

Poking Cultural Institutions: Social Media Analysis for Museums in Vienna

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Abstract

Social media is for many people an important part of their lives. People share their opinions and stories with friends and strangers over various platforms. The connections that users create while interacting with each other influence them in their daily decisions.

Moreover, information gathered on social media platforms offers valuable clues of what people are interested in. Big companies are aware on how important it is to know their customers. One part for their evaluations is social media analysis. Companies detect and observe public opinion and the general awareness of their brands.

This applies for cultural institutions as well, but is often mitigated in size and depth as their marketing budget is usually much more limited. However, they should observe and manipulate public perception with smart social media strategies as this is believed to be possible even with small budgets.

In my thesis, I explored 32 cultural institutions located in Vienna and how they use social media. I observed both the institutions and users on social media platform. I performed the following steps for my analysis:

First, I studied what kind of information is public available for analysis. I found out what platforms are used by cultural institutions and how many people they reach with their messages on them. Furthermore, I compared how active the selected museums participated in social networks, how many users they attracted and if those numbers correlate.

At the other end of the spectrum, I intended to investigate the characteristics and behaviour of users who interacted with cultural institutions on social media platforms in general. I illustrated what kind of content people like in order to create a successful social media strategy.

After data collection, I performed statistical tests to evaluate my research questions and hypothesis. I explored that social media activities have a positive effect on the popularity of cultural institutions. Therefore, I compared the activity of museums with the activity and behaviour of people interacting with them. My results also demonstrated that users who interact with cultural institutions on social networks show different characteristics than the overall user population of those networks.

In conclusion, I give insights in how social media analysis can be valuable for businesses in general and cultural institutions in particular.

Kurzfassung

Für viele Menschen ist Social Media ein wichtiger Teil ihres Alltags. Sie teilen Meinungen und Geschichten mit Bekannten und Außenstehenden auf verschiedenen Plattformen. Die online geknüpften Verbindungen beeinflussen die Menschen auch in ihren täglichen Entscheidungen.

Weiters beinhalten Social-Media-Plattformen wertvolle Informationen über die Interessen ihrer BenutzerInnen. Große Unternehmen sind sich darüber bewusst, wie wichtig es ist, die eigenen KundInnen zu kennen. Die Analyse von Social Media ist eine Möglichkeit, mehr über die eigenen KundInnen zu erfahren. Dafür beobachten Unternehmen die Einstellung der KundInnen zur eigenen Marke.

Für Kulturinstitutionen gilt dasselbe, jedoch haben diese oft nur geringe Budgets für Werbung und Marketing zur Verfügung. Gerade für diese Sparte empfiehlt es sich, die öffentliche Meinung der BesucherInnen mit der kostengünstigen Social-Media-Analyse zu überwachen.

In meiner Diplomarbeit untersuchte ich die Social-Media-Auftritte von 32 verschiedenen Kulturinstitutionen in Wien. Ich untersuchte jeweils die einzelnen Institutionen und die Benutzer, die mit den Institutionen interagieren. Für diese Analyse führte ich folgende Schritte durch:

Als erstes demonstrierte ich, welche Daten aus sozialen Netzwerken extrahiert werden können. Danach untersuchte ich, welche Plattformen von welchen Kulturinstitutionen verwendet werden und die Reichweite, die die Institutionen damit erzielen. Außerdem verglich ich, wie aktiv die ausgewählten Museen agierten, wie viele BenutzerInnen sie akquirierten und dass eine Korrelation zwischen diesen Werten existiert.

Einen weiteren Fokus legte ich auf die BenutzerInnen, die mit den Kulturinstitutionen in den sozialen Netzwerken interagierten. Ich untersuchte deren Zusammensetzung, wie sie mit den Kulturinstitutionen kommunizierten und welche Inhalte besonders viel Anklang fanden.

Nach dem Sammeln der Daten verwendete ich statistische Tests, um die Resultate zu evaluieren. Ich zeige, dass die Aktivität in sozialen Medien Auswirkungen auf die Popularität der Kulturinstitutionen hat. Dafür verglich ich die Aktivität der Museen mit der Reaktion der BenutzerInnen, die mit diesen interagierten. Meine Resultate zeigen außerdem, dass sich NutzerInnen, die mit Kulturinstitutionen interagierten, von der Gesamtheit der NutzerInnen der Social Networks unterscheiden.

Zusammengefasst demonstriere ich die Wichtigkeit der Social-Media-Analyse für Unternehmen und Kulturinstitutionen.

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Introduction

1.1 Motivation

More and more people are spending time in online social networks. The new communication medium is used to express opinions, converse with friends or consume news. Social networks are also used for business related activities. People search online for products, read recommendations from others, and want to get in direct contact with the businesses.

According to a market survey commissioned by web2watch, five million Austrians are using the World Wide Web. Thereof are 2 million people using social media actively. One third of the population between 16 and 74 are registered in social networks, publish blogs, and comment articles¹.

Companies are aware of the growing importance of social media. The Social-Media-Report HR 2012 reveals that already 58% of businesses are using social media. Forty percent of businesses answered that they are planning to invest more in social media in 2013².

Despite the awareness for social media, companies still have a long way to go in order to implement successful social media strategies. The Wirtschaftskammer Österreich (WKÖ) gives recommendations for small and medium-sized businesses in their publication 'Social Media Guidelines' [E-Center der WKÖ, 2013]. The authors admit that social media causes to some extent the loss of control over the public opinion. On the other hand, social media can act as an amplifier for the message of a company. Nevertheless, it does not matter whether the companies decide to participate actively or not, the users are in power of the discussed topics. Therefore, it is especially important to at least observe the public opinion about the own products and services.

The same points apply not only for businesses but also for public and private cultural institutions. For cultural institutions is it especially important to know what people think about

¹web2watch. Studie: Social Media Nutzung in Österreich. <http://www.web2watch.com/studie-social-media-nutzung-in-osterreich> accessed April 16, 2013.

²StepStone. Social-Media-Report 2012: Personaler planen höhere Investments in Online Jobbörsen und Facebook & Co. <http://www.stepstone.at/Ueber-StepStone/presse/social-media-report-hr2012.cfm> accessed April 16, 2013.

their services and exhibitions. An active fanbase is a valuable factor for increasing popularity and identifying characteristics of customers. For example, more than 35000 people express their sympathy for the museum 'Haus der Musik' on Facebook³. The social network is an important marketing tool for the museum as the fans regularly consume the institution's updates.

A structural analysis can provide insights into the composition of the fanbase. The information is the foundation for identifying success factors. As a result, it is possible to adapt and enhance the social media strategy of cultural institutions.

1.2 Problem Definition

I already stated the importance for businesses to know their customers and how they evaluate their range of products and services. It is understood that the previous statement is valid for cultural institutions as well. Today, museums mainly rely on traditional questionnaires and surveys to determine the satisfaction of their visitors. However, this approach is time consuming, expensive, and prone to error.

A better approach is to leverage already available data. Especially social media platforms provide suitable information. The challenge is to filter and relate this pile of information.

Many researchers already examined the positive effects of social media on businesses. Various guidelines give advice for implementing a successful social media strategy. So far, less research has been done in the area of cultural institutions. The audience of cultural institutions can be different to other companies. The success factors need to be identified and tested for validity.

1.3 Aim of the Work

The purpose of this master's thesis is to identify how cultural institutions are able to exploit the benefits of social media while avoiding the dangers of it. This work is composed of a theoretical and a practical part.

The theoretical part shows possible applications of social media for cultural institutions. The work presents different practices and tools for establishing a vital social media community. It also shows ways to profit from such a community.

The practical part focuses on data extraction and analysis. First, it gives an overview over the process of data extraction from various social networks. The results from the social networks differ from each other and are presented as well. Secondly, the thesis comprehends an analysis of the extracted data. Its purpose is to identify success factors for social media appearances. The question is whether number of visitors, activity, type of content or timing have influence on user participation. Furthermore, the demography of the users is part of the analysis as well. It shows the structure of a museum's fanbase and the differences to the overall population of the social network.

³Facebook. Haus der Musik. <https://www.facebook.com/hausdermusik> accessed April 16, 2013.

1.4 Methodological Approach

During the three phases research, data acquisition, and evaluation, different methods will be applied.

First, I conduct a comprehensive literature research in order to get an understanding of current research about social media and cultural institutions. I discuss different types of social media platforms and choose three platforms for the analysis.

The data acquisition phase mainly concerns the extraction of third-party records from the chosen social networks. A script is needed for extracting data automatically. The extracted data is stored in a self implemented database.

During the evaluation phase, the extracted records are combined and compared to each other. I conduct a structural analysis in order to expose the composition of institutions and users. Furthermore, I compute the results of the analysis in this phase. Statistical tests are the main method for testing whether the results are significant or not.

1.5 Structure of the Thesis

My master's thesis is divided into 6 chapters. Chapters 2 and 3 provide the theoretical base and the understanding of the topic. Chapters 4 and 5 describe the practical part of the thesis.

Chapter 2 - Social Media: This chapter provides a comprehensive introduction to social media. It discusses what social media is and how it can be classified. Furthermore, the text gives insights in successful social media marketing and gives suggestions for businesses.

Chapter 3 - Cultural Institutions Using Social Media: The third chapter focuses on the opportunities for cultural institutions when using social media. It gives an overview of current research topics in the area of social media for museums. Both findings of theoretical theories and practical experience are presented.

Chapter 4 - Data Acquisition: The chapter data acquisition presents how the data for the analysis is gathered. Both the cultural institutions and the data source for my sample is introduced. Also a detailed description of the data extraction process can be found in this chapter.

Chapter 5 - Data Analysis and Evaluation: This chapter comprehends the data analysis and evaluation. First, the influence factors on the popularity of a cultural institution on a social network are tested. Next, the online activity of museums is analysed. Finally, users who interacted with the cultural institutions are analysed and compared to the overall population of the social networks.

Chapter 6 - Summary and Future Work: The last chapter summarizes the finding of this master's thesis and presents suggestions for future research.

Social Media

2.1 What is Social Media?

2.1.1 Social Media and the Internet

In our current understanding, the term social media is often connected with online applications. But even before the invention of the internet, social media existed. The telephone, the telegraph, and even the postal service are technologies which enabled people to communicate with each other [Drury University, 2010].

The Early Years

When Raymond Samuel Tomlinson sent the very first email, he added a social scope to the features of the ARPANET. As we know now, his research changed the worlds' societies. Emails are the oldest building part of online social media. Since then a huge variety of tools were invented for connecting people and sharing information.

The next big step after the introduction of emails was the development of Usenet and bulletin board systems. Users were able to connect with modems in order to contribute to online discussions with other users. At a very early stage, companies realized the benefits of the new technologies as the first commercial online services such as Prodigy and CompuServe started their business. They allowed users to chat and socialize with each other [O'Dell, Jolie, 2011] [Cameron Chapma, 2009].

The Era of the World Wide Web

Tim Berners-Lee changed the game completely when he built the foundation for the World Wide Web in 1991. With this set of protocols and formalisms it was easier for users to get access to the Internet and link documents with each other. From this point on, the development of new concepts and sites increased at a rapid pace [Shadbolt and Berners-Lee, 2008].

Among popular social media sites were geocities, a social networking site, and theglobe.com, where users could personalize their online experience. AOL added another aspect to the landscape of technologies with the Instant Messenger. And even one of the first social networks, Six Degrees, was founded in the 1990ies [O'Dell, Jolie, 2011].

Online Social Networks Arise

In 2000 the World Wide Web hype came to an halt with the bursting of the dot-com bubble. However, shortly after the crash were new platforms like Friendster and its clone MySpace founded. They were the first modern social networks that allowed friends from real life connecting online. The success of these social networks was evident and inspired the creation of many famous platforms such as LinkedIn, Facebook, and Google+ [Boyd and Ellison, 2008].

The New Social Media Landscape

Also worth mentioning are online games and virtual online worlds. Similar to social networks, users are gathering at platforms to connect with like-minded people. In online games (e.g. World of Warcraft) are users playing within given settings. On the other hand, in virtual worlds (e.g. Second Life) are users able to contribute their own content [Mennecke et al., 2008].

Some of the new applications focused on one special aspect. Examples for that are flickr for sharing photos, YouTube for hosting and sharing videos, and digg for rating links. Another outstanding position in the social media landscape has Twitter. The site emerged from an online short message service to an important news medium [Drury University, 2010].

2.1.2 Social Media in Numbers

The success of Social Media can easily be seen in recent usage statistics of internet users. InSites Consulting provides an exhaustive study of usage statistics of social media platforms in 2011¹. They estimate that two billion people use the internet worldwide. Over one billion people are registered at least on one social network. On average 73% of the online population are member of one or more Social Networks and almost 100% are aware of the existence of such networks.

Similar numbers can be found at comScores report from 2011². The researchers claim that in all demographic groups and within both genders a further growth of social media penetration can be examined. Across all regions, women are spending more time than men with social media but men exhibit higher growth rates. The researchers discovered huge differences in growth rates between different social media platforms as well. With the success of social networks, the time spent with instant messaging and e-mails is decreasing. The trend towards social networks is explicitly significant for digital natives (age 15-24). Finally, the researchers predict future growth rates for social media because of the rapid diffusion of smart phones.

With this numbers in mind the importance of an understanding of social media for brands and consumers is evident.

¹InSites Consulting. <http://www.slideshare.net/stevenvanbelleghem/social-media-around-the-world-2011> accessed July 16, 2012.

²comScore Europe. http://www.comscore.com/Press_Events/Presentations_Whitepapers/2012/The_State_of_Social_Media accessed July 16, 2012.

2.1.3 Definition

So far the term *social media* has been stressed a lot in this work. Hence, it is necessary to provide a definition to create a common understanding.

My favorite definition for social media is also the simplest one. Lon Safko writes in his book [Safko, 2010]:

“Social media is the media we use to be social.”

This is only a short statement and the author himself admits that it takes much more words to give a deep understanding of the term. Therefore, the researcher examines the two words in detail. The term *social* describes the basic need of humans to connect with other people and share thoughts and experiences amongst each other. People from all cultures enjoy being included in groups with similar minded people and have conversations with one other. The second part of the terminology is *media*, which refers to the tools of communication. The word represents the technology that is used for connecting with other people. The two words together form the term *social media* which characterizes how we use existing technology to reach out and connect with other people. Social media is also about how businesses build and maintain relationships with their customers and leverage them. [Safko, 2010]

Another often cited definition is from Kaplan and Haenlein [Kaplan and Haenlein, 2010]:

“Social Media is a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user generated content.”

This definition requires an understanding of the two related concepts Web 2.0 and user generated content. Both terms are often used in the same context but refer to different ideas. Generally speaking Web 2.0 is the platform for evolution of social media whereas user generated content is how people make use of social media.

The purpose of the following two sections is the distinction of both concepts, thus giving the reader a deeper understanding of the topic.

2.1.4 Web 2.0

Tim O’Reilly is widely credited for forming the term Web 2.0. In 2004, he hosted the first annually Web 2.0 conference and from that point on the term came into common use. One year after this conference, he wrote an article to clarify exactly what the Web 2.0 is.

The Web 2.0 is not a technical new version of the World Wide Web which can be downloaded and installed. It is more an indicator for the big changes of the World Wide Web after the burst of the dot-com bubble in 2001. To define the term better, O’Reilly stated the following seven aspects [O’Reilly, 2005]:

- The Web as a platform
The World Wide Web emerged into a service platform where a lot of different applications are hosted. One famous example for the Web as a platform is Google Docs, which provides a full Office package online.

- **Harnessing collective intelligence**
In contrast to the 'Web 1.0', not only administrator but also users are contributing content to the Web. Users can share their own pictures or videos with others on platforms such as Flickr or YouTube. Users can also add personal opinions to projects (e.g. Wikipedia) with the goal to create valid knowledge. This process is called wisdom of the crowd.
- **Data is the next Intel Inside**
The success of an application highly depends on the quality and quantity of used data. This data is often contributed by users which can arise legal issues, especially about the ownership of data.
- **New ways of software development**
The switch from software as a product to software as a service led to changes in software engineering. New versions are published at a very early stage in the development. Hence, the feedback of the audience has a high impact on development and users emerge to co-developers.
- **Lightweight programming models**
Data can be provided easily through HTTP- or web service interfaces. Subsequently, developers can access the data through APIs and use it for own web services.
- **Software, which can be used on many devices**
One feature of the Web 2.0 is that software is not limited any more to the PC platform. Rather a variety of mobile devices are available for calling web applications and displaying information.
- **Rich user experience**
More and more traditional desktop applications get transformed into web applications. This is feasible because current Web technology allows providing similar usability features for users. One set of key technologies is AJAX, which is necessary for creating asynchronous web applications.

2.1.5 User Generated Content

The term user generated content got popular in 2005 and describes media content which is publicly available and contributed by end-users [Kaplan and Haenlein, 2010].

User generated content has to fulfil certain criteria to be labelled as such. The OECD (Organisation for Economic Co-operation and Development) proposed three basic requirements for user generated content [OECD, 2007]:

- **Publication requirement**
The content has to be publicly available on the Web. The work can be published either on a website which is available for everyone or on a website which is restricted to a certain user group. This characteristic excludes the content of emails and two-way instant messages.

- Creative effort

Users have to put a certain amount of creative effort in creating work to be credited for user generated content. Hence, it is not enough to just replicate existing content (e.g., posting a link to an article or uploading a part of a television show to an online video website). Moreover the users have to add their own value (e.g., uploading their own original photographs or writing a new blog post). It is very difficult to define the minimum amount of creative effort necessary. This depends very much on the context of the work.

- Creation outside of professional routines and practices

Work is not considered to be user generated content if the work is created with an institutional or commercial market context in mind. Thus, user generated content is usually created from non-professionals without expectation of monetary reward.

The OECD states in their report that a small number of platforms are responsible for a huge share of data traffic. The most successful platforms for allocating user generated content are social networks and video sharing services. The amount of user generated content will increase rapidly in the next years because of the following effects [OECD, 2007]:

- Technological drivers

The amount of user generated content depends very much on the number of households with broadband connection. Furthermore, cheap prices for hard drives and consumer electronics (e.g., photo or video cameras) amplify the quantity of contributed work even more. Also existing technologies and online services are important, which allow users to upload their content and make it publicly available.

- Social drivers

The habits of Internet users are changing as well and social drivers are considered to be the most important drivers for change. Especially the generation of 'digital natives', which grew up with digital technologies, have a greater willingness to share content and to adapt to new concepts. Initially most of user generated content was provided from young males. Nowadays, other demographic groups are starting to contribute their ideas as well.

- Economic drivers

Companies have an increasing interest in user generated content and the opportunities of leveraging the content. This leads to more competition amongst corporations and results in lower costs and increased availability of tools for creation of user generated content.

- Institutional and legal drivers

Institutional and legal drivers are also important for the growth of user generated content. For instance the Creative Commons provide regulations for the distribution of copyrighted work. Also end-user licensing agreements encourage users to produce user generated content. The agreements grant copyright to the user who uploaded the work.

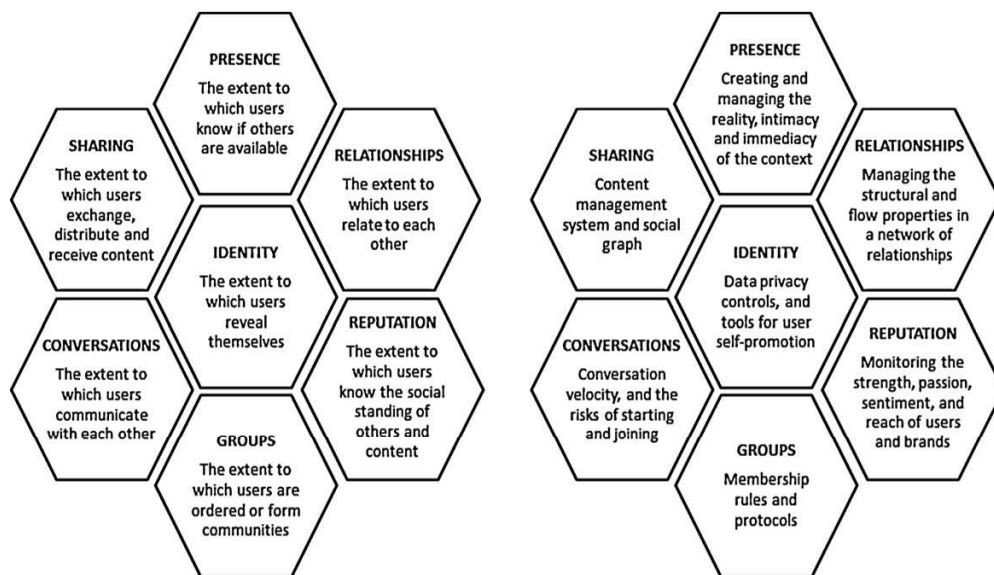


Figure 2.1: Social media honeycomb model: The left honeycomb comprises functionality of social media. The right honeycomb describes the implications of the functionality [Kietzmann et al., 2011].

2.2 Characteristics of Social Media

It is essential that businesses understand the characteristics of social media in order to leverage the opportunities of social media. Therefore, it can be useful to use a framework to classify different social media platforms. Kietzmann et al. define social media by using seven building blocks: identity, conversations, sharing, presence, relationships, reputation, and groups [Kietzmann et al., 2011]. Each block explains a specific facet of social media usage and its implications for companies. An overview of the honeycomb model can be seen in Figure 2.1.

- Identity

The issue of how much of their true identity users have to reveal on social media platforms is crucial and therefore, it is located in the centre of the honeycomb model. Platform providers have an urge to collect valid private information of users for marketing purposes. On the other hand, a lot of users do not want to reveal their true identity online. The effect of this dilemma varies between different social media platform. For example in social networks such as Facebook, users are encouraged to not only use their real names, but also to provide additional personal information (e.g., user photo, personal interests). On other social networks such as Divorce360, where people exchange their private experience about their divorce, the user profiles obviously do not reveal the true identity. A negative

effect of anonymity is that it encourages cyber-bullying and the use of offensive language. Therefore, businesses have to think about possible impacts carefully in order to find the right balance between protecting privacy and revealing identities of users.

- Conversations

Users engage in conversations on social media platforms with individuals or groups for several reasons. Either they want to express feelings, maintain relationships or use the medium to advert an issue. The conversations have different characteristics themselves. For instance, short status updates on Twitter are posted in a very fast manner in real-time, whereas a blog post facilitates rich and longer conversations and the time between two blog posts is longer. Hence, Twitter focuses more on conversations than identities. For firms it is crucial to observe the conversations to stay informed about their customers. Businesses should monitor the discussed topics and how fast the discussions are changing. Companies could also start new discussions in order to show the audience that they care about their opinion. On the other hand it could have negative impacts if firms interfere in conversations which are originally not theirs.

- Sharing

The building block *sharing* represents the amount of exchanged and received content. It depends on the objectives of the social media platform whether sharing leads to conversations or relationships between users. Furthermore, the authors argue that people using social media platforms are connected through shared objects. These objects are for instance photos on Flickr, music on MySpace or careers on LinkedIn. It is crucial for companies to identify the objects that users share with each other. Moreover, companies have to ensure that the shared content meets legal requirements. For example, YouTube is responsible that users do not upload videos which violate copyrights.

