who only use one social networking site (Langa, 2014).

Social media may be an effective tool to reach a wide range of people. However, organizations must be careful about different aspects. First of all, being present on a social media channel is not enough and it may also cause negative outcomes. It is true that establishing and abandoning a profile on a social networking site will create exposure with very low levels but it is also dangerous since the inactivity may cause negative ideas for potential customers (Waters *et al.*, 2009). To prevent this situation, organizations including the opera houses are trying to actively use their social media accounts. Secondly, the content and presentation of the posts are crucial to attract attention from users. The study regarding museums and their use of Twitter presents that posts about public relations, events announcements, the fact of the day, and retweeting other users' or the institution's tweet create lesser engagement while posts with gaming, voting, co-curating projects, and live-tweeting events create greater engagement (Langa, 2014).

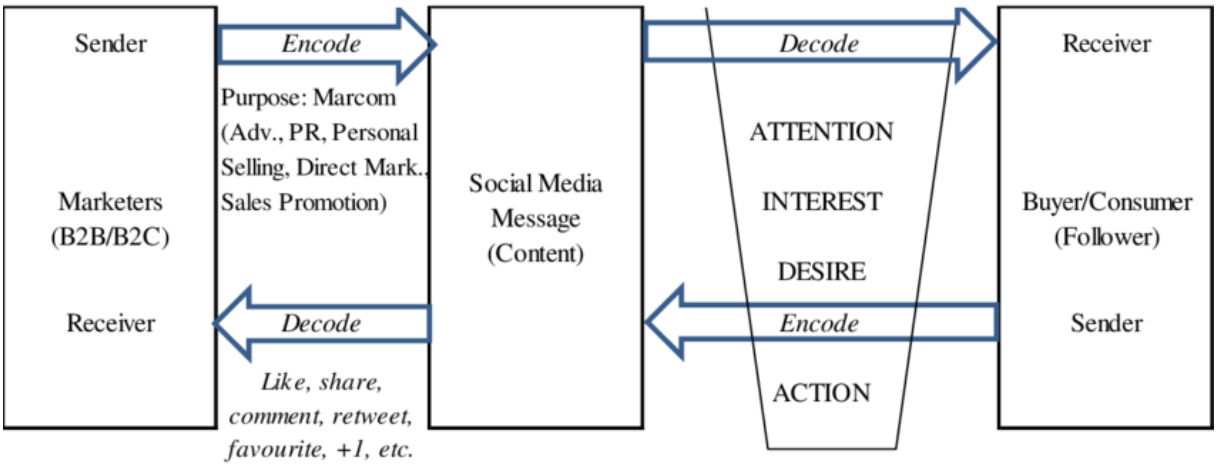

Figure 2.6 : Social media communication model (Batum and Ersoy, 2016)

Technology is not a new trend for opera houses. Cultural institutions utilized from different technologies for more than 50 years to communicate their audience but now the number of the organizations that imply Web 2.0 tools into their communication strategies have dramatically increased (López *et al.*, 2010). They are trying to reach their stakeholders by using various applications of Web 2.0. They prepare wikis to give information about them and their events. Some of them use blogging to increase the participation of users. Yet, the most important tool to reach people is social networking sites, currently. The communication cycle for social media can be seen in Figure 2.6 above. In all cases, these tools have to be integrated with the official websites of the organizations to leverage their benefits (Russo, Watkins and Groundwater-Smith, 2009).

Social media is a great solution for opera houses as mentioned before. However, the use of social media communication has some significant limitations. These benefits and their limitations can be listed as a shortage of resources, cost-benefit ratio, the difficulty of success measurement, and structure of art institutions (Hausmann, 2012). Arts and culture organizations strongly depend on financial aid from individuals, foundations, and government agencies (Benzing, Leach and McGee, 2011). With the ongoing economic crises, a lot of organizations experience budget cuts around the world. As an art institution, opera houses are likely to encounter this situation. Yet, their need for marketing is increasing despite this condition. With limited resources, social media can be a useful tool to communicate with stakeholders since a computer and

access to the internet can be enough for an effective social media use. Another problem can be related to the management of social media channels. The opera houses may not have the enough budget for additional employee and use the current staff for the management of social media channels. It can lead to ineffective content creation and poor use of the channels. To prevent this problem, hiring a talented person or educating the current staff can be solution but the cost analysis should be realized. Social media communication is an easy solution, but it can be costly by making investments without measuring the performance. In this case, measurement of the performance may be the problem. Of course, there are some metrics provided by social networking sites such as the number of post views, but it can be easily argued whether they really show the success of the communication strategy. Finally, hierarchy can be a limitation for the use of social media. The nature of social media includes rapid change and interactivity. Opera houses should be agile to catch the latest trends to pursue a successful social media marketing.

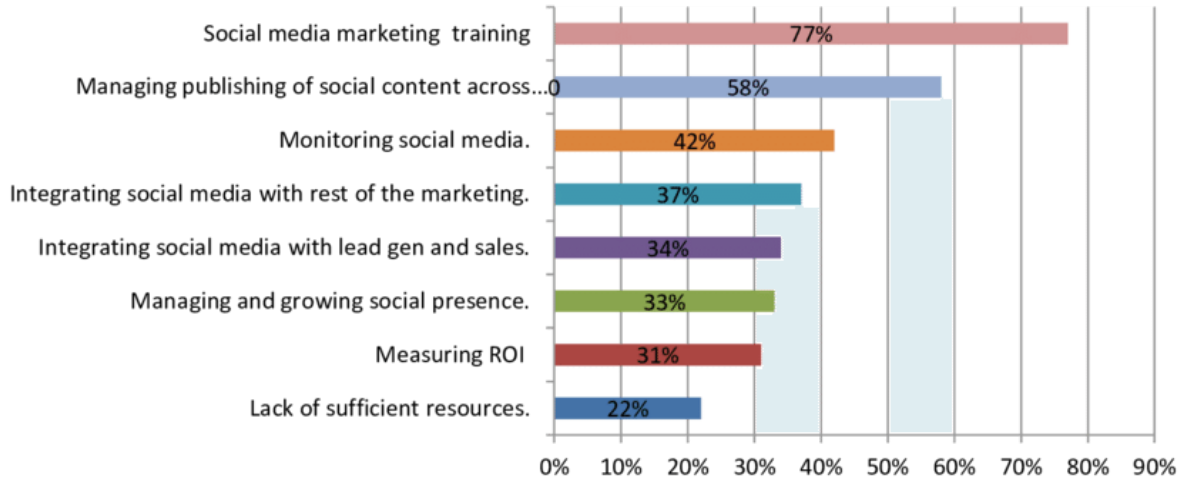

Figure 2.7 : Challenges of social media marketing (Bansal, Masood and Dadhich, 2014)

After discussing the problems, it is clear that opera houses have strongly competitive environments. New strategies should be investigated and implemented by arts organizations to gain a competitive advantage in the market and attract new people (Hausmann and Poellmann, 2013). Based on the literature for arts management, an increase in the demand can be achieved by marketing especially after the impact of

the digital revolution (Kotler, 2008). The art institutions should meet the needs of the changing world with regards to marketing (Rentschler, 2007). For marketing, social media has quickly become a trend thanks to its tremendous increase in users and applications (Weinberg, 2009). The rules of marketing have been changed with social media and organizations should be present on different channels to attract customers (Scott, 2015).

Opera houses should definitely give significant importance to social media communication. The reasons, advantages, and limitations of the social media strategy have been argued in this section. After this point, it will be questioned how opera houses should measure their performance and which ones are more successful.

2.5. Most Used Social Platforms

There are a variety of social media platforms that have different characteristics and target segments. Thus, not every social networking site is useful for opera houses to communicate with their followers. The features provided by the platform and the total number of users are important factors for channel selection. Opera houses should consider these issues while maintaining their social media use.

The world's most used social platform is seen in Figure 2.8 located below. Facebook is still the most popular social networking site owing to nearly 2.5 billion active users. The messaging applications such as WhatsApp and WeChat also appear here since they are considered as social platforms, too. However, they are not usable as a channel for social media communication. Another issue is the country-specific platforms. There are some Chinese social media channels that have a significant number of users. Yet, their use is quite limited out of the country borders. When these reasons and the number of active users are considered for social media platforms, it can be said that Facebook, Instagram, and Twitter are the best channels for opera houses. In fact, they are highly utilized by opera houses around the world. Thus, the study will be focused on these three channels.

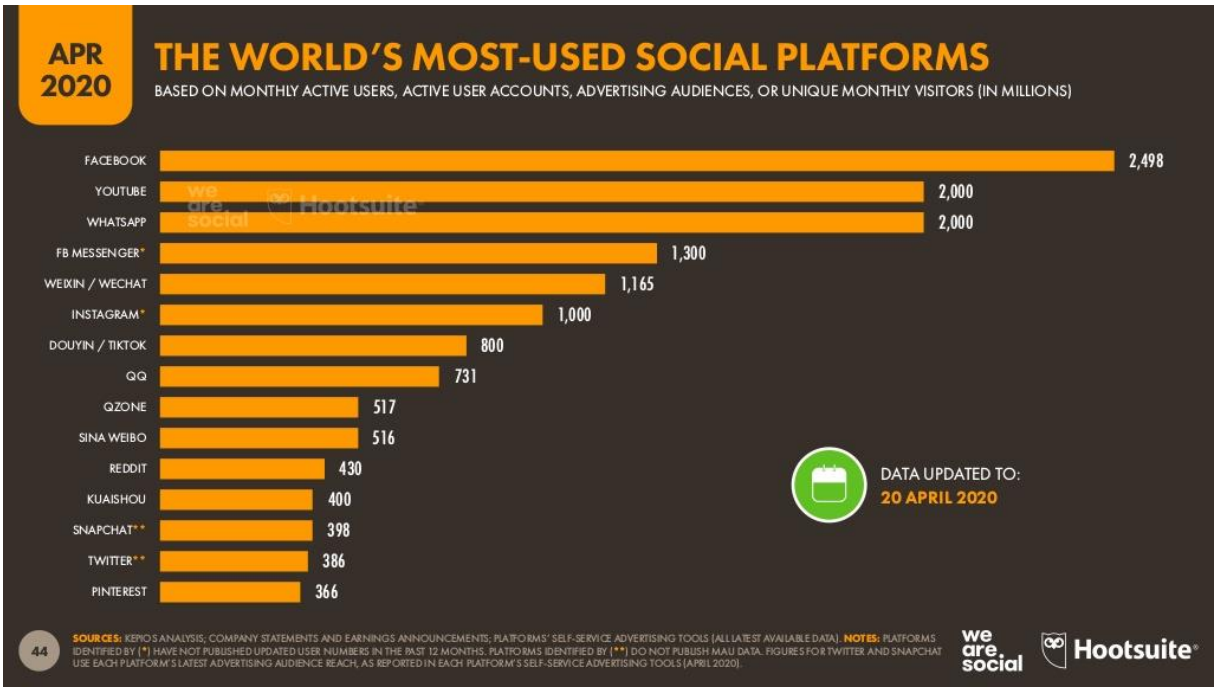

Figure 2.8 : Number of users of social media platforms (Kemp, 2020)

2.6. Measurement of Social Media Use

The importance of social media and its use by opera houses have been explained until this point. It is clear that opera houses should utilize the benefits of social media. Yet, another important point is related to the measurement of their social media use. In this way, the activities of different opera houses around the world can be statistically compared with each other. By combining these measurements with different dimensions, useful insights can be obtained to interpret the current situations, to define the problems, and create suggestions for a more effective social media management.

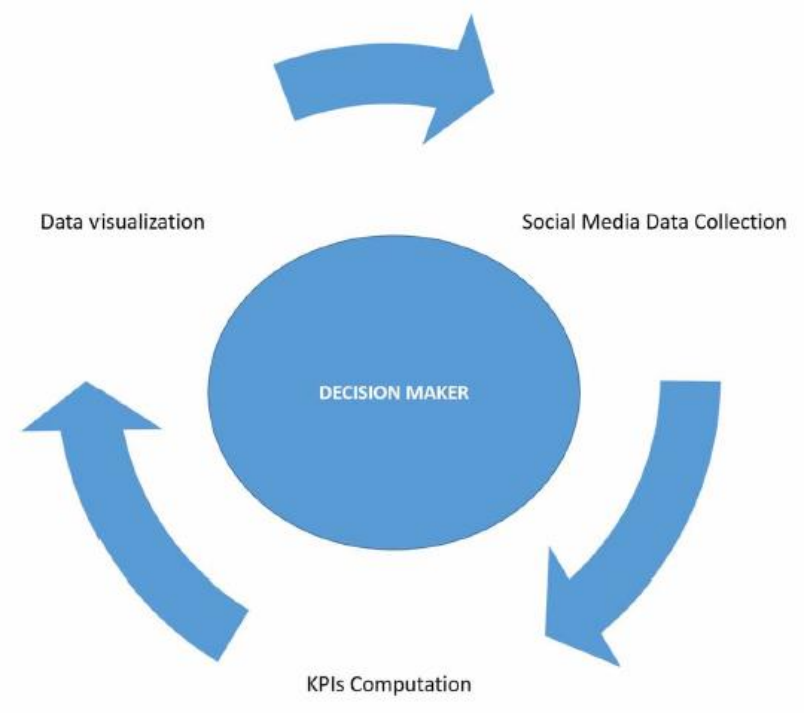

Figure 2.9 : Framework for performance measurement with social media data

To analyze the social media data, a cycle of steps can be followed as seen in Figure 2.9 (Agostino, Arnaboldi and Azzone, 2018). The first step is the collection of social media data. The social media channels have been selected as Facebook, Instagram, and Twitter as argued previously. The additional explanation of data will be given in the later sections. Then, the next step is the computation of KPIs. In this study, the objective is to make a literature review and using existed formulas from the literature for the computations. It will be deeply discussed in the methodology part. Finally, the last step is the visualization of data. Several visuals have been created in the study to effectively demonstrate the results of the analyses. Microsoft Excel, Google Sheets, R programming language, and Power BI have been used to create graphics given in the article.

3. METHODOLOGY

3.1. Sampling and Data Collection

First, the sample of opera houses has been created. 48 popular opera houses from 21 countries have been chosen for the study. The list of opera houses can be seen in Table 3.1 as sorted with regards to countries. The official Facebook, Instagram, and Twitter accounts of these opera houses have been found through their websites.

Table 3.1 : List of opera houses

Opera Name	**City**	**Country**
Teatro Colon	Buenos Aires	Argentina
Sydney Opera House	Sydney	Australia
Wiener Staatsoper	Vienna	Austria
Théâtre Royal de la Monnaie	Brussels	Belgium
National Centre for the Performing Arts (NCPA)	Beijing	China
Royal Danish Theater	Copenhagen	Denmark
Finnish National Opera	Helsinki	Finland
Opéra National de Paris	Paris	France
Opera National de Lyon	Lyon	France
Théâtre des Champs Elysées	Paris	France
Opéra de Strasbourg	Strasbourg	France
Deutsche Oper	Berlin	Germany
Staatsoper Unter den Linden	Berlin	Germany
Komische Oper	Berlin	Germany
Bayerische Staatsoper	Munich	Germany
Oper Frankfurt	Frankfurt	Germany
Semperoper Dresden	Dresden	Germany
Staatsoper Hamburg	Hamburg	Germany
Staatstheater Stuttgart	Stuttgart	Germany

Dutch Nationale Opera and Ballet	Amsterdam	Holland
Teatro alla Scala	Milan	Italy
Teatro Petruzzelli	Bari	Italy
Teatro Comunale di Bologna	Bologna	Italy
Teatro Lirico di Cagliari	Cagliari	Italy
Teatro Maggio Musicale Fiorentino	Florence	Italy
Teatro Carlo Felice	Genoa	Italy
Teatro San Carlo	Naples	Italy
Teatro Massimo	Palermo	Italy
Teatro dell'Opera	Rome	Italy
Accademia Nazionale di S. Cecilia	Rome	Italy
Teatro Regio	Turin	Italy
Teatro Lirico Giuseppe Verdi	Trieste	Italy
Teatro La Fenice	Venice	Italy
Arena di Verona	Verona	Italy
New National Theatre	Tokyo	Japan
Oslo Opera House	Oslo	Norway
Royal Opera House Muscat	Muscat	Oman
Polish National Opera	Warsaw	Poland
Bolshoi Theatre	Moscow	Russia
Mariinsky Theatre	St. Petersburg	Russia
Teatro Real	Madrid	Spain
Gran Teatre del Liceu	Barcelona	Spain
Royal Swedish Opera	Stockholm	Sweden
Opernhaus Zürich	Zurich	Switzerland
Royal Opera House	London	United Kingdom
Metropolitan Opera	New York	USA
Lyric Opera of Chicago	Chicago	USA
War Memorial Opera House	San Francisco	USA

A periodical data scrapping has been applied to gather data on social media accounts. Among the different data scrapping methods, Python has been selected owing to several advantages. First, Python is free of charge and open source. Therefore, it is

possible to easily reach and use various libraries. It is also the reason why Python is preferred in different research areas. Additionally, it is a flexible and user-friendly programming language. Finally, the selected social media platforms which are Facebook, Instagram, and Twitter are technically appropriate for data scrapping by using Python.

3.2. Literature Review for Existed Measurement Models

The necessity and importance of the measurement for social media use have been deeply argued and explained until this point. The objective of this study is quantifying and benchmarking the social media strategies of different opera houses to obtain useful insights. Therefore, a literature review has been realized to gather different methods and key performance indicators. Different studies exist in the literature that focuses on various objectives, channels, or topics. First of all, the ones that can be used in this study and is relevant regarding objectives have been collected. They will be briefly explained in this part. The aim of this study is to use the existed methods for the analysis, not creating a new methodology. Thus, the most suitable methods will be selected to be utilized for the analysis process. Then, the reasons for this selection will be discussed.

Since Facebook is one of the pioneers for social media and still has the leading platform regarding the total number of users, most of the studies focus on Facebook. There are different approaches and suggested indicators to measure the performance for the use of Facebook. Some approaches can be seen in Table 3.2 below. The majority of the indicators focus on the measurement of engagement. The authors tried to create different formulas for different objectives. On the first part of the table, it can be seen as a step by step approach to calculate the engagement level. In the second part of the table, different concepts of engagement can be noticed. Different dimensions have been created by considering the activities of both organization and user sides.

In brief, the most utilized parameters are the number of fans, likes, comments, shares, and posts in the existed formulations. They are generally used in a proportional shape

to make the results meaningful. In cases where the resulted numbers are so small, a coefficient of 100 is used to make comparison of the numbers easier.

Table 3.2 : Performance indicators for Facebook

Author	**Dimension**	**Formula**
(Oviedo-García *et al.*, 2014)	Ratio of Interest	$\frac{\text{Likes} + \text{Comments} + \text{Shares} + \text{OtherClicks}}{\text{Number of Posts}}$
	Ratio of Effective Interest	$\frac{\text{Ratio of Interest}}{\text{Average Impressions}}$
	Engagement	$\frac{\text{Ratio of Effective Interest}}{\text{Average Reach}}$
(Mariani, Mura and Di Felice, 2018)	Generic Engagement	$\frac{\text{Likes} + \text{Comments} + \text{Shares}}{\text{Total Posts} * \text{Total Fans}} * 100$
	Brand Engagement	$\frac{(\text{Likes.Users} + \text{Comments.Users} + \text{Shares.Users})}{\text{Posts.DMO} * \text{Total Fans}} * 100$
	User Engagement	$\frac{(\text{Likes.Users2Users} + \text{Comments.Users2Users} + \text{Shares.Users2Users})}{\text{Posts.Users} * \text{Total Fans}} * 100$
	Generic Engagement for users' activity	$\frac{\text{Likes} + \text{Comments} + \text{Shares}}{\text{Total Posts}} * 100$
	Brand Engagement for users' activity	$\frac{(\text{Likes.Users} + \text{Comments.Users} + \text{Shares.Users})}{\text{Posts.DMO}} * 100$
	User Engagement for users' activity	$\frac{(\text{Likes.Users2Users} + \text{Comments.Users2Users} + \text{Shares.Users2Users})}{\text{Posts.Users}} * 100$

Twitter is another social networking site that has a lot of studies about it. Resembling Facebook, there are various measurement proposals in point of different dimensions and objectives. Some of these methods can be seen in Table 3.3 below. In the case of Twitter, the indicators for the communication side are more common. It can be said that the number of posts is more remarkable and clearly shows the communication effort. In the first part of the table, the possible activities on Twitter have been matched with suitable dimensions. In the last part, formulas with more numerical characteristics are seen. Again, they have proportional shapes and coefficients to adjust the results. The dimensions have changing names with different authors, but the main concept is the measurement of communication and engagement sides. The most utilized parameters are the number of followers, tweets, favorites, and retweets to measure the performance.

Table 3.3 : Performance indicators for Twitter

Author	**Dimension**	**Formula**
(Sashi, Brynildsen and Bilgihan, 2019)	Advocacy	Number of retweets
	Connection effort	Number of tweets
	Interaction effort	Number of tweets with links
		Number of tweets with hashtags
		Number of tweets with mentions
	Retention effort	Number of tweets with replies

	Calculative commitment	Number of followers
	Affective commitment	Number of favorites
(Muñoz-Expósito, Oviedo-García and Castellanos-Verdugo, 2017)	Ratio of Interest	$\frac{\text{Interactions}}{\text{Number of tweets}} * 100$
	Ratio of Effective Interest	$\frac{\text{Ratio of Interest}}{\text{Average Impressions}} * 100$
	Engagement	$\frac{\text{Ratio of Effective Interest}}{\text{Average Reach}} * 100$
	Engagement on tweet	$\frac{\frac{Interactions}{Impressions}}{Reach\ of\ tweet} * 100$

Instagram is another popular social networking site, today. However, there are fewer studies that focus on Instagram when it is compared with Facebook or Twitter. Instagram is a comparatively newer platform than the previously considered social networking sites. Thus, it can be said that its importance for the organizations emerged in near future. The popularity of Instagram and the number of organizations that adopt this channel is increasing every day.

One of the highly accepted methodologies will be explained in this section. The formulations in Table 3.4 can be noticed in various studies in the literature. A lot of authors utilized from these formulations to calculate social media use for different dimensions. The origin of this methodology depends on research that focuses on Facebook and the measurement of the engagement levels (Bonsón and Ratkai, 2013). Then, it is seen that the same methodology has been adapted to Twitter in a few years later (Bonsón, Perea and Bednárová, 2019). Owing to the strong structure and popularity in the literature, this methodology has been used also including Instagram (Molinillo *et al.*, 2019).

The main parameters of the method are standardized, and they are the number of likes, comments, shares, posts, and followers. Each activity is connected to a dimension. In this case, the number of likes is the indicator of popularity. While the number of comments is named as commitment, the number of shares is related to virality. Finally, the authors argue that the sum of these factors results in engagement. It can be said that engagement consists of three pillars according to this methodology.