- Presence

The meaning of the block *presence* describes the connection between the real world and the virtual world. For example the social network Foursquare allows users to publish their physical location via check-ins. Another application is Friends Around Me which displays the public accessible status of friends of different social media platforms. Presence is also about the extent to which friends are available. For example in LinkedIn it is displayed which friends are online. Firms should take into account how important it is for the user to see the physical location or the availability online. This depends of course whether the users want to engage in real life or not. Sometimes users might also want to be available just for a particular group of other users.

- Relationships

Different levels of relationships have a special importance for social networks. Users can discuss on the same issue, list each other as friends or follow their updates. The building block relationships displays the extent to which users can relate with each other. In general social media platforms which do not value identities highly, also do not value relationships highly either. Different social networks focus on different kinds of relationship maintenance between users. LinkedIn, for instance, shows how many degrees are between the

own profile and the targeted profile. This social network is based on expanding the own social network and minimizing the distance to certain important people (e.g. a possible employer). In contrast to that, other platforms like Skype are more focused on existing relationship maintenance. This implies that social media sites have to take into account the amount and strength of kept relationships between users.

- **Reputation**

A user's reputation represents his or her status amongst other users. Measuring reputation on social media platforms can be conducted in different ways. On Twitter, for instance, a high number of followers can indicate the popularity of a user. Other platforms allow users to rate content explicitly. This feature is also available on YouTube, where videos can be liked or disliked. For social media platforms it is crucial to identify appropriate metrics for measuring the reputation of a user or the content. The evaluation can be based either on objective data (e.g. counting of followers) or subjective opinions of the users (e.g. rating systems).

- **Groups**

The functional building block *groups* expresses how users form communities and organise their groups within a social media platform. The authors identify two different types of groups. First, users can label their friends with different categories (e.g. 'school mates' or 'family'). Second, groups can be a place to communicate with other users who do not necessarily have to be friends. Those groups can be either secret, private or accessible by everyone. The feature of grouping users should be available right from the beginning because users expect to have the possibility of ordering their relationships. Groups are also a way to filter the amount of information which users are exposed to. This is explicitly important considering the enormous bulk of generated content on social media platforms.

With the presented honeycomb model it is possible for companies to identify and concentrate on a few major building blocks. However, none of today's successful social media platforms concentrate on just one block. They rather focus on three to four characteristics, depending on the purpose of their platform and the requirements of their users.

2.3 Classification of Social Media

Other than the approach from Kietzmann et al. [Kietzmann et al., 2011], Kaplan and Haenlein provide a classification scheme which allows assigning every social media platform to exactly one kind [Kaplan and Haenlein, 2010]. The researchers rely on theories both from media research and social processes (see Figure 2.2).

2.3.1 Media Research

The horizontal dimension of the classification scheme represents the media aspect of social media. It is dedicated to the theories of social presence and media richness.

		Social presence/ Media richness		
		Low	Medium	High
Self-presentation/ Self-disclosure	High	Blogs	Social networking sites (e.g., Facebook)	Virtual social worlds (e.g., Second Life)
	Low	Collaborative projects (e.g., Wikipedia)	Content communities (e.g., YouTube)	Virtual game worlds (e.g., World of Warcraft)

Figure 2.2: Classification of social media with the dimensions social presence/media richness and self-presentation/self-disclosure [Kaplan and Haenlein, 2010].

Social presence is a measure for the influence on the behavior of the communication partner. The higher the value, the more influence is evident. Social presence is characterized by the two components intimacy and immediacy. Intimacy is a value which is high for interpersonal (e.g., face-to-face talk) and low for mediated (e.g., telephone call) communication. Immediacy on the other hand is high for synchronous (e.g., live chat) and low for asynchronous (e.g., email) discussions.

Media richness measures how much information can be transferred over a certain time interval. The more information that can be transmitted, the richer the medium is. This value relies on the theory that the purpose of communication is to resolve confusion between communication partners. Hence, the more information that can be transferred results in a more effective and thereby richer medium.

2.3.2 Social Processes

The vertical dimension of the classification scheme describes the second part of social media, namely social processes. It is based on the amount of self-presentation a platform allows and how much self-disclosure it requires.

Self-presentation is a concept which describes how people try to form the perception other people have of them. For instance, people try to influence others to gain rewards. People also have the wish to obtain a certain image of them, according to the perceived personal identity.

Self-disclosure on the other hand is about the revelation of personal information. This can be an important factor during the development of intimate relationships but can also happen between strangers.

2.3.3 Classification Scheme

Kaplan and Haenleins classification scheme leads to six different types of social media platforms [Kaplan and Haenlein, 2010]. Blogs and collaborative projects (e.g., Wikis) score lowest in the context of social presence and media richness because they only allow basic communication. More elaborated are social networking sites and content communities as they allow sharing of

multimedia content in various ways. The highest score in this dimension is represented by virtual social worlds and virtual game worlds which try to imitate face-to-face conversations.

Collaborative projects, content communities, and virtual communities score low on the dimension of self-presentation and self-disclosure. Those platforms either focus not on specific content domains or use stricter rules for self-presentation and self-disclosure as other platforms. In the following sections I will give an overview and examples for every type.

2.3.4 Collaborative Projects

Many users work together simultaneously when creating a collaborative project. This joint effort should lead to better results than what only one user could do. According to Kaplan and Haenlein, collaborative projects can be grouped into social bookmarking applications and wikis [Kaplan and Haenlein, 2010]. On social bookmarking sites (e.g., Delicious), users collect and rate links whereas wikis (e.g., Wikipedia) are used to create mostly text-based content.

Social Bookmarking Sites

Social bookmarking sites are used for organising and sharing personal bookmarks. Users are able to bookmark interesting pages and assign keywords to them. The social scope is added with sharing of personal links within the community.

Tagging links on a social bookmarking site leads to the joint development of a shared vocabulary. Such vocabularies are usually called folksonomy. The term folksonomy was coined by Thomas Vander Wal and is a combination of the two words folk and taxonomy [Mathes, 2004].

Mathes writes in a paper about folksonomies and their strengths and limitations [Mathes, 2004]. For instance, a folksonomy can be used for information seeking. Users can search for specific topics to discover links that other users marked with the same tags. Folksonomies are created from non-professionals and therefore much cheaper than the work of experts. Furthermore, they reflect the actual vocabulary of users.

On the other hand, the use of an uncontrolled vocabulary can lead to several problems. Ambiguity and synonyms for words are often misleading. Users are able to assign tags independently. Hence, it can happen that two different concepts have the same tag or that two tags refer to the same concept. In addition, spaces and multiple words in tags can cause further misunderstanding in folksonomies.

Wikis

Ebersbach et al. state in their book that wikis changed the functionality of the Web tremendously [Ebersbach et al., 2008]. Wikis are focused on content which is written by many users in a joint effort. Every user can read and edit texts. The changes of texts are visible on a history page. Furthermore, users are responsible for the structure of texts. Participants can add pages and interlink them with other articles. Hence, every individual has a high relevance regarding the quality of the content.

The first wiki was developed by Ward Cunningham in 1995. His goal was to provide software for programmers who work together on the same source code. Cunningham called his

application WikiWikiWeb. The name is inspired by the Hawaiian word *wiki* which means quick or to hurry.

Cunningham's invention was further developed ever since. A majority of now available wiki software is under an open source license. Today's most successful wiki software is MediaWiki from the Wikimedia Foundation. MediaWiki allows the administration of projects of all sizes. Their most famous project is Wikipedia which provides encyclopaedic knowledge.

In 2001 Wikipedia got online in an English version. By today, Wikipedia is available in 285 languages. The biggest versions are in English, German, French, and Dutch with all more than one million content pages³.

Other online wikis focus on special interests of users. Communities use those wikis for conversing about cars, recipes, TV series or other topics.

Wiki software is very popular aside from the Web as well. For instance, corporate wikis exist in the intranet of many companies. They are used for documenting internal knowledge. Wikis can also be valuable for project teams to represent the development status or for documentation issues.

One problem with wikis are edit wars. This phenomenon occurs when two or more users disagree on a specific issue. Then one user changes the edit of the other user back to his or her opinion and vice versa. Usually administrators are called to settle edit wars and decide on a correct version.

Another problem addresses the content of wikis. As every individual is allowed to participate, the correctness of the text cannot be assured. Thus, most wikis encourage their writers to reveal their sources and cite them correctly.

2.3.5 Blogs

Alby states in his book that blogs are existent for a long time in the social media sphere [Alby, 2008]. The term *blog* is an acronym for weblog and indicates a log or journal which is published on the Web. A blog usually represents one author and has several entries in reverse chronological order. Even before the term blog existed, people administrated personal web pages which were similar to blogs.

Nevertheless blogging gained high popularity since the introduction of easy useable blogging systems (e.g., Blogger, WordPress).

Features of a Blog

Blogs can also represent more than a simple Web diary. With the possibility of commenting to entries, blogs emerge to a participative medium. Hence, readers are able to join discussions and add further aspects to them. Furthermore, readers can subscribe to blogs or single entries to get immediate updates. The difference to a forum is that on blogs, only the author can start discussions, whereas in forums every registered member can.

Another valuable functionality when using blogging systems are the creation of permalinks. With permalinks every post gets its own address. As a result, it is possible to link to a specific

³Wikipedia. http://meta.wikimedia.org/wiki/List_of_Wikipedias accessed July 16, 2012.

entry or get informed when other authors refer to an own entry. The latter functionality is called trackback and increases together with permalinks the interconnectedness of different blogs.

Types of Blogs

A majority of blogs are presented in a text-based form. Besides that, other types exist as well. Podcasts, for instance, have similarities with radio stations. The author produces several audio files instead of text entries. Interested persons are able to subscribe to podcasts to get regular updates. The same principles apply to video blogs where videos are the preferred medium for entries.

Microblogs gained high popularity when Twitter started its service in 2006 [Jack Dorsey, 2006]. A microblog differs from a traditional blog especially in the size of blog entries. On Twitter for instance, entries are not allowed to exceed 140 characters.

Blogosphere

The term *blogosphere* describes all existing blogs and their connections between each other. Search engines for blogs such as Technorati⁴ publish the state and development of the blogosphere frequently. The blogosphere comprises of one highly interconnected core, some blogs with less links to others and a lot of blogs which are not connected [Technorati, 2011].

Types of Bloggers

Technorati identifies 5 types of bloggers in their report to the state of the blogosphere in 2011 [Technorati, 2011]:

1) Hobbyist

Hobbyists represent the main group in the blogosphere with 60% of all bloggers. They mainly use their blogs to express personal matters. Furthermore, hobbyists spend only a few hours each week on writing postings and comments.

2-3) Professional Part- and Full-Timers

Members of these two groups account for 18% of all bloggers. In addition, they earn money with their blogs. Nevertheless most of them don't see blogging as their primary source of income.

4) Corporate

8% of all blogs belong to corporate bloggers. Blogging is either their full-time job or they blog full-time for the company they are working for. Corporate bloggers mainly converse about the topics business and technology.

5) Entrepreneurs

Entrepreneurs represent 13% of the blogosphere. The bloggers mainly use their blog for representing their expertise and for attracting new clients.

⁴Technorati. <http://technorati.com/> accessed July 16, 2012.

2.3.6 Content Communities

The term *content community* is not very common in social media research. Kaplan and Haenlein use the term for applications that allow sharing media content with others [Kaplan and Haenlein, 2010]. Content communities exist for a wide range of different media content: Text (e.g., Bookcrossing), photos (e.g., Flickr), videos (e.g., YouTube) or slideshows (e.g., Slideshare).

Users are usually not required to create a personal profile on content communities. If profile pages are necessary, they contain only basic information about the person.

Content communities often struggle with the issue of copyright-protected content. The platforms have to assure that no protected material is uploaded to their website.

Cheng et al. write in their paper about video sharing on the case of YouTube [Cheng et al., 2007]. The authors differentiate video sharing sites such as YouTube and its competitors from traditional video servers and peer-to-peer file downloads. The latter platforms make it difficult for users to discover new content because the videos are not connected to other clips. YouTube on the other hand gives users the possibility to upload and tag their own videos easily. In addition, users can comment on the content which adds a social context in hosting media.

2.3.7 Social Networking Sites

Social networking sites are very popular among Web users. The biggest social networking site is Facebook which was founded in the U.S. [Kaplan and Haenlein, 2010]. People spend the most time online with social networking. The activity is popular amongst people from every nationality, age, and gender [comScore, 2011].

History

Networks are an important tool in many sciences such as physics, biology, economics or social sciences. The research of networks in social sciences is dated back to the social philosopher Comte in the 19th century. 100 years later leveraged Jacob Moreno existing findings to explain why several girls in a community decided to run away from home.

Kochen and de Sola Pool coined the term *small world problem* in the 1950s. It raises the questions about the probability that two randomly selected persons from a network know each other and over how many acquaintances they are linked to each other. Stanley Milgram extended this theory with his *six degrees of separation*. He states that everyone is linked to everyone else with only six or fewer steps.

Another milestone in social network research was introduced by Granovetter in the 1970s. The researcher emphasized the importance of weak ties which represent acquaintances in social networks. Persons who maintain weak ties are more likely exposed to novel information. Twenty years later, this idea was expanded to the concept of *social capital*. The idea suggests that people who are well connected to other important people have better chances in finding a good job or getting promotions [Borgatti et al., 2009].

Features of Social Networking Sites

Online social networks allow users to create a personal information profile. Profiles can comprise of pictures, videos, audio files or any other type of personal information. Users of social networking sites can declare each other as friends. Furthermore, it is possible to share information or to converse with friends via chat or messaging [Kaplan and Haenlein, 2010]. Groups are a concept which allows users to share content with all affiliated members of the group. Admission to a group can be restricted or open to every member of the social network [Mislove et al., 2007].

Schneider et al. evaluated the features of social networking sites [Schneider et al., 2009]. According to the researchers, users spend more than half an hour per day on the social networking platform. However, during longer sessions are users not continuously active. The most popular features of the investigated social networks were user profiles, downloading photos, and messaging.

Anatomy of Social Networks

Mislove et al. examine the structure of different online social networks in their paper [Mislove et al., 2007]. Their results show that online social networks with directed links exhibit a high link symmetry. A high link symmetry is evident if most of the nodes have directed links in both directions. This phenomenon increases the connectivity within a network but makes it also more difficult to identify important information hubs in the network.

Next, the researchers demonstrate the existence of a power-law degree distribution. The degree of a node is a measure of the number of incoming links and outgoing links. The power-law distribution suggests that most of the nodes within the networks have a small degree, whereas only a few nodes have a much higher degree. Indegree and outdegree appear to be similar for every node.

All of the observed social networks exhibit short path lengths between two random nodes. The path lengths are also significantly shorter in comparison with path lengths in the Web.

Last, the researchers also investigate clustering effects. A cluster is a set of nodes which are densely connected to each other. The examined networks contain many clusters that are composed of nodes with a small degree. The few nodes with high degree act as connectors between the clusters. These high-degree nodes are the core of the network. Removing them would lead to higher path lengths and disconnected clusters.

Marketing Opportunities

Businesses can utilize online social networks for marketing activities. Companies decide whether they participate actively, publish advertisement or observe the communication. Bolotaeva and Cata summarize in their paper research about marketing with social networking sites [Bolotaeva and Cata, 2011].

Social networks can be beneficial for building brand awareness and conducting market research. It is especially important for businesses to observe how their brands are perceived by the audience. Advertising on social networking sites tends to be very cost efficient.

Furthermore, social networks can be used to establish a personal connection with customers. The direct and personal interaction with users can be important for product development and customer feedback. Social network marketing should be well integrated in the marketing mix amongst other marketing channels.

However, business should be aware of the downsides of social network marketing. It is essential that the privacy of users and the ethical and legal issues are respected. Having that in mind, social networks can be a positive momentum in establishing customer relation.

2.3.8 Virtual Worlds

According to Kaplan and Haenlein, virtual worlds score highest in the dimension of social presence and media richness [Kaplan and Haenlein, 2010]. Virtual worlds offer three-dimensional worlds which can be explored with avatars. An avatar is a visual representation of a player. Avatars can interact with each other and with the environment.

Kaplan and Haenlein distinguish between virtual game worlds and virtual social worlds [Kaplan and Haenlein, 2010]. In virtual game worlds are users playing within a given setting according to the rules of the game. Virtual social games have greater similarity to real life where only a few set of rules (e.g., basic physics laws) are stated. Hence, the inhabitants of virtual social worlds do not only interact with the environment but can also change parts of it.

Simulation Games and Fantasy Games

Schultze and Rennecker provide a deeper insight in the topic of virtual game worlds [Schultze and Rennecker, 2007]. They further distinguish virtual game worlds in simulation games and fantasy games. Both require the player to follow a strict set of rules but they differ in the degree to which these worlds are similar to real life.

Simulation games exhibit a high similarity with the reality. The game America's Army for instance, tries to replicate the duties of an American soldier in every detail. The graphics and sound effects are astoundingly realistic. The creator of the game, the U.S. Army, uses the game also to recruit soldiers.

Fantasy games on the other hand feature a less real environment. They are often set in fantasy or science fiction worlds. Players of World of Warcraft for instance, inhabit the Warcraft Universe. Players wander around in the colourful environment with their exotic looking avatars. Massively multiplayer online games (MMOG) as World of Warcraft often have a focus on collaboration. Players need to form groups to accomplish specific tasks.

Virtual Social Worlds

Mennecke et al. argue in their article that virtual social worlds are sub-types of massively multiplayer online games (MMOG) [Mennecke et al., 2008]. Virtual social worlds usually feature an unstructured three-dimensional world which allows their players to interact with the world and with other players. Moreover, users play within an active economy including ownership of virtual and intellectual property. The players are able to exchange services and virtual goods that are created within the virtual environment.

Many virtual social worlds support buying and selling of virtual property. Second Life (a very popular virtual social world designed by Linden Lab) for instance, uses the synthetic currency Linden Dollar for commercial activities. Linden Dollars represent virtual money but can be exchanged to real life currencies at a floating exchange rate.

Second Life

The previous mentioned researchers Kaplan and Haenlein wrote another paper about the business opportunities with virtual social worlds in general and Second Life in particular [Kaplan and Haenlein, 2009]. Among all virtual worlds, Second Life is special in number of players and set of rules. Residents – as Second Life players are called – hold all rights to their created content. Hence, they are allowed to sell virtual created content to other residents. This creates a virtual economy which is connected to the real economy through currency exchange.

The virtual economy made it especially interesting for companies to join Second Life. Kaplan and Haenlein identified five opportunities for companies [Kaplan and Haenlein, 2009]:

- **Advertising/Communication**
Similar to real life, companies have several alternatives to run their advertising campaigns in Second Life. The traditional billboards are available as well as the possibility of sponsoring events. Furthermore, companies can build a flagship store to exhibit their real life products. All these efforts have the goal to attract the attention of potential customers.
- **Virtual product sales**
In addition to the exhibition of real life products, companies can sell services and virtual products within the game. Other companies aim to bridge virtual and real life with buying products within Second Life and deliver them to the customers in real life.
- **Marketing research**
Second Life provides many possibilities for market research. First, companies can perform quantitative questionnaires to a lower price than in real life. Second, businesses can test the reaction of potential customers to new products which is less expensive than test market analysis in real life. Some companies go one step further and involve the residents in the creation of new services and products.
- **Human resource management**
Second Life can also be used in the context of human resource management. One possibility is to organise recruiting events to attract potential candidates. Nevertheless, virtual recruitment should only be used in addition to traditional recruiting because for the company it will be crucial to know what person is behind the avatar.
- **Internal process management**
The visual representations of avatars in Second Life gives corporations the opportunity to hold business meetings within the game. Similar to phone- and video-conferencing, employees are able to meet and discuss in the virtual space.

2.4 Social Media Marketing

Consumers are not the only group that is interested in social media. Since the introduction of the World Wide Web and social media, companies try to leverage uprising opportunities. Many researchers focus on developing successful social media strategies for every type of company. Nevertheless, it is difficult to find and apply a fitting strategy to a company because of the huge differences between existing platforms. The different platforms are treated too often as stand-alone elements. Corporations should instead focus more on an integrated strategy of different social media services and traditional marketing.

Social media changed many existing marketing paradigms because it creates more opportunities to connect corporations with their customers. In a social media context, companies have to focus more on establishing and continuing their relationship with the customer.

Consumers get empowered and expect to play an active role in the media process. In addition, users can influence brand messaging and product development. Keeping track of the opinions of their customers should always be the focus of companies. Social media is just one way to accomplish that with a reasonable amount of resources [Hanna et al., 2011].

In the following sections, I will picture the social media marketing process in greater detail.

2.4.1 Analysis

Before engaging in social media, an analysis of ongoing discussions is necessary. Companies' products and services will be a topic even without an active participation on social media platforms.

Companies can get insights in conversations among customers via Web monitoring. Web monitoring is a tool to identify which platforms customers use to express their opinion about products and services. This analysis will give corporations knowledge about how customers are perceiving them.

Web monitoring can be done in-house, simply by searching for keywords at social media platforms. This will probably cost a lot of time and effort. An alternative is using commercial social media analysing tools or hiring a professional agency [Kreutzer and Hinz, 2010].

2.4.2 Topics of Interest

The goal of social media marketing is to establish a long-lasting relationship to current and potential customers. Social media can help to build up trust and loyalty towards the corporation. Kreutzer and Hinz list several topics companies should focus on [Kreutzer and Hinz, 2010]:

- User traffic
Businesses need to offer interesting and up-to-date information on their social media presences in order to increase the number of visitors to their site. Competitions and unique offers will attract further users. Links from one social media platform to other platforms will increase traffic on those sites as well.
- Brand awareness
The more people talk about a specific brand, the more familiar the customers will get with

this brand. Social media platforms can be used to spread information. Users will share this information with their friends if it is interesting enough. This leads to a broad reach and higher brand awareness.

- **Ranking on search engines**
Social media sites are usually ranked very high within the results of a search engine. Therefore, the presence on different social media platforms is an easy way to be listed within the top results.
- **Image management**
Participation on social media platforms gives companies the possibility to form the perception of their brand. Businesses can react quickly on emerging problems when they listen carefully to their customers.
- **Customer retention**
Social media offers the opportunity of unique conversation channels with the customer. For instance, businesses can offer customer service via social media platforms. Companies can increase their social value with every social media activity which leads in succession to a high brand value.
- **Innovation management**
Companies are able to include customers in the process of developing new products and services. On social media platforms have users the possibility to comment on new innovations or contribute their own ideas.

2.4.3 Challenges

Participating in social media is not that easy as it looks like. Corporations face different challenges in order to get positive results.

Companies often underestimate the effort which is necessary for sustaining a social media appearance. If there are not enough resources available, companies should focus on simple Web monitoring.

Most businesses do mistakes at the early stage of creating a social media appearance. Establishing a profile on a social media platform is very easy. But before that, companies should develop a strategy on where and how to engage with the audience. If the customers are not satisfied with the services provided by the company, it can have negative effects.

A very important step is to nominate a person or a team that is responsible for all social media activity. These employees need to be competent in marketing and public relations and be affine with the social media landscape.

Besides the content, companies have to decide on the intensity of communication as well. Users usually get informed on every update. If companies are updating too often they will lose the attention of their friends and followers.

Another challenge regarding social media is that the opinion of customers is never stable. News and comments spread fast in the network because people are highly interconnected. Hence, users influence other users and the sentiment towards a company can change rapidly.

This means that companies have to act quickly when negative messages arise in order to avoid negative effects.