Table 3.4 : Performance indicators for Facebook, Twitter, and Instagram

Dimension	**Code**	**Formula**
Popularity	P1	$\frac{\text{Number of posts favorited}}{\text{Total posts}}$
	P2	$\frac{\text{Total number of likes}}{\text{Total posts}}$
	P3	$\frac{\text{P2}}{\text{Number of followers}} * 1000$
Commitment	C1	$\frac{\text{Number of posts commented}}{\text{Total posts}}$
	C2	$\frac{\text{Total number of comments}}{\text{Total posts}}$
	C3	$\frac{\text{C2}}{\text{Number of followers}} * 1000$
Virality	V1	$\frac{\text{Number of posts shared}}{\text{Total posts}}$
	V2	$\frac{\text{Total number of shares}}{\text{Total posts}}$
	V3	$\frac{\text{V2}}{\text{Number of followers}} * 1000$
Engagement		P3 + C3 + V3

Finally, another methodology about the measurement of social media use is strongly related to the evaluation of social media communication efforts. The aim of the model is measuring the degree of corporate social media use by considering to what extent

organizations are exploiting the benefits of single or multiple social media platforms (Aichner and Jacob, 2015). It heavily focuses on the social media activity of the brands for certain social media platforms. It is also taking into account the customer side with their reactions. Yet, the main objective is quantifying the use of the organization's side.

One of the advantages of the model is its usability for different social media platforms and its capability to create an overall social media use score by combining individual scores of platforms. It supports to combine up to five platforms. The model started with social media channels such as Facebook, YouTube, Google+, LinkedIn, and Twitter. Then, the formulas have been slightly adjusted to include Instagram in the latter article (Aichner, 2019). The increase in the popularity of Instagram can be said as influential for this choice.

The process of methodology can be summarized in four steps. Firstly, the platforms that will be examined are determined and the number of active users around the world obtained. It is important to calculate the impact of each social media platform. Next, the SMIF (Social Media Impact Factor) is calculated for each platform by using the numbers of active users and Equation 3.1 below. It is obvious that the sum of SMIF values will be equal to 1.

$$SMIF_{platform} = \frac{Active\ Users_{platform}}{\sum Active\ Users_{platforms}} \qquad (\mathbf{3.1})$$

In the third step, the SMU (Social Media Use) values are calculated for each social media platform. The formulas are slightly different due to the characteristics of the social media channels. The focused channels in this study are Facebook, Twitter, and Instagram and related formulas can be seen below. The first parameter is the number of posts and it represents the frequency of social media activity of the brands. Then, there are interactions divided by the total number of followers. There is also one additional coefficient for standardization of the SMU values. This standardization process makes the results more meaningful and easier for comparison. These coefficients located at the end of the formulas are unique for each study and should be calculated in advance. For the calculation of the coefficients, the three opera houses

that have the largest Facebook followers will be used as suggested in the article about the football clubs' social media use (Aichner, 2019). The average values of these three opera houses are used to calculate the ideal SMU score. Then, the need for the coefficient emerges to make this ideal SMU score equal to "1" for standardization. Clearly, the coefficient can be calculated by dividing 1 by the SMU score. For the ideal case, the SMU score will take the value of 1. By adding this coefficient to the formula, all results should be changed between 0 and 1. While "SMU=0" means no use, "SMU=1" presents the full use of a social media channel. The result of the equation can exceed the upper limit. In this case, SMU should be equal to the optimal value which is one.

$$SMU_{facebook} = Posts * \frac{Likes + Comments * 5 + Shares * 10}{Fans} * C_{facebook} \quad (\mathbf{3.2})$$

$$SMU_{twitter} = Tweets * \frac{Favorites + Retweets * 10}{Followers} * C_{twitter} \quad (\mathbf{3.3})$$

$$SMU_{instagram} = Posts * \frac{Likes + Comments * 5}{Followers} * C_{instagram} \quad (\mathbf{3.4})$$

As a fourth and final step, CSMU (Corporate Social Media Use) value is calculated for the organization. It represents the overall social media use. To obtain this value, the SMU value of the organization for a channel is multiplied by the SMIF value of the same channel. This process is applied for all channels taken into account. Finally, the sum of them gives the CSMU value for an organization as seen in Equation 3.5 below. Since the sum of SMIF values is equal to 1, SMU values for organizations have also a range changing between 0 and 1. Having "0" as an SMU score means no presence on social media. On the other hand, "1" represents a full score and full utilization of social media.

$$CSMU_{organization} = \sum SMU * SMIF \quad (\mathbf{3.5})$$

There are various methods to measure the performance of social media communication as told in this section. Yet, the most suitable ones will be used in the analysis part. The choice of the used method and reasons for this selection will be discussed in the next part.

3.3. Methodology for the Study

The main objective of this study is to focus on the the opera houses by evaluating and benchmarking their social media use with each other. Thus, the last-mentioned CSMU model has been selected as a starting point for the analysis. There are crucial reasons that support this decision.

First of all, this model has been created to define the degree of social media use of corporations. Therefore, it is convenient to measure the social media use of opera houses by using this model and compare their communication effort by using social media. Secondly, it is appliable to different social media platforms such as Facebook, Instagram, and Twitter which are the focus of the article. Formulations and applications regarding these platforms also exist in the literature. SMU values of each channel are changing between 0 and 1 owing to the standardization process. In this way, the comparison of utilization for each channel is easy. Different channels can be compared to obtain different insights from the analyses. Finally, the model provides a feature to combine the scores of each channel and obtain a score for overall social media use. Having an overall social media usage score is the fastest way to define the most successful opera houses on account of social media communication. It is also easy to compare opera houses with each other and create segments according to obtained scores.

To bring a new dimension to the, cluster analysis will be conducted, too. The objective is the segmentation of opera houses based on their communication efforts on social media. R programming language will be utilized since it is free of charge and highly used in similar areas. Monthly posting distributions of opera houses will be used as the input for the analysis. After creating smaller samples based on the posting frequency

of opera houses, the different behaviors of opera houses can be observed more clearly.

In addition to the communication side, it is useful to examine the user side by analyzing the engagement. It may give additional and interesting insights to help opera houses for creating a better social media strategy. There are different methods for the measurement of engagement regarding different social media channels. In this article, the model that has been explained in Table 3.4 will be used for the analyses. There are significant points that promote this selection. At first, this methodology is highly accepted in the literature with a lot of examples by different authors and articles. It has a strong yet simple structure with standardized parameters. Thus, the implementation of the method and interpretation of the results are clear. Subsequently, the formulas are convenient to apply for Facebook, Twitter, and Instagram. This condition perfectly matches with the focus of the study regarding pre-defined social media platforms.

Furthermore, the period of the Covid-19 pandemic will be taken as another dimension in the analysis part. It will be investigated whether there is an effect of the virus outbreak on the communication effort of the opera houses. To justify this hypothesis, the data for the first three months of 2020 can be compared with the data of the same months of 2019. Weekly posting distribution of opera houses is a basic indicator of the communication effort. Therefore, weekly post numbers of opera houses will be statistically compared regarding Facebook, Instagram, and Twitter. The t-test with a 95% confidence level will be applied for statistical analysis.

The selection of the methodology and reasons behind it have been argued in this part. Since the literature review has been summarized and methodology has been explained, it is suitable to proceed with the analysis section. The chosen methods will be deeply investigated in the analysis part.

4. ANALYSIS AND RESULTS

4.1. Descriptive Analysis

As explained before, 48 opera houses have been selected from different countries around the world. The most used social media platforms by opera houses are Facebook, Instagram, and Twitter. The list of opera houses and their social media accounts can be seen in Table 4.1 below. The data regarding the first three months of 2019 and 2020 have been retrieved from these social media accounts. When the table is observed, it is seen that almost every opera house is present on nearly every channel. The presence is called as official when a link exists to Facebook, Instagram, or Twitter accounts from the homepage of organizations (Agostino, 2013). Only one opera house is not present regarding Facebook. In the case of Instagram and Twitter, two opera houses are missing on each platform.

Table 4.1 : List of opera houses and their social media accounts

Opera House	**Facebook Name**	**Instagram Name**	**Twitter Name**
Teatro alla Scala	Teatro alla Scala	teatroallascala	teatroallascala
Teatro Petruzzelli	Fondazione Teatro Petruzzelli	fondazioneteatropetruzzelli	PetruzzelliBari
Teatro Comunale di Bologna	Teatro Comunale Bologna	comunalebologna	ComunaleBologna
Teatro Lirico di Cagliari	Teatro Lirico di Cagliari	teatroliricodicagliari	teatro_lirico
Teatro Maggio Musicale Fiorentino	Teatro del Maggio	-	maggiomusicale
Teatro Carlo Felice	Teatro Carlo Felice	teatrocarlofelice	CarloFeliceTv
Teatro San Carlo	Teatro San Carlo	teatrosancarlo	teatrosancarlo
Teatro Massimo	Teatro Massimo Palermo	teatromassimo	teatromassimo
Teatro dell'Opera	Teatro dell'Opera di Roma	opera_roma	OperaRoma
Accademia Nazionale di S. Cecilia	Accademia Nazionale di Santa Cecilia	accademiadisantacecilia	santa_cecilia
Teatro Regio	Teatro Regio Torino	teatroregiotorino	TeatroRegio
Teatro Lirico Giuseppe Verdi	Teatro Lirico Giuseppe Verdi	teatroverdits	TeatroVerdiTS

Teatro La Fenice	Teatro La Fenice	teatrolafenice	teatrolafenice
Arena di Verona	Arena di Verona	arenadiverona	arenadiverona
Royal Opera House	Royal Opera House	royaloperahouse	RoyalOperaHouse
Opéra National de Paris	Opéra national de Paris	operadeparis	operadeparis
Deutsche Oper	Deutsche Oper Berlin	deutscheoperberlin	deutsche_oper
Staatsoper Unter den Linden	Staatsoper Unter den Linden	staatsoperberlin	StaatsoperBLN
Komische Oper	Komische Oper Berlin	komischeoperberlin	Komische_Oper
Bayerische Staatsoper	Bayerische Staatsoper	bayerischestaatsoper	bay_staatsoper
Opernhaus Zürich	Opernhaus Zürich	operzuerich	operzuerich
Dutch Nationale Opera and Ballet	De Nationale Opera - Dutch National Opera	nationaleoperaballet	DutchNatOpera
Teatro Real	Teatro Real	teatro_real	Teatro_Real
Wiener Staatsoper	Wiener Staatsoper	wienerstaatsoper	WrStaatsoper
Metropolitan Opera	The Metropolitan Opera	metopera	MetOpera
Sydney Opera House	Sydney Opera House	sydneyoperahouse	SydOperaHouse
Bolshoi Theatre	Bolshoi Theatre of Russia	bolshoi_theatre	BolshoiOfficial
Mariinsky Theatre	Mariinsky Theatre	mariinsky	mariinskyen
Oper Frankfurt	-	oper_frankfurt	operfrankfurt
Semperoper Dresden	Semperoper Dresden	semperoper	semperoper
Opera National de Lyon	Opéra de Lyon	operadelyon	operadelyon
Gran Teatre del Liceu	Gran Teatre del Liceu	liceu_opera_barcelona	Liceu_cat
Polish National Opera	Teatr Wielki - Opera Narodowa	operanarodowa	Opera_Narodowa
Royal Swedish Opera	Kungliga Operan	kungligaoperan	KungligaOperan
Finnish National Opera	Ooppera & Baletti	oopperabaletti	oopperabaletti
Oslo Opera House	Den Norske Opera & Ballett	operaen_	Operaen
Royal Danish Theater	Det Kongelige Teater	kglteater	kglteater
Théâtre Royal de la Monnaie	La Monnaie De Munt	lamonnaie.demunt	LaMonnaieDeMunt
Lyric Opera of Chicago	Lyric Opera of Chicago	lyricopera	LyricOpera
War Memorial Opera House	San Francisco Opera	sfopera	SFOpera
Teatro Colon	Teatro Colón	teatrocolon	TeatroColon
New National Theatre	New National Theatre Tokyo	newnationaltheatretokyo	-

National Centre for the Performing Arts (NCPA)	National Centre for the Performing Arts	-	-
Royal Opera House Muscat	Royal Opera House Muscat	roh_muscat	ROH_Muscat
Staatsoper Hamburg	Staatsoper Hamburg	staatsoperhamburg	staatsoperHH
Staatstheater Stuttgart	Staatstheater Stuttgart	staatsoperstuttgart	oper_stuttgart
Théâtre des Champs Elysées	Théâtre des Champs-Elysées	theatre_champs_elysees	TCEOPERA
Opéra de Strasbourg	Opéra national du Rhin	operadurhin	Operadurhin

Although the table is almost full, it does not show that opera houses are using all of these channels. Being present on a social media channel and being an active user are different issues. Thus, this table can be misleading when examined alone. Additional analysis should be realized on account of the social media activity of opera houses.

Facebook is the most actively used channel by opera houses. It has been mentioned that one opera house does not use Facebook. However, all of the remaining opera houses are actively utilizing from this channel. In brief, 47 out of 48 opera houses use Facebook. Instagram has a similar situation regarding the activity. All of the opera houses that have an Instagram account use actively this channel. Thus, it can be said that 96% of opera houses really use the Instagram platform. Finally, Twitter stands out with inactive accounts. Despite being present on Twitter, five of the opera houses are inactive. Therefore, it is more accurate to declare that 85% of opera houses utilize from Twitter.

4.2. Social Media Usage of Opera Houses

As discussed in the methodology section, the main method that will be used for the analyses is the CSMU model. The analysis section starts with the evaluation of the social media use of opera houses by using this model. The data for the first three months of the year 2020 will be used for this process. Then, additional analyses will be carried out according to results. CSMU model consists of four steps as explained before. The first step is the definition of monthly user numbers of social media

platforms. The focus of this study is the definition of active social media users for the social media channels that will be analyzed. The latest data for the numbers of monthly active users regarding April 2020 has been used as previously given in Figure 2.8. The data can be seen in Table 4.2 below.

Table 4.2 : Number of users for social media platforms

Social media name	**Active users / month (in billions)**
Facebook	2.498
Instagram	1
Twitter	0.386
Total	3.884

Secondly, the social media impact factor (SMIF) for each channel is calculated by using Equation 3.1. It is basically the proportion of active users for a channel to the number of total social media users. The calculations can be seen below.

$$SMIF_{facebook} = \frac{2.498}{3.884} = 0.643$$

$$SMIF_{instagram} = \frac{1}{3.884} = 0.257$$

$$SMIF_{twitter} = \frac{0.386}{3.884} = 0.099$$

The third step is the calculation of social media use values for each channel. Equations 3.2, 3.3, and 3.4 will be used for Facebook, Twitter, and Instagram, respectively. However, there is another important step to proceed. First, the coefficients at the end of the equations should be calculated. As explained before, the standardization cannot be performed without these coefficients. Three opera houses having the largest Facebook followers which are Sydney Opera House, Royal Opera House, and Metropolitan Opera will be used.

Table 4.3 : Facebook activities of selected opera houses

Opera house	Fans	Postings (monthly)	Average per posting		
			Likes	Comments	Shares
Sydney Opera House	2122457	35.6	426.9	29.0	53.7
Royal Opera House	1230328	58.0	2391.9	103.5	655.2
Metropolitan Opera	562479	81.3	775.7	57.2	165.2
Average	1305088	58.3	1198.2	63.2	291.4

The average values of the selected opera houses are used to calculate the coefficient for Facebook given in Equation 3.2. The sum of the average number of likes (1198.2), comments times five (63.2*5), and shares times ten (291.4*10) is multiplied with the average number of monthly postings (58.3). Then, the result is divided by the average number of followers which is 1,305,088. It gives the result for an optimal SMU of 0.198. The last step of the calculation is dividing 1 by this result. Finally, the coefficient is obtained as “5.052” and the Facebook formula taken its last shape given on Equation 4.1 below.

$$SMU_{facebook} = Posts * \frac{Likes + Comments * 5 + Shares * 10}{Fans} * 5.052 \qquad (\mathbf{4.1})$$

Table 4.4 : Instagram activities of selected opera houses

Opera house	Fans	Postings (monthly)	Average per posting	
			Likes	Comments
Sydney Opera House	144334	13.7	806.0	9.6
Royal Opera House	659887	65.3	5056.9	34.8
Metropolitan Opera	354633	77.0	3043.3	39.2
Average	386284	52.0	2968.7	27.9

The same process will be applied to calculate the constant for the Instagram formula. The sum of the average number of likes (2968.7) and comments times five (29.9*5) is

multiplied with the average number of monthly postings (52.0). Then, the result is divided by the average number of followers which is 386,284. It gives the result for an optimal SMU of 0.418. The last step of the calculation is dividing 1 by this result. Finally, the coefficient is calculated as “2.390”. The constant is also added at the end of the formula and the final version is Equation 4.2 below.

$$SMU_{instagram} = Posts * \frac{Likes + Comments * 5}{Followers} * 2.390 \quad (\mathbf{4.2})$$

Table 4.5 : Twitter activities of selected opera houses

Opera house	**Fans**	**Postings (monthly)**	**Average per posting**	
			Likes	**Retweets**
Sydney Opera House	144800	88.3	10.3	15.2
Royal Opera House	199033	148.0	19.4	26.9
Metropolitan Opera	232885	55.7	81.0	41.1
Average	192239	97.3	36.9	27.7

Then, the constant for Twitter is calculated by following the same process. The sum of the average number of likes (36.9) and retweets times ten (27.7*10) is multiplied with the average number of monthly postings (97.3). Then, the result is divided by the average number of followers which is 192,239. It gives the result for an optimal SMU of 0.159. The last step of the calculation is dividing 1 by this result. Finally, the coefficient is calculated as “6.283”. The result is also added at the end of the formula as seen on Equation 4.3.

$$SMU_{twitter} = Tweets * \frac{Favorites + Retweets * 10}{Followers} * 6.283 \quad (\mathbf{4.3})$$

In the fourth and final step, SMU values can be calculated for each opera house and channel. Then, CSMU values can be obtained by combining the SMU values with previously calculated SMIF values. The updated CSMU formula for this study can be seen in Equation 4.4 below.

$$CSMU_{opera\ house} = SMU_{facebook} * 0.643 + SMU_{instagram} * 0.257 + SMU_{twitter} * 0.099 \quad (\mathbf{4.4})$$

By using the final versions of the formulas with updated coefficients for this study, social media use scores of the opera houses have been calculated as seen in Table 4.6 below. These results will be used for the later steps.

Table 4.6 : Social media use of opera houses

Opera Name	$SMU_{facebook}$	$SMU_{instagram}$	$SMU_{twitter}$	$CSMU$
Teatro alla Scala	0.720	0.517	0.152	0.611
Teatro Petruzzelli	1.000	0.106	0.000	0.671
Teatro Comunale di Bologna	0.517	0.479	0.123	0.468
Teatro Lirico di Cagliari	1.000	0.595	0.063	0.803
Teatro Maggio Musicale Fiorentino	1.000	0.000	0.911	0.734
Teatro Carlo Felice	1.000	0.759	1.000	0.938
Teatro San Carlo	0.837	1.000	0.002	0.796
Teatro Massimo	1.000	0.220	0.102	0.710
Teatro dell'Opera	1.000	1.000	1.000	1.000
Accademia Nazionale di S. Cecilia	1.000	0.975	0.579	0.952
Teatro Regio	1.000	1.000	1.000	1.000
Teatro Lirico Giuseppe Verdi	1.000	0.985	0.843	0.980
Teatro La Fenice	1.000	0.987	1.000	0.997
Arena di Verona	0.133	0.460	0.094	0.213
Royal Opera House	1.000	1.000	1.000	1.000
Opéra National de Paris	1.000	1.000	0.428	0.943

Deutsche Oper	0.501	0.203	0.386	0.413
Staatsoper Unter den Linden	1.000	0.713	1.000	0.926
Komische Oper	1.000	0.434	1.000	0.854
Bayerische Staatsoper	1.000	0.920	1.000	0.979
Opernhaus Zürich	0.494	0.611	0.491	0.524
Dutch Nationale Opera and Ballet	0.969	0.808	0.027	0.834
Teatro Real	0.646	0.692	0.502	0.644
Wiener Staatsoper	1.000	0.363	0.000	0.737
Metropolitan Opera	1.000	1.000	0.739	0.974
Sydney Opera House	0.094	0.193	0.623	0.172
Bolshoi Theatre	0.879	0.364	0.062	0.665
Mariinsky Theatre	0.785	1.000	0.000	0.762
Oper Frankfurt	0.000	0.608	0.000	0.157
Semperoper Dresden	0.647	0.381	0.858	0.599
Opera National de Lyon	0.474	0.136	0.298	0.370
Gran Teatre del Liceu	0.374	0.641	1.000	0.505
Polish National Opera	1.000	0.439	0.001	0.756
Royal Swedish Opera	0.786	0.708	0.867	0.774
Finnish National Opera	1.000	1.000	0.737	0.974
Oslo Opera House	0.938	0.640	0.000	0.768
Royal Danish Theater	0.717	0.491	0.027	0.590
Théâtre Royal de la Monnaie	1.000	0.699	1.000	0.922
Lyric Opera of Chicago	0.772	0.173	0.335	0.575
War Memorial Opera House	0.302	0.500	0.106	0.333
Teatro Colon	0.591	0.322	0.018	0.465
New National Theatre	1.000	1.000	0.000	0.901
National Centre for the Performing Arts	0.074	0.000	0.000	0.048
Royal Opera House Muscat	0.037	0.159	0.013	0.066
Staatsoper Hamburg	1.000	0.640	1.000	0.907
Staatstheater Stuttgart	1.000	0.961	1.000	0.990
Théâtre des Champs Elysées	0.566	0.556	0.701	0.577
Opéra de Strasbourg	1.000	0.853	0.724	0.935

4.2.1. Benchmarking of Channels

After the calculation of social media use scores for each channel and opera house, the first interpretation can be realized to compare channels. The use of Facebook, Instagram, and Twitter has been quantified with the calculation of SMU scores for each opera house. The average use of these channels by opera houses can be easily calculated. The average utilization values by opera houses for each social media platform can be seen in Figure 4.1.

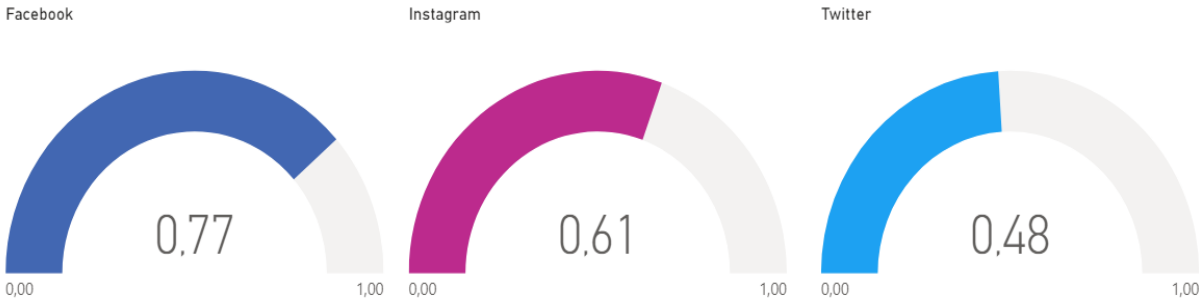

Figure 4.1 : Average social media use by channels

Facebook is the most utilized social networking site by opera houses around the world. It has the highest score for usage with a value of 0.77. It is an expected outcome since Facebook is still overperforming in the social media sector. It is the oldest among these channels and has the highest active user numbers in the world. In the second place, there is Instagram with a score of 0.61 and slightly less usage than Facebook. Then, Twitter is the least preferred channel by opera houses having barely half of the full score. Finally, the overall social media use of the opera house has a score of 0.7 out of 1 as seen in Figure 4.2. It shows that opera houses are quite active on social media in general. It has been argued before that social media is a great solution for opera houses since they face a lot of limitations. According to these results, it is seen that opera houses are trying to communicate with their stakeholders by using social media channels.