The same problem is evident if companies are communicating wrong facts or if companies are committing mistakes. News about failures will spread quickly in the network and can affect the company's image negatively [Kreutzer and Hinz, 2010].

2.4.4 Measure Success

The success or failure of social media effort depends on the platform and tends to be difficult to measure. To some extent are the same methods as for evaluating online advertising and corporate websites valid. The amount of traffic on the site is a basic indicator of popularity. In addition, it should be measured how long the customers stay on the page and how often they return.

Another measure regards the reach of social media activity. It quantifies how many users consume the information via the official appearance of the company and how many users share the information.

Conversions and transactions should be observed as well. The first measure indicates how many viewers of the company's appearance transform into interested customers (e.g., become fans, subscribe to the newsletter). The second measure is used to monitor how many transactions (e.g., number of orders) are performed by customers after the start of a new marketing campaign.

Companies should always monitor not only quantitative but also qualitative measures. For example, criticism of a company can result in high quantitative measures. However, the negative sentiment of the conversation will damage the image of the company. Hence, it is essential to listen to customers and how they feel about the company [Kreutzer and Hinz, 2010].

2.5 Behaviour Guidelines

Kaplan and Haenlein provide a set of behaviour guidelines for companies using social media [Kaplan and Haenlein, 2010]. The generic guidelines are not targeted towards a specific social media platform but can be applied for different types of platforms. The first five points address the media aspect of social media:

- **Choose carefully**
The huge amount of different social media platforms makes it necessary for companies to choose wisely which platform they wish to engage themselves with. According to the results of the market analysis, a platform should be chosen where the targeted users can be found.
- **Pick the application, or make your own**
Usually companies use an already existing social media platform for their activities. Nevertheless, in some cases own applications are developed. In both cases it is important to understand what social media is about and what the audience is interested in.
- **Ensure activity alignment**
Companies often decide to get active in more than one social media platform. In that case it is necessary to align the activities on the different platforms with each other.

- **Media plan integration**
Traditional media and social media are two different fields for the company. The customer sees them both as part of the company's image. Therefore, it is important to have an integrated strategy for both traditional and social media.
- **Access for all**
A successful social media campaign ensures that all employees have access to the corporate social media appearance. Sometimes only a group of employees has the right to add content but everyone should be at least able to read updates.

The next five points address the social aspect in social media [Kaplan and Haenlein, 2010]:

- **Be active**
Sustaining a social media appearance costs a lot of time and effort. It is fundamental to engage in discussions and respond to comments of customers. The content which is shared should always be up-to-date.
- **Be interesting**
Popular companies in social media are posting interesting pieces of information. Therefore, it is necessary to listen to the audience carefully and analyse what is to their liking.
- **Be humble**
Every social media platform has its own rules of how users interact with each other. For a company it is important to discover those rules before they get active.
- **Be unprofessional**
Despite the previous given advice, companies should still be authentic and a little bit unprofessional. It is not necessary to hire a professional writer. It is recommended to let regular employees add content because they are perceived as more genuine.
- **Be honest**
It will damage the image of the company if overly positive comments are written by anonymous accounts. Those accounts will be immediately suspected as employees of the company. Therefore, it is better to be honest and also allow negative comments from the community.

2.6 Social Media Concerns and Criticism

Social media platforms have to face different concerns and criticism. Especially popular sites have to deal with controversies. Below I provide a non exhaustive list of issues that social media platforms have to handle.

2.6.1 Privacy and User Rights

Social media platforms often store huge amounts of personal data of users. This data is valuable and can be sold to third parties.

The terms of use and privacy policies of social media platforms are often too long and written in a judicial language. This makes it difficult for users to understand the meaning of the text. Furthermore, policy changes are often not communicated on a popular place.

Especially users which are not Web affine face disadvantages. They do not know how to change complex privacy settings or opt-outs for advertisement.

Another problem is the lack of democracy. Users of social media platforms are usually not allowed to participate in the formulation of policies. On the other hand corporate social media platforms are collecting user generated content in an exorbitant way [Fuchs, 2011].

Protecting the own social graph is a privacy issue in social networks. This addresses the problem that third parties can have access to personal data via friends' profiles. Knowing the friends of a user can also be valuable information for marketers, employers or insurers [Bonneau et al., 2009].

2.6.2 Cyberbullying and Stalking

It is called cyberbullying if offenders use the internet to harm people. This problem is especially significant among teenagers. A survey from Walrave and Heirman claims that one third of the asked minors already experienced cyberbullying and one fifth was involved in perpetration [Walrave and Heirman, 2011]. Furthermore, most offenders and victims are heavy Internet users.

Cyberbullying is also associated with stalking. A stalker is someone who is obsessed with another person. Besides other technology, social media platforms provide new possibilities for stalkers to track their victims. Social media appearances are often used to gather information or post damaging information about the victims.

The most common way stalkers harass their victims is through constant contact. Social media applications are one way to find the victim online and send multiple private or public messages. In this case, stalkers benefit again from the anonymity in the Internet.

Hence, it is very important for social media users to carefully read and adjust privacy settings. This will help to prevent access to personal information from stalkers [Fraser et al., 2010].

Cultural Institutions Using Social Media

Social media is already part of many people's daily routine. This phenomenon affects the communication of museums fundamentally. Cultural institutions have the chance to actively participate in conversations and leverage arising opportunities.

Communities use social media platforms which are not under the museums' control to converse about their topic of interest. Hence, the online appearance of a museum is not solely determined by their official website alone [Proctor, 2010].

This section of my master's thesis will shed light on the opportunities and challenges museums face when using social media applications.

3.1 Museum 2.0

The term *museum 2.0* was coined by researcher and blogger Nina Simons¹. She compares the changes in museums to the changes of the Web (see Chapter 2.1.4). Traditional museums are content distributors and use one-to-many communication. Modern museums on the other hand involve their audience and participate in a many-to-many communication.

The requirements for museum 2.0 institutions are similar to the requirements for Web 2.0 applications [Simon, 2006]:

- Venue as content platform
Traditional museums act as content providers where interested persons are viewers. The idea of a museum 2.0 is to emerge to a content platform where people can contribute and share their own ideas.
- Architecture of participation with network effects
A product shows a network effect when it improves with every additional person who uses

¹Museum 2.0. <http://museumtwo.blogspot.co.at/> accessed July 24, 2012.

it. A museum examines the same effects when people start to converse about the museum or its samples. Web 2.0 platforms foster the communication between strangers and give museums the opportunity to raise attention.

- Perpetual beta
This point is very difficult to accomplish for museums. It means that exhibitions would be already open to public before they are completely finished. During and after the show, the exhibition is still developing.
- Flexible, modular support for distributed products
This definition of Web 2.0 has the least application to museums. It would allow third parties to utilize museums as platforms for their own projects. Museums can allow that in a limited way for instance for cafes or day-care facilities.

3.1.1 Why should Museums care about Social Media?

As already mentioned, it will be impossible for museums to refuse social media and Web 2.0 completely. Museums are already a topic in online conversations. Leveraging the opportunities of Web 2.0 would allow museums to provide richer and more relevant content for the consumer. Ellis and Kelly emphasize the importance of social media for museum practice [Ellis and Kelly, 2007].

The authors point out that museums own a lot of valuable items. Furthermore, they have access to specialists in various fields. This knowledge is often considered to be niche content. Web 2.0 applications can facilitate interaction and bridge the gap between museums and people.

Social media can also be important for marketers. A broad reach can be achieved with little effort. Enthusiasts will spread the information within their networks which might offset a snowball effect. Hence, more people get in touch with the museums content.

Simon remarks in her article one more important reason for museums to care about social media [Simon, 2009]. In the 2000s the Web was all about search. For museums it was important to maintain websites where interested persons can find information about the institutions. With Web 2.0 technologies the Web is less about search and more about social context. This means that users get access to information through their personal online networks. Hence, museums have to use the same communication channels as their audience in order to reach them.

3.1.2 Organisational Change

The shift to a more open and participative museum requires several organisational changes within the museums. Kelly gives some advice for museums in her article [Kelly, 2009].

First of all, the content has to be easy to discover and challenging for the visitor. The employees of museums have to know the content to answer questions from visitors. Furthermore, the institutions should provide opportunities for socialisation among interested persons.

Social media is one possibility to reach those goals. To do so, the organisations themselves need to take some risks when engaging in social media. The museums will lose some power over the provided content when users start to add their own ideas. The cultural institutions need

to observe the dynamics carefully to be able to learn from them and react quickly. Organisations should focus on establishing new communities around their institutions. This requires the museums to actively participate and encourage people to form connections and networks.

The above points are important for every employee of museums and it is crucial that everyone supports the new directives. Proctor gives in her article deeper insight into the work of curators [Proctor, 2010]. Curators are a specialists who are using their expertise to assemble exhibitions. Curators are creating knowledge with their work. Social media encourages ordinary visitors to engage in this process with commenting or adding content. Hence, curators can leverage this user generated content and add it to the project. This means that the experts are rather storytelling than producing knowledge.

Curator need a special set of skills for accomplishing the new requirements. Not only expertise in a specific field is demanded but also creativity and educational capabilities. The experts should be familiar with Web 2.0 technologies and their rules. Furthermore, curators have to communicate with people within networks and leverage their ideas.

3.1.3 Needs of Museums

For a successful social media strategy it is important to know the needs of museums first. Wilde and Mann write in their paper about collaborative development of applications [Wilde and Mann, 2010]. The authors list several requirements for museums in their paper. Museums need to take the requirements into consideration when deciding whether to engage with social media:

- **Collections**
The collections of a museum characterise the institution. The items within the collections are usually rare and valuable and of particular interest for the public. As a consequence, museums should make their collections publicly available.
- **Education**
Museums are aiming to educate their audiences through exhibitions. Interested persons visit those exhibitions to learn something about a specific topic.
- **Profit**
A lot of cultural institutions work as non-profit organisations. Nevertheless, it is crucial for every institution to make profit. Therefore, museums need efficient financial management and marketing strategies.
- **Events**
Museums host both exhibitions and independent events. The events have to be scheduled and organised which requires a well-performing event management.
- **Technology**
Cultural institutions usually lack both material and human resources. This situation hinders investment in new technologies. Therefore, museums need to identify and leverage available resources.

- **Mission**
Museums have mission statements which are usually depending on their core collections. Cultural institutions need to clarify if an appearance in social media is in line with the their mission.

3.1.4 Expectations from Users

The expectations people have towards museums were already partially discussed in this thesis. In this section I want to give a summary of the user requirements. Smith explores in his article user expectations towards museums and their online presence [Smith, 2008].

Generally speaking, users expect a higher degree of interaction between them and the museums' online presences. They want cultural institutions to listen to their ideas and engage in many-to-many conversations. Users want to feel valuable for museums and want to be remembered every time they visit online presences.

Furthermore, users have explicit expectations toward the provided content. They demand both interactive features and content in various formats (e.g., video and audio). With an increasing number of mobile devices, the content should be conveniently accessible via mobile phones and tablets as well.

Users have the desire to add their own content to the museums' Web presences. This includes the possibility to comment on articles, ask questions to the staff or other experienced users, tag content, and create and manage their own content. A lot of users are very creative and want to share their achievements with other interested persons. They expect museums to provide the platform for it and appreciate their effort.

3.1.5 User Participation

Stages of Social Participation

Modern museums have to provide possibilities for user participation in order to attract and bind further audiences. Before achieving the highest stage, it is important to understand all levels of user participation. Simon suggests in her articles five stages of social participation (see Figure 3.1) [Simon, 2007] [Simon, 2010]:

- **Stage 1**
At this stage, consumers enjoy the content of exhibitions or online presences. Visitors are only passively consuming and no interaction with the institutions or other visitors is evident.
- **Stage 2**
If the content of stage 1 is interesting enough to consumers, they will start to interact with it. For instance, museums can give visitors the opportunity to play exhibition items or tag them online. Even though consumers interact with the objects, there is still no interaction between other visitors or the institutions themselves.
- **Stage 3**
At stage 3, cultural institutions allow their visitors to explore interactions of other visitors

social participation via me-to-we design

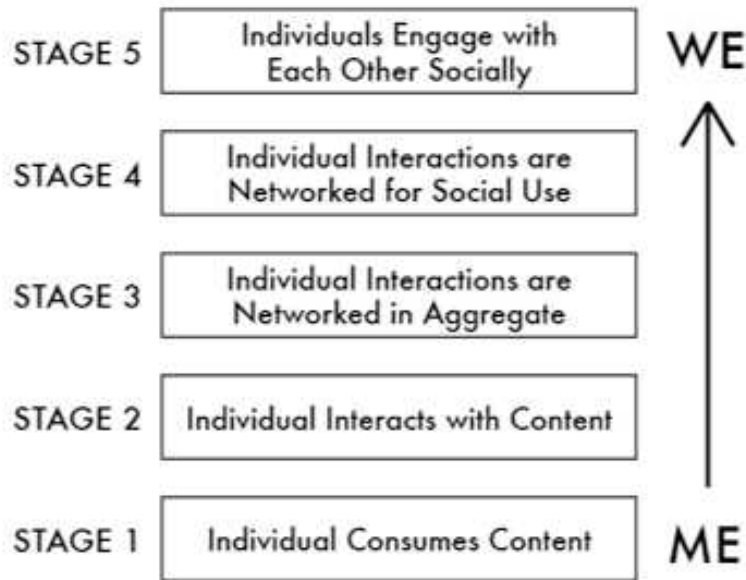


Figure 3.1: The figure shows how cultural institutions can support social engagement among their audience. Museums start with providing content for consumers, then interlink users via shared interests and finally provide a social space where people freely connect with others [Simon, 2010].

with the content (as described in stage 2). For example, users can see tags or votes on items of other users. This gives visitors a first feeling of connectedness to other participants.

- Stage 4
Users still interact with the museum content at stage 4 but now they can comment on the interactions of others as well. Platform provide opportunities for users to connect with likeminded people. Hence, visitors are interlinked with each other via the content.
- Stage 5
At the last stage, users form communities where they are encouraged to discuss the content and topics beyond. Finally, visitors interact both with the content and with other visitors.

Design for Participation

One question which probably arises when studying Simon's stages of participation [Simon, 2010] is how curators can design an exhibition which encourages participation. Salgado summarizes some design options in her paper [Salgado, 2008].

First of all, the topic needs to be chosen carefully. Depending on the theme of the item and the overall exhibition, participation can arise or not. Presentation of items is another crucial factor for participation. Visitors need to see how they can contribute and what this potential contribution might lead to. Furthermore, users should have several opportunities to add content such as leaving a written comment or a video clip.

Accessibility to both the content and the interaction features are another important point to consider. Museums have to assure that disabled or inexperienced visitors have the possibility to participate. Especially the different levels of visitors' Web literacy should be taken into account during design.

3.1.6 Challenges and Concerns

So far it should be evident for the reader that social media can be an opportunity for museum practice. Nevertheless, some institutions still hesitate to engage with social media. In this section I will list some concerns the organisations have.

Online Authority

Cultural institutions were used to practice one-to-many conversations where they have the power to control released information. Social media is changing the way of communication to many-to-many conversations. Visitors use the technology to add their own thoughts and ideas to the museums' content.

Simon suggests museums to emerge to platforms which provide users the opportunity to have a unique experience with the museums' content [Simon, 2008]. The operation of a platform will give an organisation several powers to control information:

- Rules of behaviour
Museums can set rules for participants to follow. Hence, platforms have to some extent control over the type of content users can contribute. Rules can be stated with statements that users have to accept when signing up.
- Use of user generated content
Platforms have to declare in their terms of use to whom user generated content belong. For instance, museums can claim the ownership of user generated content and use it for their benefit (e.g., within a exhibition).
- Promote and feature preferred content
Platforms are able to feature outstanding contributions on their front page. This allows museums to exhibit valuable user generated content and form the behaviour of the community. Furthermore, it will reward certain users and spur other users to contribute as well.
- Define available interaction
Every platform offers a specific set of possible interactions. These interactions (e.g. contact other users, rate items, create exhibits) have a great influence on the behaviour of the community. Cultural institutions have to consider carefully which features they provide.

Legal Issues

Cultural institutions have to think about arising legal issues regarding provided content. For instance, when visitors of museums take pictures or videos of artworks and publish them later, they probably violate the copyright of the artists. On the other hand it is not feasible to prohibit cameras or phones within the exhibition space. One solution is to make an agreement with the owner of the items which includes pictures and videos done by private persons for their own use.

The same principles apply if cultural institutions upload content to their own website. Showing pieces of art on a website is a type of publishing and should be only done if all legal issues are settled with the artists.

If museums upload content to third party platforms they should pay attention to their general terms and conditions. Some platforms retain the right to use the user generated content in every way they see fit. This could lead to further publishing of the content and can be only done by museums if the artists agree [Minder and Vogelsang, 2011].

Institutional Structures

The use of social media tools will have an impact on existing working procedures within the museums. This will be a challenge for the internal structure in general and every employee in particular.

Especially institutions that are owned by the public often encounter resistance. Public authorities usually have a conservative attitude towards technological change. Further problems can arise if the IT department blocks specific social media sites because of security or other concerns.

Finally the museums have to define who is responsible for the social media presence. Social media is usually seen as another marketing tool which would put the marketing department in charge. Nevertheless, a successful and authentic presence can only be achieved if employees from other departments contribute as well [Minder and Vogelsang, 2011].

Lack of Resources

Most of the museums do not have a budget for social media initiatives. Some of the expenses can be covered by the budget for public relations. Nevertheless, an explicit effort is necessary for maintaining a successful social media presence.

Even if the budget is settled, museums require skilled employees who maintain the social media presence. They should understand the rules of the medium and be able to moderate discussions.

A possible solution to overcome those problems is to use the communities themselves. For instance, some tasks can be outsourced to motivated and trusted members of the communities [Minder and Vogelsang, 2011].

3.2 Social Media in Museums' Practice

In this section I summarize some opportunities for cultural institutions to leverage social media regarding the museums' practice. Possible strategies stretch from audience research and building a community to allow visitors to tag content. Social media can have an impact on how visitors experience collections and even on the development of exhibitions.

3.2.1 Audience Research

For cultural institutions it is vital to know their audience. Audience research provides statistics and benchmarks for museums. Those numbers give an insight on how to improve visitor numbers and interaction with stakeholders [Alexander, 2008].

Furthermore, audience research provides the institutions with knowledge about visitors. In the past, this was primarily done via focus groups. Focus groups are a very costly in terms of time and money. Social media offers another way to connect with both potential and actual visitors besides traditional audience research. Jensen and Kelly examine in their research the possibilities of Blogger and Facebook for audience research [Jensen and Kelly, 2009]. Social media platforms ensure a two-way communication with the audience. Whereas the blog posts are frequently read by users, the users hardly ever leave comments. Facebook users on the other hand join discussions more often. Overall the social media tools help the researchers to get to know their audiences' expectations and opinions.

3.2.2 Building a Community

The next step after knowing the audience is to support the creation of stable communities with the museums as the main topic. It is important to get valuable input for the museums' practice. Building communities is a delicate task and above all needs time and engagement.

Jensen and Kelly suggest three stages for building vital online communities [Jensen and Kelly, 2009]:

1. Invite people

In the beginning it is necessary to spread the word about the museums new social media presence. Emails to interested persons are a first attempt to direct attention to the site. Links from other online presences can have an effect on visitor numbers as well. People who are already members of the community should be regularly encouraged to invite more people from their own online networks. Above all, it is important to allow everyone access to the platform. Especially users with little Internet literacy should be educated on how to interact with the social media presence of the museum.

2. Keep posting ideas

It is vital to keep posting interesting pieces of information on the social media platform to maintain the interest of the community. Ideas formulated as questions will encourage users to join a conversation with each other and the museum.

3. Use the community

Finally, the community can be used to contribute their own ideas. A vital community will converse about their opinions and expectations towards the museum. They comment on posts and add their own content. All these points can be valuable for the museums for both market research and exhibition development.

3.2.3 Exhibition Development

Exhibition development contains both previously described points: audience research and building a community. To curate an exhibition with support of social media tools it is necessary to know the audience and stir enthusiasm around the topic.

Kelly and Jensen state in their papers that the potential audience should be involved in the planning of the exhibition right from the beginning [Kelly, 2009] [Jensen and Kelly, 2009]. Interested persons can read status updates via frequent blog posts. Social networks invite the users more to start discussions and contribute to existing conversations.

As soon as a vital community is established, users can be encouraged to contribute to the exhibition development process. Museums have several possibilities to involve their audience including rating and tagging items and adding user-generated content. The opinion of the audience about objects can be a substantial contribution to the exhibition. Furthermore, user-generated content can complement existing exhibits.

3.2.4 Tagging Content

Shirky points out some problems with traditional categorisation schemes in his article [Shirky, 2005]. Especially large, not homogenous collections are difficult to categorise. For the cataloguers it is hardly possible to foresee future categories. Furthermore, users have maybe a different method to describe items.

Tagging is another approach to categorisation. Users are encouraged to manually add keywords to digital items. The users' annotations are not observed by an authority. The tags will group the items together and form an organic categorisation scheme. Users are motivated to add tags if their annotations are instantly visible. Furthermore, an easy user interface is vital for the success of the tagging system [Voss, 2007].

Shirky describes tagging as a simple and low cost alternative to traditional categorisation which is done by specialists [Shirky, 2005]. Tagging will give the system the opportunity to recommend other categories to users based on the given tags of others. Furthermore, the categories will stay dynamic and always up-to-date.

Tagging for Cultural Institutions

Tagging systems can be very valuable for museums as well. It is an opportunity for cultural institutions to enhance their online collections.

Traditionally, curators of a collection document the objects according to internal guidelines of museums. Cultural institutions act as authorities which define the affiliation of items.

Social tagging is another way for museums to document their collections. Users are invited to assign keywords to the museums' objects online. Those keywords probably differ from the curators perspective, but will give museums an insight on how their visitors perceive their collections. The added annotations from users allow the system to process broader queries. This will improve the public access to collections [Trant, 2009].

Motivation for Tagging

Leason and her team conducted a survey to examine the expectations and motivations of visitors towards tagging [Leason and steve.museum, 2009]. The majority of participants of the survey tried tagging because they wanted to experience art tagging (> 90%). Furthermore, some were interested in tags other users assigned to objects and they wanted to explore new objects (~35%). Only a few visitors wanted to see what new art is available, search the system for objects similar to ones they saw before, or see tags they assigned themselves (~10%).

The next question the team asked the participants of the survey was why they assigned tags. Most of the users wanted to help the museum documenting their collection (~70%). Other motivations included improving the search for other visitors, to learn about art, or just for fun (~50%). A minority of users tagged art because they wanted to find objects later again, or to connect with other users (~10%).

3.2.5 Museum Learning

Theory of Learning

Learning is considered as the impact an experience has on a person. The individual who is learning can make those experiences alone or within a community. Museums offer an environment for rich learning experiences. Hence, museums are venues where people go in order to learn about topics of interest [Kelly, 2007].

Museums are especially credited for being places for rich informal learning. Informal learning is the first type humans use after they are born. It is neither organized nor structured. Informal learning is characterized as being experimental and spontaneous. This type of learning occurs when people watch documentaries on television, converse with other people or visit an exhibition in a museum [Ainsworth and Eaton, 2010].

Social Media and Learning

The opportunities for cultural institutions to become venues for informal learning are not restraint to the physical building. Social media tools allow interested people to prolong the learning experience besides their visits in the museum. Various social media platforms can be used for providing a participative learning experience where people can converse about topics of interest [Russo et al., 2008].