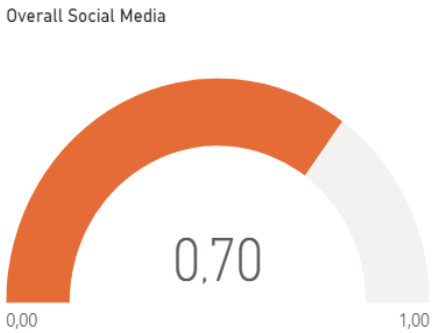

Figure 4.2 : Average social media use of opera houses

4.2.2. Comparison of Opera Houses by Social Media Platforms

After the general comparison of channel use, a detailed benchmarking of opera houses by social media platforms will be discussed in this section. The following graphs have been formed by using social media usage scores that have been previously calculated. Facebook is the most popular social media platform by opera houses. This result is natural to expect since Facebook is still in the leading position on social networking sites around the world. This condition makes Facebook quite attractive for organizations. Half of the opera houses have the full score for Facebook use as seen in Figure 4.3. Only one opera house is not present on Facebook for the first quarter of 2020. Yet, it should be expressed that the missing opera house has also created a Facebook profile after this study had been conducted. In brief, it can be said that opera houses utilize Facebook efficiently to communicate with users.

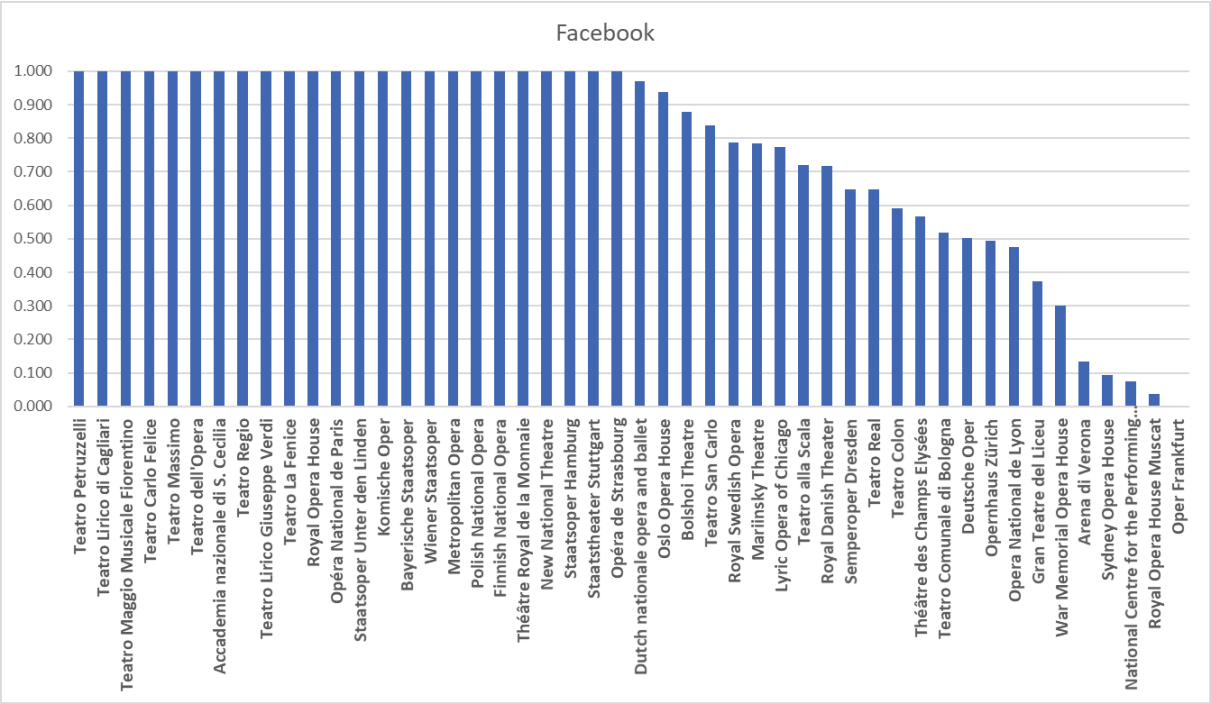

Figure 4.3 : SMU scores for Facebook

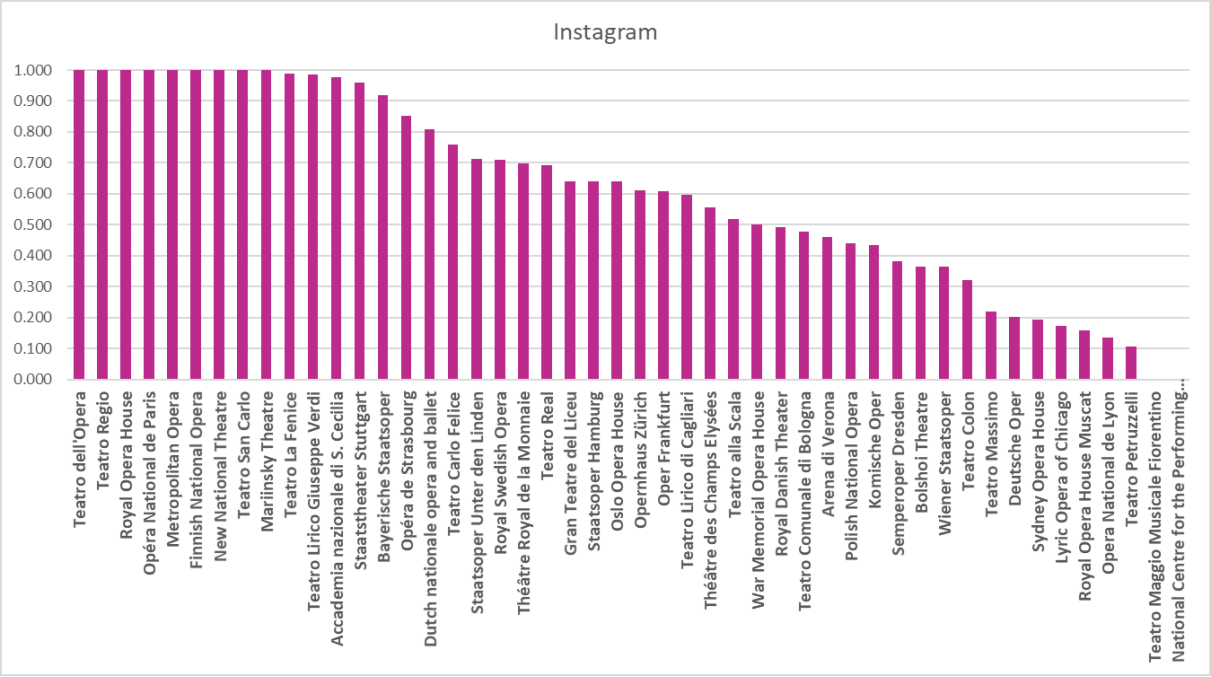

Figure 4.4 : SMU scores for Instagram

In the case of Instagram, the popularity is less than Facebook. However, the general use of this channel by opera houses is also successful. Nine of the opera houses fully use Instagram as seen in Figure 4.4. Besides these top users, a linear trend can be seen for the remaining of the sample. The use of Instagram almost linearly decreases thorough the sample. Another interesting point is the other extremum of the distribution. There are only two opera houses with zero scores for the use of Instagram. While one of them is not present on Instagram, there is no official account for the other opera house.

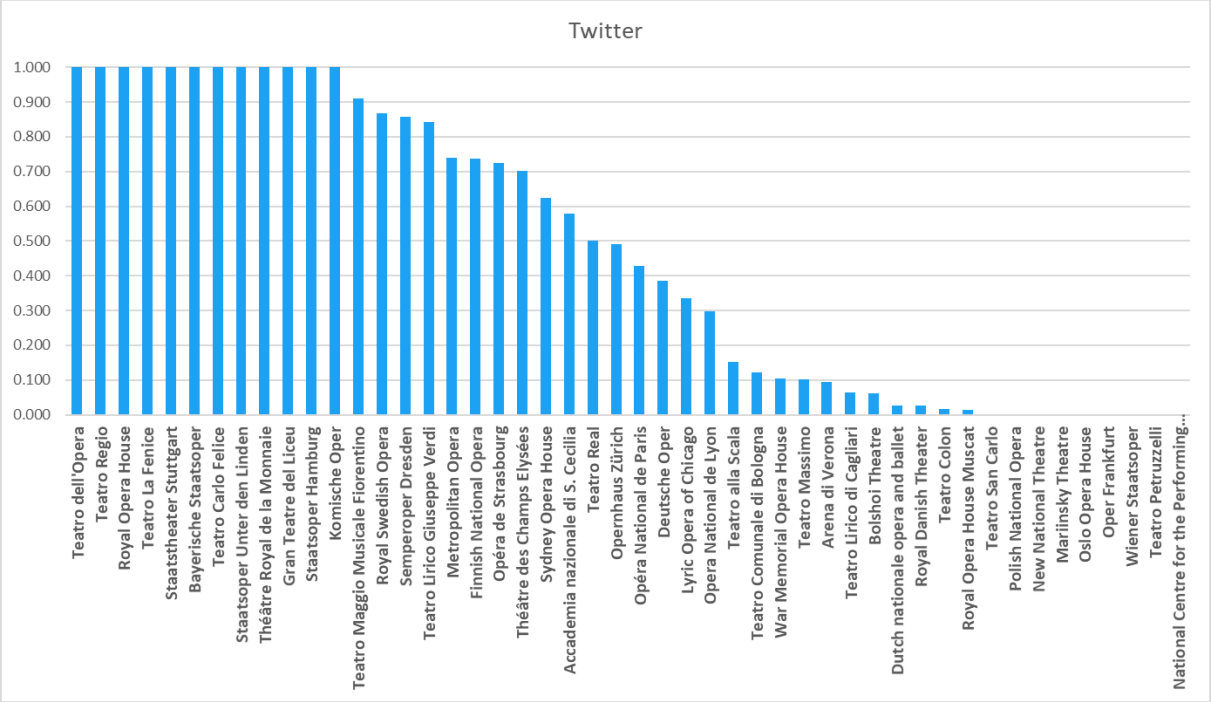

Figure 4.5 : SMU scores for Twitter

A different trend can be seen for Twitter on the contrary to Facebook or Instagram. There is an intense transition on the scores. Still, there are really successful opera houses regarding the use of Twitter such as the previous platforms. 12 of the opera houses are seen to fully utilize from this platform as seen in Figure 4.5. Yet, a third of the sample has a score lower than 0.1 and it causes a dramatic decrease in the average use of Twitter. In brief, it is clear that Twitter is the least used social networking site for opera houses among these channels.

4.2.3. Comparison of Opera Houses by Overall Social Media Use

Considering the average social media use of opera houses, it can be said that they make quite a great effort for social media communication. A linear trend is seen when the opera houses are sorted according to their CSMU scores. As seen in Figure 4.6, there is a smooth transition on overall social media use scores. Three of the opera houses have the perfect score which is one. It means that these opera houses fully use every channel for communication. They are Teatro dell'Opera from Rome, Teatro Regio from Turin, and Royal Opera House from London. So, two of the most successful opera houses are from Italy. It should be also expressed that Teatro La Fenice from Venice and Staatstheater Stuttgart from Stuttgart have almost perfect scores with 0.997 and 0.990, respectively. At the end of the list, there are Royal Opera House Muscat from Oman and National Centre for the Performing Arts (NCPA) from China with CSMU points 0.066 and 0.048, respectively. They can be considered as the opera houses that they barely utilize from social media to communicate.

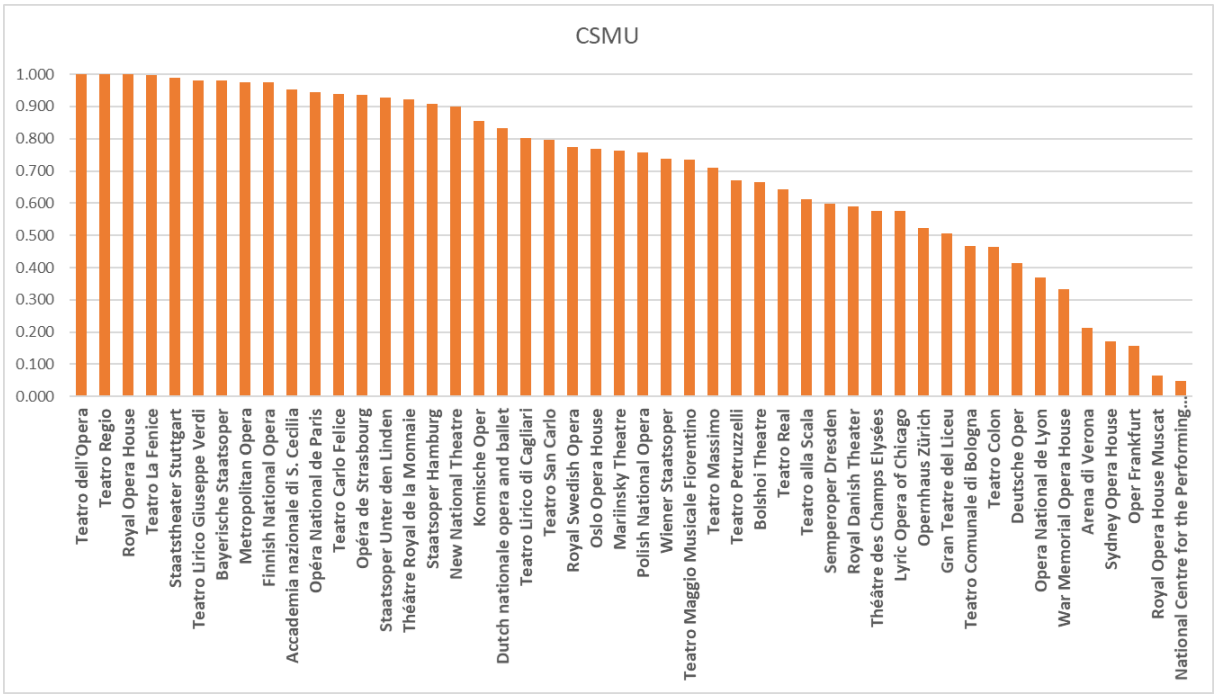

Figure 4.6 : CSMU scores

4.2.4. Reflection by Countries

The location of opera houses is also an effective factor regarding the use of social media. A reflection by countries may result in useful insights. Thus, the social media use scores of opera houses have been grouped by the countries. The use of different platforms and overall social media use for countries have been obtained by calculating the average scores of opera houses in a country.

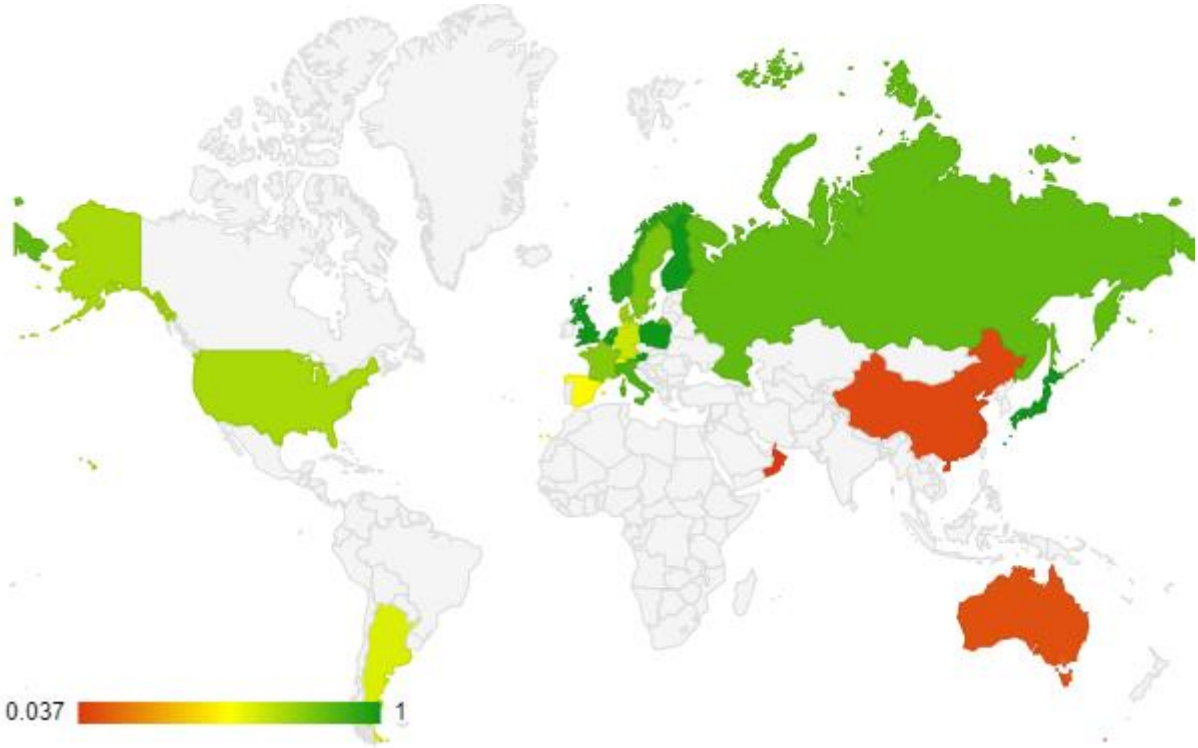

Figure 4.7 : Use of Facebook by official accounts of opera houses monitored

The impressive use of Facebook in different countries can be easily seen in Figure 4.7 above. The majority of the world has been expressed with the green color that means the opera houses in these countries efficiently use Facebook for social media communication activities by having SMU scores higher than 0.7 out of 1. Since Facebook is the most preferred social networking site by opera houses, the general scenario on the world map matches the expectations. Especially the area of northern Europe and Japan seems more successful for Facebook usage. Three countries stand out with reddish colors and they are Oman, China, and Australia. For sure, it should

be noted that one opera house is included in each of these countries. Thus, the country reflection of these areas shows the performance of one opera house each.

For the use of Instagram, a very similar situation is seen as the use of Facebook. When it is considered that Instagram has been acquired by Facebook in 2012 and pursues a successful strategy worldwide, this similarity can be expected. Instagram is the second famous channel for opera houses following Facebook. The utilization rates of Instagram are not so far from the scores of Facebook regarding opera houses. Thus, a similar distribution on the world map would be estimated. When the world map in Figure 4.8 is examined, the same successful and failed countries are seen regarding the use of Instagram to communicate with users. Again, Japan and northern countries have better scores than other countries while China has the lowest use of Instagram around the world.

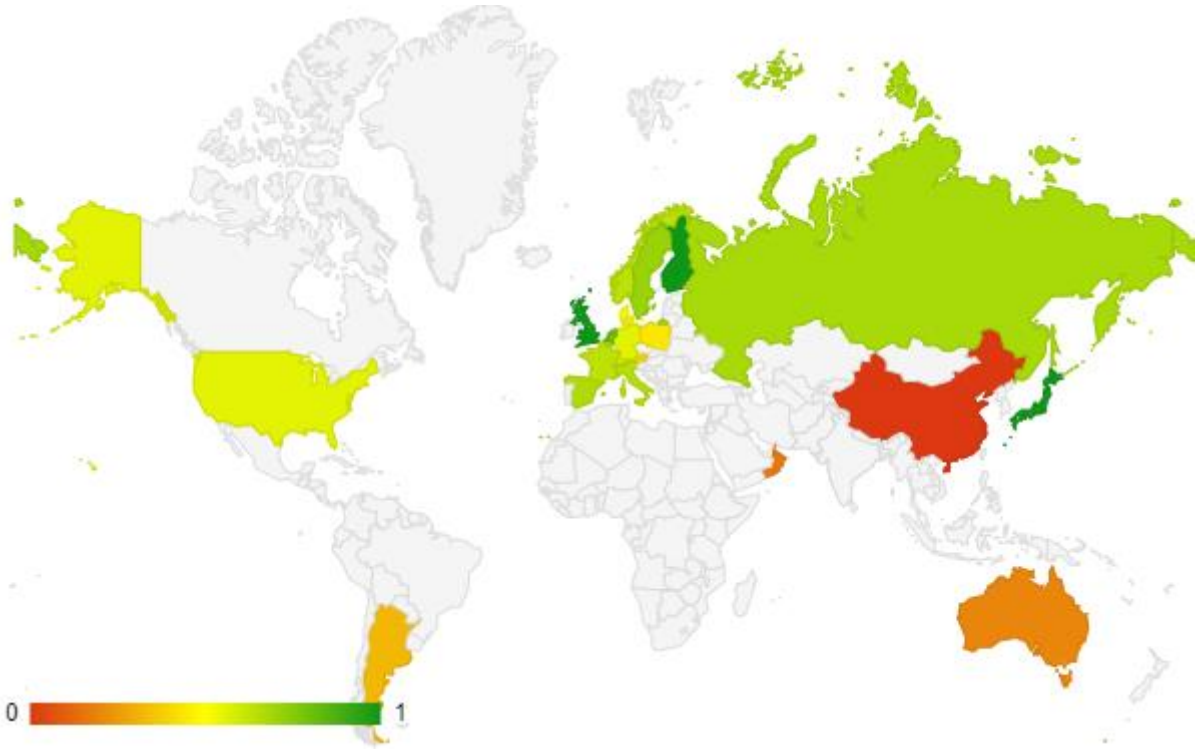

Figure 4.8 : Use of Instagram by official accounts of opera houses monitored

In the case of Twitter, there is a dissimilar situation as easily noticed by looking at Figure 4.9 below. This time, almost half of the world has been expressed with red color since Twitter is the least used social media channel by opera houses. There are still

successful countries in northern Europe, but the average of the continent decreases for this channel. Since Dutch Nationale Opera and Ballet, Royal Danish Theater, and Polish National Opera have quite low scores and Wiener Staatsoper is not present on Twitter and they are the only opera houses considered for Holland, Denmark, Poland, and Austria respectively, these countries have dark red colors on world map. New National Theatre from Japan that highly utilizes from Facebook and Instagram does not show presence on Twitter. Additionally, Australia is an interesting case since it is one of the few countries that use Twitter better than Facebook or Instagram.