Kelly argues in her paper as well that museums should leverage the opportunities of social media in order to provide more places for informal learning [Kelly, 2009]. She emphasizes that social media is free of choice, has many entrance points, is user-controlled, and used for

leisure, entertainment and learning. Furthermore, experiments and participation is allowed and encouraged. All this points qualify social media as a tool for informal learning.

3.3 Social Media Tools

In the previous sections I described how social media can be included in the museums' practice. In the following sections I focus on different social media tools.

3.3.1 Digital Collections

Dawson focuses on digital collections in his research [Dawson, 2010]. Digital content can be either digitally created (e.g., e-books, digital music, digital graphics) or digitalised (e.g., digital representations of tangible objects).

Cultural institutions have to consider several aspects when providing public access to digital collections. First, museums need the permissions of the artists if the items are under copyright. Furthermore, maintaining digital collections demand further efforts to select, catalogue, and describe the items adequately. Hence, digitalisation should be a long-term project within the institutions.

The process of digitalisation can be supported by appropriate partner institutions. This would help museums with early experiments and lead to a successful implementation.

In reference to Dawson, five motives exist for cultural institutions to provide digital collections [Dawson, 2010]:

- **Access and use**
Some cultural institutions consider their collections as public goods. Digitalisation of the collection should improve access and use for interested persons.
- **Digital preservation**
The aim of digital preserving an object is to save a copy from the object. This will ensure long-term access and conservation of the item.
- **Cyberinfrastructure**
The main purpose of creating a cyberinfrastructure is to facilitate and encourage research and learning. Cyberinfrastructure can be seen as a competitive advantage for economies.
- **Commercial content**
One motivation to provide digital collections is for commercial reasons. This implies that the access to the digital collections is only granted for paying customers.
- **Social content**
User generated content is characterising the last category. Users upload and share their own digital objects for social motives. Institutions can participate on those platforms and share their own content as well.

3.3.2 Blogs

Museums can use blogs to regularly inform their audience about ongoing work and exhibitions. Blogs are easy to set up and cheap in maintenance. Blogs can be about either the museums' work in general or specific projects in particular. One benefit of blogs is that they can attract further visitors who discover the content via search engines.

Chan and Spadaccini examined the state of the museums' blogosphere in 2007 [Chan and Spadaccini, 2007]. Their conclusion is that blogs already became important communication platforms. The most successful blogs focus on delivering specialized and high quality content to their audience. Most of them encourage user participation through commenting on articles. Furthermore, it is necessary for successful blogs to provide more than just marketing information. The museums' blogosphere in general is very much interlinked with each other with more than 80 percent of bloggers link to other museum blogs.

3.3.3 Collaborative Projects

The collaborative nature of wikis provides many opportunities for cultural institutions. Museums can use wikis both for involving their audience and internal processes [Bowen, 2008] [Stein and Bachta, 2010] [Tunsch, 2007].

Museum Wikis

Museum wikis are one possibility to facilitate the cooperation between interested persons and the institution. The wikis will invite users to contribute their ideas and knowledge about topics of interest.

For successful museum wikis, the same rules apply as to every other wiki. Before starting with the implementation, the institutions should carefully considerate whether the wikis will have benefits for the community and what topics they should cover. Then, museums should announce a person or a team that will populate the wiki with articles in the beginning. The next step is to invite users to contribute and start building communities. Wikis should allow access from as many people as possible in order to gain popularity. Therefore, the institutions have to consider whether the wiki is writeable for everyone or just for registered users. The museums will be responsible for the hosted user generated content. Hence, museums should install regularities to prevent misuse [Bowen, 2008].

Internal Use

Museums' websites often provide a big amount of information. Especially websites that host digital collections need additional content (e.g., metadata about the object, historical background) added by professionals. Those professionals are seldom computer literate.

Stein and Bachta suggest in their paper how a wiki system can overcome this problem [Stein and Bachta, 2010]. Wiki systems can be the solution when they supplement the content management systems of the museums' websites. The markup syntax of wikis is easy to understand for ordinary computer users. Furthermore, wikis allow collaborative content creation of many

users. On wikis, everyone is allowed and encouraged to add or change content on every page. Wiki allow managing the structure of information.

On the other hand, wikis usually do not allow sophisticated graphical representations of content. Content management systems can overcome this insufficiency. Furthermore, content management systems offer opportunities for permission management.

In conclusion, the researchers suggest using desired features of both wikis and content management systems to support maintenance of dynamic and rich websites.

3.3.4 Content Communities

Content communities offer the opportunity for museums to upload and host their own content (e.g., photos, videos). Platforms such as Flickr for pictures or YouTube for photos provide features for both uploading and interacting with the content.

Alexander et al. examined professional YouTube channels of five different museums [Alexander et al., 2008].

The researchers classify the hosted videos in three types agile, adaptive, and traditional. A small amount of videos were of the agile type which means that they were produced within a small time frame and little staff (e.g., walk through the collection). The majority of videos are adaptive. Adaptive videos require more pre-planning and are refined in a post-production (e.g., artist in action). The traditional type includes videos which are professionally produced. A lot of preplanning and resources are necessary. This kind of videos is more often hosted on the museums' websites than on their YouTube channels.

According to the researchers, most videos are produced for promotional and archival purposes. Some other videos feature interviews with artists and employees or demonstrations and presentations.

Community interaction was another point that the researchers measured. Every video out of 174 videos on 5 channels got 4 comments on average. The majority of video responses (42 in total) were conducted by one single user. Hence, the conversation amongst users was not that active as hoped. Furthermore, only a few videos gained popularity among the community and only one video exceeded 100.000 views.

In conclusion, the institutions had the impression that their YouTube channels are beneficial for the museum's work and popularity. YouTube provides a chance for museums to reach a broad audience and educate them in another approach.

3.3.5 Mobile Technology

Mobile technology enables new ways to discover content. Many museums already experimented with PDAs within the museum to give the visitor additional information if requested. This can be a good way to explain the collection but usually there are no links to content outside the museum. Past experiments allowed visitors to follow set paths rather than exploring them on their own or sharing their experience with others.

Van Dijk and his team experiment with mobile technology in order to create a richer experience for visitors [Van Dijk et al., 2009]. The researchers developed several location based

applications with the aim to explore Amsterdam. Their focus was on finding new ways to get their audience interested and facilitate participation.

Based on the reaction of the participants, the researchers conclude that the environment of a city offers great possibilities to involve an audience. The participants had no trouble using mobile technology and were eager to take part. In conclusion, mobile technology was proven to be able to reach further audiences and educate them in a new way.

3.3.6 Use of Social Media Tools

Kaul conducted an empirical study to observe which social media tools are used by cultural institutions [Kaul, 2011]. 344 cultural institutions from Germany, Austria, and Switzerland took part in the study. The researcher concludes that only 10% of the participants use social media intensively whereas around 70% percent of the participants use social media just little or not at all.

The most popular social media tools amongst the participants are platforms for information exchange, social networking sites, and content communities. Blogs and collaborative projects are ranked at an average level. Virtual worlds are the least important platform for cultural institutions.

3.4 Trends

Many researchers try to identify trends that museums have to face in the future. Online presence and social media will get even more important for cultural institutions. But not only technical changes will influence museums.

The Center of the Future of Museums summed up challenges that American museums have to face. The researchers identify four major trends and describe how cultural institutions are affected [Chung et al., 2008]:

- **Demographic shifts**
In the future we will face an aging population that is more ethnically diverse. Museums have to adapt to those changes and find creative ways to attract new audiences.
- **Instability**
The future economy is unstable and difficult to predict. Energy prices will be volatile, the threat of a new recession will be omnipresent and wealth will be concentrated amongst fewer people. Museums should remain a stable place where people from different social layers have access.
- **Changing communication technology**
New communication technology will change the behaviour of people. The access to information will get cheaper and more distributed. Museums have to participate in new communication channels in order to remain a viable and trusted source of information for people.

- Focus on individual
Everyone can be an opinion leader and publish his or her ideas on the internet. People will be more creative using existing technology. Museums should provide personalized experience for museum visitors in order to attract visitors.

Reinboth is another researcher who tries to predict the future for cultural institutions [Reinboth, 2010]. In his article he suggests several points that museums should concentrate on in order to operate successfully. The researcher outlines seven assumptions based on talks at the conference 'VII. Rheinischen Museumstag':

- More autonomy
Museums will need more autonomy in order to be able to interact with online media. Participation in online media requires fast reaction which is contrary to the sedate hierarchical structures of many museums.
- Online reach as a success figure
A broad reach and a rich online community should be a desirable goal for museums. Hence, the number of online visitors should be considered as a success figure.
- Loss of privilege of interpretation
Social media allows the audience to be part of discussions. They can add their own knowledge or opinions to the provided content. Therefore, curators and museums' experts will lose their privilege of interpretation.
- Extended museums' collections
Technology allows museums to present pieces of their own collections together with other institutions online. This allows museums to create exhaustive virtual exhibitions regarding specific topics.
- Optimizing of search results
For museums it will be important to be highly ranked within search engines result sets not only when entering their name but also when entering the museums' topics of interest. This can be achieved through search engine optimization and participation in online projects.
- Leverage communities
Communities are holding knowledge which can be important for museums. For example, members of communities can help the institutions to locate mistakes in exhibit descriptions or information texts.
- Virtual exhibitions
3D technology allows recreating physical exhibitions online. But even with this technology virtual exhibitions will not replace real exhibitions because the experience for visitors will be different in the physical environment of museums.

Data Acquisition

In this chapter I want to give an overview over which data I used for my analysis and how I gathered it. The results of my analysis will be presented in Chapter 5.

4.1 Approach

In my master's thesis I analyse social media presences of cultural institutions in Vienna. The museums and social media platforms are presented in detail in the following sections.

I developed a script for extracting the desired data. This program is described in Section 4.4 'Data Extraction'. In the same section I take a closer look on the outcome of the data extraction. In particular, I describe which features of the data I use for my analysis.

I conducted the data extraction on April 8, 2013. The data includes status updates and comments from institutions and users from the beginning of the appearances till the day of data extraction.

4.2 Cultural Institutions

In my master's thesis I analyse data from 32 cultural institutions in Vienna. The analysis of users and timelines is limited to the eight Federal Museums in Vienna which are owned by the Republic of Austria.

The exhaustive list of museums including links to their social network profiles can be found in Appendix A.1.

4.2.1 Austrian Federal Museums

I chose the eight Austrian Federal Museums for the demographic analysis of the users and the posting analysis of the institutions. All eight museums are owned by the Republic of Austria. The list of museums can be found in the appendix in Table A.2.

The legal background for those institutions is defined in the law text 'Bundesmuseen-Gesetz' from 2002¹. The law text states that the cultural institutions are owned by the Republic of Austria to fulfil their cultural and educational policy and scientific duties. Every institution has to serve the public with conservation and presentation of past and present knowledge. Therefore, the museums are obliged to assemble and prepare valuable items for their collection. Those vast collections should be presented to the public to create understanding for the evolution and connections of different phenomena in the fields of sociology, art, technology, nature, and research.

Every museum owned by the Republic of Austria is supervised by the federal minister for education, art, and culture. The cultural institutions are obliged to report to the minister annually. Furthermore, the legislative authority has influence on the curatorship of the museums.

On the other hand the institutions get yearly government aid in the amount of 107.7 million Euros for fulfilling their mission.

4.3 Data Source

4.3.1 Facebook

Facebook is the largest online social network and amongst the sites with the most user traffic worldwide². In December 2012, Facebook counted more than one billion monthly active users and 618 million daily active users³. The vast amount of users alone makes Facebook interesting for various areas of research.

The museums which I am analysing are aware of the significance of Facebook. 28 out of the 32 cultural institutions maintain profiles on the social network and post status updates regularly.

In this section I want to give insights into the success story of Facebook and highlight interesting aspects for researchers.

The network's anatomy

Facebook gives users the opportunity to be part of different virtual communities. Users are represented by virtual user profiles which present individual information about the persons. Users can highlight relationships in compliance with other users by adding other profiles to their own friends list.

Institutions and individuals can create pages and groups. Pages are public profiles which every user can show their interest to. The membership to groups is more exclusive and needs the approval of the group administrator.

A key concept in Facebook is interaction. Users can post personal status updates which can include text, links, and videos. It is possible to tag friends in status updates. Another form of interaction is commenting on posts or expressing sympathy with liking posts.

¹Bundesmuseen-Gesetz 2002. <http://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20001728> accessed January 15, 2013.

²CrunchBase. Facebook. <http://www.crunchbase.com/company/facebook> accessed February 2, 2013.

³Facebook. Key Facts. <http://newsroom.fb.com/content/default.aspx?NewsAreaId=22> accessed February 2, 2013.

The newsfeed is the central hub where all the information from a user's community is aggregated. The feed displays updates from friends, pages, and groups in reverse chronological order. Furthermore, users have access to personal event calendars.

Facebook provides different ways of communication for their users. Private messages can be sent to friends and most recently even to all Facebook users⁴. Wall posts are less private messages which will be visible to friends of the addressee as well. The simplest type of messages is to poke a friend which basically is the equivalent to say 'Hi!'.

Besides the already mentioned features, the Facebook Platform is one of the reasons for the success of the social network⁵. The Facebook Platform allows third parties and their applications access to the network, thus providing additional features for users.

History

Mark Zuckerberg founded Facebook as an exclusive online social network for Harvard Students. Due to its success among Harvard students, the network expanded rapidly to various colleges in the US. Sean Parker, a cofounder of Napster, assisted the young team in the beginning.

In the following year, Facebook grew further and finally opened registration to the network to everyone with a valid email address. During this first period of growth, various companies tried to acquire Facebook unsuccessfully. The young company only allowed investments from selected business partners.

In 2012, Facebook went public and started to trade shares on the NASDAQ. At this moment, Facebook is amongst the most valuable US Internet companies and the network is still growing⁶.

Research Areas

As Facebook is connecting millions of people, it makes it a valuable source for different research areas. Wilson et al. searched for published literature concerning the social network to summarize in a review [Wilson et al., 2012]. The authors categorize papers into five categories:

- Descriptive analysis of users

Descriptive analysis describe the people using Facebook and how they behave. The authors refer to two studies published by the Facebook research team that show how users are connected to each other (see [Ugander et al., 2011] and [Backstrom et al., 2012]). The researchers focused on the anatomy of the network and calculate that every user is connected to 214 friends on average in the US. The distribution of number of friends appears to be curvilinear and highly skewed. Hence, 20% of users have 25 friends or less, the median friend count is at 99 and only a few users reach the possible maximum of 5000

⁴Facebook. Sending a Message. <https://www.facebook.com/help/326534794098501> accessed February 15, 2013.

⁵CrunchBase. Facebook Platform. <http://www.crunchbase.com/product/facebook-platform> accessed February 2, 2013.

⁶CrunchBase. Facebook. <http://www.crunchbase.com/company/facebook> accessed February 2, 2013.

friends. Most of friendship connections are with people from the same age and nationality. Furthermore, the researchers discover that 92% of users are connected by only four degrees of separation.

- User motivations

Wilson et al. divided the articles concerning user motivations in two subcategories [Wilson et al., 2012]. The smaller amount of researchers focus on the external pressure on nonusers and users to participate in Facebook related activities. The majority of researchers examine internal motivations. Facebook is first and foremost used for keeping in touch with friends which will increase the social capital of the individual. The network helps to fulfill the users' desire to monitor other members in the personal surroundings and maintain connections with them. This could also help to reduce solitude of individuals. Contrariwise, loneliness tends to increase if users merely passively browse through the content and abstain from interaction with others. Another reason for people to use Facebook is to relieve boredom.

- Identity presentation

Facebook encourages users to complete their personal profiles. Besides the personal curated information, interaction with friends is an important factor how persons are perceived. Wilson et al. state that most of the online profiles are accurate representations of individuals [Wilson et al., 2012]. This is due to the fact that a majority of social ties in the network also exist in the offline world. Hence, users feel pressure to keep their online representations in accordance to their real life. How a person's profile is perceived is not only dependent on information provided by the individual but also on the number of friends and their appearance.

- Social interaction

Papers of this category observe how Facebook is affecting relationships between people and groups. Especially companies can benefit from connections on Facebook. For example, customer feedback is a valuable source of information for businesses. Facebook can also be a niche marketing tool, leading to a measurable increase of store visits. Some companies admitted to use Facebook to evaluate job candidates. Nevertheless, relationships on Facebook can create tensions for individuals. Users often have friends from different social groups and separating them in the network can be challenging.

- Privacy issues

According to Wilson et al., Facebook is in a dilemma regarding privacy issues [Wilson et al., 2012]. On the one hand Facebook wants users to share as much information as possible which increases the network's value for advertisers. On the other hand Facebook has to protect their users from potential privacy risks. Furthermore, the reviewed literature suggests that more and more users are sensitive to privacy issues. Hence, Facebook will be required to simplify the users' access to personal privacy settings.

Data Collection Methods

It is possible to gather data about Facebook in different ways. Wilson et al. identify three data collection methods in their review of Facebook research [Wilson et al., 2012]:

- Study participants in offline context
Researchers recruit volunteers in offline context especially for early usage studies. This method of data collection is useful for comparing users to nonusers and online to offline behaviour.
- Study participants using Facebook applications
Applications can access personal information of profiles if the owners of the profiles agree. Hence, the success of studies highly depends on how many participants the researchers can recruit with their applications.
- Data crawling
Algorithms can automatically collect public available data from user profiles on Facebook; no approval from the users is necessary. Facebook tries to limit this method of data collection with implementing stricter policies.

In my master's thesis I use data crawling as a data collection method. I am comparing museum pages and the anatomy of their fans to each other. Hence, it is necessary to collect data from every institution rather than individual application users.

4.3.2 Twitter

Twitter is one of the most popular websites worldwide, with most visitors hailing from the US⁷. The platform counts 500 million members, thereof one third of accounts were active in a three months period⁸. Users create more than one billion updates every 2-3 days⁹.

In my analysis of 32 cultural institutions in Vienna, 18 of them actively use Twitter for communication.

Jack Dorsey, the creator of Twitter, started the service in 2006 with his very first post: 'just setting up my twttr'¹⁰. In July, the platform launched officially and was open for the public. Since then, the platform grew rapidly and reached an annually growth rate of 1382% in 2009. In the following year, Twitter launched the Tweet Button which makes it easier for web publishers to integrate Twitter services into their own sites. The impact of the micro blogging service was subject of discussion during the Arab Spring. It is presumed that Twitter played an important role when organising the protests¹¹.

⁷Alexa. twitter.com. <http://www.alexam.com/siteinfo/twitter.com> accessed February 19, 2013.

⁸TechCrunch. Twitter May Have 500M+ Users But Only 170M Are Active, 75% On Twitter's Own Clients. <http://techcrunch.com/2012/07/31/twitter-may-have-500m-users-but-only-170m-are-active-75-on-twitthers-own-clients> accessed February 19, 2013.

⁹All Twitter. Watch Tweets Being Sent Around The World In Real-Time With Tweetping [MAP]. http://www.mediabistro.com/alltwitter/tweetping_b35247#more-35247 accessed February 19, 2013.

¹⁰Twitter. Jack Dorsey. <https://twitter.com/jack/status/20> accessed February 19, 2013.

¹¹Mashable. Twitter Rewind: Big Highlights From 2012 to 2006. <http://mashable.com/2012/03/21/history-of-twitter-timeline> accessed February 19, 2013.

Terminology

Twitter allows users to facilitate micro blogs. Micro blogs have the same features as blogs but limit their authors to shorter posts. One blog post on Twitter is called tweet and counts a maximum of 140 characters [Small et al., 2012]. In general, tweets are public for users and nonusers. However, users have the possibility to post protected tweets which make them visible only for a chosen audience¹².

Tweets include information according the location, time, number of retweets, and involved users. Within the limitation to 140 characters, tweets can contain user information, links, multimedia content, user mentions, and hashtags. Mentions are public messages to other users and are signalled with the symbol '@', followed by the name of the addressee¹³. Hashtags (marked with the symbol '#') are used to coin keywords in order to categorize messages and participate in global discussions¹⁴. Furthermore, tweets can be retweeted from users to publish them to a broader audience.

Twitter allows users to become followers of other users in order to consume their status updates regularly. This connection does not have to be agreed mutually. Top Twitter users have millions of followers and are hubs in the user community¹⁵.

Demographics

The only mandatory information for setting up a Twitter account is the username. Additionally, users voluntarily can reveal their real name, location, website, and a short description of themselves. With this limited data it is difficult for researchers to extract information about demographics of users.

Mislove et al. tried to use available data and compare it to the U.S. population [Mislove et al., 2011]. The researchers collected data from users that set their location information to a city within the U.S. The cumulated user accounts represent more than 1% of the U.S. population. The authors of the study show that Twitter is relatively more used from people living within populous counties. Furthermore, the researchers compare the self-reported names to official name lists and reveal that 72% of users are male.

Pew Research Center conducted a phone survey amongst 1005 adults. They discover that the gender distribution of users is almost equal with a slight tendency to men. Furthermore, young adults (age 18-19) are highly over represented [Rainie et al., 2012].

¹²Twitter. About Public and Protected Tweets. <https://support.twitter.com/articles/14016-about-public-and-protected-tweets#> accessed February 19, 2013.

¹³Twitter. Types of Tweets and Where They Appear. <https://support.twitter.com/groups/31-twitter-basics/topics/109-tweets-messages/articles/119138-types-of-tweets-and-where-they-appear#> accessed February 19, 2013.

¹⁴Twitter. Using hashtags on Twitter. <https://support.twitter.com/groups/31-twitter-basics/topics/109-tweets-messages/articles/49309-what-are-hashtags-symbols#> accessed February 19, 2013.

¹⁵Socialbakers. Twitter Statistics. <http://www.socialbakers.com/twitter/> accessed February 19, 2013.

Trending Topics

Trending topics on Twitter reflect actual discussions of users. Topics are selected by an algorithm which observes the latest tweets. Usually trending topics are represented by hashtags or short expressions.

Asur et al. studied trending topics on Twitter and their persistence and decay [Asur et al., 2011]. The researchers observed that the number of tweets assigned to a trending topic is characterized by a strong log-normal distribution. The decay function for tweets appears to be mostly linear.

Furthermore, the researcher investigated the persistence of trends. Most trending topics show a short time span of 20-40 minutes. Only a few topics with many active contributors last for a longer time. However, one third of trending topics reappear during the time of observation.

Trending topics are mostly originated in traditional media. Thus, social media in general and Twitter in particular operates as a filter and amplifier for content created from traditional media.

Subsequently, the researchers observe the impact of users on trending topics. They discover that tweets from a small number of users are the origin for the majority of trending topics. However, the number of followers does not correlate with the influence on creating trends. More important are the number of retweets by other users and the content of tweets.

Twitter Research

More than 91% of all user profiles on Twitter are public. This gives scientists the opportunity to study communication within a large group of the population [Mislove et al., 2011].

Public data such as tweets and user data can be extracted using the Twitter APIs. For example, tweets contain much more information than just the text. Tweets include information about the location, time, number of retweets, and involved users¹⁶.

Researchers can use the collected data for studies in various fields. Small et al. mention some applications for scientists in their paper [Small et al., 2012]:

- Track flows of information
- Observe shifts of conversations and demographics
- Study how social media is used
- Observe trending topics

Twitter as News Medium

Kwak et al. investigated if Twitter has more similarities with a social network or a news medium [Kwak et al., 2010]. The authors crawled the Twittersverse and found several differences to traditional social networks.