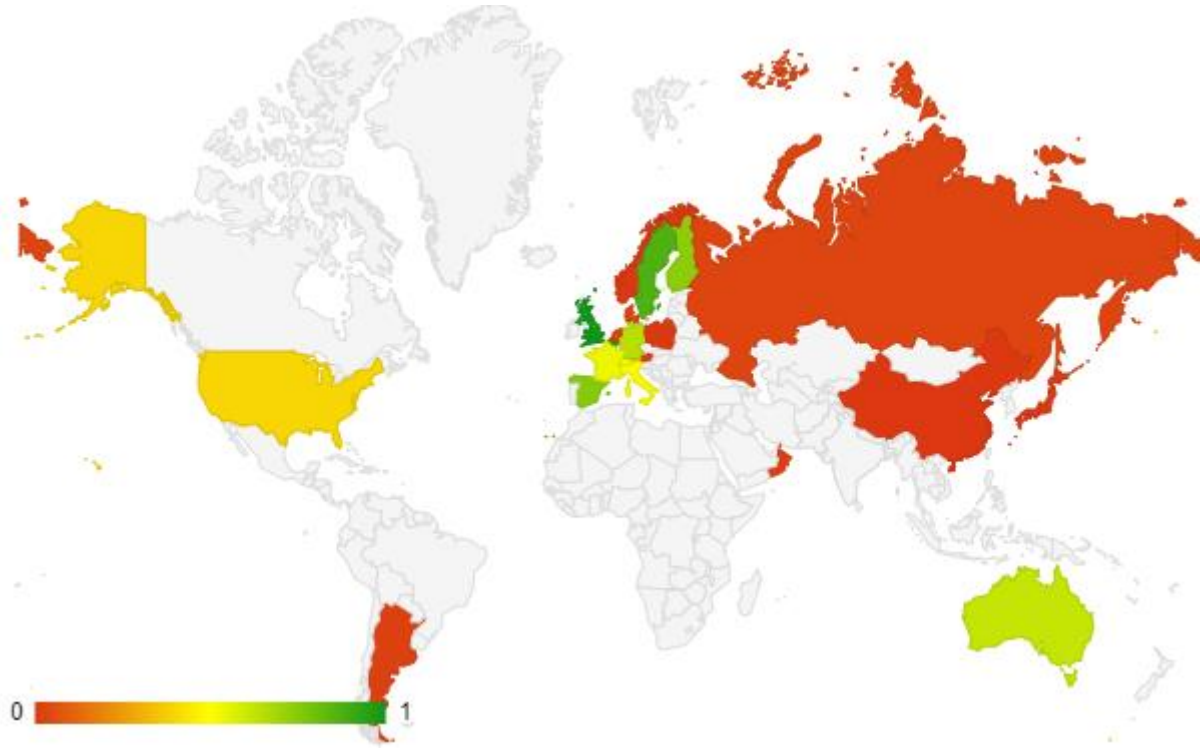

Figure 4.9 : Use of Twitter by official accounts of opera houses monitored

Finally, the overall usage of social media of opera houses grouped by countries is seen in Figure 4.10 below. It includes the use of three channels which are Facebook, Instagram, and Twitter. As discussed before, opera houses generally quite active on social media and they are trying to stay connected with people. The most successful opera houses are from the United Kingdom, Finland, Belgium, and Japan as seen in green color. Europe shows great performance as a whole continent.

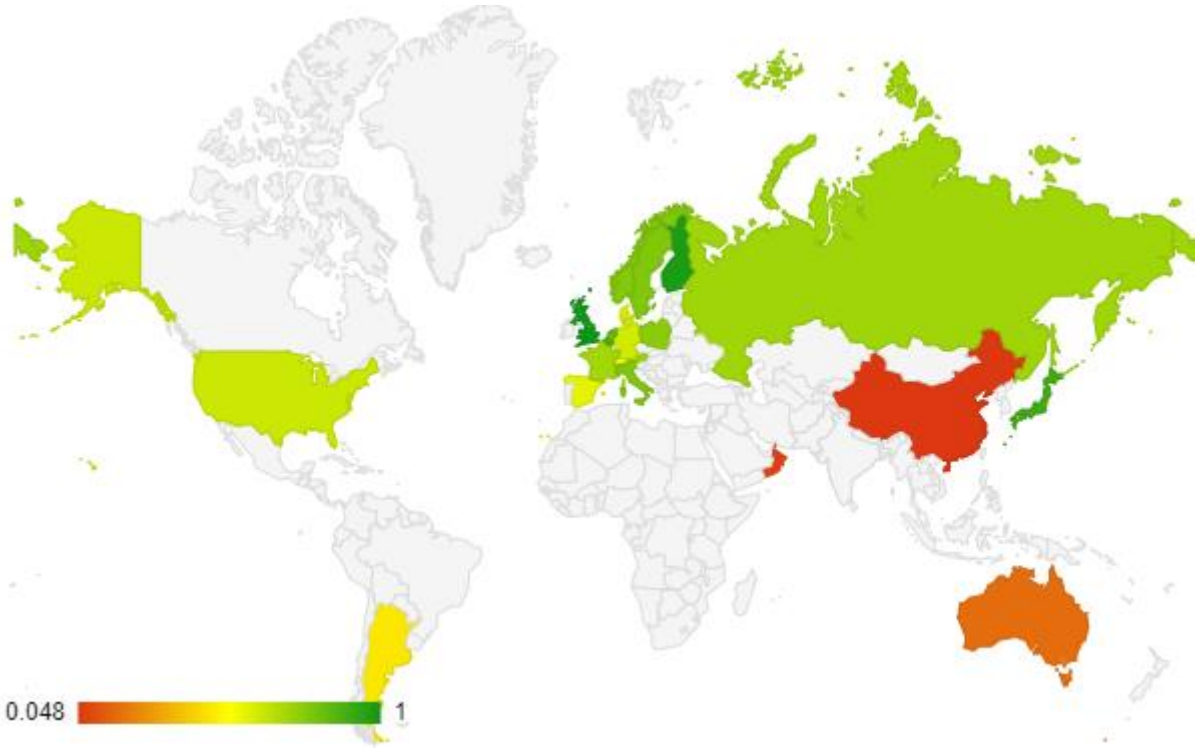

Figure 4.10 : Use of social media around world

Three countries stand out with reddish color which are Oman, China, and Australia. China has the lowest overall social media use with a score of 0.048 out of one. The reason may be related to the implementations of the government about the use of the Internet. Western applications are forbidden or limited to use in China. Two social media platforms Facebook and Twitter which are the focus of this article are blocked in the country. Additionally, there are popular national social media platforms used in China. For example, local social media platforms Tencent WeChat and Weibo have attracted millions of users by using the opportunity of the absence of popular western applications (Thomala, 2020). In short, the focused social media channels in this study may not match the social media characteristics of Chinese opera houses. In the case of Oman, the country is experiencing a significant transformation regarding development. Oman is a tribal society that is still considered as conservative by Western standards. Yet, the effects of these factors are declining owing to development efforts in recent years. In fact, Oman has been ranked as most improved nation in terms of development proceeding 40 years (Klugman, 2010). This development also positively affects the cultural area. The first cultural repository of the country which is Oman Museum has been founded in 1974 and The Royal Oman

Symphony Orchestra has been formed in late 1980s which is one of the few national orchestras in the Middle East (Crystal and Peterson, 2020). Finally, the first opera house of the country which is Royal Opera House Muscat has been opened in 2010. Considering that the country is experiencing a serious transformation and its effects on cultural area is quite new, it is normal to expect low utilization rate from social media by the opera house. Finally, Australia is another interesting point to discuss. The possible reason for having a low score for social media use is the severe popularity of the Sydney Opera House. It is widely known in the whole world owing to its unique architectural design. It has been even added to World Heritage List by UNESCO in 2007 (Murray, 2019). As it will discuss in the later sections, it is a great example of the issue related to the difficulty of maintaining engagement when the number of followers is increased. Most probably, their communication effort is not sufficient considering its high number of followers, especially on Facebook.

4.3. Cluster Analysis Regarding Activity on Social Media

Besides the CSMU model, analyzing the posting frequency of opera houses a great way to compare their communication efforts on social media. Opera houses can be ordered on account of their daily, weekly, or monthly posting numbers as a first step. The most and least frequently posting accounts can be found in this way. However, grouping them will be difficult and require subjective decisions since there are multiple entries and variables.

For a more efficient and standardized clustering, a simple R code has been used in this study. These clusters will be used as a descriptive analysis at first. Then, they will be combined with additional processes for a deeper investigation. The R code used for cluster analysis can be seen in Figure 4.11 below.

```r
library(psych)
library(readxl)
mydata <- read_excel("C:/Users/Murat/Desktop/fb_month_2020.xlsx")

#Cluster

library(cluster)

cluster4 <- kmeans(mydata[c(2:4)], centers = 4, nstart = 100)


library(rgl)
plot3d(mydata[c(2:4)],size =10 , col=rainbow(4)[cluster4$cluster])


#Adding the cluster results:

mydata <- cbind(mydata, cluster4$cluster)

mydata_cluster4 <- factor(mydata$cluster4)

anova_cluster4 <- aov(mydata$January ~ mydata_cluster4)
summary.aov(anova_cluster4)
TukeyHSD(anova_cluster4)

anova_cluster4 <- aov(mydata$February ~ mydata_cluster4)
summary.aov(anova_cluster4)
TukeyHSD(anova_cluster4)

anova_cluster4 <- aov(mydata$March ~ mydata_cluster4)
summary.aov(anova_cluster4)
TukeyHSD(anova_cluster4)

boxplot(mydata$January ~ mydata_cluster4, plot = TRUE)
boxplot(mydata$February ~ mydata_cluster4, plot = TRUE)
boxplot(mydata$March ~ mydata_cluster4, plot = TRUE)


#Creating new excel file with factor scores and clusters
install.packages("openxlsx")
library(openxlsx)
write.xlsx(mydata, file="fb_cluster_2020.xlsx", sheetName="fb")
```

Figure 4.11 : R code for cluster analysis

To briefly explain the R code, the first rows are used to import required libraries and data. Daily, weekly, and monthly posting distribution of opera houses have been tested for cluster analysis. Monthly posting distribution gave the best results for creating unique segments. Therefore, the part of mydata[c(2:4)] on line 9 includes the number of posts on January, February, and March 2020 for each social media account of opera houses. So, three attributes have been used for the cluster analysis which is the number of months. Then, there is a plot function to visualize the clusters. After clustering, the next step is conducting statistical tests to observe whether clusters are really different from each other. The selection of the Anova test can be seen in the code. The reason is that the number of variables to compare is more than two. Then,

there are functions to draw boxplot diagrams for visualization of the results. Finally, the results are saved in a new Excel file.

4.3.1. Case of Facebook

The number of monthly Facebook postings from the first three months of 2020 have been used as data. Having three clusters was not enough to distinguish the opera houses. Then, creating five clusters has become unnecessary since some clusters did not show unique characteristics failing the Anova test. Based on the data and size of the sample, it has been seen that four clusters are convenient to group the opera houses. With a 95% confidence level, the four clusters are different from each other according to the Anova test. The visual of the clusters can be seen in Figure 4.12 below.

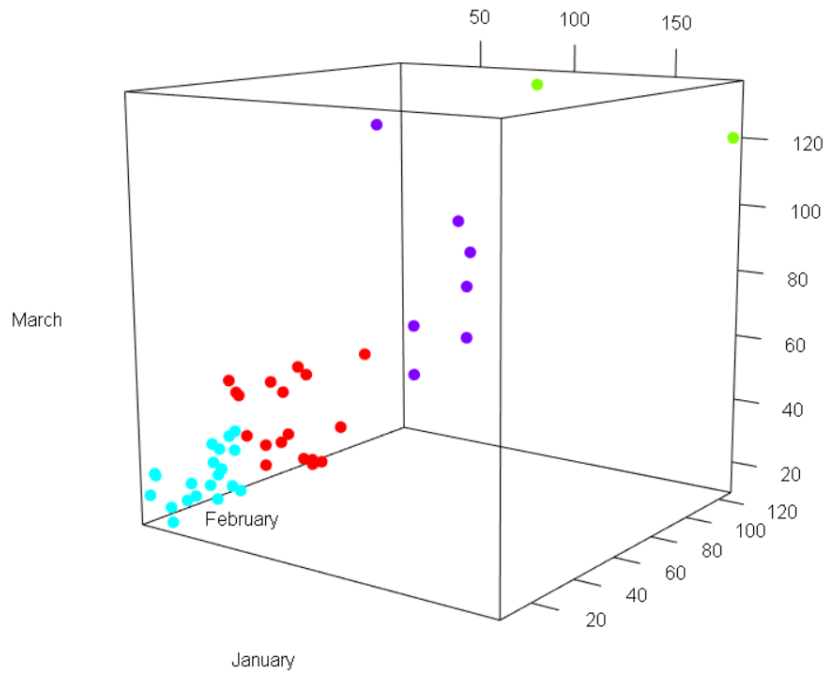

Figure 4.12 : Visualization of clusters for Facebook

The distribution of the number of Facebook posts for 4 clusters is seen in Figure 4.13 below for January, February, and March respectively. The first cluster consists of the

most active users and will be named as “top posting accounts for Facebook”. Owing to their outstanding performance, this cluster has the smallest size with only 2 opera houses. The second cluster follows the leaders and they will be tagged as “frequent posting accounts”. The third cluster is formed by the least active users as seen. Thanks to their low level of activities, they will be codded as “occasional posting accounts”. Finally, the fourth cluster shows a medium activity on Facebook. Therefore, the fourth cluster will be named as “daily posting accounts”.

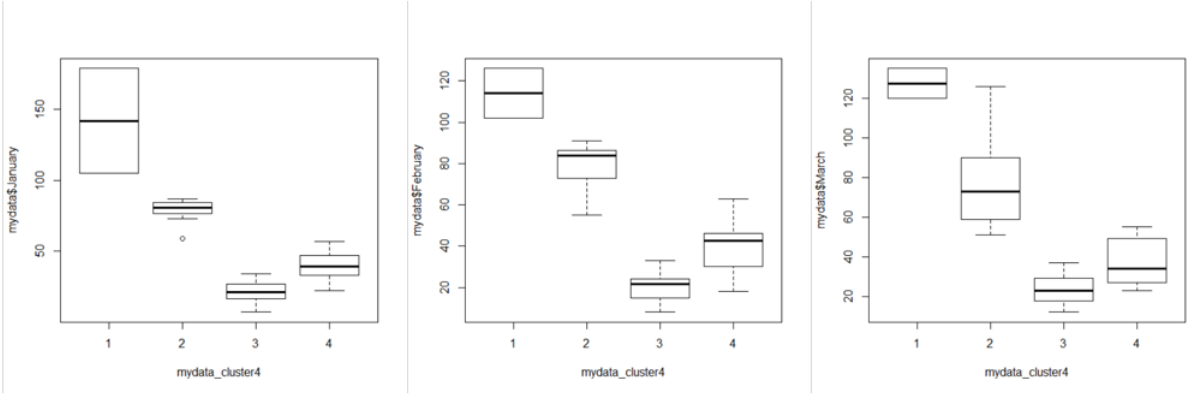

Figure 4.13 : Distribution of monthly postings for Facebook clusters

4.3.2. Case of Instagram

The number of monthly Instagram postings from the first three months of 2020 have been used as data. Based on the data, the size of the sample, and the results of Anova tests, four clusters are also convenient to group the opera houses. While creating five clusters become unnecessary, having three clusters was not enough to distinguish the opera houses according to the Anova test. With a 95% confidence level, the four clusters are different from each other. The plot of the clusters can be seen in Figure 4.14 below.

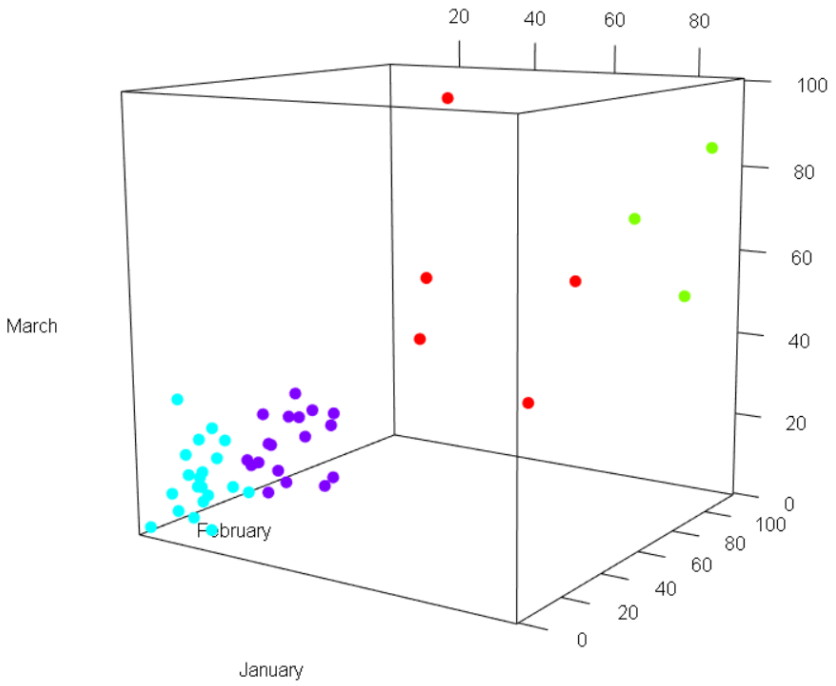

Figure 4.14 : Visualization of clusters for Instagram

The distribution of the number of Instagram posts for 4 clusters is seen in Figure 4.15 below for January, February, and March respectively. The second cluster consists of the most active users and will be named as “top accounts for Instagram”. Owing to their outstanding performance, this cluster has the smallest size with only 3 opera houses. The first cluster follows the leaders and they will be tagged as “frequent posting accounts”. The third cluster is formed by the least active users as seen. Thanks to their low level of activities, they will be codded as “occasional posting accounts”. Finally, the fourth cluster shows a medium activity on Instagram. Therefore, the fourth cluster will be named as “daily posting accounts”.

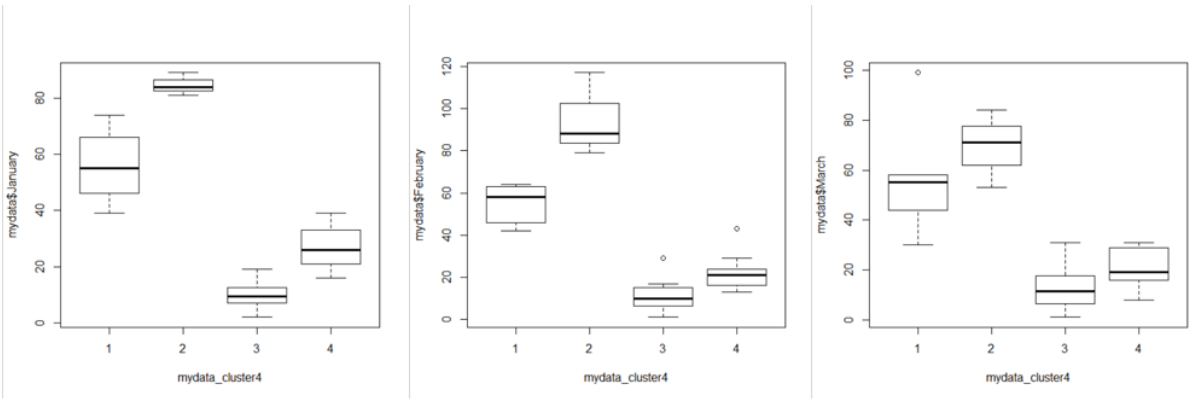

Figure 4.15 : Distribution of monthly postings for Instagram clusters

4.3.3. Case of Twitter

The number of monthly tweets from the first three months of 2020 have been used as data. Based on the data, the size of the sample, and Anova tests, four clusters are also convenient to group the opera houses. While creating five clusters become unnecessary, having three clusters was not enough for the efficient segmentation of opera houses according to the Anova test. With a 95% confidence level, the four clusters are different from each other. The graph of the clusters can be seen in Figure 4.16 below.

The distribution of the number of Twitter posts for 4 clusters is seen in Figure 4.17 below for January, February, and March respectively. The first cluster consists of the most active users and will be named as “top accounts for Twitter”. Owing to its outstanding performance, this cluster has one opera house. The third cluster follows the leaders and they will be tagged as “frequent posting accounts”. The second cluster is formed by the least active users as seen. Thanks to their low level of activities, they will be codded as “occasional posting accounts”. Finally, the fourth cluster shows a medium activity on Instagram. Therefore, the fourth cluster will be named as “daily posting accounts”.

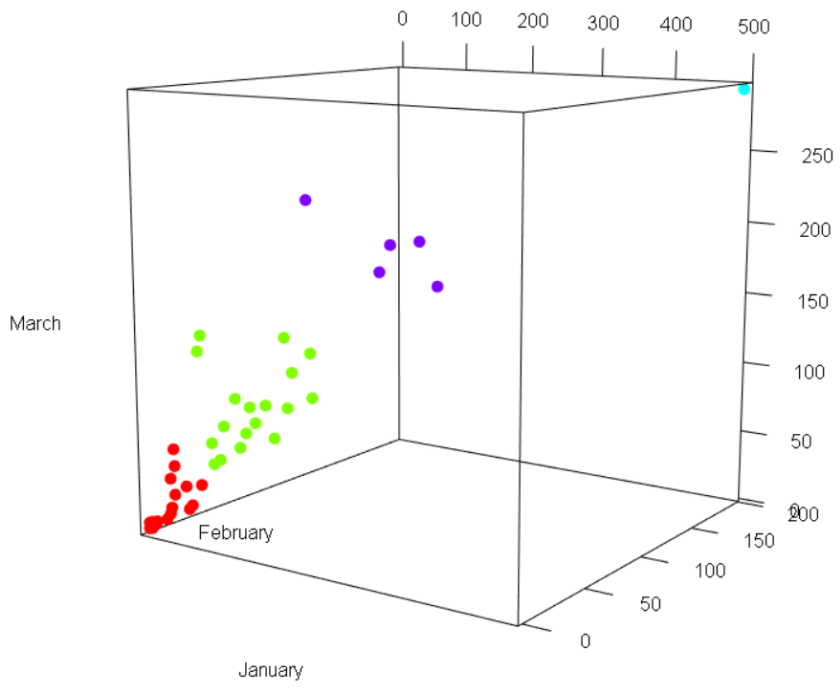

Figure 4.16 : Visualization of clusters for Twitter

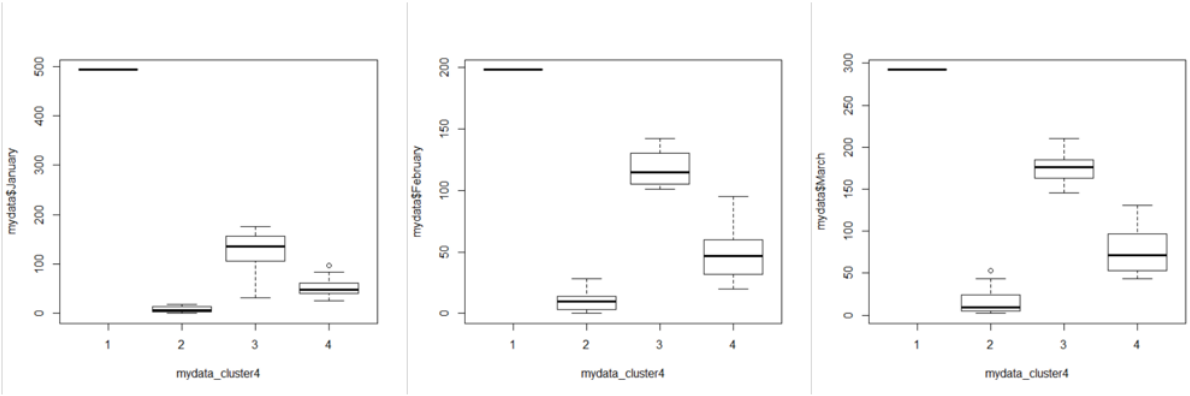

Figure 4.17 : Distribution of monthly postings for Twitter clusters

4.4. Effects of Covid-19 Pandemic

The entire world experienced the serious effects of the Covid-19 pandemic. The virus outbreak influenced every aspect of life for people, organizations, and countries. People changed their habits while creating a new normal life for themselves.

Companies had to adapt to these conditions by changing their way of business. All of these changes also affected the communication strategies of organizations.

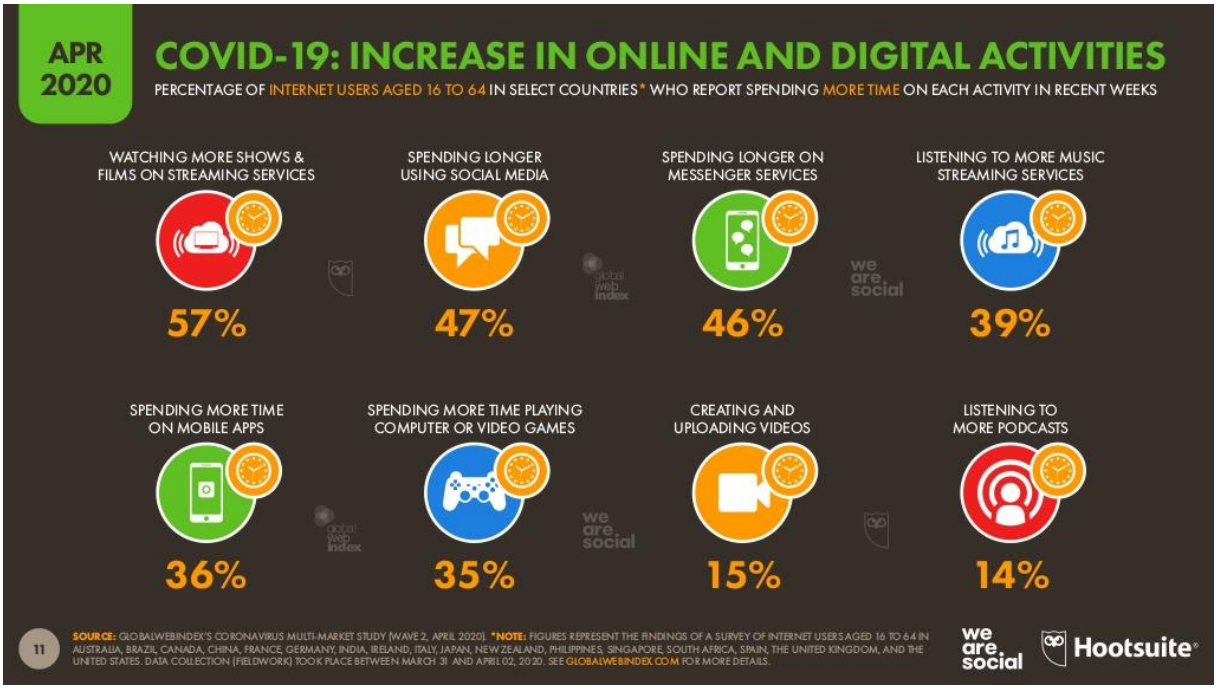

Figure 4.18 : Effects of Covid-19 on online and digital activities (Kemp, 2020)

Owing to precautions for virus outbreak, people started to stay longer at their homes. As a natural result of this situation, the use of social media saw a significant rise. People started to spend more time on social media platforms. As seen in Figure 4.18, 47% of people mentioned that they spend more time using social media. Besides from negative effects, crises always create opportunities. One of the opportunities for organizations is certainly focusing on social media communication during the Covid-19 pandemic. Since people spend more time on social media, organizations can engage with their stakeholders and reach more users.

Until this point, the latest data belonging to the year 2020 have been used to evaluate the social media usage of opera houses. Their performance in the first period of 2020 has been calculated and interpreted. At this point, it should be questioned whether the Covid-19 pandemic affected the effort of opera houses for social media communication. To justify this argument, it is convenient to compare the same periods of sequential years.

4.4.1. Comparison of Sequential Years

The first three months of 2020 have been considered for the previous analysis steps. Now, analysis of the first periods of the years 2019 and 2020 will be conducted to observe whether there is an effect of the virus outbreak on the communication effort of the opera houses. Thus, the data includes the first three months of 2019 and the same months for 2020. Weekly posting distribution of opera houses will be considered for Facebook, Instagram, and Twitter. To complete this analysis, an Excel table has been prepared as noticed in Figure 4.19.

					2019													2020													Means		S.Dev.		Variance Test (F-one tail)	Result	T-Test (one-tail)	Result
	ID	Opera Name	Followers	Country	Week1	Week2	Week3	Week4	Week5	Week6	Week7	Week8	Week9	Week10	Week11	Week12	Week13	Week14	Week1	Week2	Week3	Week4	Week5	Week6	Week7	Week8	Week9	Week10	Week11	Week12	Week13	Week14	2019	2020	2019	2020				
FACEBOOK	49	Staatstheater Stuttgart	3458	Germany	1	8	2	2	2	7	1	3	2	2	3	2	0	1	4	0	1	3	3	3	0	3	4	2	7	9	3	3	3	2	2	0.331	Accept	0.317	Same
	12	Teatro Lirico Giuseppe Ver	10934	Italy	12	8	17	11	15	22	12	14	12	14	23	17	21	3	6	6	18	14	9	16	11	10	8	8	5	5	5	2	14	9	5	5	0.273	Accept	0.004	Different
	45	New National Theatre	14894	Japan	3	2	5	7	6	12	8	8	6	9	4	6	10	1	0	11	7	12	17	17	8	12	5	10	4	5	4	3	6	8	3	5	0.038	Reject	0.114	Same
	2	Teatro Petruzzelli	17944	Italy	5	5	3	4	5	3	6	2	2	2	7	5	1	0	8	9	8	11	14	9	13	14	7	11	7	1	4	2	4	8	2	4	0.008	Reject	0.000	Different
	48	Staatsoper Hamburg	20382	Germany	3	8	7	7	7	10	5	7	6	10	9	8	8	0	3	6	10	12	10	11	11	9	9	11	8	3	8	3	7	8	3	3	0.278	Accept	0.117	Same
	51	Opéra de Strasbourg	20525	France	4	8	13	8	7	13	15	8	7	7	15	22	9	1	3	7	14	8	8	9	13	18	6	14	13	8	17	1	10	10	5	5	0.425	Accept	0.471	Same
	32	Semperoper Dresden	24025	Germany	1	3	4	5	4	10	3	5	3	8	10	4	5	2	0	1	2	7	5	3	4	3	7	5	5	1	2	3	5	3	3	2	0.204	Accept	0.080	Same
	4	Teatro Lirico di Cagliari	26536	Italy	2	11	15	13	15	12	6	12	14	17	7	7	9	1	3	12	12	11	13	14	17	10	14	14	4	7	5	2	10	10	5	5	0.465	Accept	0.454	Same
	41	Théâtre Royal de la Monna	28657	Belgium	5	7	7	7	7	7	7	8	7	8	8	7	7	1	4	6	6	6	4	5	5	6	6	6	4	5	8	1	7	5	2	2	0.361	Accept	0.014	Different
	19	Komische Oper	31348	Germany	5	8	8	8	12	9	10	12	12	10	7	9	9	1	2	4	6	11	9	5	8	7	6	8	5	0	4	1	9	5	3	3	0.429	Accept	0.005	Different
	18	Staatsoper Unter den Linde	32049	Germany	3	7	9	6	5	5	6	3	4	4	2	5	6	0	3	8	11	10	11	8	7	6	8	7	9	8	5	4	5	8	2	2	0.398	Accept	0.002	Different
	6	Teatro Carlo Felice	32908	Italy	0	0	0	3	20	10	38	28	19	30	28	11	18	1	18	30	70	35	28	30	57	22	15	6	29	40	36	9	15	30	13	17	0.152	Accept	0.006	Different
	22	Dutch nationale opera and	32996	Holland	7	8	10	6	7	6	7	7	7	7	8	5	8	1	4	8	6	6	7	7	6	6	19	7	4	4	6	2	7	7	2	4	0.012	Reject	0.452	Same
	50	Théâtre des Champs Elysée	33024	France	2	6	3	5	4	2	4	2	2	2	5	9	5	0	2	10	4	7	4	5	6	8	3	6	7	7	10	2	4	6	2	3	0.315	Accept	0.014	Different
	17	Deutsche Oper	40792	Germany	11	16	12	13	12	13	17	11	9	12	14	13	11	1	10	11	14	12	13	14	10	4	7	7	8	3	5	4	12	9	4	4	0.460	Accept	0.020	Different
	11	Teatro Regio	41055	Italy	1	9	11	9	8	11	9	15	3	8	11	13	10	0	2	12	22	26	12	9	19	11	15	10	15	48	41	12	8	18	4	13	0.000	Reject	0.008	Different
	38	Finnish National Opera	43055	Finland	4	17	6	8	11	5	7	9	9	8	7	11	7	1	4	7	9	9	5	7	9	6	6	7	9	7	10	2	8	7	4	2	0.037	Reject	0.217	Same
	37	Royal Swedish Opera	43963	Sweden	3	6	5	5	4	4	6	3	6	3	8	6	7	0	0	5	5	7	3	5	5	5	2	4	5	3	5	1	5	4	2	2	0.391	Accept	0.152	Same
	21	Opernhaus Zürich	46413	Switzerlar	3	6	9	5	4	9	4	9	5	5	7	6	7	1	3	9	4	6	5	8	2	3	5	7	5	2	6	2	6	5	2	2	0.434	Accept	0.149	Same
	3	Teatro Comunale di Bologn	46916	Italy	0	0	0	0	0	0	0	1	9	8	7	10	7	0	1	4	4	7	6	6	7	9	8	6	3	3	4	1	3	5	4	2	0.039	Reject	0.073	Same
	33	Opera National de Lyon	47332	France	2	6	7	7	7	11	4	3	6	4	5	7	6	1	4	4	8	6	6	4	7	5	6	9	9	3	3	2	5	5	3	2	0.334	Accept	0.500	Same
	43	War Memorial Opera Hous	48111	USA	0	3	4	5	3	4	7	5	7	4	7	6	5	0	2	5	7	6	9	7	9	6	6	10	9	11	15	3	4	8	2	3	0.087	Accept	0.003	Different
	5	Teatro Maggio Musicale Fic	53676	Italy	10	17	21	16	18	12	19	17	17	14	14	17	13	3	13	21	27	27	21	22	22	27	27	21	6	57	34	17	15	24	4	12	0.001	Reject	0.005	Different
	8	Teatro Massimo	58755	Italy	13	7	16	10	11	11	8	9	10	14	9	15	8	1	8	5	7	14	10	5	4	7	2	2	14	14	13	8	10	8	4	4	0.319	Accept	0.095	Same
	34	Gran Teatre del Liceu	59807	Spain	3	10	6	7	11	14	9	10	8	7	15	7	8	0	1	3	7	7	3	5	5	8	7	5	3	4	2	1	8	4	4	2	0.034	Reject	0.002	Different
	20	Bayerische Staatsoper	60457	Germany	10	21	11	12	15	23	27	21	14	18	19	27	21	2	14	15	20	19	22	22	18	21	16	15	22	29	21	8	17	19	7	5	0.117	Accept	0.260	Same
	10	Accademia nazionale di S. (	61245	Italy	3	10	8	7	9	7	6	5	4	7	10	7	2	1	4	5	3	16	5	5	6	5	6	3	8	15	20	7	6	8	3	5	0.015	Reject	0.170	Same
	42	Lyric Opera of Chicago	64002	USA	6	11	11	13	15	10	14	13	13	13	11	12	11	1	4	9	7	8	10	10	14	14	13	11	10	10	14	4	11	10	4	3	0.391	Accept	0.195	Same
	30	Mariinsky Theatre	72148	Russia	1	18	18	14	20	15	17	15	9	11	15	23	15	1	1	1	4	7	11	9	12	10	15	9	10	12	13	2	14	8	6	5	0.123	Accept	0.008	Different
	35	Polish National Opera	75261	Poland	6	4	3	7	4	3	5	8	7	6	6	6	7	1	3	4	5	5	5	8	8	9	7	7	4	6	13	4	5	6	2	3	0.150	Accept	0.117	Same
	28	Bolshoi Theatre	81350	Russia	2	5	5	3	7	5	5	8	5	7	7	9	6	1	1	3	6	5	9	5	5	4	7	9	9	6	7	2	5	6	2	3	0.332	Accept	0.407	Same
	44	Teatro Colon	81625	Argentina	0	0	5	5	6	7	13	11	14	6	9	8	8	1	0	2	1	5	2	2	4	1	1	4	5	7	8	2	7	3	4	2	0.020	Reject	0.008	Different
	40	Royal Danish Theater	81912	Denmark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	5	6	2	5	4	4	3	4	5	4	6	3	0	4	0	1	#DIV/0!	######	#####	#DIV/0!
	46	National Centre for the Per	82782	China	3	4	1	4	4	3	5	4	4	3	6	1	2	0	1	3	6	6	2	1	3	1	4	4	1	3	3	1	3	3	2	2	0.414	Accept	0.293	Same
	39	Oslo Opera House	90075	Norway	5	7	8	8	10	13	11	12	9	8	2	10	8	0	1	8	7	8	10	7	12	11	14	14	5	7	13	6	8	9	4	4	0.446	Accept	0.271	Same
	9	Teatro dell'Opera	100181	Italy	18	12	20	23	18	21	15	15	29	11	29	33	25	4	12	16	17	15	27	23	16	19	26	20	8	7	18	5	20	16	8	7	0.271	Accept	0.134	Same
	23	Teatro Real	107897	Spain	2	3	8	6	12	9	16	10	11	11	11	14	10	0	2	5	3	9	4	6	7	3	6	4	6	8	7	2	9	5	5	2	0.007	Reject	0.007	Different
	24	Wiener Staatsoper	120483	Austria	4	6	8	7	5	7	9	9	13	4	6	13	5	2	1	9	10	8	6	3	9	5	4	7	7	9	8	6	7	7	3	3	0.226	Accept	0.350	Same
	47	Royal Opera House Muscat	135713	Oman	6	7	7	6	7	10	7	6	11	14	8	7	13	1	4	6	0	0	0	0	0	1	13	10	2	0	1	1	8	3	3	4	0.201	Accept	0.001	Different
	7	Teatro San Carlo	138497	Italy	4	6	9	9	6	9	6	4	4	5	4	6	6	1	7	5	9	4	5	5	7	8	6	4	3	11	12	1	6	6	2	3	0.153	Accept	0.289	Same
	13	Teatro La Fenice	264422	Italy	4	5	10	7	10	9	7	11	10	13	10	12	10	0	8	16	26	20	18	23	22	22	18	20	18	20	18	9	8	18	4	5	0.116	Accept	0.000	Different
	16	Opéra National de Paris	303156	France	8	10	16	14	13	12	22	17	21	20	18	20	16	2	6	16	10	14	15	25	23	15	19	19	9	13	13	6	15	15	6	6	0.469	Accept	0.421	Same
	1	Teatro alla Scala	365938	Italy	11	21	19	23	19	19	19	22	23	21	21	17	23	3	5	19	18	24	17	19	20	14	9	2	14	11	25	9	19	15	5	7	0.218	Accept	0.053	Same
	14	Arena di Verona	404413	Italy	1	2	2	2	2	2	5	2	2	2	2	2	2	0	1	1	2	3	0	2	2	2	2	2	3	6	6	2	2	2	1	2	0.044	Reject	0.214	Same
	25	Metropolitan Opera	562479	USA	9	12	12	17	17	15	13	20	13	16	12	15	15	1	9	19	17	19	19	26	21	19	22	20	13	13	20	7	13	17	4	5	0.308	Accept	0.018	Different
	15	Royal Opera House	1230328	United Kir	6	8	9	11	7	11	9	10	11	11	11	15	11	2	9	11	13	14	11	19	15	12	15	17	11	6	16	5	9	12	3	4	0.173	Accept	0.017	Different
	27	Sydney Opera House	2122457	Australia	4	5	7	7	8	7	12	9	7	7	8	39	12	0	3	8	6	7	12	10	13	9	9	14	5	2	5	4	9	8	9	4	0.002	Reject	0.252	Same
	31	Oper Frankfurt	#N/A	Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!	######	#####	#DIV/0!

Figure 4.19 : Statistical test for sequential years

When Figure 4.20 is examined, the progress for Facebook can be seen. Yet, the same process has been also applied to the remaining channels which are Instagram and

Twitter. The table starts with the data of opera houses. Then, the numbers of weekly posting can be seen for 2019 and 2020, respectively. As expressed before, the periods are the first three months of 2019 and 2020. The weekly posting distribution of 48 opera houses has been compared for consecutive years by using a t-test with a 95% confidence level to investigate whether there is a meaningful difference between the weekly posting distributions of opera houses through different years.

It has been observed that there are meaningful differences in the posting frequency of several opera houses. While almost half of the opera houses maintained the same posting frequency, other opera houses show changes in their communication effort. However, it may be worthwhile to analyze the behavior of accounts that show differences. The necessity for considering an additional dimension is obvious to obtain useful insights.

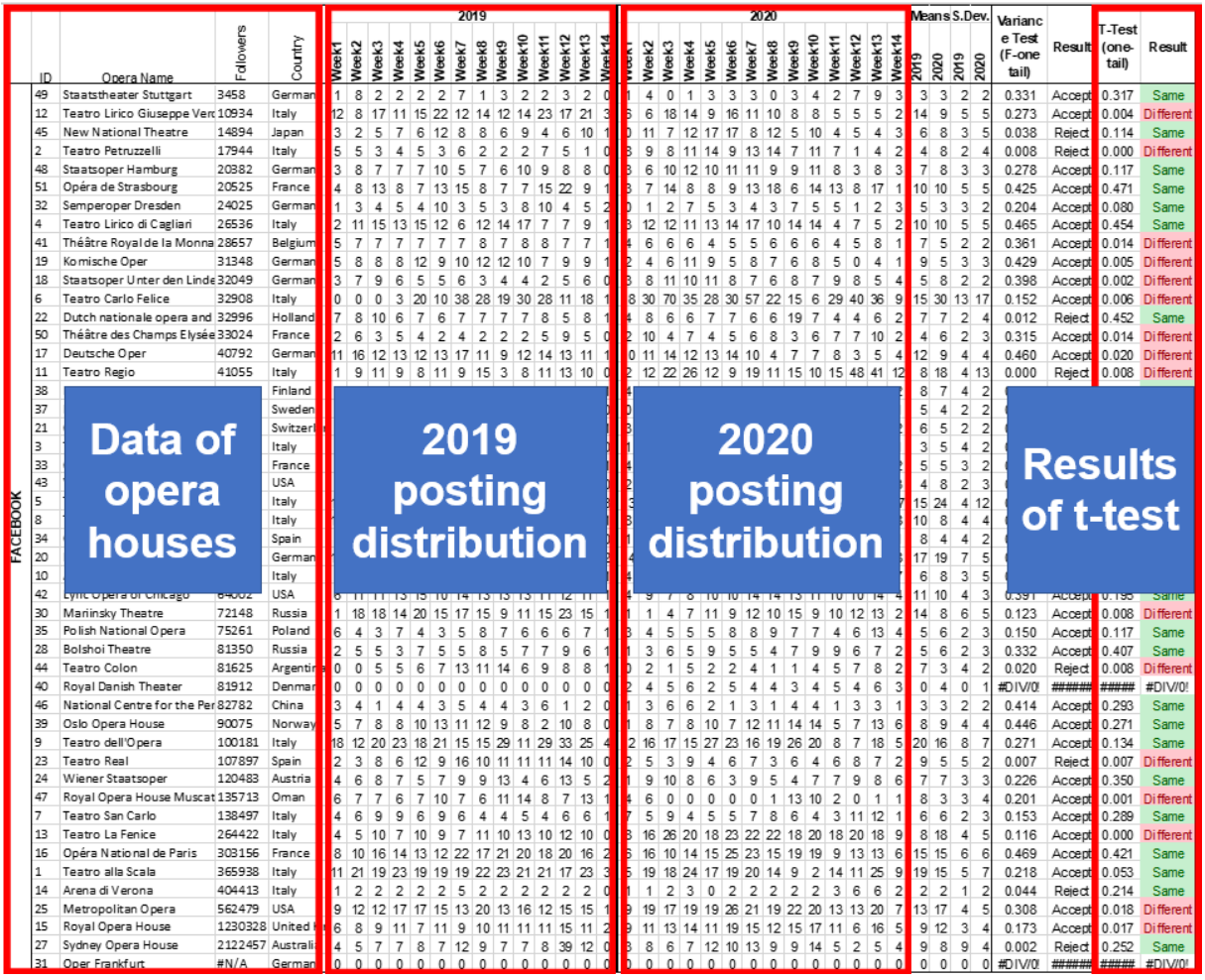

Figure 4.20 : Application of t-test

4.4.2. Addition of Clusters

While meaningful changes have been observed for almost half of the sample, a specific pattern could not appear to explain the behaviors of the opera houses. This situation is valid for all channels that are examined. It is clear that another dimension should be included in the analysis in addition to the weekly posting distribution of opera houses. In this way, these differences in posting frequencies can be interpreted logically.

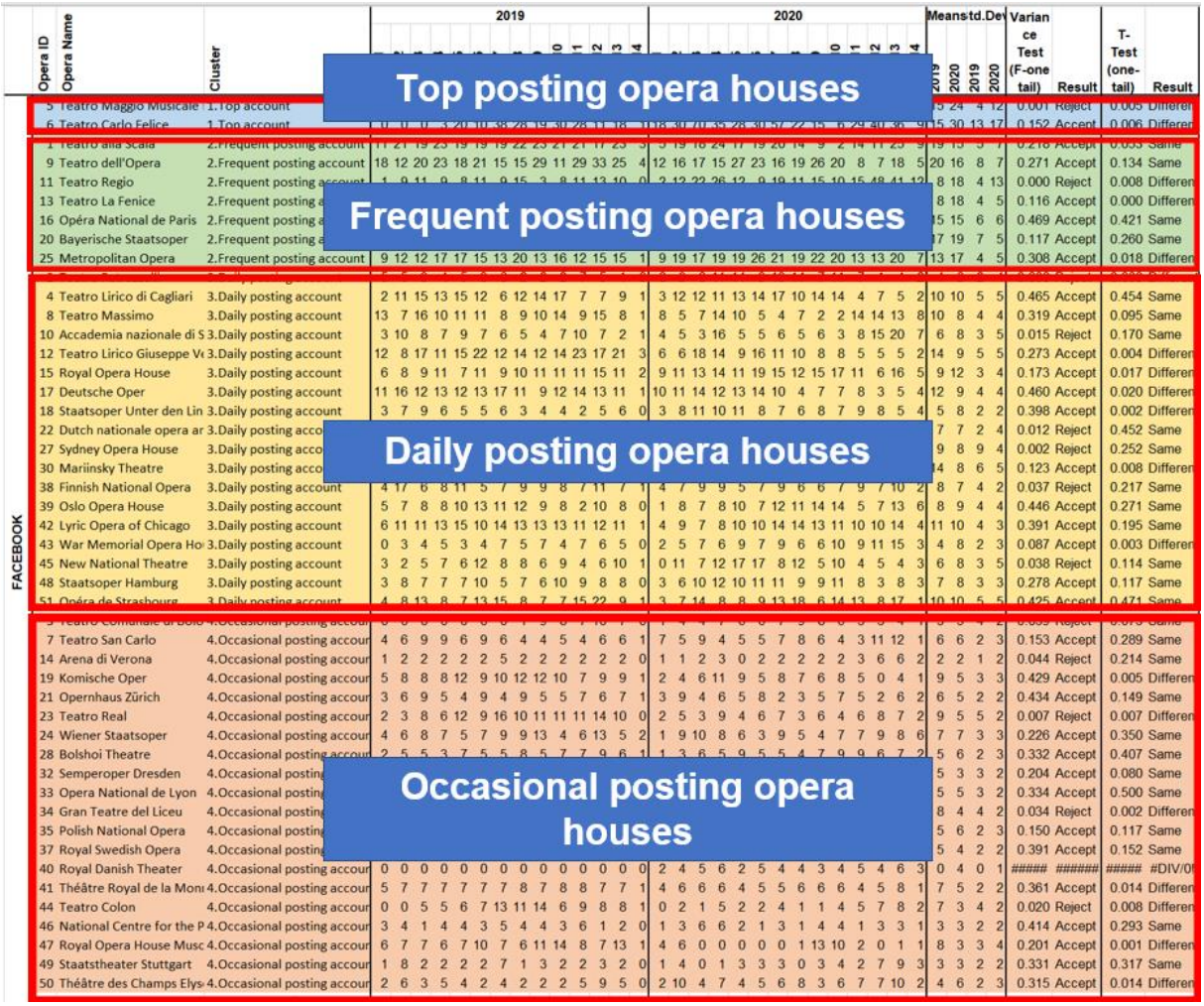

Figure 4.21 : Analysis by clusters

Various dimensions have been experimented such as the number of followers or countries of opera houses. To illustrate, it has been expected that opera houses with the most followers increased their posting frequency during the pandemic period or

opera houses in the most affected countries from the virus outbreak created more posts. Yet, the results could not justify these expectations. A useful pattern has not emerged with these dimensions.