¹⁶Developers. Tweets. <https://dev.twitter.com/docs/platform-objects/tweets> accessed February 20, 2013.

The majority of social networks exhibit a power-law distribution. The researchers reveal that the number of followers does not fit this prediction. In fact, many profiles have more followers than the power-law distribution would suggest.

Twitter also exhibits a very low level of reciprocity. Only 22% of user pairs show a reciprocal connection which is far less than on other social networking platforms. Furthermore, two thirds of users are not followed by any of their followings which suggest that for those users Twitter is more news medium than a social networking site.

Despite the low level of reciprocity, the average path length between two users is 4.12. This fact suggests that users follow other users not only because of social reasons but because they are interested in their updates.

The researchers investigated the source of trending topics as well. The researchers claim that 85% of all trending topics were headlines from traditional media. Hence, Twitter is heavily used to diffuse existing content quickly throughout the network.

4.3.3 Foursquare

Foursquare is a location based social network which sets the platform apart from the previous described platforms Facebook and Twitter. The purpose of the social network is to facilitate social communities around physical places.

Foursquare perceives itself as a service to save and share visited locations. Furthermore, the application gives recommendations to discover new venues using the collected data from all users¹⁷. The social network has also similarities with games. Users can earn points and special awards while using the application [Duffy, 2011].

About Foursquare

Dennis Crowley and Naveen Selvadurai built the Foursquare prototype in 2008. In the following year, the application was launched in several areas and later worldwide. The social network is a huge success with 30 million people using the application by now. So far, users have generated more than 3 billion check-ins¹⁸.

With a check-in, users unveil their current location to friends. Users can either check in to registered venues or create new places. After a check-in, users are able to see other people who are currently or were recently at the same place. To inform even more people about their current location, users can connect their Foursquare accounts to other social media platforms such as Facebook and Twitter.

Foursquare is not only a location based social network but also a game. Users earn intangible and tangible rewards for check-ins which are an important aspect for users to engage with Foursquare. Intangible rewards are points, badges, and mayorships. Badges are awarded for different achievements such as check-ins at special venues or on special days. Users become mayors of locations if they check in most often in the past 60 days. Badges and mayorships are both visible on the profile pages. Tangible rewards can be discounts offered by companies to mayors or checked in users.

¹⁷Foursquare. About foursquare. <https://foursquare.com/about> accessed February 25, 2013.

¹⁸Foursquare. About foursquare. <https://foursquare.com/about> accessed February 25, 2013.

Another use for Foursquare is as a social recommendations application. Users can rate venues and post pictures and tips. Tips are short texts which tell other users about the qualities of locations [Lindqvist et al., 2011].

Motivations for Users

Lindqvist et al. conducted interviews and surveys to reveal why people use Foursquare [Lindqvist et al., 2011]. Most of the participants use Foursquare to coordinate with friends. Users share their location to signal availability to friends and they are also interested in where their friends are at the moment. Some users also appreciate to preserve their own location history to keep track of visited venues.

Foursquare is also used to discover new places. Badges motivate users to check in to not known locations. Tips were perceived as especially useful for evaluating the quality of new places.

Most of the users initially started to use the application because they were curious about it. Other reasons for engaging are because Foursquare is perceived as being fun and because of friends who already use the application.

Discounts are not perceived as strong motivators for Foursquare users. But as the authors mention, this could change if more businesses start to offer special rewards.

Cramer et al. largely agree with the above points in their own study [Cramer et al., 2011]. Additionally, the authors emphasize the motivation for users to learn about new people. Some users are interested in other people who are currently at the same venue or are the mayor of the visited venue.

Badges in Social Media

Badges or trophies are major motivators for online games. Foursquare is not only a social network but also an online game. Lindqvist et al. identify badges as an important feature to engage people using Foursquare [Lindqvist et al., 2011].

Antin and Churchill give more insights into the impact of intangible rewards in the social media context [Antin and Churchill, 2011]. The authors identify five social psychological functions for badges and trophies:

- Goal setting
Badges are perceived as goals and the expectation to reach them is a major motivator for users.
- Instruction
In the early stages of games, badges can work as instructors to introduce new users to core functions of the game.
- Reputation
Badges provide information about users' achievements and expertises.
- Status/Affirmation
Publically displayed, badges can be perceived as status symbols.

- Group identification
Badges can show the affiliation to several groups and emphasize similarities between individuals.

Research Areas

Foursquare holds a rich set of location based data. However, the service does not allow access to individual check-in information of users. But users have the possibility to connect their Foursquare accounts with their Twitter profiles. Once the accounts are linked to each other, tweets are posted every time the users checks in to locations. As most of the Twitter accounts are public, it is feasible to filter tweets including Foursquare information and consequential collect location data originated from Foursquare check-ins [Noulas et al., 2011b].

The collected data allows researchers to study human mobility and model spatio-temporal patterns. Various studies pointed out that the number of check-ins peaks during the week three times per day: in the morning, for lunchtime, and in the evenings. On the weekends there are no significant peaks detectable [Noulas et al., 2011a] [Noulas et al., 2011b] [Cheng et al., 2011].

Different cities show differences in the time of those peaks. This reflects the variety of social rhythms in various cities. Furthermore, the probability that users check in to the same places is especially high after exactly 1 day or exactly 1 week has passed [Cheng et al., 2011].

The covered distance between two check-ins generally follows a power-law distribution. This suggests that the bigger the distance is, the less people exist who travel that far. The only exception appears when observing mobility data within cities where the power-law distribution is a poor fit [Noulas et al., 2011a].

The distance people cover on average depends on several reasons. In the US, inhabitants of coastal cities exhibit a higher radius than inhabitants of inland cities. On the other hand, people tend to travel bigger distances if they are living in sparsely populated areas than those living in densely populated areas. Furthermore, the collected data suggests that people from wealthier areas cover mostly bigger distances than people from less rich areas.

All this results suggest that Foursquare is indeed a valuable source for mobility studies [Cheng et al., 2011].

4.4 Data Extraction

I used data from Facebook, Twitter, and Foursquare for the analysis in this master's thesis. I collected data from both the museums and the users who are connected to the museums. All three networks offer APIs to allow developers acquiring data. The data was extracted on April 8, 2013.

Subsequently I will give a short introduction into the APIs, their limitations, and how I used them to collect the desired data for my analysis. In the text, I focus on certain features of the APIs which I needed for developing my algorithms. I also describe what kind of information about the museums and users I was able to retrieve.

4.4.1 Facebook

All data in Facebook is interconnected and forms a giant graph. Some of the connections are public accessible, for others are special permissions necessary.

With the Graph API it is possible to interact with objects of the social graph. Objects can be entities such as users or posts but also connections such as friendship links. The API can be queried with basic HTTP requests¹⁹. Facebook offers several SDKs on top of the low-level HTTP-based API for JavaScript, PHP, iOS, and Android. Furthermore, third parties offer SDKs to support developers²⁰.

A useful tool when working with the social graph is the Graph API Explorer²¹. With this tool it is possible to test requests in a sandbox mode. The API Explorer shows the results of HTTP requests in JSON format.

Query the Graph

Developers need a Facebook account to be able to use the functionalities of the Graph API. With a Facebook account it is possible to create Facebook applications. Application require a name and the URL where they are hosted. Once the application is created, Facebook assigns an App ID and an App Secret. ID and secret are used during the login process to authenticate users and create access tokens. An access token is generated by Facebook after the authorization process. It contains the permissions that the logged in user granted the application²².

Facebook uses OAuth for the login procedure. I illustrate the OAuth login in Figure 4.1. If the user is not logged in, he or she gets redirected to the Facebook login dialogue. After a successful login, the user returns to the application page. If a user is already logged in, he or she needs to authorize the application. After the user's approval, he or she gets redirected again to the application page. In case that the user is logged in and the application is authorized, the user gets authenticated and Facebook returns a code. The code variable is used to detect if the login process has already started or not. Finally, a request is sent with the code, the App ID, and App secret. In response, Facebook returns the access token. During the login process a state variable is used to protect against cross-site request forgery. In the beginning the state variable is created using a random number and stored as a session object. The state variable is always part of the communication with the Facebook servers and can be compared with the value stored in the session object.

With the access token from the Facebook login process is it possible to query the social graph. This process is pictured in Figure 4.2.

The museums are stored in the database including their names and IDs for each social network. The Facebook API is called for every cultural institution in order to retrieve basic infor-

¹⁹Facebook developers. Getting Started: The Graph API. <https://developers.facebook.com/docs/getting-started/graphapi> accessed March 3, 2013.

²⁰Facebook developers. SDK Reference. <https://developers.facebook.com/docs/sdks/> accessed March 3, 2013.

²¹Facebook developers. Graph API Explorer. <https://developers.facebook.com/tools/explorer> accessed March 3, 2013.

²²Facebook developers. Login for Server-side Apps. <https://developers.facebook.com/docs/howtos/login/server-side-login> accessed March 4, 2013.

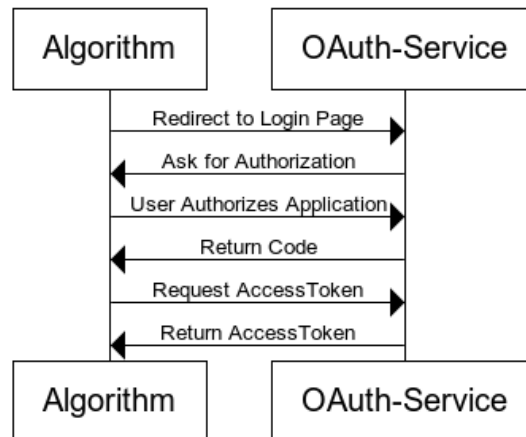


Figure 4.1: OAuth Login: Applications use the OAuth standard for authorization. The outcome of the process is an access token which is used to identify the user during subsequent communication with the application server.

mation of the museum’s Facebook appearance. In the next step, the museum’s wall is requested. The algorithm uses the connection between the museum and it’s wall posts to retrieve the information. If the wall holds to many posts to retrieve them at once it will be split up into several pages by Facebook. The algorithm crawls every page and collects containing information about posts and users such as the type of post or the author. Users who write posts or respond to posts are part of the retrieved data as well. All collected data from the museum page, it’s posts, and the users who interacted with the page will be saved into the database. After crawling the museums’ walls, more information about the users can be requested. The algorithm calls the API for every user and updates the records in the database.

Limitations

Facebook uses pagination to limit the number of results returning from a request. A link to the next and previous page is provided in the result set if they exist. These links can be used to create further requests to the API²³.

Furthermore, Facebook dictates thresholds for applications. The current upper limits for applications are 5 million monthly active users, 100 million requests per day, and 50 million impressions per day²⁴. However, I sometimes encountered problems if I was querying the social graph heavily with my algorithm. Facebook does not publish any restrictions but I guess the high frequency of calls from one single IP address was the reason why Facebook blocked my incoming requests for a certain time.

²³Facebook developers. Pagination. <https://developers.facebook.com/docs/reference/api/pagination> accessed March 3, 2013.

²⁴Facebook developers. Facebook Platform Policies. <https://developers.facebook.com/policy> accessed March 3, 2013.

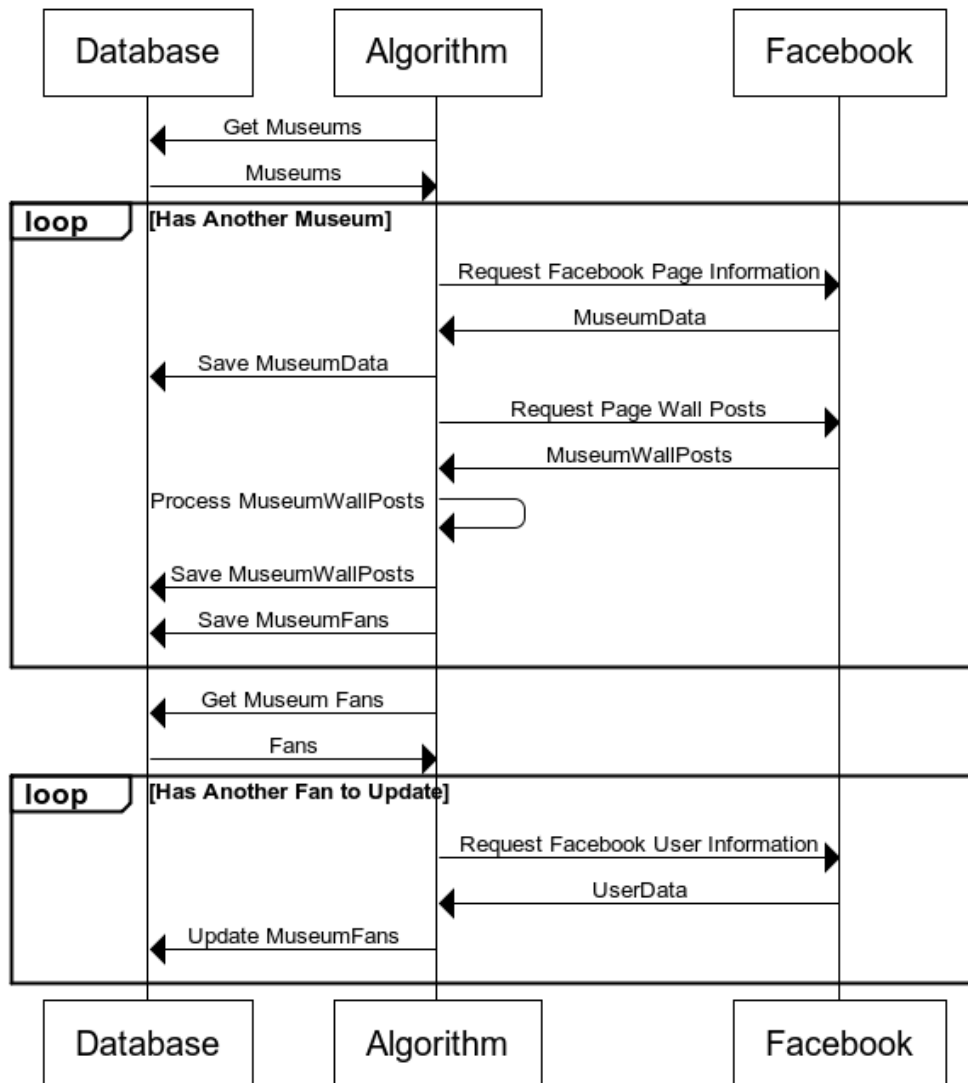


Figure 4.2: Retrieve Facebook Data: The pictured script extracts data from museums and users who interact with the museums from Facebook. The results are saved into a database.

Extracted Data from Facebook

I was able to collect data from the museums' pages which is visible for every Facebook user as well. This includes the number of likes, the number of people who visited the place, and how many users interacted with the page lately.

Furthermore, I could retrieve the entire timelines of pages. Timelines include posts which were created both from the page owner and other users. Every post contains information about the user who wrote it, the message, the type, the number of likes and comments, the creation source, and the time when it was written or updated.

Users who are connected to the museums' pages are better protected in the social graph. For example, it is possible to retrieve the number of likes of a page but not who these users are. I could only identify users who interacted with the page. An interaction is posting a status to a museum's wall or commenting or liking a wall post.

I could only collect the IDs from users while crawling the museums' timelines. Another API call was necessary in order to get additional data about users from Facebook. Facebook protects user information more thorough than page information. Even though users may set profile information public it was only possible to retrieve certain data. Hence, I was able to collect information about the users name, the gender, and the localisation of the profile.

4.4.2 Twitter

The Twittersverse basically consists of four important concepts:

- Tweets
Tweets are status updates and form the basic objects in the Twittersverse²⁵. Tweets include for example the author, creation time, place, and if they were retweeted.
- Users
Users are the authors of tweets²⁶. The object holds information about the user profile, number of followers, and number of friends.
- Entities
The purpose of entities is the representation of metadata of published content on Twitter²⁷. Entities can be either hashtags, mentions, uploaded media or URLs.
- Places
Places are physical locations with geo coordinates²⁸. They indicate where a Tweet was issued or reveal the mentioned locations.

²⁵Developers. Tweets. <https://dev.twitter.com/docs/platform-objects/tweets> accessed March 18, 2013.

²⁶Developers. Users. <https://dev.twitter.com/docs/platform-objects/users> accessed March 18, 2013.

²⁷Developers. Entities. <https://dev.twitter.com/docs/platform-objects/entities> accessed March 18, 2013.

²⁸Developers. Places. <https://dev.twitter.com/docs/platform-objects/places> accessed March 18, 2013.

Twitter does not ask for authentication to query the Twittersverse. All public available data can be retrieved with requests to the Twitter API. However, Twitter restricts the number of API calls per hour from third parties. The Twitter API allows 150 unauthenticated calls per hour issued from one IP address. 350 calls per hour are permitted if a user is authenticated via OAuth.

In general, rate limitations only apply for read requests. Write requests and calls to the search API show higher rate limits or are not limited at all²⁹. In my algorithm I only use read requests.

It is possible to request the actual rate limit and the next reset time via the API³⁰.

Collecting Tweets

I only use unauthorized requests to call the Twitter API. I illustrated the algorithm in Figure 4.3.

First, the list of cultural institutions is retrieved from the database. Thereafter, the Twitter API is called for every museum in order to request account information. The responded data includes information about the number of followers and number of tweets. All retrieved data will be saved in the database.

In the next step, the algorithm is requesting the IDs of the museums' followers. With one API call it is possible to retrieve up to 5000 follower IDs at once. In case a museum has more than 5000 followers, the algorithm calls the API until all IDs are collected. Again, all retrieved data will be saved in the database.

The algorithm requests the timeline of an account to collect all tweets of a museum. Twitter limits the amount of responded tweet objects to 200. Therefore, the API has to be called more often in order to crawl the entire timeline of an account.

In the last step, more information about the museums' followers is collected. The algorithm gets all museums' follower IDs from the database. Then, a request is issued to look up account information of the user. Twitter allows to send up to 100 IDs in one request. The responded data includes the username, the number of followers, and the number of tweets. The algorithm calls the API until information about all followers is collected. Last, all retrieved data is saved in the database.

Extracted Data from Twitter

Twitter allows access to all data which is publicly available. I was able to withdraw information about the museums' accounts. This information includes the number of followers, the creation date, the number of posted tweets, and how many users the museum follows.

Furthermore, I collected all tweets that the museums ever posted. A tweet is composed of its text, its creation date, its source, its location, if it is a reply to another tweet, and how often it got retweeted by others.

I was not only able to get the number of followers of a cultural institution, I could also get the IDs of the museums' followers. Having those user IDs I was able to request more information

²⁹Developers. Rate Limiting. <https://dev.twitter.com/docs/rate-limiting/1> accessed March 19, 2013.

³⁰Developers. Rate Limiting FAQ. <https://dev.twitter.com/docs/rate-limiting-faq#checking> accessed March 19, 2013.

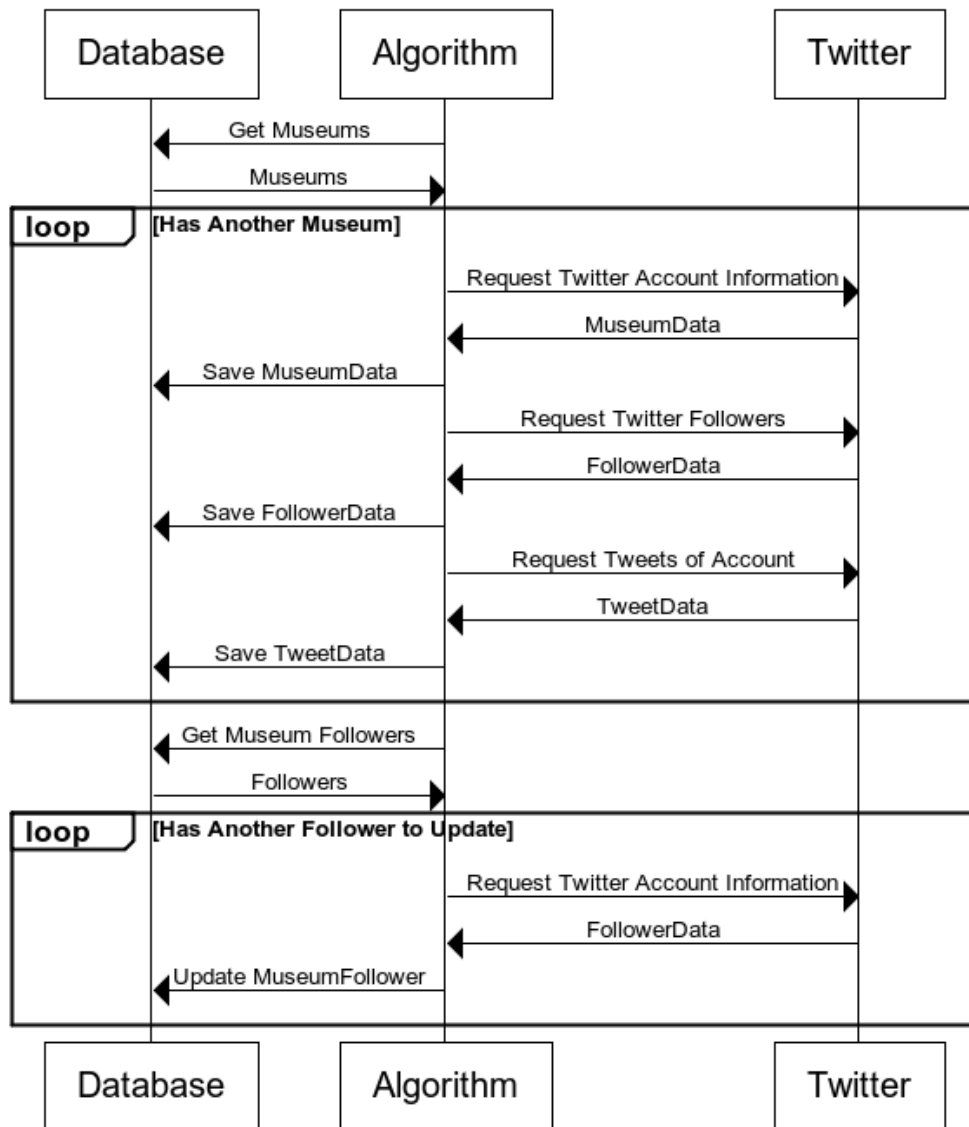


Figure 4.3: Retrieve Twitter Data: The digram describes a script which extracts data from Twitter. Information about both museums and their followers is requested and saved into a database.

about every user. I extracted the number of followers and tweets, when the account was created, the used language, and how many other users the account follows.

4.4.3 Foursquare

The Foursquare API provides access to all public available data. Furthermore, various actions like check-ins or adding information to a venue can be executed. If a user is authorized through Foursquare, even user specific tasks can be carried out.

A very useful tool to test requests is the API Explorer³¹. All queries are URLs that specify the request and eventually contain information about the authorized user. The response from Foursquare is always a JSON Object that can be examined with the API Explorer as well.

Foursquare offers different APIs and platforms for developers³²:

- Core API
The centerpiece of the Foursquare API gives developers the opportunity to execute actions which are also available for users on mobile devices and through the website.
- Real-time API
Through the real-time API, push notifications are sent to venue managers and developers when users are checking in.
- Connected apps platform
The connected apps platform grants third party applications access to Foursquare content. This platform is Foursquare's newest feature and still in experimental mode.
- Merchant platform
The merchant platform addresses registered venue owners in particular. Developers can use the provided methods for building own applications to allow managers administrating venues.
- Venues platform
The venues platform is a compendium of all places stored within Foursquare. All public accessible information about locations can be retrieved. No user identification is necessary for extracting information from the venues platform.

In my algorithm I use both the core API and the venues platform in order to retrieve information about the cultural institutions and users who interacted with the observed locations.

³¹Foursquare developers. API Explorer. <https://developer.foursquare.com/docs/explore> accessed March 24, 2013.

³²Foursquare developers. The foursquare Platform. <https://developer.foursquare.com/overview> accessed March 24, 2013.

Retrieve Locations and Users

Similar to Facebook, Foursquare requires OAuth authentication in order to be able to communicate with the API. Only some endpoints of the API are reachable without an authenticated user. In my algorithm, I used authenticated calls to communicate with the Foursquare API.

The first step is to register the application at Foursquare. It is necessary to own a Foursquare account to register applications. After the registration, Foursquare assigns an ID and a secret which is necessary to obtain an access token during the login process.

Foursquare uses OAuth for orchestrating the login process. I already described this process in Section 4.4.1 and I illustrated it in Figure 4.1. The result of the login process is an access token from Foursquare. This access token is used for the communication with the API to identify the user and the application³³.

After the login process, the algorithm calls the Foursquare APIs in order to retrieve information about the museums and users. This process is pictured in Figure 4.4.

First, the algorithm gets the list of museums from the database. Next, the algorithm calls the venue platform and requests information for each museum. This information is both saved in the database and used for retrieving user information. The algorithm extracts user IDs which are part of the museum data. The extracted user data is saved in the database as well.

After the algorithm collected all information from the museums, it requests the list of Foursquare users from the database. The algorithm calls the core API in order to get additional information about the users. The retrieved information is used to update the users' records in the database.

Limitations

Foursquare limits the number of userless requests to 5000 per hour and application. If the application uses OAuth, 500 authenticated requests per hour and user are possible. Foursquare informs developers about the remaining number of requests in the response header.

If an application requires more requests per hour than the limit allows, it is possible to ask Foursquare to extend the limit³⁴.

Extracted Data from Foursquare

Foursquare differs from Facebook and Twitter as the data is not created by the institutions but the users. I retrieved information about the locations which corresponded with the museums. The retrieved data consists of location information, the number of users who were here, the number of check-ins, the number of photos and tips, and the user rating.

Foursquare does not allow to identify users who checked in to locations. However, it is possible to retrieve users if they interacted with the location in another way than with a check-in. Users are visible if they left a tip or a photo, listed the location or are the major of the location. Users who recently checked in are visible as well.

³³Foursquare developers. Connecting. <https://developer.foursquare.com/overview/auth> accessed March 24, 2013.

³⁴Foursquare developers. Rate Limits. <https://developer.foursquare.com/overview/ratelimits> accessed March 24, 2013.

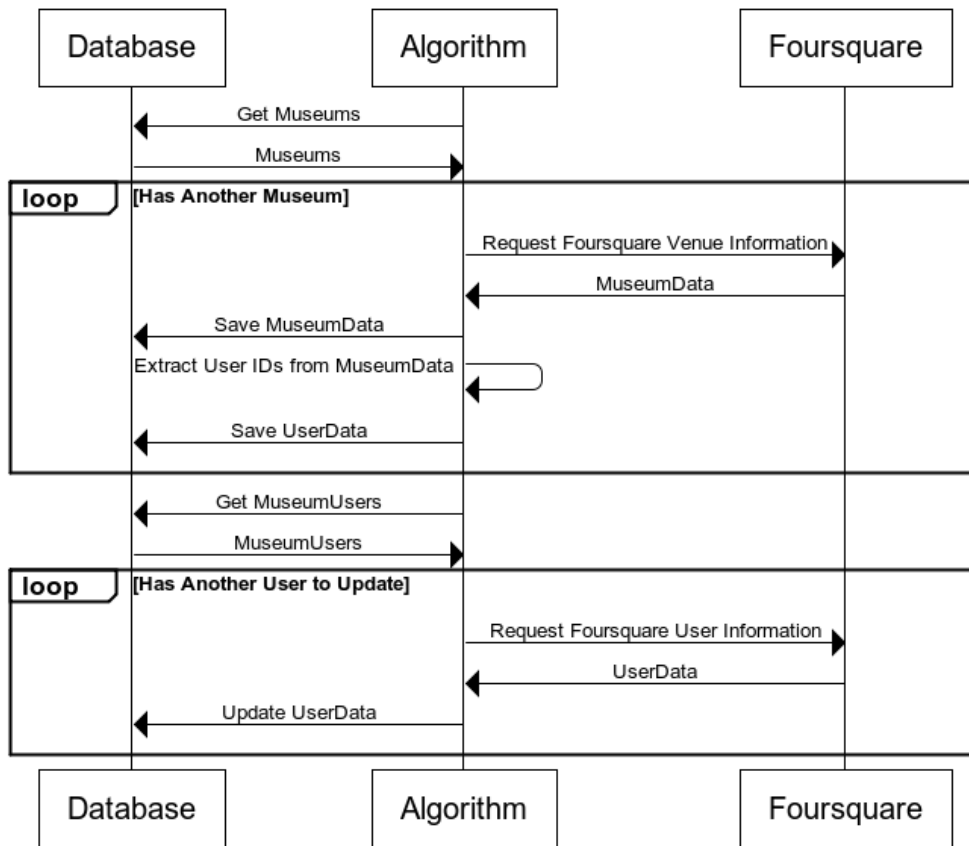


Figure 4.4: Retrieve Foursquare Data: The pictured process extracts information about locations which represent museums from Foursquare. The location information and the information about interacting users is saved into a database.

I was able to gather more information about users who I identified through the location object. The returned user objects reveal a lot of information about the individuals: name, gender, home city, biography, number of friends, number of taken pictures and left tips, number of mayorships, number of badges, and number of check-ins.

Data Analysis and Evaluation

This chapter includes the results of my analysis. Section 5.1 discusses the analysis of the cultural institutions. I use two-tailed tests to verify the significance of my results. The methodology for testing regressions is explained in section 5.1.1.

Section 5.2 is an analysis of the users who interact with cultural institutions on social networks.

5.1 Fans and Followers

Why are some cultural institutions more successful than others on social networks? And what is the best strategy to acquire fans and followers? I used the retrieved data from the museums to identify success factors. The data comprehends of information about from Vienna's cultural institutions and their representation on Facebook, Twitter, and Foursquare. The number of museums' visitors is retrieved from Statistik Austria for the year 2011¹.

I used regressions to test some of the correlations. The methodology for testing regressions is explained in the next section. Subsequently, I present the results for all three social networks.

5.1.1 Methodology for Testing Regression Slope

First, I illustrate scatterplots and the associated regression lines for a regression test. I test whether a dependent variable Y is correlated to an independent variable X . The statistical test is about the slope of the linear regression line

$$Y = B_0 + B_1 * x$$

¹Meistbesuchte Museen und Ausstellungen 2002 bis 2011 nach Einrichtungstyp, Eigentümer bzw. Erhalter und Bundesland. http://www.statistik.at/web_de/static/meistbesuchte_museen_und_ausstellungen_2002_bis_2011_nach_einrichtungstyp__021261.pdf accessed April 10, 2013.

where B_0 is the axis intercept and B_1 is the slope. The null hypothesis states that the slope equals zero

$$H_0 : B_1 = 0$$

$$H_1 : B_1 \neq 0$$

which is the case if there is no significant relationship between the dependent and the independent variable. The chosen significance level α is 5% for all tests. The standard error of the sample is calculated with the formula

$$SE = \sqrt{\sum (y_i - \hat{y}_i)^2 / (n - 2)} / \sqrt{\sum (x_i - \bar{x}_i)^2}$$

where y_i and x_i are the observed values, \hat{y}_i is the estimated value, \bar{x}_i is the mean for an observation i , and n is the number of observations. The degrees of freedom is calculated from the number of observations:

$$DF = n - 2$$

The test statistic for the two-tailed test is a t-score

$$t = b_1 / SE$$

where b_1 is the slope of the sample's regression line and SE is the slopes standard error. The P-value decides whether the hypothesis is rejected or not. It is calculated with

$$P\text{-value} = P(T \leq -t) + P(T \geq t)$$

where T is the probability value from the normal distribution. The hypothesis will be rejected if the P-value is smaller than the significance level. Statistical evidence for a correlation exists if the null hypothesis gets rejected.

5.1.2 Facebook

From 32 cultural institutions in my dataset maintain 28 institutions a Facebook page. I excluded data from 'Kapuzinerkirche und Kaisergruft' because they joined Facebook just three days before I extracted the data.

First, I test if cultural institutions with a high visitor frequency are also more popular on Facebook. The hypothesis states whether highly frequented museums have more likes or not. Figure 5.1 shows the scatterplot of visitors per year in relation to likes on Facebook. The red line indicates the regression line $y = 7598 + 0.004974 * x$.

The independent variable X represents the visitors per year. The dependent variable Y represents the number of likes on Facebook. The calculations result to $SE = 0.0024$ for the standard error of the sample, $DF = 25$ for the degrees of freedom, and $t = 2.1$ for the t-score. The P-Value for the results is 0.046 which is smaller than the significance level of 0.05. Hence, the null hypothesis gets rejected and there might be a positive correlation between the number of visitors and the number of likes on Facebook.

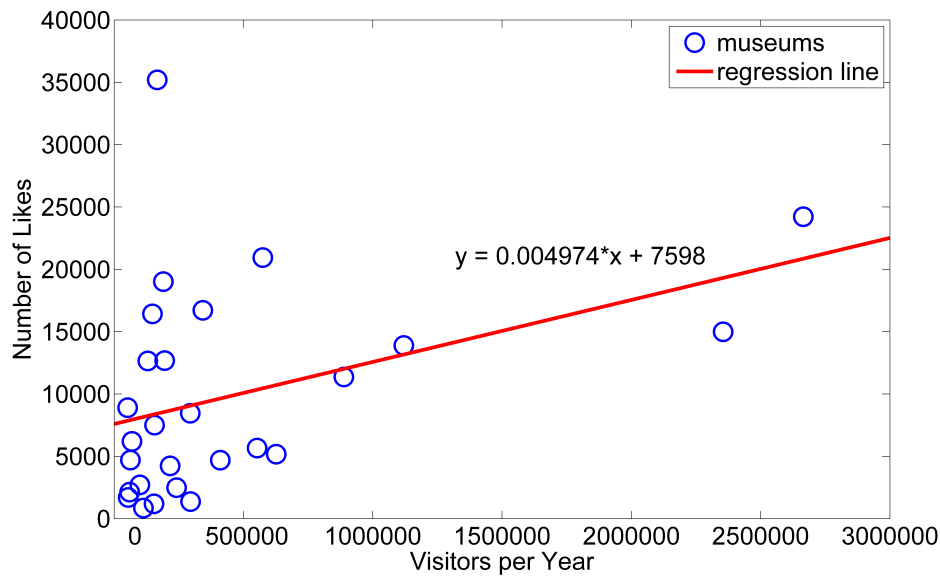


Figure 5.1: Test for correlation between $X = VisitorsPerYear$ and $Y = NumberOfLikes$ for Facebook. $SE = 0.0024$, $DF = 25$, $t = 2.1$, $P-Value = 0.046$.

Next, I test whether there is a positive correlation between the activity of a museum on Facebook and the number of likes. One way to measure the activity of a cultural institutions is the number of posted status updates. In this case, the independent variable X is the number of posts and the dependent variable Y is the number of likes. Figure 5.2 shows the scatterplot with the regression line.

Standard error, degrees of freedom, and t-score are $SE = 4.32$, $DF = 25$, and $t = 2.64$. This results to a P-Value of 0.014 which is below the significance level. Hence, the null hypothesis gets rejected and there is evidence for a correlation between the number of posts and the number of likes.

One problem with this measure is, that it does not take the time into account. The museums started posting between 2009 and 2012. Cultural institutions that created their page earlier had more time to acquire fans. Bearing this in mind, I divided the number of posts and the number of likes per the number of days the accounts are already active. Figure 5.3 shows the new regression plot.

With $SE = 3.56$, $DF = 25$, and $t = 1.14$ the P-value results in 0.26. The null hypothesis gets not rejected because the P-value is above the significance level.

At last, I analyse the content which cultural institutions posted on Facebook. What is the best strategy to get the most response to a posting? I used timeline data from the eight Austrian Federal Museums which own a Facebook account. I show in Figure 5.4 which type of post generates the most likes and comments. According to my analysis, photos and videos get the most response from users. Status updates exhibit few likes on average but have the ability to spark discussions.

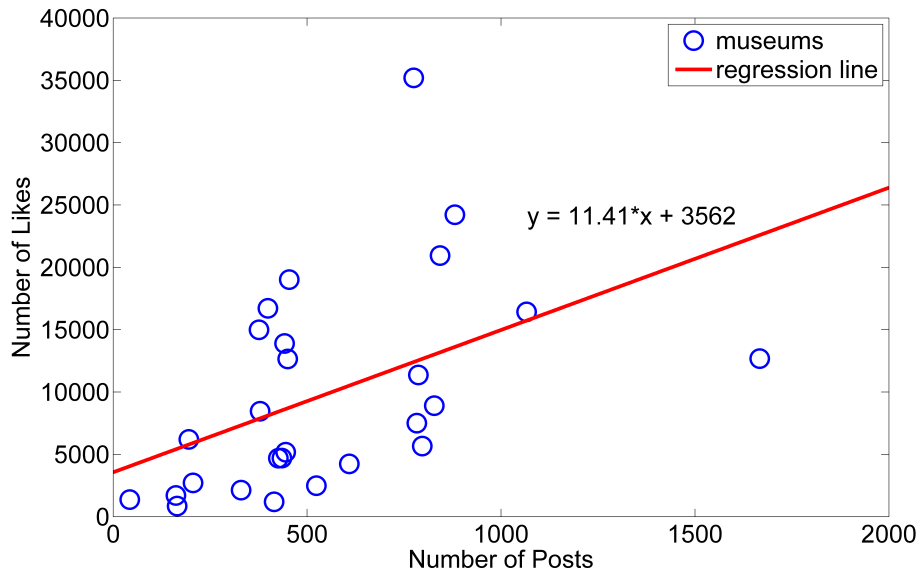


Figure 5.2: Test for correlation between $X = \text{NumberOfPosts}$ and $Y = \text{NumberOfLikes}$ for Facebook. $SE = 4.32$, $DF = 25$, $t = 2.64$, $P\text{-Value} = 0.014$.

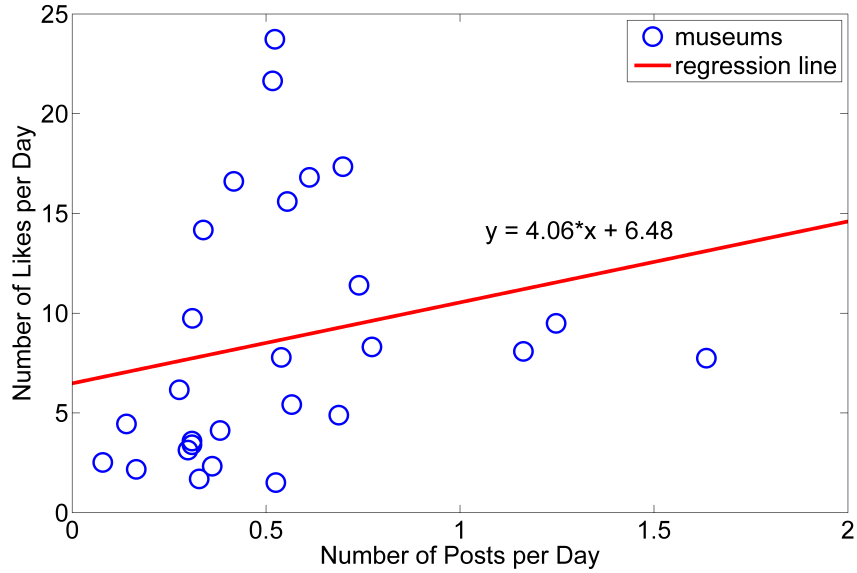


Figure 5.3: Test for correlation between $X = \text{NumberOfPostsPerDay}$ and $Y = \text{NumberOfLikesPerDay}$ for Facebook. $SE = 3.56$, $DF = 25$, $t = 1.14$, $P\text{-Value} = 0.26$.

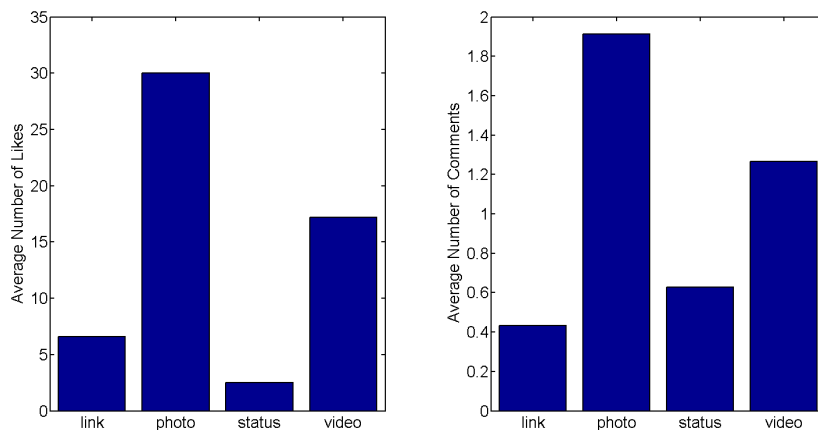


Figure 5.4: The left graph pictures the average number of likes for posted links, photos, text statuses, and videos on Facebook. The right graph shows the average number of comments for the different posting types on Facebook.

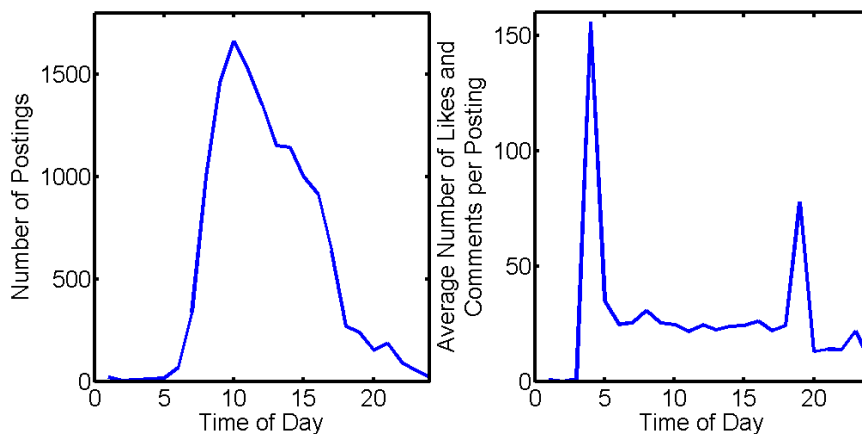


Figure 5.5: The left graph illustrates at which time of day most of the status updates were posted on Facebook. The graph on the right indicates the average number of comments and likes per status update depending on the time of day on Facebook.

On the other hand is it important to know when to post an update in order to get as much response as possible. My analysis shows that the average number of likes and comments is almost equal for every hour. Only postings which were created at 4am and 6pm generate a particular high number of likes and comments. The distributions for both the number of postings and the average number of likes and comments over one day are shown in Figure 5.5. Figure 5.6 shows on which day of the week museums post and when they get the most response on a posting.

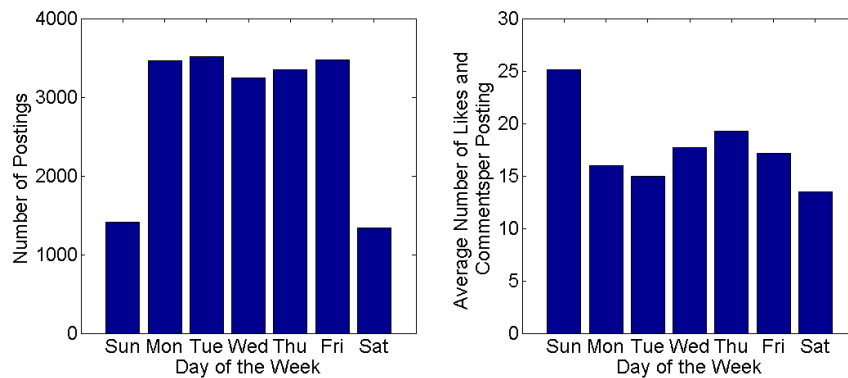


Figure 5.6: The figure on the left shows at which days museums are posting new status updates on Facebook. The figure on the right indicates at which day a museum gets the most response (comments and likes) for a post on Facebook.

Researchers from Salesforce Marketing Cloud claim that postings on weekends and in the non-busy hours from 8pm to 7am get the most response². The results of my analysis indicate that posts on Sundays spark high response. However, museums post very little on the weekends. Similar, postings in non-busy hours get most response but only a few are posted at that time. Hence, cultural institutions should schedule more of their posts at weekends and during non-busy hours.

5.1.3 Twitter

Only 18 out of 32 cultural institutions in Vienna maintain a Twitter account. 'Hofreitschule' started using Twitter just two days before I extracted the data. Therefore, I excluded the institution from my analysis. For the remaining 17 accounts I first test whether the number of visitors of a museum is correlated to the number of followers. The scatter plot with the regression line is pictured in Figure 5.7.

The number of followers is the dependent variable Y . The computed values for the standard error, degrees of freedom, and t-score are $SE = 0.37$, $DF = 15$, and $t = -0.66$. This results in a P-value of 0.52. The P-value is much bigger than the significance level, thus the null hypothesis is accepted. Hence, there is no statistical evidence for a correlation between the number of visitors per year and the number of followers on Twitter.

Next, I test the influence of the institutions' online activity on the amount of followers. In particular, I try to answer the question if it pays off to participate actively on Twitter or not. Figure 5.8 shows the scatterplot for the independent variable number of tweets and the dependent variable number of followers.

²Salesforce Marketing Cloud. Strategies for Effective Wall Posts: A Timeline Analysis. <http://www.salesforcemarketingcloud.com/resources/ebooks/strategies-for-effective-wall-posts-a-timeline-analysis> accessed April 13, 2013.