Finally, the previously created segments with cluster analysis have been decided to utilize by combining the analysis for the comparison of weekly posting distributions as seen on Figure 4.21. Thus, the analysis page has been divided into four sections. Thus, each social media platform has been analyzed for each cluster which is top, frequent, daily, and occasional posting opera houses.

There is a general pattern seen on all channels. This pattern can be briefly explained as followed. In the case of top and frequent posting operas houses, all of them posted same or more in 2020. For the daily posting opera houses, no specific behaviors have been observed. Subsequently, the majority occasional posting opera houses posted same or less in 2020.

Table 4.7 : Changes in posting frequencies of opera houses

Cluster	**Cluster size**	**In 2020, they posted:**		
		Same	**Different**	
			More	**Less**
Top posting accounts	6	3	3	0
Frequent posting accounts	17	10	7	0
Daily posting accounts	54	30	12	12
Occasional posting accounts	55	32	4	19

The detailed results can be seen in Table 4.7 given above. The analysis has been applied on Facebook, Instagram, and Twitter accounts of opera houses. The table represents the sum of every channel. Overall, almost half of the social media accounts of opera houses have a similar number of posts for the years 2019 and 2020. Yet, nearly half of the sample showed that there is a statistically meaningful change in their posting frequencies. To justify this, a t-test with a 95% confidence level has been applied to compare the distributions.

All of the changes regarding top and frequent posting opera houses are positive. In other words, there is no opera house that posted less on any social media platform in

2020 for these segments. Since the opera house in these clusters gives significant attention to social media communication, it can be said that they tried to follow the trend during the pandemic. They increased their communication effort with the increasing social media use durations by people. The cluster of daily posting accounts shows the characteristics of a transition area. Regarding the number of differences, exactly half of the cluster increased their posting frequency while the other half reduced the number of postings. The last segment is opera houses which are occasional users of social media. While 58% of the cluster maintained the same posting frequency, 35% of the accounts posted significantly less during the pandemic. Only 7% of the accounts show an increase in posting frequency. Most probably, a major motivation to create posts for these opera houses is to announce their events. Thus, precautions taken due to virus outbreak may have resulted in a decrease in social media use. Since these opera houses are not quite active to engage the customers, their main communication topic can naturally be their events. The cancellation of the events can easily create the perception of unnecessity for social media communication. These are the results for overall social media use for opera houses. For insights for each channel, the following graphs can be examined.

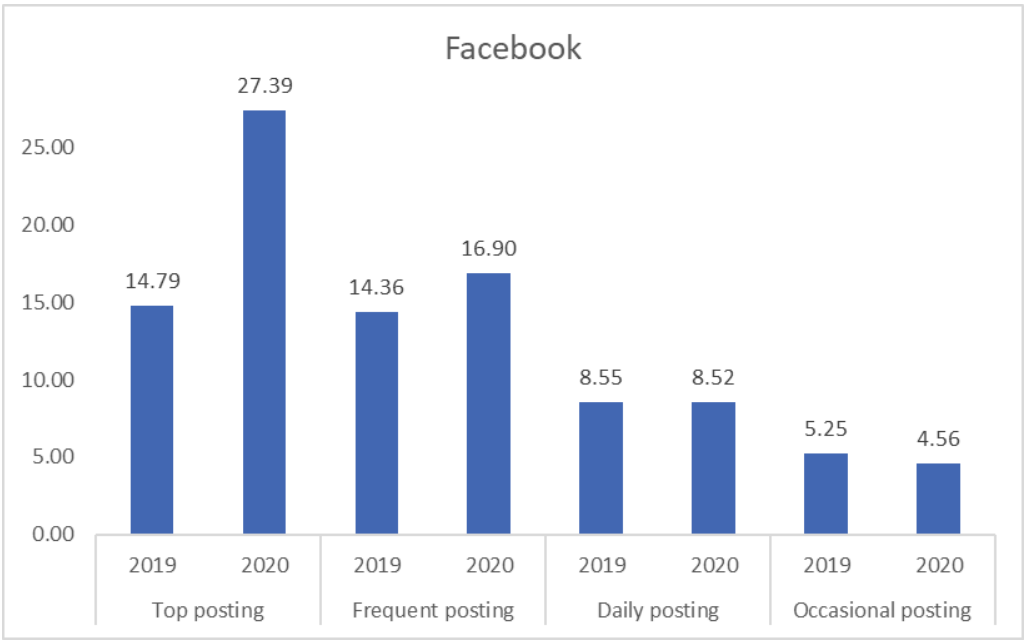

Figure 4.22 : Weekly postings on Facebook

For Facebook, the average number of weekly posts by opera houses can be seen for each segment in Figure 4.22. An increase is easily seen for the first segments formed of top and frequent posting accounts. The increase is more dramatic for the top posting opera houses since it has been doubled. In the case of daily users, the posting frequency is almost the same. For the cluster of occasional posting opera houses, a slight decrease can be noticed in terms of weekly posting.

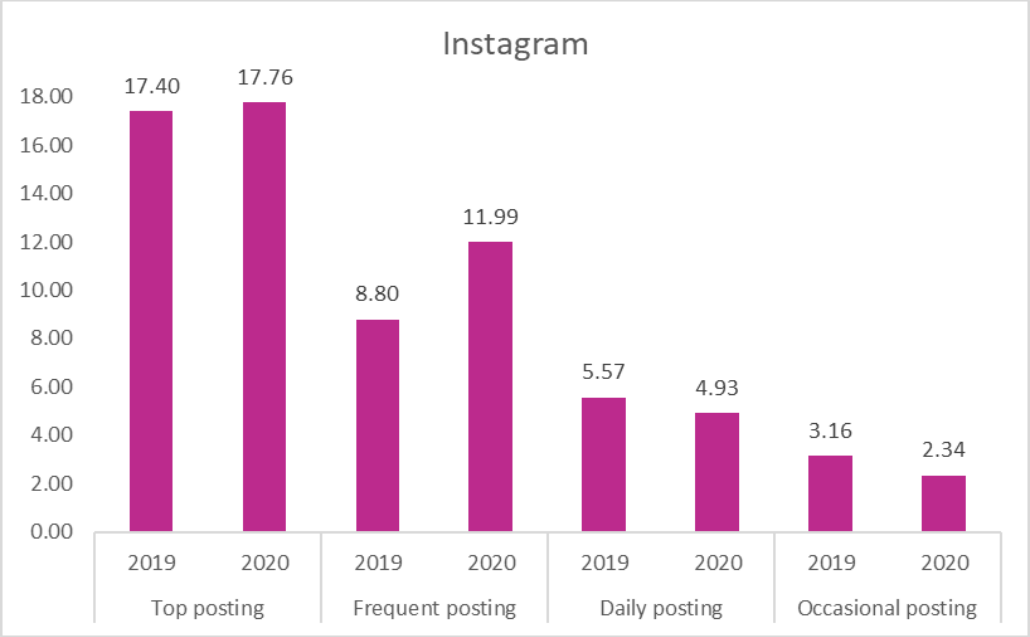

Figure 4.23 : Weekly postings on Instagram

For Instagram, the average number of weekly posts by opera houses can be seen for each segment in Figure 4.23 above. There is a quite similar situation to Facebook. While the average stays almost same for top posting accounts, an increase is easily seen for the segment consisted of frequent posting accounts. In the case of daily users, the posting frequency is almost same. For the cluster of occasional posting opera houses, a slight decrease can be noticed in terms of weekly posting.

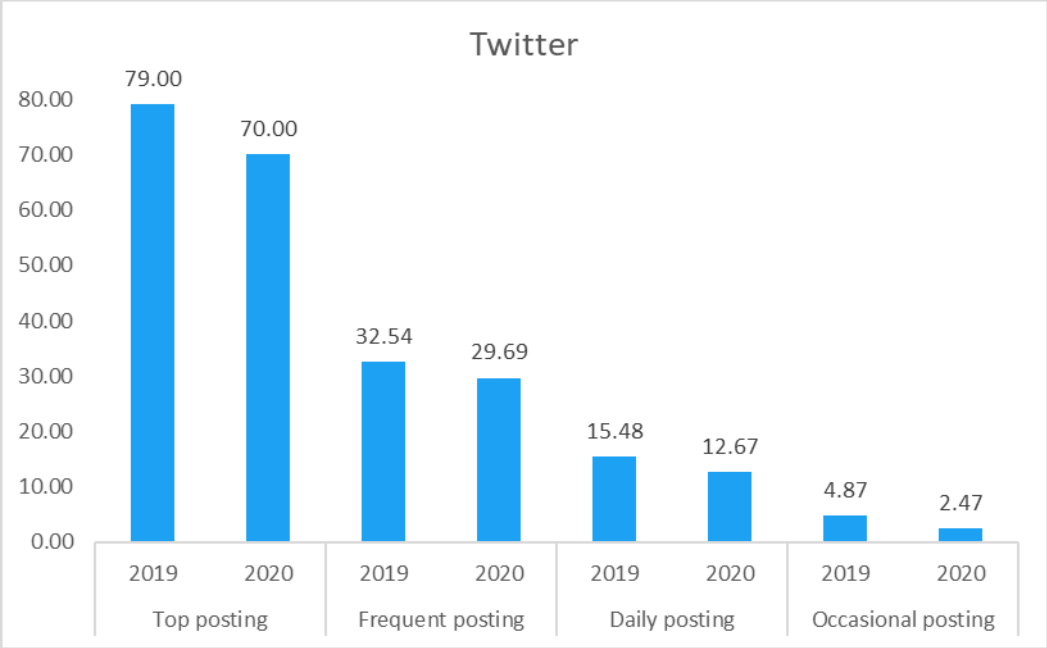

Figure 4.24 : Weekly postings on Twitter

For Twitter, the average number of weekly posts by opera houses can be seen for each segment in Figure 4.24. This time, there is a different situation. Firstly, a decrease is seen for the first segments formed of top and frequent posting accounts. In the case of daily users, the posting frequency has diminished, too. For the cluster of occasional posting opera houses, a slight decrease can be noticed in terms of weekly posting. In brief, the average posting saw a decrease in all clusters regarding Twitter.

4.5. User Side for the Opera Houses

Until this point, the communication efforts of opera houses have been examined. Thus, opera houses were the main side taken into account. However, the user side could be useful to consider. Evaluating the engagement of users sustained by opera houses' social media accounts will also provide interesting insights. Therefore, the user side will be also analyzed by considering the engagement factor.

4.5.1. Evaluation of the Engagement Levels

There are different methods for the measurement of engagement regarding different social media channels as discussed in the methodology section. In this article, the model that has been explained in Table 3.4 will be used for the analyses. The reasons that promote this selection have been also explained in the methodology section.

$$x_{scaled} = \frac{x - x_{min}}{x_{max} - x_{min}} \qquad (\mathbf{4.5})$$

Similar to previous analyses, the data of the first period of 2020 have been used to calculate the engagement levels. They have been calculated for each opera house and social media platform as seen in Table 4.8 below. The letter of “E” has been used as an abbreviation for engagement in the table. The engagement scores for every opera house and channel are placed on columns tagged with E. This method does not involve a standardization process. Thus, the results have a quite wide range. For an easier and effective comparison of the scores, normalization has been applied to the results. Min-Max scaling method which is one of the most popular standardization methods has been selected for the process. The formula has been given with Equation 4.5 above. In this way, the minimum value will be equal to zero, while the maximum one will take the value of one. The scaled results have a range between 0 and 1. Scaled results have been abbreviated with the letter “S” as seen on the same table.

Table 4.8 : Engagement levels and scaled versions

Opera Name	**Facebook**		**Instagram**		**Twitter**	
	E	**S**	**E**	**S**	**E**	**S**
Teatro alla Scala	0.900	0.088	7.281	0.065	0.107	0.015
Teatro Petruzzelli	7.155	0.868	25.012	0.674		
Teatro Comunale di Bologna	2.061	0.232	12.687	0.250	0.846	0.156
Teatro Lirico di Cagliari	2.634	0.304	22.563	0.590	0.222	0.037

Teatro Maggio Musicale Fiorentino	0.917	0.090			0.637	0.116
Teatro Carlo Felice	1.580	0.173	11.541	0.211	5.259	1.000
Teatro San Carlo	2.090	0.236	9.291	0.134	0.087	0.011
Teatro Massimo	3.659	0.432	11.041	0.194	0.802	0.148
Teatro dell'Opera	1.842	0.205	6.246	0.029	1.102	0.205
Accademia Nazionale di S. Cecilia	2.726	0.315	12.807	0.254	0.668	0.122
Teatro Regio	3.072	0.359	9.904	0.155	3.465	0.657
Teatro Lirico Giuseppe Verdi	5.119	0.614	16.182	0.370	3.171	0.601
Teatro La Fenice	1.275	0.134	16.866	0.394	1.298	0.243
Arena di Verona	1.038	0.105	18.284	0.443	0.415	0.074
Royal Opera House	2.561	0.295	7.716	0.079	0.232	0.039
Opéra National de Paris	1.480	0.160	7.987	0.089	0.109	0.015
Deutsche Oper	1.027	0.104	13.219	0.269	0.479	0.086
Staatsoper Unter den Linden	4.030	0.478	6.264	0.030	1.118	0.208
Komische Oper	3.533	0.416	15.526	0.348	0.919	0.170
Bayerische Staatsoper	1.654	0.182	13.848	0.290	0.846	0.156
Opernhaus Zürich	1.710	0.189	13.095	0.264	0.259	0.044
Dutch Nationale Opera and Ballet	2.043	0.230	12.191	0.233	0.390	0.069
Teatro Real	1.577	0.172	7.504	0.072	0.125	0.018
Wiener Staatsoper	2.399	0.275	9.645	0.146		
Metropolitan Opera	1.775	0.197	8.692	0.113	0.524	0.095
Sydney Opera House	0.240	0.005	5.651	0.009	0.176	0.028
Bolshoi Theatre	3.128	0.366	8.702	0.113	0.134	0.020
Mariinsky Theatre	1.728	0.191	8.799	0.117		
Oper Frankfurt			23.264	0.614		
Semperoper Dresden	3.247	0.380	16.075	0.367	0.539	0.098
Opera National de Lyon	1.251	0.131	7.900	0.086	0.750	0.138
Gran Teatre del Liceu	1.203	0.125	10.373	0.171	0.485	0.087
Polish National Opera	3.482	0.410	16.779	0.391	0.031	0.001
Royal Swedish Opera	3.577	0.422	15.771	0.356	1.758	0.331
Finnish National Opera	3.775	0.446	20.785	0.529	0.900	0.167

Oslo Opera House	2.549	0.293	15.530	0.348		
Royal Danish Theater	3.086	0.360	9.720	0.148	0.983	0.183
Théâtre Royal de la Monnaie	3.734	0.441	14.540	0.314	0.903	0.167
Lyric Opera of Chicago	1.483	0.160	10.041	0.159	0.250	0.042
War Memorial Opera House	0.780	0.073	7.102	0.058	0.130	0.019
Teatro Colon	1.955	0.219	8.453	0.105	0.233	0.039
New National Theatre	8.215	1.000	34.499	1.000		
National Centre for the Performing Arts (NCPA)	0.450	0.032				
Royal Opera House Muscat	0.197	0.000	5.403	0.000	0.028	0.000
Staatsoper Hamburg	2.961	0.345	12.810	0.255	2.137	0.403
Staatstheater Stuttgart	4.661	0.557	30.657	0.868	1.460	0.274
Théâtre des Champs Elysées	1.319	0.140	10.138	0.163	0.347	0.061
Opéra de Strasbourg	2.082	0.235	23.702	0.629	1.204	0.225

4.5.2. Reflection by Countries

Communication and engagement are different concepts. While some of the opera houses show great effort on social media communication, their engagement levels may not be high. Engagement highly depends on the community of users. Thus, grouping engagement scores according to countries can be a useful and easy way to interpret the results. When the social media communication scores have been expressed on the world map in the previous sections, the green color was dominant due to the generally high communication effort of the opera houses. However, a different scenario appears in terms of engagement levels.

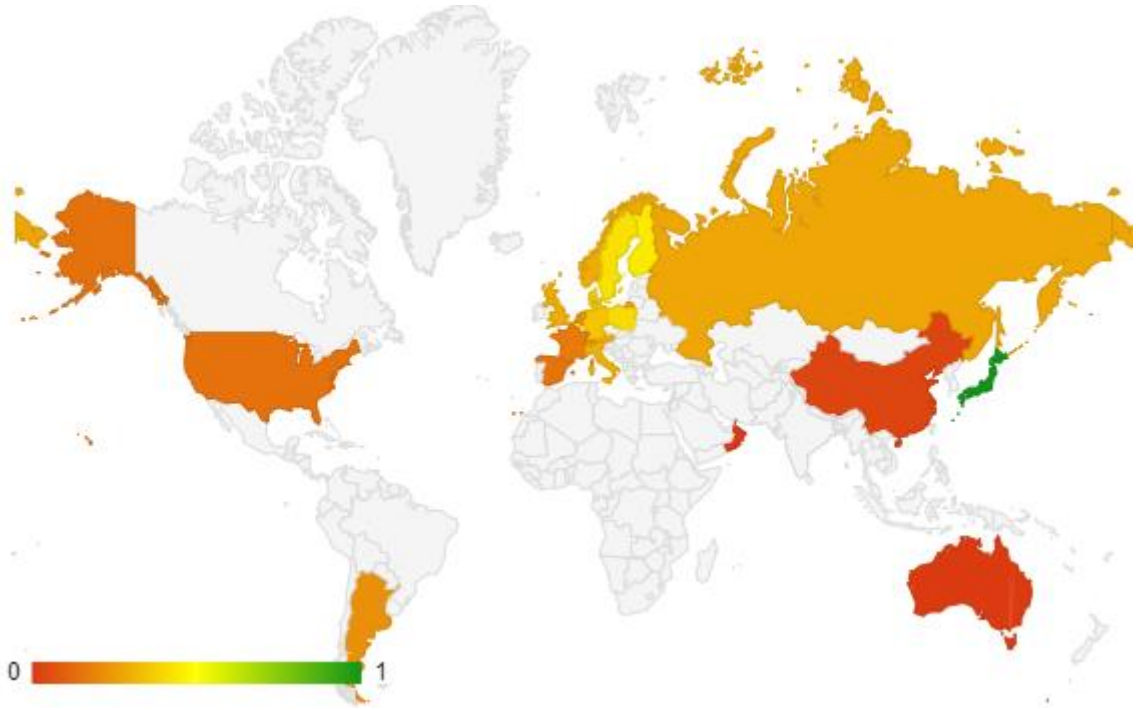

Figure 4.25 : Engagement levels for Facebook around the world

Average engagement scores of countries are seen in Figure 4.25 for Facebook and in Figure 4.26 for Instagram. Scaled engagement scores have been used to create these maps. There is a quite similar situation regarding Facebook and Instagram. Japan stands out on the world map by having the only green color. Japan dominates whole countries by having the highest engagement levels for both social media platforms. The three countries that also experience problems for the communication side have low engagement levels, too. Yet, another important point is the continent of Europe in general. European opera houses that make a great effort on communications could not catch the success of the New National Theatre from Japan with regards to engagement.

Twitter shows a different spectrum in the world map, unlike Facebook or Instagram. Again, the scaled scores have been used to create Figure 4.27. Since the New National Theatre from Japan is not present on Twitter, Japan is not involved in this section. Some of the European opera houses regain the top places in this channel. While Sweden has the highest average engagement level, Italy and Germany attract attention by having green shades. The remaining countries have similar engagement levels as other social media platforms.