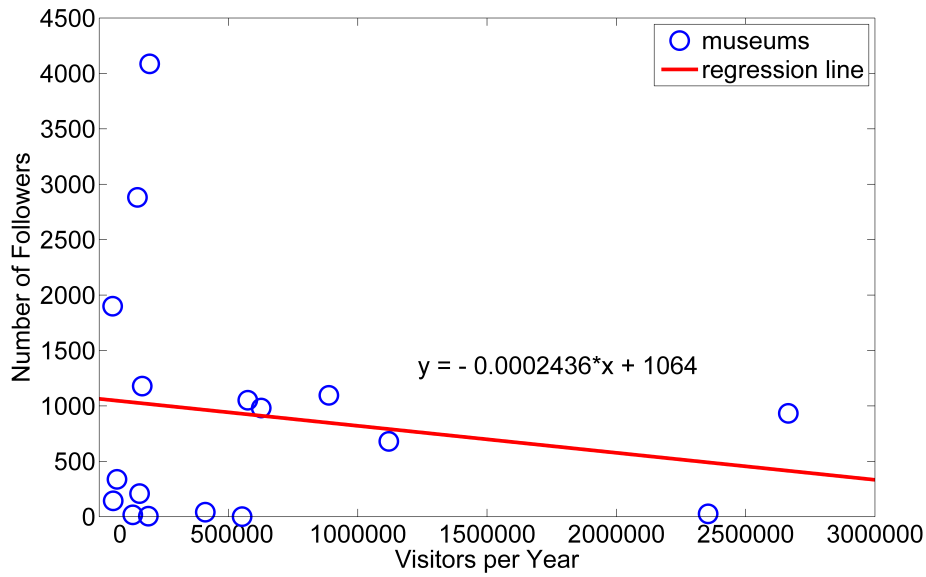


Figure 5.7: Test for correlation between $X = VisitorsPerYear$ and $Y = NumberofFollowers$ for Twitter. $SE = 0.37$, $DF = 15$, $t = -0.66$, $P\text{-Value} = 0.52$.

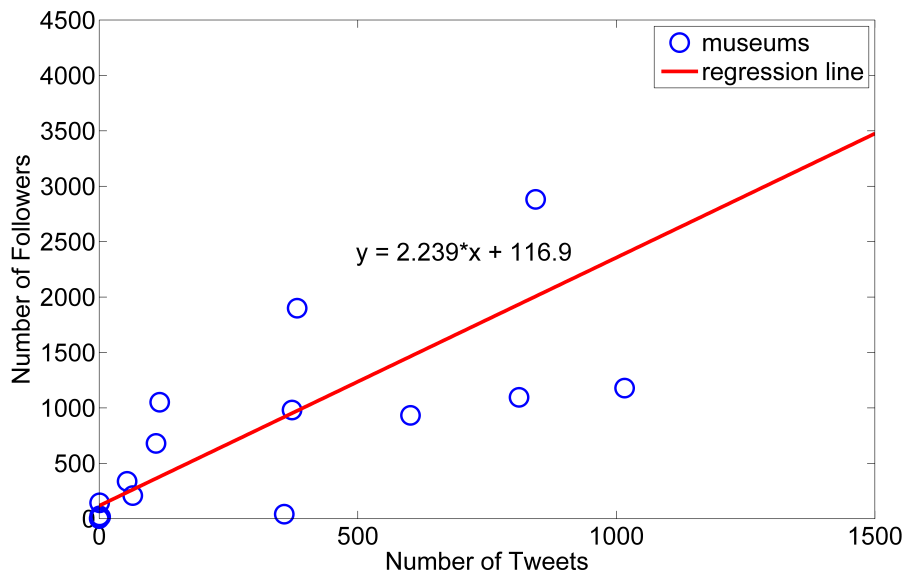


Figure 5.8: Test for correlation between $X = NumberofTweets$ and $Y = NumberofFollowers$ for Twitter. $SE = 0.39$, $DF = 15$, $t = 5.7$, $P\text{-Value} = 4.18E - 05$.

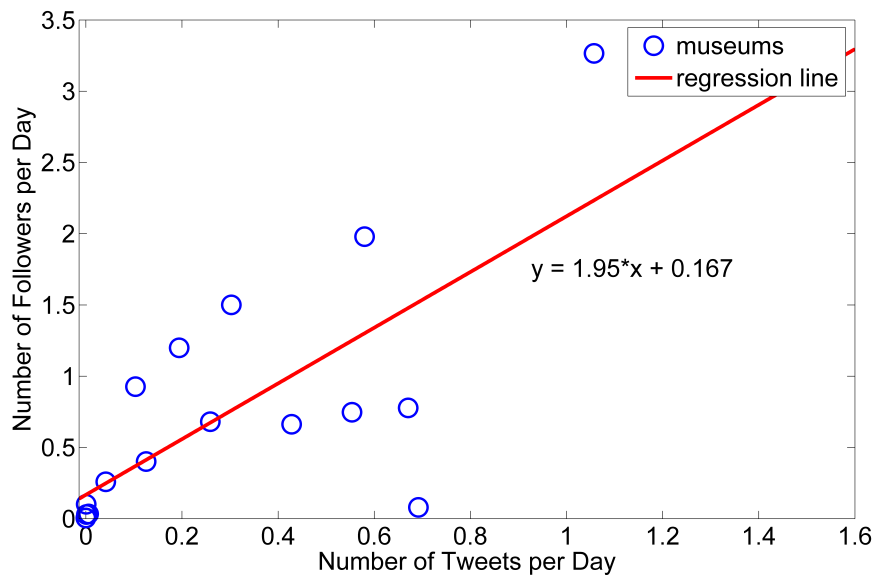


Figure 5.9: Test for correlation between $X = \text{Number of Tweets Per Day}$ and $Y = \text{Number of Followers Per Day}$ for Twitter. $SE = 0.49$, $DF = 15$, $t = 3.98$, $P\text{-Value} = 0.0012$.

The resulting values for the regression are: $SE = 0.39$, $DF = 15$, and $t = 5.7$. This results in a P-value of $4.18E-05$. The P-value is much smaller than the significance level of 5%. Hence, the null hypothesis is rejected and there is evidence for a correlation between the number of posted tweets and the number of followers.

To make sure that this results is not biased by the number of days the different museums are already on Twitter, I did another regression with standardised values. I divided both the independent variable and the dependent variable by the number of days that the account is active. This returns the number of tweets per day as X and the number of followers per day as Y . The scatterplot with the regression line is illustrated in Figure 5.9.

The calculations result to $SE = 0.49$ for the standard error of the sample, $DF = 15$ for the degrees of freedom, and $t = 3.98$ for the t-score. The P-value is 0.0012 which is below the significance level. Therefore, the null hypothesis gets rejected and there might be a correlation between the number of tweets per day and the number of acquired followers per day.

It is important for a cultural institution to spark engagement amongst their followers. The number of retweeted tweets is a good measure for the engagement of followers. The more followers retweet, the broader is the reach of a tweet. I collected tweets from the 5 Austrian Federal Museums which maintain a Twitter account. In total, the museums posted 1900 tweets. 24% of tweets were retweeted by 2 followers on average.

According to Salesforce Marketing Cloud, it is important to take the time of tweeting into

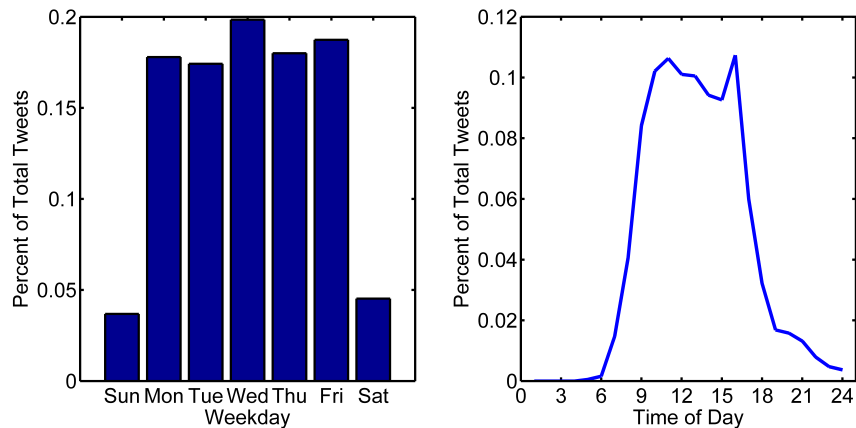


Figure 5.10: The left figure shows on which day the observed museums post tweets on Twitter. The right graph illustrates at which time of day the observed museums post tweets on Twitter.

account in order to achieve high engagement rates³. The researchers claim that the best days for tweeting is on weekends and the best time is between 8am and 7pm. Figure 5.10 shows when the museums from the sample post tweets.

One can see that the museums are mainly posting on weekdays rather than weekends. 91% of the tweets were in the suggested timeframe from 8am to 7pm. Hence, the museums should post more tweets on weekends in order to increase engagement.

5.1.4 Foursquare

I identified location representations for all of the 32 cultural institutions on Foursquare. None of the locations is listed as verified which indicates that the operators of the institutions did not claim the ownership. The content of the locations' representations on Foursquare is created by the users. The owner of the businesses do not participate actively. Therefore, I can only test if there is a correlation between the number of visitors per year and the number of check-ins on Foursquare. The scatterplot for this hypothesis is illustrated in Figure 5.11.

The independent variable Y represents the number of check-ins on Foursquare. The standard error of the sample is $SE = 0.35$, the degrees of freedom is $DF = 30$, and the t-score is $t = 7.75$. The P-Value results to 1,21E-08 which is smaller than the significance level of 0.05. From this follows that the null hypothesis gets rejected. Hence, there is statistical evidence that the number of check-ins on Foursquare correlates with the number of visitors per year for cultural institutions.

³Salesforce Marketing Cloud. Strategies for Effective Tweeting: A Statistical Review. <http://www.salesforcemarketingcloud.com/resources/ebooks/strategies-for-effective-tweeting-a-statistical-review> accessed April 13, 2013.

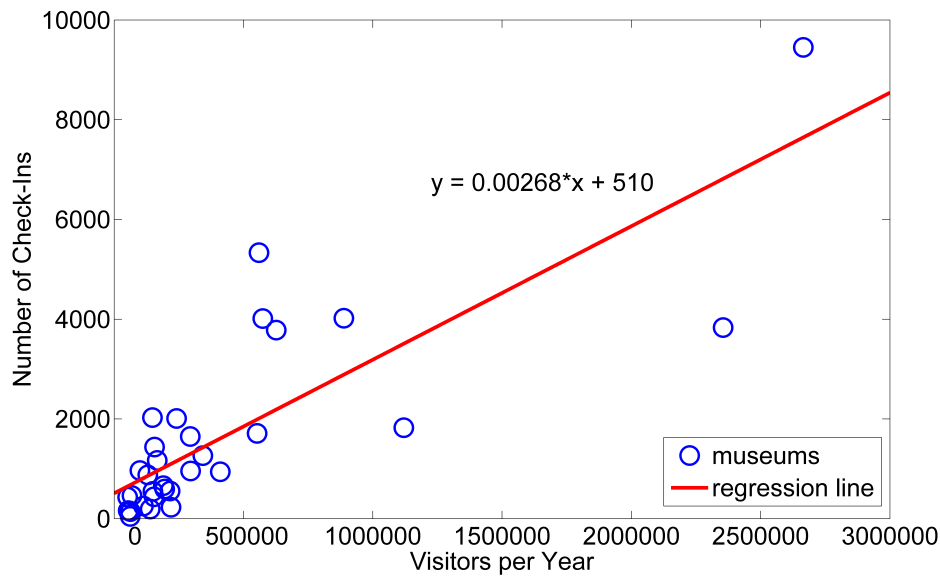


Figure 5.11: Test for correlation between $X = VisitorsPerYear$ and $Y = NumberOfCheck-Ins$ for Foursquare. $SE = 0.35$, $DF = 30$, $t = 7.75$, $P-Value = 1,21E - 08$.

5.2 Demography of Users

In this section I want to give insights in who the users are that interact with museum pages in social networks. Therefore, I analyse user information I retrieved from Facebook, Twitter, and Foursquare. User accounts that I collected were fans of museums or interacted with the museums' representations on social networks. I limited my analysis to the eight Austrian Federal Museums (see also Section 4.2.1). I also test the hypothesis that the characteristics of museum fans are similar to the characteristics of the social networks' overall populations.

The amount of user information I was able to retrieve varied considerably between the used sources. Facebook knows a lot about their users but reveal only username, sex, and localisation to data crawlers. Twitter and Foursquare allow access to all public user information. However, Twitter profiles comprise less information than Foursquare profiles.

5.2.1 Facebook

I retrieved 6212 unique users from Facebook who interacted with the museums' pages. Facebook only allows to retrieve username, sex, and localisation.

The localisation is the user's chosen language for the platform. It does not indicate the user's mother tongue but offers information about the language in which the user likes to converse. The distribution of languages is shown in Figure 5.12. The majority uses Facebook in German. This fact is not surprising as all eight museums from the analysis are located in Vienna. The

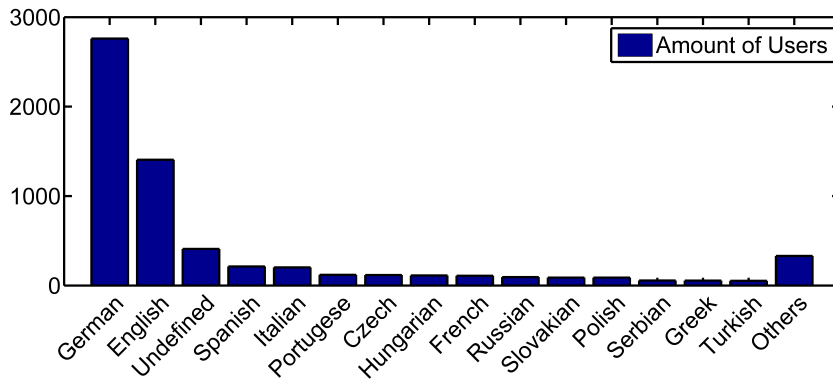


Figure 5.12: Language settings of Facebook users

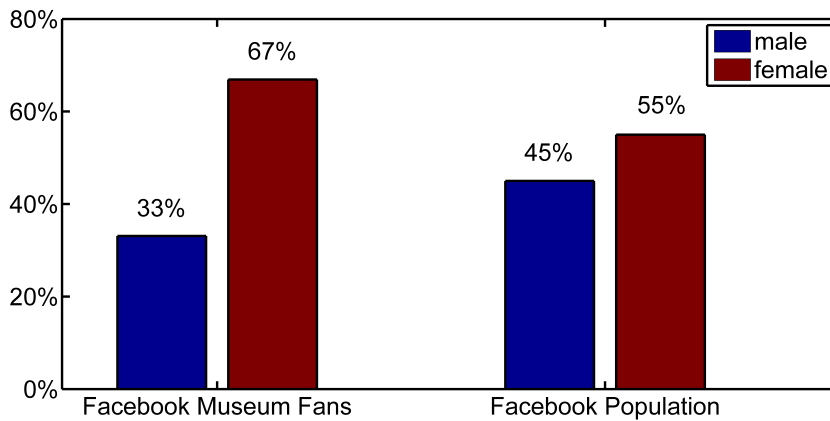


Figure 5.13: Sex Ratio Facebook: Distribution of men and women from museum fans on Facebook and overall Facebook population.

second most used language is English. Undefined language is the third biggest group. These are profiles which are not users but public pages. It is not possible to detect the used language of public pages. All other languages are used by less than 220 individuals.

From the 6212 retrieved users state 528 no sex. Profiles without a stated sex are either page profiles or individual profiles who do not want to disclose their sex publicly. From the remaining users are two thirds female. Figure 5.13 illustrates the sex ratio of users who interacted with the museums' pages and the sex ratio of all users in the network. The data concerning the whole population is taken from Quantcast⁴.

The sex ratio of users who interacted with museums and the sex ratio of the whole Facebook

⁴Quantcast. facebook.com. <https://www.quantcast.com/facebook.com#!demo> accessed April 1, 2013.

population seem very different. However, I used the binomial test to prove whether the difference is significant or not. The whole Facebook community consists of 45% men and 55% women. The sample consists of 1881 men and 3803 women. For the test I use the significance level $\alpha = 1\%$. The null hypothesis states that the sex is equally distributed in both groups:

$$H_0 : p = p_0$$

$$H_1 : p \neq p_0$$

The lower and upper boundaries c_l and c_u for the critical areas are defined by the formulas:

$$\sum_{i=0}^{c_l} B(i | p_0, n) \leq \frac{\alpha}{2}$$

$$\sum_{i=c_u}^n B(i | p_0, n) \leq \frac{\alpha}{2}$$

Applying this formulas results in $c_l = 2434$ and $c_u = 2681$. The null hypothesis is accepted if the measured value p is between the lower and upper boundary. 1881 persons of the sample are male. Hence, the number of men is below the lower boundary and the null hypothesis is rejected. This suggests that the sample of museum fans and the overall Facebook population differ from each other.

5.2.2 Twitter

Five of the eight Federal Museums maintain a Twitter account. The five museums have 5713 followers in total and 4327 unique followers. I retrieved each follower's used language and the number of followers, followings, and tweets.

Figure 5.14 illustrates the used languages of the museums' Twitter followers. English is the most used language. This is different to the results from Facebook. The second most used language is German. Spanish and Italian are both used by more than 150 individuals. All other languages are used by less than 100 users.

Next, I analysed how active the museums' followers are and compare that again to the Twitter community. Figure 5.15 displays the mean and the median for the number of followers, followings, and tweets. The blue circle marks the mean for every feature. A red line indicates the median and inside the box are all values within the 25th and 75th percentiles. The museums' followers have on average 2046 followers, follow 1414 other accounts, and post 1227 tweets.

The results show a big difference to other research about the Twitter community. In 2012, Beevolve conducted an analysis of 36 million Twitter users and conclude that the average Twitter user has 208 followers, follows 102 other users, and posts 794 tweets⁵. Diego Basch did the same examination with 1 million Twitter users in 2012. Users in his dataset have 85 fowollers, follow 85 other accounts, and post 520 tweets on average⁶.

⁵Beevolve. An Exhaustive Study of Twitter Users Across the World. <http://www.beevolve.com/twitter-statistics> accessed April 4, 2013.

⁶Diego Basch's Blog. Some Fresh Twitter Stats. <http://diegobasch.com/some-fresh-twitter-stats-as-of-july-2012> accessed April 4, 2013.

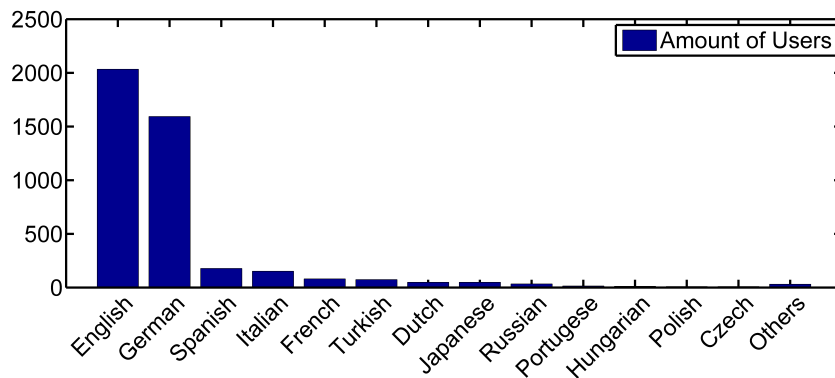


Figure 5.14: Language settings of Twitter users

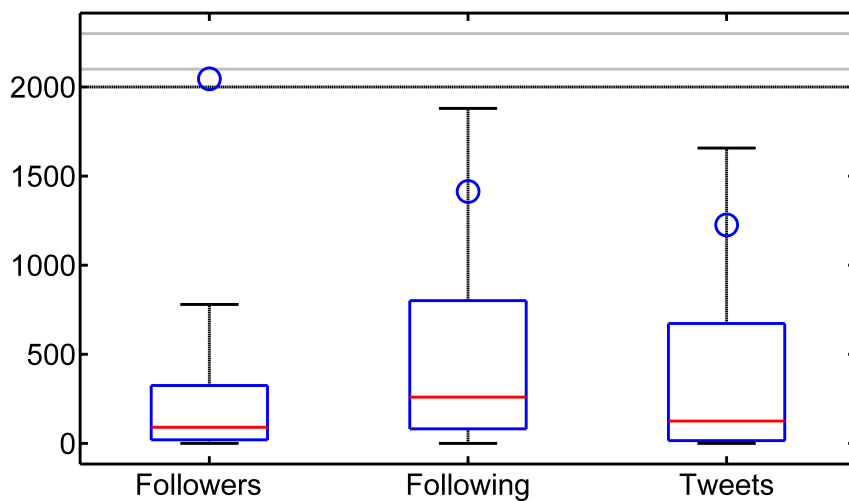


Figure 5.15: Number of followers, followings, and tweets of Twitter users with the medians as red line, the quartiles within the blue box, and the means as blue circles.

The comparison with other studies suggests that followers of museums are more active than Twitter users in general. Museums' followers have more followers, follow more users, and posted more tweets than the average Twitter user.

5.2.3 Foursquare

I retrieved 233 distinct users with the Foursquare API. Foursquare allows access to the majority of user information. I retrieved name, sex, home city, and the number of friends, tips, badges,

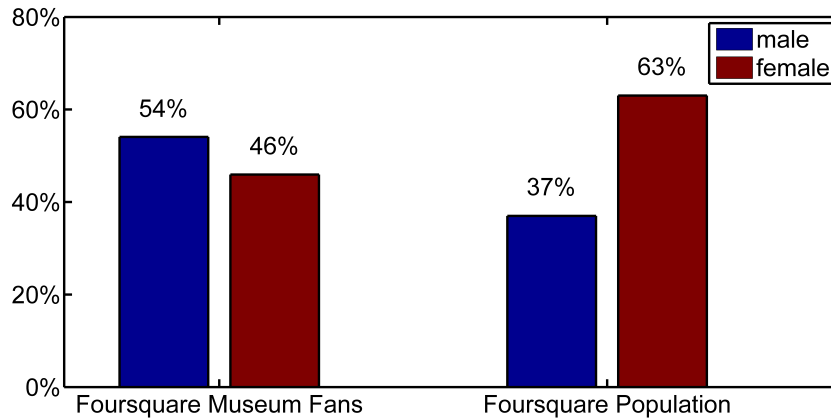


Figure 5.16: Sex Ratio Foursquare: Distribution of men and women from museum fans on Foursquare and overall Foursquare population.

mayorships, check-ins, todos, and photos.

I was able to find user statistics of the Foursquare population for some of the characteristics. Foursquare itself reveals only the number of users and check-ins⁷. Every user has 100 check-ins on average. Users of my sample have 1611 check-ins on average. The median of the sample is 700. This suggests that people who interacted with museums on Foursquare are more active than the general Foursquare population.

A narrow majority of users in the sample are male whereas the overall Foursquare population is predominantly female. The sex ratio of both the sample and the population is shown in Figure 5.16. The data of the Foursquare population is taken from Quantcast⁸.

Again, I use the binomial test to prove the significance of the sex ratio's difference. 37% of the Foursquare population are male. The sample consists of 113 men and 96 women. I test for a significance level of $\alpha = 1\%$. The null hypothesis claims that the sex ratio of the sample is equal to the sex ratio of the population:

$$H_0 : p = p_0$$

$$H_1 : p \neq p_0$$

The lower and upper boundaries c_l and c_u for the critical areas are calculated with the formulas:

$$\sum_{i=0}^{c_l} B(i | p_0, n) \leq \frac{\alpha}{2}$$

$$\sum_{i=c_u}^n B(i | p_0, n) \leq \frac{\alpha}{2}$$

⁷Foursquare. About Foursquare. <https://foursquare.com/about> accessed April 7, 2013.

⁸Quantcast. foursquare.com. <https://www.quantcast.com/foursquare.com#!demo> accessed April 1, 2013.