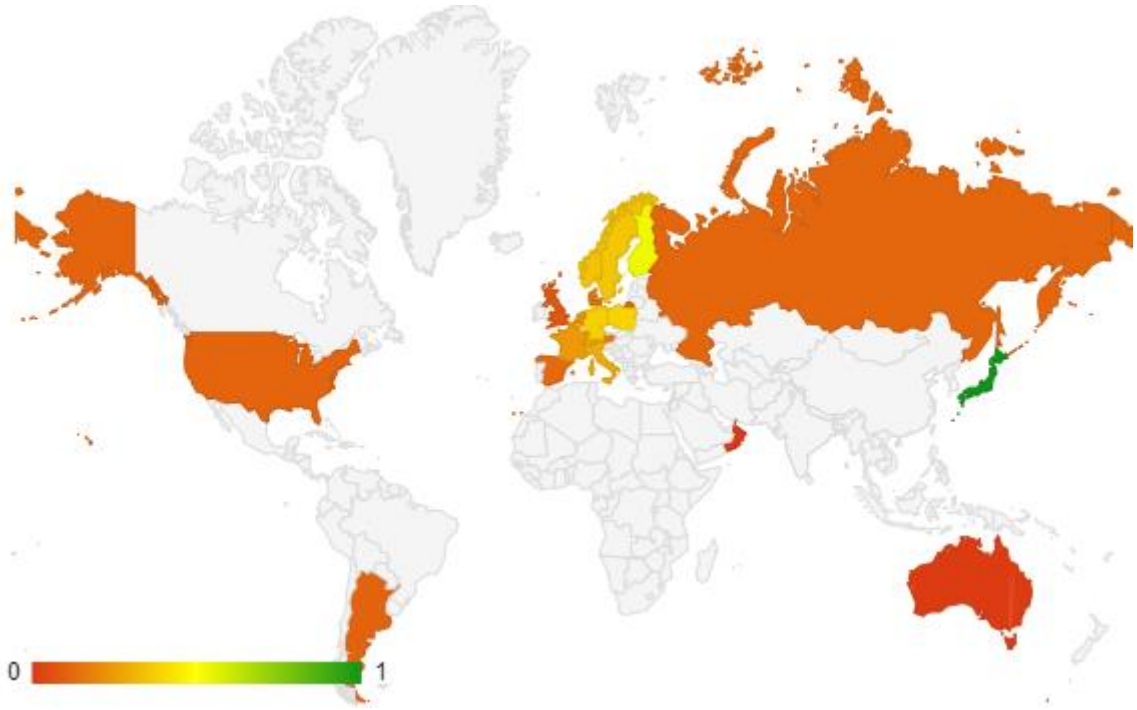

Figure 4.26 : Engagement levels for Instagram around the world

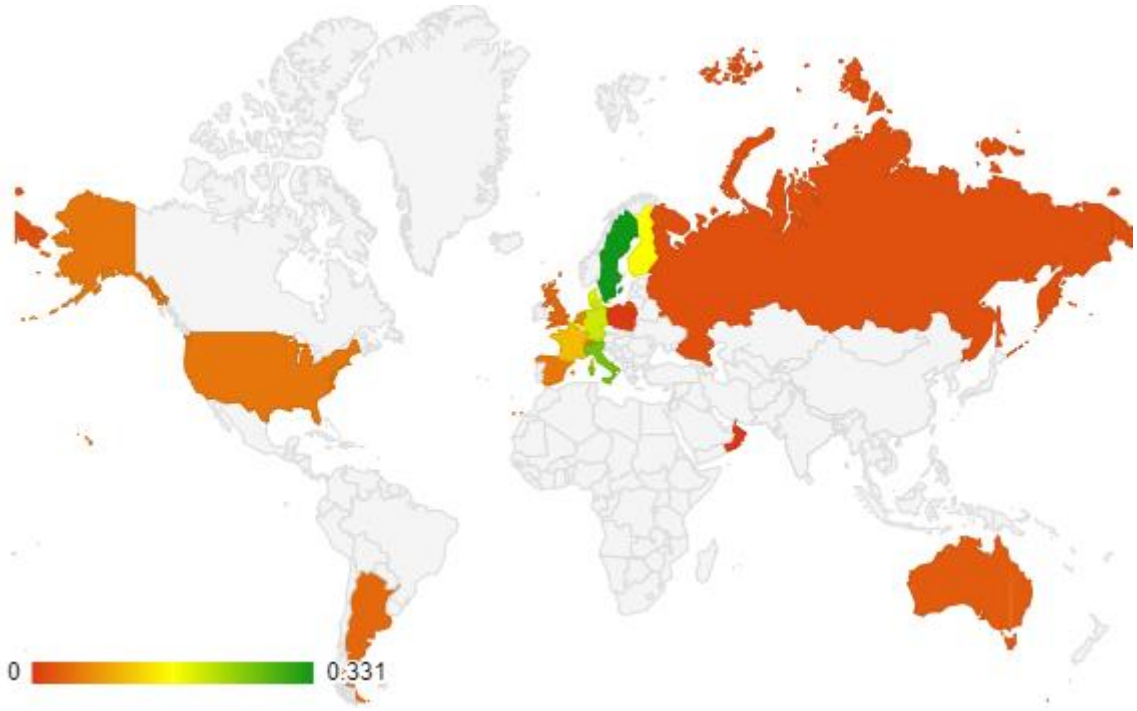

Figure 4.27 : Engagement levels for Twitter around the world

4.5.3. Reflection by Number of Followers

The number of followers for social media accounts of opera houses is another dimension that can be included. In this section, the effects of the number of followers on engagement levels will be observed. The possible relationship between them will be investigated. Here, the previously calculated engagement scores have been compared with the number of followers by using scatter graphs. The horizontal axis of the graphs belongs to the follower numbers. A logarithmic scale has been used on this axis to create better visualizations.

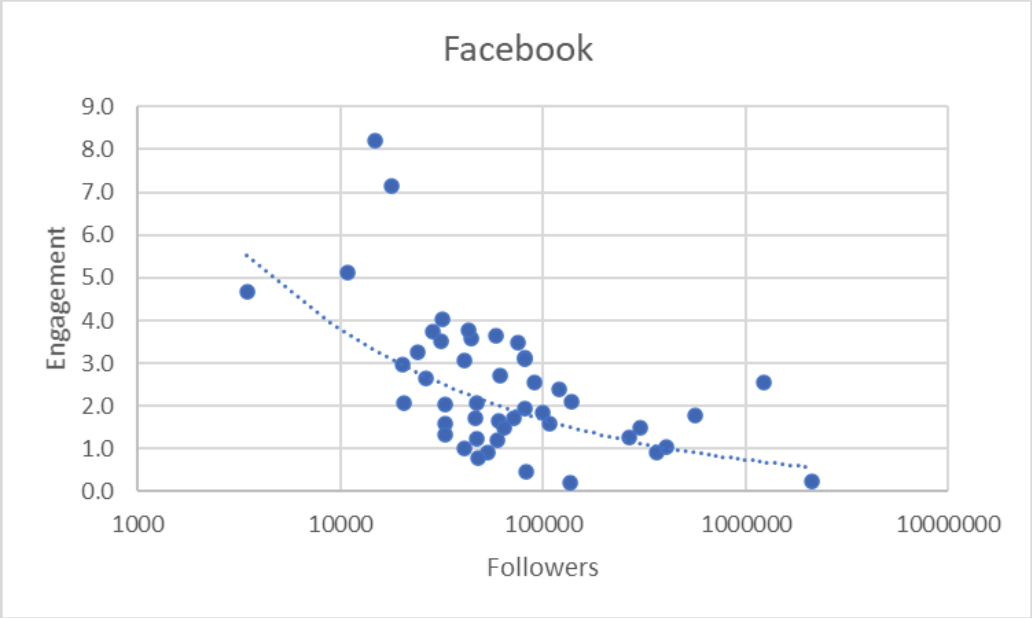

Figure 4.28 : Comparison of engagement with number of followers on Facebook

A comparison of engagement levels on Facebook and the number of followers is seen in Figure 4.28 given above. It can be said that there is a weak correlation between these variables. The power trendline is the most suitable one among the different types of trendlines such as linear, exponential, or logarithmic. The value of R-squared is 0.3084 as seen on the graph.

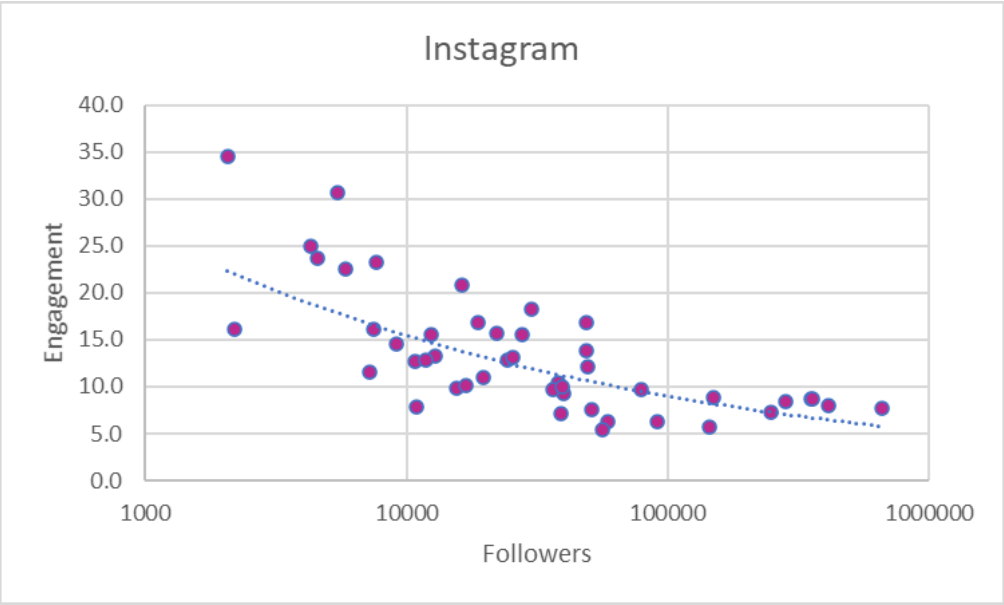

Figure 4.29 : Comparison of engagement with number of followers on Instagram

A comparison of engagement levels on Instagram and the number of followers is seen in Figure 4.29 given above. It can be said that there is an intermediate correlation between these variables. Still, power trendline is the most convenient type. The value of R-squared is 0.5326 which shows a higher correlation than the case of Facebook.

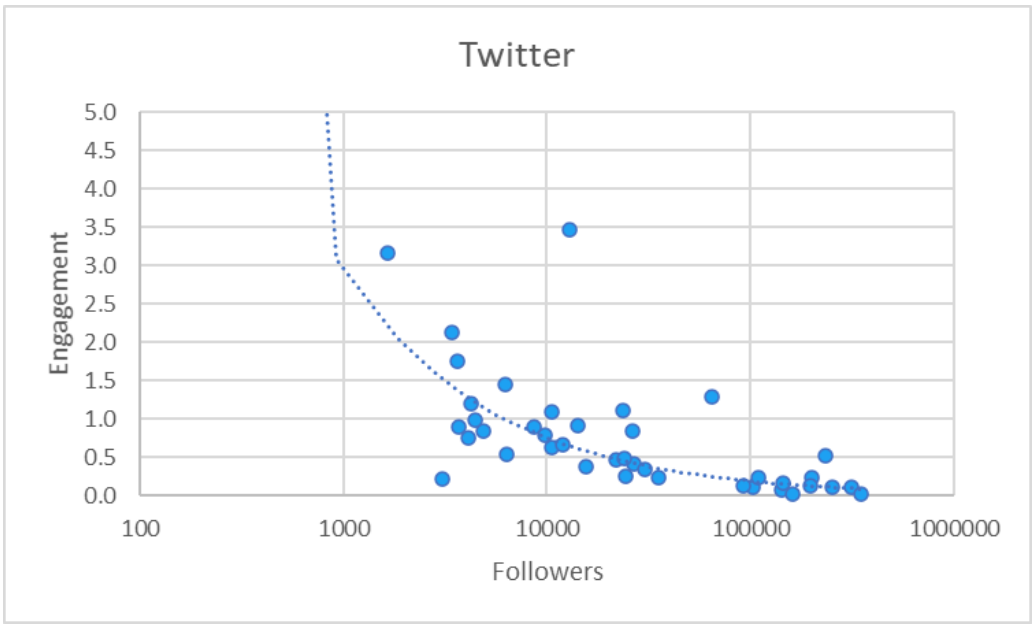

Figure 4.30 : Comparison of engagement with number of followers on Twitter

A comparison of engagement levels on Twitter and the number of followers is seen in Figure 4.30 given above. Again, power trendline is the most convenient type. The value of R-squared is 0.6398 as seen on the graph. Twitter shows a significant correlation when it is compared with other social media channels.

Although the importance of the correlation changes for channels, it is clear that there is a relation between the engagement levels and the number of followers. When the number of followers increases, the engagement levels are generally decreased for opera houses. It is natural to expect this relation since the number of followers is the denominator in the equations for engagement measurement. Yet, it should be considered that interactions also increase with the enhancing follower number. Thus, comparing two variables can be still useful.

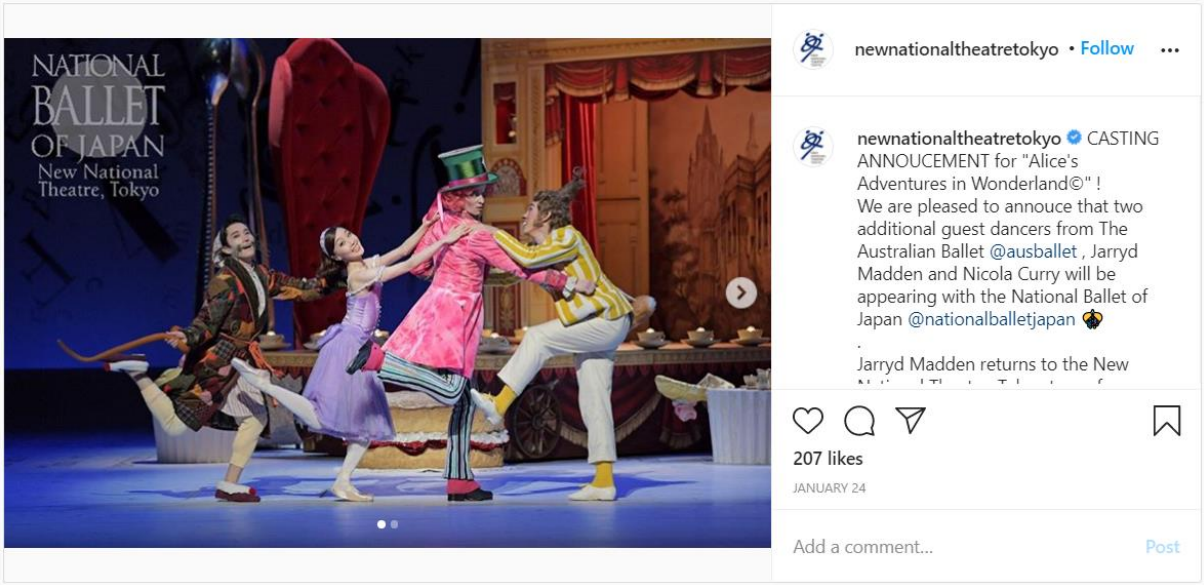

Figure 4.31 : Most liked post of New National Theatre's Instagram account

Figure 4.32 : Most liked post of Sydney Opera House's Instagram account

To demonstrate, this phenomenon explains the situation of opera houses such as the Sydney Opera House. Owing to its popularity, the Sydney Opera House has the highest number of followers on Facebook among opera houses. It has over 2 million followers by doubling the opera house ranked in second place regarding the number of followers. Yet, Sydney Opera House is the second last opera house in terms of engagement on Facebook. For example, the posts with the highest number of likes are seen in Figure 4.31 and Figure 4.32 for New National Theatre from Japan and the Sydney Opera House from Australia, respectively. The extreme difference between the number of interactions for these posts is clearly seen. While New National Theatre's post has only 207 likes, the other post has 17,753 likes. It may be expected that the Sydney Opera House has higher engagement levels after examining these posts. However, the difference between the number of Instagram followers is enormous as well. While New National Theatre has around 2000 followers, Sydney Opera House has over 144 thousand followers for its account. Eventually, New National Theatre has the highest engagement level for Instagram among all opera houses. On the other hand, the Sydney Opera House is placed near the bottom.

4.5.4. Reflection by Communication and Engagement

In the final steps of the analyses, two main outcomes of the calculations have been used. The social media usage scores have been utilized to focus on the opera houses' side. Then, the engagement scores have been used to also observe the user side. Now, the scores for social media communication and engagement will be compared to analyze whether there is a meaningful relation between them with regards to different social media channels.

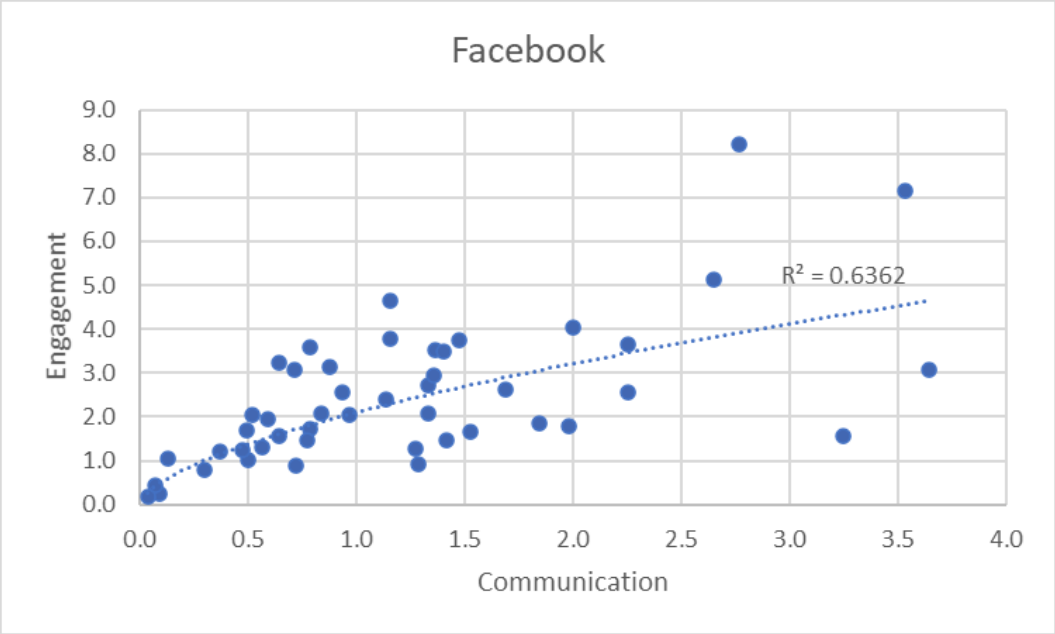

Figure 4.33 : Comparison of engagement with communication on Facebook

The original engagement scores without normalization have been used. On the other hand, the overall social media use scores have been selected for the communication axis. It should be expressed that the original results for overall social media use have been used in cases where the result exceeds the upper limit. In the CSMU methodology, these values are considered as 1 which is the upper limit. However, it causes distortion on correlation.

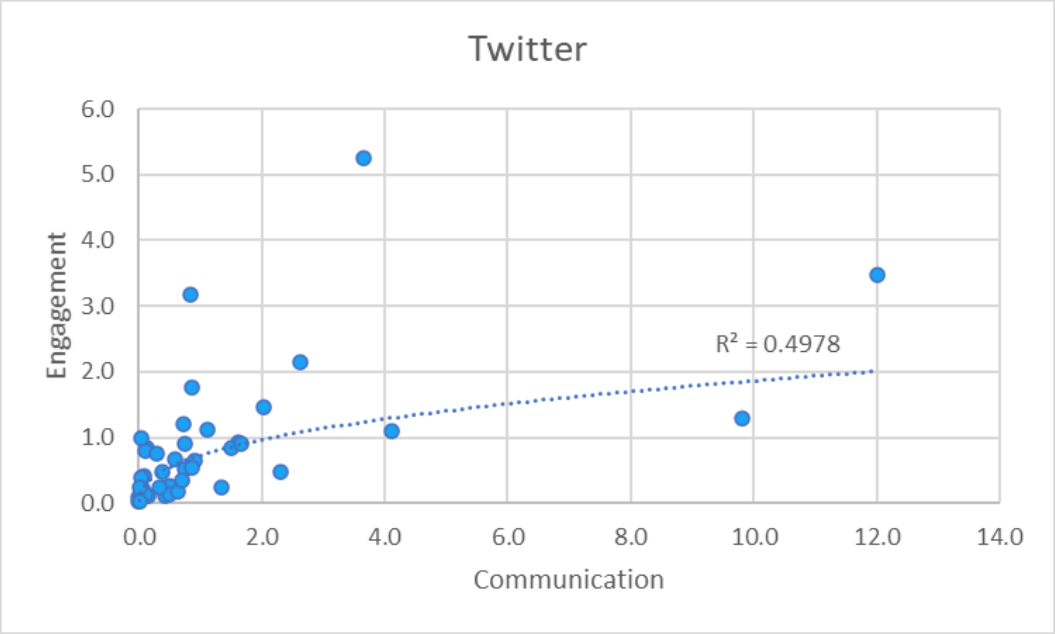

Figure 4.34 : Comparison of engagement with communication on Twitter

The scatter graph for Facebook is seen in Figure 4.33 located above. While the engagement scores form the vertical axis, the overall social media use values are on the horizontal axis. A relation is easily visible between the variables. A power trendline has been applied and the R-squared value is seen as 0.6362 on the graph. Then, the scatter graph for Twitter can be seen in Figure 4.34. Again, a power trendline was the most suitable type to perform. Although there are outliers in the data, there is still an intermediate correlation with an R-squared value of 0.4978. In brief, there is a visible correlation between communication effort and engagement levels for Facebook and Twitter. Thus, it can be said that engagement levels are increasing with the increasing communication effort. A possible reason for this clear relation may result from the similarities of methodologies. While communication scores are calculated, the user interactions are also taken into account. The common variables may cause the correlation on these results. However, this hypothesis may be valid on the subject of Facebook and Twitter. Instagram shows a contradiction for the assumption.

Figure 4.35 : A trending post from the Facebook account of Teatro Petruzzelli

It has been expressed that engagement levels can be increased by enhancing communication efforts on Facebook. To illustrate, two trending posts with the highest interactions are seen in Figure 4.35 and Figure 4.36 from Facebook accounts of Teatro Petruzzelli and National Centre for the Performing Arts (NCPA), respectively. While Teatro Petruzzelli pursues an intensive communication strategy, NCPA's Facebook

account is not quite active regarding Facebook postings. Both posts have been created on almost the same dates. The contents and presentations of the posts are also the same. They mention the disinfection processes of opera houses for future events. Similar visuals have been used to attract attention. However, there is a significant difference in the number of interactions as seen in the pictures. Although Teatro Petruzzelli has a significantly lower number of followers than NCPA on Facebook, it has one of the highest engagement levels owing to its communication effort.

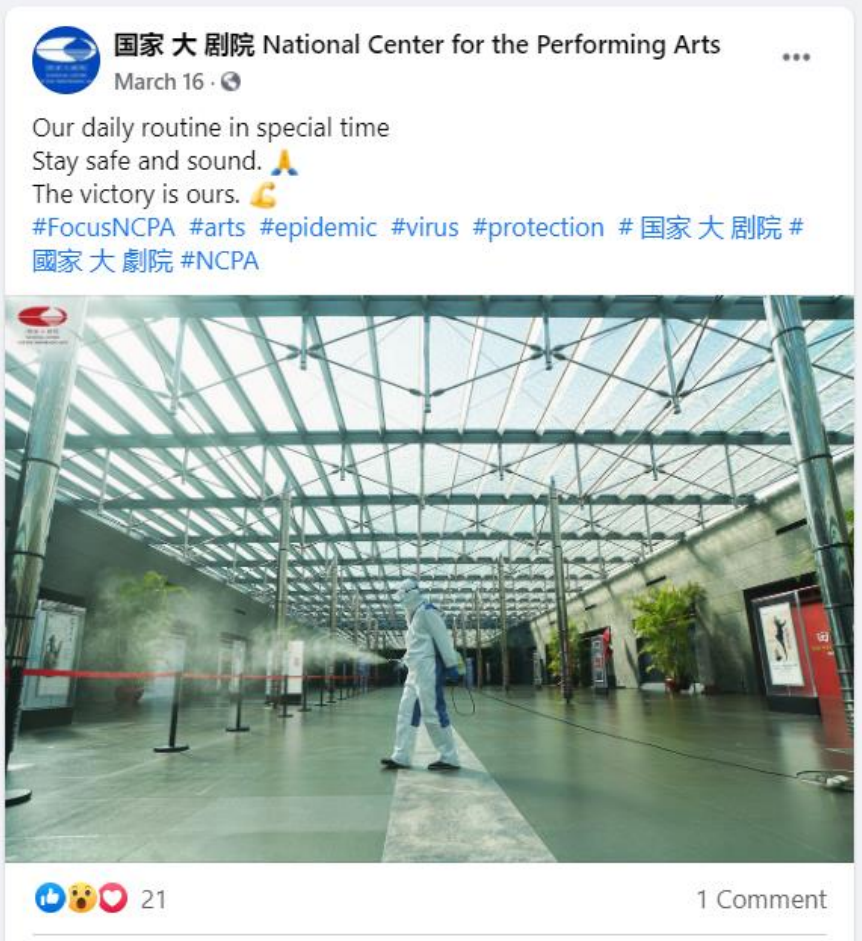

Figure 4.36 : A trending post from the Facebook account of the National Centre for the Performing Arts (NCPA)

The final scatter graph belongs to Instagram as seen in Figure 4.37 below. The values are clearly seen as independent at first glance. They are widely scattered in a two-dimensional plane. Still, a trendline has been applied like the previous graphs. The value of R-squared is seen as 0.0178 on the graph and it also proves the independence of the variables. On the contrary to Facebook and Twitter, there is absolutely no correlation between communication effort and engagement levels in terms of Instagram.

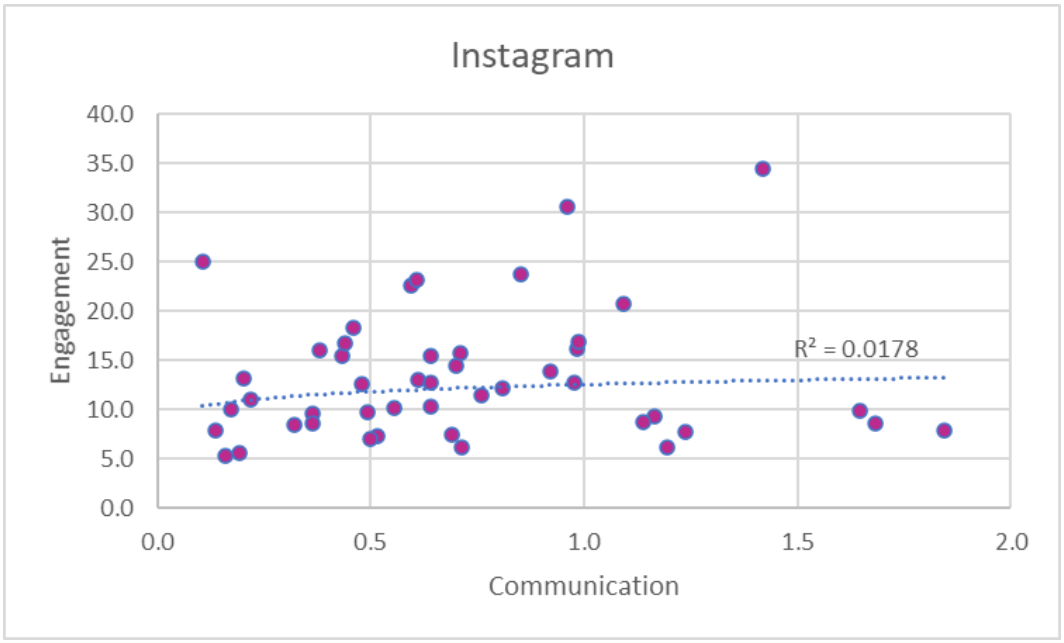

Figure 4.37 : Comparison of engagement with communication on Instagram

Keeping great communication efforts may be sufficient to increase engagement for Facebook and Twitter. However, Instagram requires other points to pay attention due to its lack of correlation between communication and engagement as seen. To demonstrate, the posts that have the highest number of likes from Instagram accounts of Staatstheater Stuttgart and Teatro Lirico Giuseppe Verdi can be seen in Figure 4.39 and Figure 4.38, correspondingly. The significant difference in the number of likes can be easily noticed. Both opera houses have the same level of communication scores for Instagram. However, the engagement level of Staatstheater Stuttgart is twice of Teatro Lirico Giuseppe Verdi. In the case of Instagram, it is possible to have low engagement levels even with frequent posting, and vice versa. There are different

aspects to take into consideration for Instagram communication. These factors may cause possible differences in engagement. One of the possible reasons regarding these two opera house accounts may be related to language. When the posts of Staatstheater Stuttgart have been observed, it can be said that they are using both German and English for communication. While they prefer the local language for local events, they use English to mention big things such as festivals or celebrations of international events. On the other hand, Teatro Lirico Giuseppe Verdi only uses the Italian language. Even the given post on Figure 4.38 that is shared on the New Year's Day does not include English. The quality of image and captions are quite important to attract attention on Instagram. In brief, it can be said that it is possible to have high engagement levels even with a low level of communication effort by giving importance to these factors.

Figure 4.38 : Most liked post of Teatro Lirico Giuseppe Verdi's Instagram account

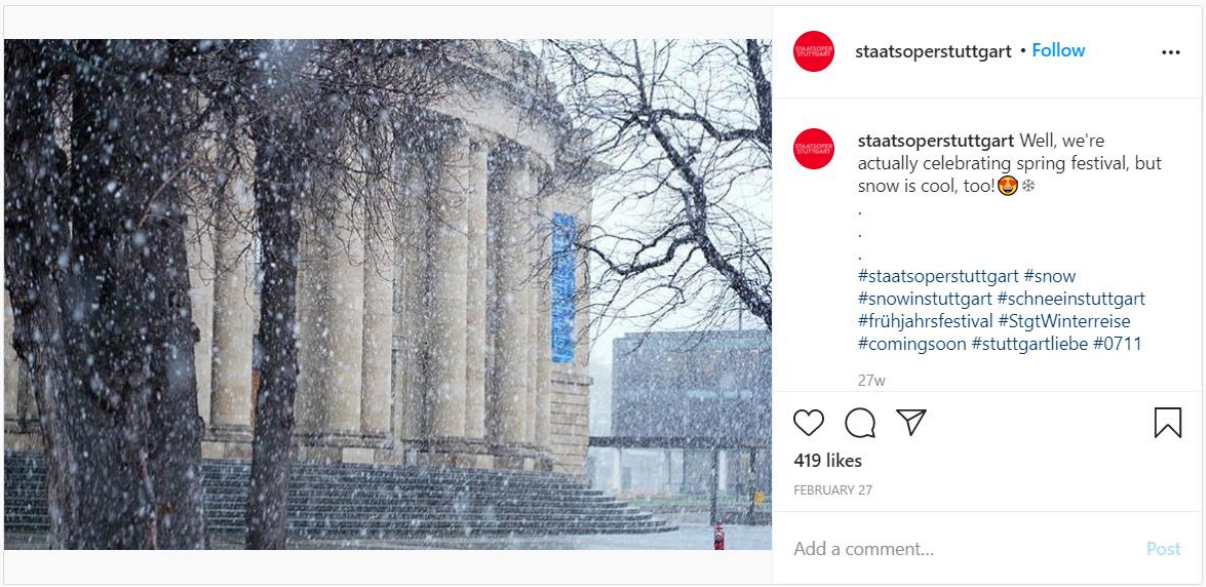

Figure 4.39 : Most liked post of Staatstheater Stuttgart's Instagram account

4.5.5. Reflection by Clusters

Until this point, engagement levels of opera houses have been compared regarding countries, the number of followers, and communication levels in this section. Yet, all of the opera houses have been simultaneously used on these analyses. In addition, analyzing smaller samples may result in interesting insights. Thus, clusters have been also used to observe the user side. Average engagement levels of opera houses have been calculated for each cluster as seen in Table 4.9 below.

Table 4.9 : Average engagement levels for clusters

Cluster	Average Engagement		
	Facebook	Instagram	Twitter
Top posting account	1.25	7.64	1.30
Frequent posting account	1.71	8.39	0.41
Daily posting account	3.04	13.73	0.83
Occasional posting account	2.28	15.01	1.01

Based on these results, the first impression can be the comparison of social media channels as seen in Figure 4.40 given below. The same colors used on previous cluster analysis have been also used in this section to provide an easier comparison. The comparison of channels based on clusters has the same scenario as the comparison without clusters. Instagram has significantly highest engagement levels for all four clusters. While Facebook is the second channel regarding engagement, Twitter is in the last rank. The only exception is the cluster for top posting accounts. Twitter has slightly higher engagement levels than Facebook just for this segment. Besides this exception, Facebook is a more successful channel than Twitter in overall with regards to engagement, while Instagram overperforms.

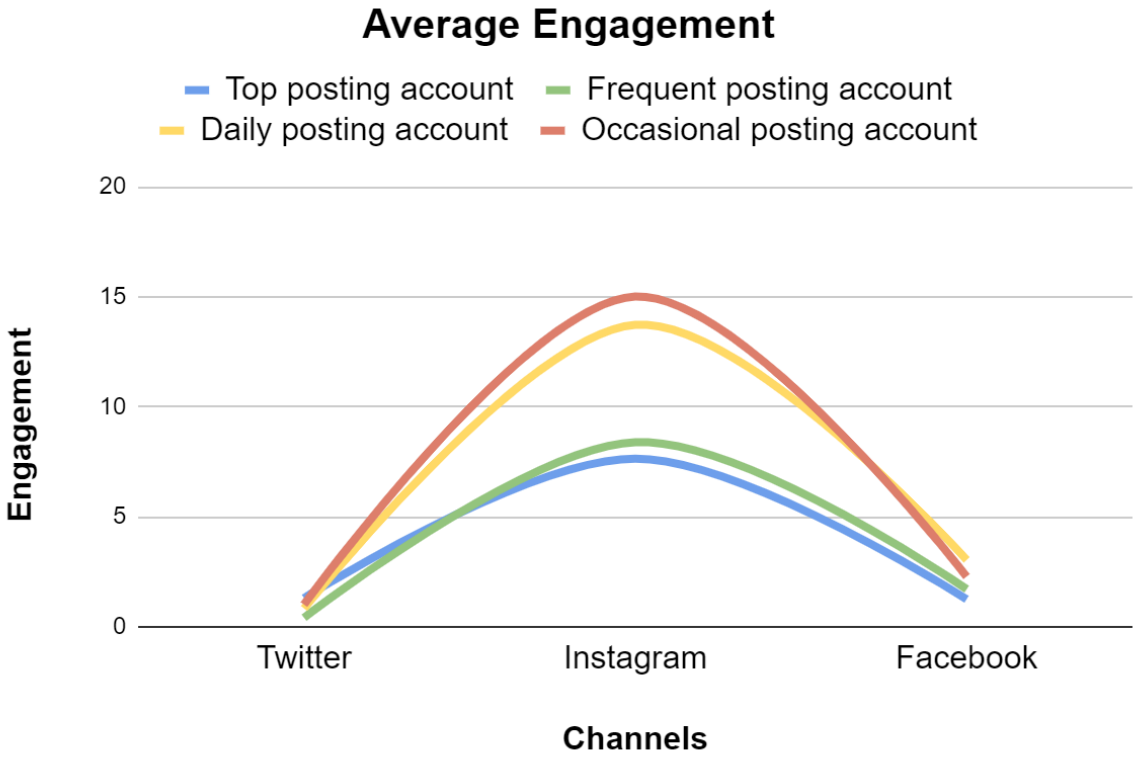

Figure 4.40 : Average engagement levels of clusters by channels

Furthermore, an interpretation based on the clusters can be realized as seen in Figure 4.41 given below. Facebook and Twitter show a similar characteristic. The average of engagement levels does not significantly change regarding clusters. For Facebook, daily posting accounts have the highest engagement average. Yet, it sees a decrease

in frequent and top posting accounts. Twitter has similar average engagement levels for all clusters. However, the cluster of top posting accounts is the most successful one in this channel. Twitter is the only case that top posting accounts have higher engagement than other clusters. Finally, Instagram shows the biggest differences in terms of clusters as clearly seen in Figure 4.41. The most interesting result is that the cluster of occasional users have the highest engagement levels while the second rank belongs to daily users. In the case of frequent and top posting accounts, the average engagement levels are decreasing dramatically. These situations match the results of the previous section regarding the comparison of communication and engagement. Instagram showed its lack of correlation between these variables and the same condition is seen for clusters, too. It is possible to have higher engagement levels even with occasional posting.

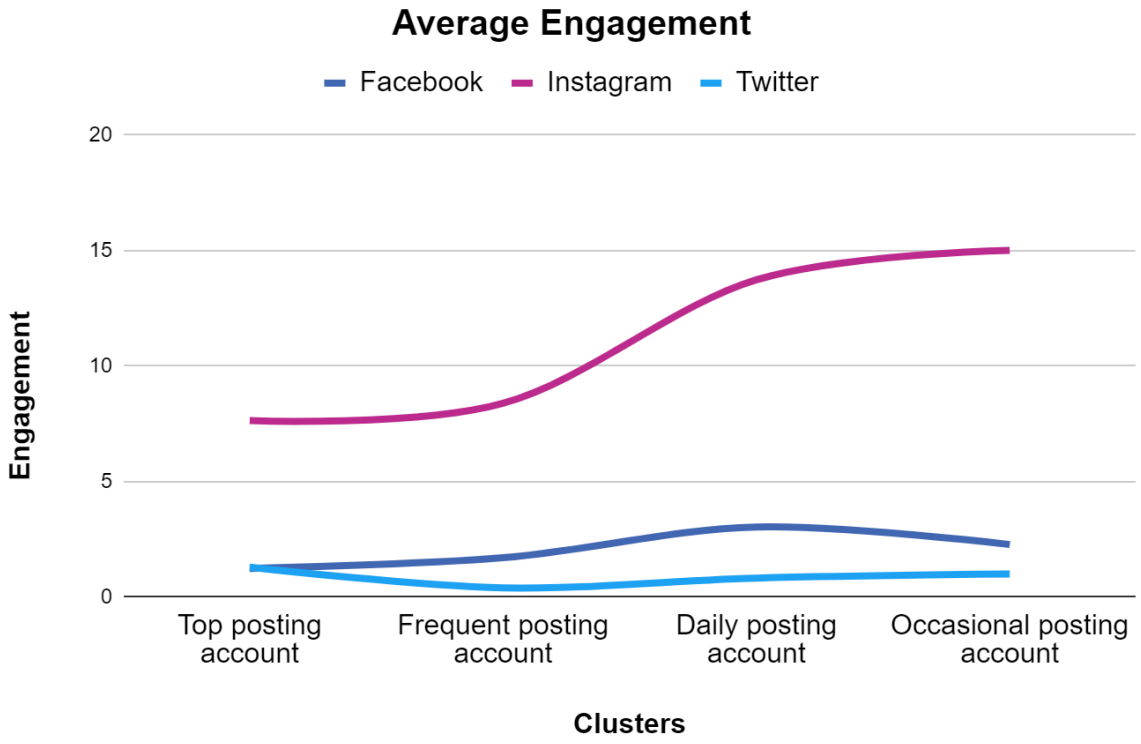

Figure 4.41 : Average engagement levels of channels by clusters

5. DISCUSSION

Digitalization is undoubtedly one of the crucial global trends as it has been selected as a starting point in this study. Digital technologies are continuing to enhance every day by completely changing the world. New tools are being emerged and they are swiftly adopted by people. Therefore, it is firmly integrated with daily life by changing the habits and lives of communities. There are numerous examples, but social media has been chosen as the research subject of this article.

Social media still maintains its growth. The technological advancements are the first reason behind this sustainable development. For example, the transition into Web 2.0 created a favorable environment for social media platforms. It enabled the creation of platforms with collaborative and participatory nature. Secondly, digital penetration is also increasing over the years. The rise of the internet and mobile phone users have also positively affected social media.

Social media has become an extremely large area with increasing technology. The origin of social media was based on entertainment. However, it is currently being used for various objectives by individuals and organizations. Among these different aims, communication is the most significant one for companies and organizations. Social media has become a main source for communication thanks to its easy access, the high volume of content, and internationality. It is clear that organizations have to follow this trend by using social media as a communication channel.

Social media communication is essential for organizations since it easily affects their reputations. One of the pillars of corporate reputation consists of what the company says. Thus, it is obvious that communication is significant. However, reputation is branched into two parts. The first one the offline reputation which can be matched with real-world reputation. The second one is the online reputation that shows the total of the online views of stakeholders about the organization. The necessity and importance of social media communication emerge at this point. Social media is a terrific opportunity for organizations to create, maintain, or increase their reputations. Several organizations exist that utilize from social media, but opera houses have been chosen as a research subject for this article.

The studies that focus on cultural institutions exist in the literature but the number of studies about opera houses is quite limited with regards to social media use. This a significant research area since opera houses have extremely competitive environments and struggle to engage with people. They do not have to compete with only other cultural institutions but also incredibly developed entertainment sector. Social media is a wonderful solution for opera houses regarding this competition.

Social media communication is quite useful for opera houses. However, there are some limitations and points to pay attention to. They are highly related to the management of social media accounts. Yet, one of the important issues is the measurement of the performance regarding social media use. After quantifying the social media use of opera houses, they can be compared with each other on different dimensions.

First of all, social media use of opera houses has been calculated in the study with regards to Facebook, Instagram, and Twitter. As a first insight, it has been found that opera houses heavily utilize social media. The average use of overall social media is 0.7 out of 1 for opera houses around the world. Among the examined channels, Facebook is the most popular one. While Instagram is in the second place, Twitter is the least used social media platform for opera houses.

With regards to the sample of opera houses, Teatro dell'Opera from Rome, Teatro Regio from Turin, and Royal Opera House from London have the perfect scores for overall social media use. It means that they are fully using each social media channel to communicate with their stakeholders. A deeper investigation of the social media accounts of these three opera houses can be a valuable research subject for further studies. In case of the need for a larger sample, Teatro La Fenice from Venice and Staatstheater Stuttgart from Stuttgart that has almost perfect scores with 0.997 and 0.990 can be also included.

Then, social media use of opera houses has been categorized by countries to observe the situation in the world. While, Facebook and Instagram create a similar scenario, the usage of Twitter changes in terms of countries. Regarding the overall use of social media, the majority of the countries are successful since opera houses are generally quite active on social media. While Japan and northern European countries have higher performances, Oman and China are placed on the last ranks. This extreme

difference is a direct indicator of the effects of political and governmental issues. Japan and northern European countries stand out with their stability, safety, and independence in the world. On the other hand, both China and Oman experience political instability. These factors are obviously effective for opera houses and their use of social media in these countries.

Besides the country-specific issues, global events also affect the social media use of opera houses. A recent global event is the Covid-19 pandemic that influenced every aspect of life. The entire world experienced the serious effects of the virus outbreak. One of the effects related to the research subject of this study is the increase in social media use. 47% of people say that they spend more time using social media. Since people started to spend more time on social media, an increase in the social media activities of opera houses has been assumed.

To justify this assumption, social media activities of opera houses in the same period of 2019 and 2020 have been statistically compared. The weekly posting distribution of opera houses has been used for all channels. As a result, this hypothesis has been partly proven. There is no increase in posting frequency for every opera house. However, the opera houses that actively posting on social media channels showed a significant increase during the pandemic with a confidence level of 95% of the t-test.

After examining the communication effort of opera houses, the user side has been evaluated, too. Engagement levels of users sustained by opera houses' social media accounts have been observed to provide additional insights. They have been calculated by using one of the most accepted methods in the literature. Then, different dimensions have been applied to interpret these results.

First, the effects of the number of followers on engagement levels have been tested. Two variables have been compared by using scatter graphs and R-squared values have been obtained to define the significance of the correlation. Although the significance of the correlation changes for social media platforms, it is evident that there is a relation between the engagement levels and the number of followers. When the number of followers increases, the engagement levels are mostly declining for opera houses. Therefore, it can be said that maintaining engagement levels is easier at the beginning. After opera houses attracted more followers, they should increase their effort to communicate with the users.

Furthermore, overall social media use scores and engagement levels of opera houses have been used together. They have been compared by using the scatter graphs to analyze whether there is a meaningful relation between social media communication effort and engagement levels regarding different social media platforms. It has been found that there is a visible correlation between communication effort and engagement levels for Facebook and Twitter. Engagement levels are increasing with the increasing communication effort for these channels. On the contrary, there is absolutely no correlation between communication effort and engagement levels on Instagram. Thus, it can be said that different channels require different strategies. Maintaining great communication effort may be enough to create engagement for Facebook and Twitter. However, Instagram requires other points to pay attention to due to its lack of correlation between communication and engagement. In case of Instagram, it is possible to have high engagement levels even with occasional posting, and vice versa.

As a final analysis, engagement levels have been also analyzed with regards to clusters. Average engagement levels created by opera houses have been calculated for each segment. Firstly, social media channels have been compared according to these results. Instagram has significantly higher engagement levels than other channels for every cluster. Although there is not a very big difference between them, Facebook has better engagement levels than Twitter. Facebook and Twitter show a similar characteristic and the average of engagement levels does not change significantly in terms of clusters. For Facebook, daily posting accounts have the highest average engagement and it sees a decrease in engagement for frequent and top posting clusters. In the case of Twitter, the most successful segment is the cluster of top posting accounts, while other clusters have approximate values. On the other hand, Instagram shows dramatic changes in average engagement levels for the different clusters. In addition to this extraordinary characteristic, Instagram has another interesting condition. The highest average engagement level has been created by occasional posting opera houses while the lowest average score belongs to the segment of top posting accounts in this channel. This phenomenon matches the results of the previous analysis regarding the comparison of communication and engagement. Instagram showed no correlation between the communication effort of opera houses and engagement levels of users. The lack of correlation has been seen again when a comparison between clusters and engagement has been applied. The cluster of

occasional posting accounts showed that it is possible to have higher engagement levels on Instagram even with infrequent posting.

6. CONCLUSION

Social media use of opera houses has been severely analyzed in this study to observe their effort to stay connected with the stakeholders. To achieve this objective, a comprehensive background for related issues has been constructed. The terms of social media, reputation, and the relationship between social media and reputation have been defined. The transition of social media that starts with being only an entertainment tool and ends with being an irreplaceable tool for communication has been examined with regards to various aspects.

After completing the build of the required background, the methodology of the study has been defined. Social media use of opera houses has been computed for Facebook, Instagram, Twitter, and the overall use of all channels. First, the popularity of selected social media platforms for opera houses has been observed. Then, opera houses have been compared by single channels and overall social media utilization. The most and least active users have been defined regarding social media communication. Opera houses have been categorized by countries to obtain a geographical reflection. The possible reasons for the countries have been discussed. Cluster analysis has been conducted for the segmentation of the sample. The segments have been created with regards to the activity level of opera houses on social media. The segments have been individually analyzed to understand the trends of similar opera houses. Thus, the characteristics of these smaller samples have been discovered. The segments have also been used on the later analysis steps to bring a new dimension. The issue of the Covid-19 pandemic has been included in the research, too. The effects of the virus outbreak on opera houses and their usage of social media have been analyzed it is a global event experienced by the whole world. It has been evaluated whether there is a meaningful change in the communication efforts of the opera houses due to pandemic. Finally, the focus has switched from opera houses to users. The user side has been analyzed by computing the engagement levels created by opera houses. They have been compared with different variables but also with previously calculated results.

In brief, this article is useful to observe the social media use of opera houses by considering the advantages and limitations. Besides the comprehensive literature

review, several analyses have been realized during the study. Various dimensions have been used in the analysis section including different opera houses, time periods, countries, social media channels, and methodologies. Owing to interesting insights provided by wide-ranging analysis, this article is useful both to understand the current situation of opera houses on social media and to be a reliable source for further researches.

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