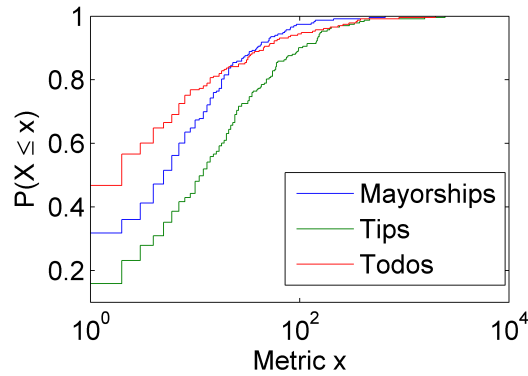


Figure 5.17: Cumulative distribution of the number of mayorships, tips, and todos of Foursquare users on a log scale.

This results in the confidence interval $c_l = 54$ and $c_u = 100$. The null hypothesis is accepted if the measured value p is within the confidence interval. 113 persons of the sample are male. The number of men exceeds the upper boundary and the null hypothesis is rejected. Hence, there is evidence that the sample population of people who interacted with museums on Foursquare and the overall Foursquare population do not have similar sex ratios.

Pontes et al. state in their paper that the distribution of number of mayorships, tips, and todos are skewed with a heavy tail [Pontes et al., 2012]. Hence, the majority of users have few mayorships, tips, and todos and only a small minority of users have a high number of mayorships, tips, and todos. The sample of users who interact with museums on Foursquare exhibit the same effect. I illustrate the phenomenon in 5.17. The figure shows the cumulative distribution of the number of mayorships, tips, and todos on a log scale.

Summary and Future Work

6.1 Summary

I showed with my master's thesis the importance of social media for businesses in general and for cultural institutions in particular. For example, museums can use social media tools for audience research, content tagging or exhibition developments. Nevertheless, it is essential that cultural institutions study the handling of social media before they start engaging with it. It is important to know the characteristics of available platforms. Every social media platform offers various features and users expect different behaviour from the participants. Next, it is essential that institutions participate actively. The provided content should be authentic and interesting for the community. The goal is to spark user engagement which leads to a broader reach of the posted messages. Cultural institutions also have to observe their fans and adapt to their behaviour in order to sustain and expand the existing community.

In my master's thesis, I extracted data from Facebook, Twitter, and Foursquare and compared the results. The analysis of extracted data shows that cultural institutions prefer Facebook over Twitter. Facebook accounts also acquire more fans than Twitter accounts. The two most used languages in the two social networks are German and English. Whereas Facebook users prefer German, Twitter users prefer English. Cultural institutions should schedule their posts on both networks more careful in order to spark engagement from the audience. More posts on weekends could increase user interaction and the museum's reach.

Furthermore, I tried to identify the factors for successful social media appearances. The first variable I tested was the number of visitors. The research question was whether popular museums also have more fans on social networks. According to my analysis, the answer to this question is true for Facebook and Foursquare. Both networks exhibit evidence that the number of visitors have positive influence on the number of people who interact with the institution's online representation. The same effect could not be observed for Twitter. The number of followers on Twitter is clearly not dependent on popularity of a museum.

I also tested if the activity of a cultural institution has a significant influence on the number of fans. Cultural institutions do not participate actively on Foursquare. Hence, the question is only

valid for Facebook and Twitter. I observed a significant relation between activity and number of followers on Twitter. The results for Facebook are more indistinct. A correlation only exists if the factor time is not taken into account.

At last, I analysed the users who interact with the cultural institutions on social media platforms. The amount of information and the kind of data I could acquire differed between the networks. Twitter is the only platform where I was able to extract information about all the institution's followers. Facebook and Foursquare allow only access to users who interacted with the museums' online representations. Facebook in general is very reluctant with user information. The network only allows access to name, localisation, and sex. Twitter and Foursquare both allow access to all public available user information.

I tested whether the extracted sample has the same characteristics than the overall population of the social networks. This is not true for all three social networks. My sample populations are different for all three cases. The sample from Facebook contains significantly less men than the sex ratio of the overall population would suggest. The Foursquare sample on the other hand contains too many men in order to match with the Foursquare population. Users who checked in to cultural institutions on Foursquare also seem to use the social network more actively than the average user. The same fact is evident for Twitter. Followers of museums have far more followers themselves, followed more other accounts, and posted more tweets than the average Twitter users.

My work demonstrates the possibilities of social media analysis for cultural institutions. More research is necessary to gain further insights into user engagement and the demographic structures of fans and followers.

6.2 Future Work

My social media analysis for cultural institutions is limited to museums in Vienna and the social networks Facebook, Twitter, and Foursquare. I propose the potential improvements for further research:

1. Data collection method

I used data crawling to retrieve data from the social networks. The developed script calls the APIs from the social networks and saves the response in a database. Another possibility to acquire information are questionnaires and interviews. Participants are recruited in an offline context. With this method it is possible to compare online to offline users and get insights about the motivations of users. Another data collection method for Facebook is the development of applications. Facebook applications can ask for more information about the user.

2. Scope of analysis

I used 32 cultural institutions in Vienna and their representation on three social networks for this analysis. The significance of my results can be further tested with an extension of the scope of analysis. The structure of the database allows adding cultural institutions on the one hand and social media platforms on the other hand. With the inclusion of

institutions from other cities or countries would it also be possible to compare the social media appearances and the fans from different locations.

3. **Demographic analysis**

The results of the analysis show that fans and followers of cultural institutions show different characteristics than the overall population of the social networks. Therefore, more research is necessary to identify and characterise users who interact with museums online.

4. **Sentiment analysis**

Further research could include sentiment analysis in the results. Sentiment analysis extracts the subjective information of a text. With this analysis is it possible to detect the opinion of users who interact with cultural institutions. Combined with the results of the structural analysis is it feasible to gain more insights in the motivations and attitudes of fans and followers.

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Resources

A.1 Social Media Appearances of Cultural Institutions

The tables A.1 to A.5 comprehend the usernames of social media appearances of the cultural institutions from my analysis. The links to the profiles can be found as footnotes.

Table A.1: Social Media Appearances of Galleries

Museum	Facebook	Twitter	Foursquare
Kunsthalle Wien	Kunsthalle Wien ^a	@KunsthalleWien ^b	KUNSTHALLE ^c
Vienna Künstlerhaus	brut Wien ^d	@brutwien ^e	Künstlerhaus ^f
Wiener Secession, Association of Visual Artists	Wiener Secession, Association of Visual Artists ^g		Secession ^h

^aFacebook. Kunsthalle Wien. <https://www.facebook.com/101947703109> accessed 08 Mar 2013.

^bTwitter. Kunsthalle Wien. <https://twitter.com/KunsthalleWien> accessed 08 Mar 2013.

^cFoursquare. KUNSTHALLE. <https://foursquare.com/v/kunsthalle/4b8f8975f964a5205c5733e3> accessed 08 Mar 2013.

^dFacebook. brut Wien. <https://www.facebook.com/123508830997774> accessed 08 Mar 2013.

^eTwitter. brut Wien. <https://twitter.com/brutwien> accessed 08 Mar 2013.

^fFoursquare. Künstlerhaus. <https://foursquare.com/v/kunstlerhaus/4b058894f964a520c5ce22e3> accessed 08 Mar 2013.

^gFacebook. Wiener Secession, Association of Visual Artists. <https://www.facebook.com/167467858314> accessed 08 Mar 2013.

^hFoursquare. Secession. <https://foursquare.com/v/secession/4b058894f964a520e7ce22e3> accessed 08 Mar 2013.

A.2 Comparison of Social Network Appearances

The tables A.6 to A.8 compare data which I extracted from Facebook, Twitter and Foursquare. The column 'Visitors in 2011' shows information from Statistik Austria¹. The data from all three social networks was extracted on 8th of April, 2013.

Table A.6 shows the museums which are represented on Facebook. The records are ordered by the number of likes. Additionally, the table indicates since when the cultural institution is active and how many wall posts are published.

The social media appearances of cultural institutions on Twitter are presented in Table A.7. The table shows the number of followers, the number of museum visitors in 2011, the creation date of the account and the number of published tweets.

Table A.8 comprehends the online representation of physical cultural institutions. The table presents the number of check-ins, the number of unique users who checked in and the number of visitors in 2011.

¹Meistbesuchte Museen und Ausstellungen 2002 bis 2011 nach Einrichtungstyp, Eigentüemer bzw. Erhalter und Bundesland. http://www.statistik.at/web_de/static/meistbesuchte_museen_und_ausstellungen_2002_bis_2011_nach_einrichtungstyp__021261.pdf accessed 10 Apr 2013.

Table A.2: Social Media Appearances of Austrian Federal Museums

Museum	Facebook	Twitter	Foursquare
Albertina Austrian National Library	Albertina Museum ^a Österreichische Nationalbibliothek ^d	@AlbertinaMuseum ^b	Albertina ^c Österreichische Nationalbibliothek - Austrian National Library ^e
Belvedere Museum MAK - Museum of Applied Arts	Belvedere Museum ^f MAK - Austrian Museum of Applied Arts / Contemporary Art ⁱ	@belvederewien ^g @MAKWien ^j	Belvedere ^h MAK - Austrian Museum of Applied Arts/Contemporary Art ^k
mumok - Museum of Modern Art Foundation Ludwig Museum of Art History Museum of Natural History of Vienna	MUMOK - Museum moderner Kunst Wien ^l Kunsthistorisches Museum Wien ^o NhM Naturhistorisches Museum Wien ^r	@MUMOKWien ^m @KHM_Wien ^p @nhmWien ^s	mumok ⁿ Kunsthistorisches Museum ^q Naturhistorisches Museum ^t
Vienna Technical Museum	Technisches Museum Wien ^u		Technisches Museum ^v

^aFacebook. Albertina Museum. <https://www.facebook.com/207782682950> accessed 08 Mar 2013.

^bTwitter. Albertina Museum. <https://twitter.com/AlbertinaMuseum> accessed 08 Mar 2013.

^cFoursquare. Albertina. <https://foursquare.com/v/albertina/4b058894f964a520c4ce22e3> accessed 08 Mar 2013.

^dFacebook. Österreichische Nationalbibliothek. <https://www.facebook.com/309267675822635> accessed 08 Mar 2013.

^eFoursquare. Österreichische Nationalbibliothek - Austrian National Library. <https://foursquare.com/v/österreichische-nationalbibliothek--austrian-national-library/4be26dee21d5a593ab9b1611> accessed 08 Mar 2013.

^fFacebook. Belvedere Museum. <https://www.facebook.com/68213601503> accessed 08 Mar 2013.

^gTwitter. Belvedere Museum. <https://twitter.com/belvederewien> accessed 08 Mar 2013.

^hFoursquare. Belvedere. <https://foursquare.com/v/belvedere/4b058892f964a5204fce22e3> accessed 08 Mar 2013.

ⁱFacebook. MAK - Austrian Museum of Applied Arts / Contemporary Art. <https://www.facebook.com/92833254894> accessed 08 Mar 2013.

^jTwitter. MAK Wien. <https://twitter.com/MAKWien> accessed 08 Mar 2013.

^kFoursquare. MAK - Austrian Museum of Applied Arts/Contemporary Art. <https://foursquare.com/v/mak--austrian-museum-of-applied-artscontemporary-art/4b058894f964a520d0ce22e3> accessed 08 Mar 2013.

^lFacebook. MUMOK - Museum moderner Kunst Wien. <https://www.facebook.com/60590027335> accessed 08 Mar 2013.

^mTwitter. mumok Vienna. <https://twitter.com/MUMOKWien> accessed 08 Mar 2013.

ⁿFoursquare. mumok. <https://foursquare.com/v/mumok/4b058894f964a520dcce22e3> accessed 08 Mar 2013.

^oFacebook. Kunsthistorisches Museum Wien. <https://www.facebook.com/80844418963> accessed 08 Mar 2013.

^pTwitter. KHM Wien. https://twitter.com/KHM_Wien accessed 08 Mar 2013.

^qFoursquare. Kunsthistorisches Museum. <https://foursquare.com/v/kunsthistorisches-museum/4b058894f964a520d2ce22e3> accessed 08 Mar 2013.

^rFacebook. NhM Naturhistorisches Museum Wien. <https://www.facebook.com/316935335271> accessed 08 Mar 2013.

^sTwitter. nhm Wien. <https://twitter.com/nhmWien> accessed 08 Mar 2013.

^tFoursquare. Naturhistorisches Museum. <https://foursquare.com/v/naturhistorisches-museum/4b1699f8f964a520c5ba23e3> accessed 08 Mar 2013.

^uFacebook. Technisches Museum Wien. <https://www.facebook.com/300347416646965> accessed 08 Mar 2013.

^vFoursquare. Technisches Museum. <https://foursquare.com/v/technisches-museum/4b058894f964a520d5ce22e3> accessed 08 Mar 2013.

Table A.3: Social Media Appearances of Museums Sustained by the Republic of Austria

Museum	Facebook	Twitter	Foursquare
Botanical Garden of the University of Vienna			Botanischer Garten ^a
Hofburg	Hofburg Wien: Kaiserappartements Sisi Museum Silberkammer ^b	@hofburg_vienna ^c	Hofburg ^d
Leopold Museum	Leopold Museum ^e		Leopold Museum ^f
Museum of Military History	Heeresgeschichtliches Museum / Militärhistorisches Institut ^g		Heeresgeschichtliches Museum ^h
Palmenhaus Schönbrunn			Palmenhaus ⁱ
Schönbrunn Palace	Schloß Schönbrunn ^j	@schonbrunn ^k	Schloss Schönbrunn ^l
Schönbrunn Zoo	Zoo Vienna Schönbrunn ^m	@zoovienna ⁿ	Tiergarten Schönbrunn ^o
Spanish Riding School	Spanische Hofreitschule ^p	@hofreitschule ^q	Spanische Hofreitschule ^r

^aFoursquare. Botanischer Garten. <https://foursquare.com/v/botanischer-garten/4b8d3a05f964a5207fee32e3> accessed 08 Mar 2013.

^bFacebook. Hofburg Wien: Kaiserappartements | Sisi Museum | Silberkammer. <https://www.facebook.com/hofburg.wien> accessed 08 Mar 2013.

^cTwitter. Sisi Museum Wien. https://twitter.com/hofburg_vienna accessed 08 Mar 2013.

^dFoursquare. Hofburg. <https://foursquare.com/v/hofburg/4a112513f964a5200e771fe3> accessed 08 Mar 2013.

^eFacebook. Leopold Museum. <https://www.facebook.com/201375765087> accessed 08 Mar 2013.

^fFoursquare. Leopold Museum. <https://foursquare.com/v/leopold-museum/4b058895f964a520f9ce22e3?ref=atw> accessed 08 Mar 2013.

^gFacebook. Heeresgeschichtliches Museum / Militärhistorisches Institut. <https://www.facebook.com/188423051181127> accessed 08 Mar 2013.

^hFoursquare. Heeresgeschichtliches Museum. <https://foursquare.com/v/heeresgeschichtliches-museum/4c825b77d6ebbf7c1504aa4> accessed 08 Mar 2013.

ⁱFoursquare. Palmenhaus. <https://foursquare.com/v/palmenhaus/4d7ce2a38f89224bc4af4ab26> accessed 08 Mar 2013.

^jFacebook. Schloß Schönbrunn. <https://www.facebook.com/100936630434> accessed 08 Mar 2013.

^kTwitter. Schönbrunn Palace. <https://twitter.com/schonbrunn> accessed 08 Mar 2013.

^lFoursquare. Schloss Schönbrunn. <https://foursquare.com/v/schloss-schonbrunn/4b058893f964a52081ce22e3> accessed 08 Mar 2013.

^mFacebook. Zoo Vienna Schönbrunn. <https://www.facebook.com/126483174073663> accessed 08 Mar 2013.

ⁿTwitter. Tiergarten Schönbrunn. <https://twitter.com/zoovienna> accessed 08 Mar 2013.

^oFoursquare. Tiergarten Schönbrunn. <https://foursquare.com/v/4b058893f964a52084ce22e3> accessed 08 Mar 2013.

^pFacebook. Spanische Hofreitschule. <https://www.facebook.com/268199146096> accessed 08 Mar 2013.

^qTwitter. Hofreitschule Wien. <https://twitter.com/hofreitschule> accessed 08 Mar 2013.

^rFoursquare. Spanische Hofreitschule. <https://foursquare.com/v/spanische-hofreitschule/4b07eed2f964a5204c0123e3> accessed 08 Mar 2013.

Table A.4: Social Media Appearances of Museums Sustained by the City of Vienna

Museum	Facebook	Twitter	Foursquare
Haus der Musik	Haus der Musik ^a	@hausdermusik ^b	Haus der Musik ^c
Jewish Museum Vienna	Jüdisches Museum Wien ^d		Jüdisches Museum der Stadt Wien ^e
Kunst Haus Wien	Kunst Haus Wien. Museum Hundertwasser ^f	@KunstHausWien ^g	Kunst Haus Wien. Museum Hundertwasser ^h
Mozarthaus Vienna	Mozarthaus Vienna ⁱ	@MozarthausVie ^j	Mozarthaus ^k
Planetarium Wien			Planetarium Wien ^l
Wien Museum	Wien Museum Wien ^m		Wien Museum ⁿ

^aFacebook. Haus der Musik. <https://www.facebook.com/73278680199> accessed 08 Mar 2013.

^bTwitter. Haus der Musik. <https://twitter.com/hausdermusik> accessed 08 Mar 2013.

^cFoursquare. Haus der Musik. <https://foursquare.com/v/haus-der-musik/4b058895f964a520f5ce22e3> accessed 08 Mar 2013.

^dFacebook. Jüdisches Museum Wien. <https://www.facebook.com/360870255318> accessed 08 Mar 2013.

^eFoursquare. Jüdisches Museum der Stadt Wien. <https://foursquare.com/v/jüdisches-museum-der-stadt-wien/4c9a259178fc236acbe73297> accessed 08 Mar 2013.

^fFacebook. Kunst Haus Wien. Museum Hundertwasser. <https://www.facebook.com/169050226448122> accessed 08 Mar 2013.

^gTwitter. Lysson. <https://twitter.com/KunstHausWien> accessed 08 Mar 2013.

^hFoursquare. Kunst Haus Wien. Museum Hundertwasser. <https://foursquare.com/v/kunst-haus-wien-museum-hundertwasser/4b058894f964a520cdce22e3> accessed 08 Mar 2013.

ⁱFacebook. Mozarthaus Vienna. <https://www.facebook.com/173852912655928> accessed 08 Mar 2013.

^jTwitter. Mozarthaus Vienna. <https://twitter.com/MozarthausVie> accessed 08 Mar 2013.

^kFoursquare. Mozarthaus. <https://foursquare.com/v/mozarthaus/4c99fe63292a6dcbfdc9ca76> accessed 08 Mar 2013.

^lFoursquare. Planetarium Wien. <https://foursquare.com/v/planetarium-wien/4f64adbee4b06cb9fb6bbf0c> accessed 08 Mar 2013.

^mFacebook. Wien Museum Wien. <https://www.facebook.com/271093876267961> accessed 08 Mar 2013.

ⁿFoursquare. Wien Museum. <https://foursquare.com/v/wien-museum/4b5c4fe3f964a520912a29e3> accessed 08 Mar 2013.

Table A.5: Social Media Appearances of Private Owned Museums

Museum	Facebook	Twitter	Foursquare
Architekturzentrum Wien	Az W Architekturzentrum Wien ^a		Az W - Architekturzentrum Wien ^b
Austrian Film Museum	Österreichisches Filmmuseum ^c	@filmmuseum ^d	Österreichisches Filmmuseum ^e
Haus des Meeres	Haus des Meeres Zoo ^f	@HausdesMeeres ^g	Haus des Meeres - Aqua Terra Zoo ^h
Imperial Crypt	Kapuzinerkirche und Kaisergruft in Wien ⁱ		Kapuzinergruft - Kaisergruft ^j
Sigmund Freud Museum	Sigmund Freud Museum ^k	@FreudMuseum ^l	Sigmund Freud Museum ^m
St. Stephen's Cathedral			Stephansdom ⁿ
ZOOM Children's Museum	ZOOM Kindermuseum Wien ^o		ZOOM Kindermuseum ^p

^aFacebook. Az W Architekturzentrum Wien. <https://www.facebook.com/323366207086> accessed 08 Mar 2013.

^bFoursquare. Az W - Architekturzentrum Wien. <https://foursquare.com/v/az-w--architekturzentrum-wien/4d691d654c4637047a859db3> accessed 08 Mar 2013.

^cFacebook. Österreichisches Filmmuseum. <https://www.facebook.com/178180455598174> accessed 08 Mar 2013.

^dTwitter. filmmuseum. <https://twitter.com/filmmuseum> accessed 08 Mar 2013.

^eFoursquare. Österreichisches Filmmuseum. <https://foursquare.com/v/österreichisches-filmmuseum/4d5810fe7c0b3704a9c0dd08> accessed 08 Mar 2013.

^fFacebook. Haus des Meeres Zoo. <https://www.facebook.com/223159565242> accessed 08 Mar 2013.

^gTwitter. Haus des Meeres. <https://twitter.com/HausdesMeeres> accessed 08 Mar 2013.

^hFoursquare. Haus des Meeres - Aqua Terra Zoo. <https://foursquare.com/v/haus-des-meeres---aqua-terra-zoo/4b7cf243f964a52002aa2fe3> accessed 08 Mar 2013.

ⁱFacebook. Kapuzinerkirche und Kaisergruft in Wien. <https://www.facebook.com/615078501854512> accessed 08 Mar 2013.

^jFoursquare. Kapuzinergruft - Kaisergruft. <https://foursquare.com/v/kapuzinergruft--kaisergruft/4c9782f194a0236a6bb1a712> accessed 08 Mar 2013.

^kFacebook. Sigmund Freud Museum. <https://www.facebook.com/98637435078> accessed 08 Mar 2013.

^lTwitter. Sigmund Freud Museum. <https://twitter.com/FreudMuseum> accessed 08 Mar 2013.

^mFoursquare. Sigmund Freud Museum. <https://foursquare.com/v/sigmund-freud-museum/4b058894f964a520c8ce22e3> accessed 08 Mar 2013.

ⁿFoursquare. Stephansdom. <https://foursquare.com/v/stephansdom/4b058892f964a52067ce22e3> accessed 08 Mar 2013.

^oFacebook. ZOOM Kindermuseum Wien. <https://www.facebook.com/204634709612610> accessed 08 Mar 2013.

^pFoursquare. ZOOM Kindermuseum. <https://foursquare.com/v/zoom-kindermuseum/4bd68e887b1876b03abf8c86> accessed 08 Mar 2013.

Table A.6: Social Media Appearances of Cultural Institutions on Facebook

Museum	Likes	Visitors in 2011	First Post	Wall Posts
Haus der Musik	35198	166800	17.03.2009	775
Schönbrunn Palace	24213	2665000	29.04.2009	881
Albertina	20939	574700	18.12.2009	843
Kunst Haus Wien	19015	190200	12.11.2010	454
Spanisch Riding School	16712	343200	15.01.2010	399
mumok - Museum of Modern Art Foundation Ludwig	16425	148200	28.04.2009	1066
Schönbrunn Zoo	14990	2355100	19.10.2010	376
Museum of Art History	13887	1120100	14.05.2009	442
Kunsthalle Wien	12677	195300	11.08.2009	1667
Mozarthaus Vienna	12650	130300	18.01.2011	450
Belvedere Museum	11361	888600	10.04.2009	787
Vienna Künstlerhaus	8902	52400	03.05.2010	828
Leopold Museum	8452	294400	07.07.2009	379
MAK - Museum of Applied Arts	7498	156200	25.06.2009	783
Sigmund Freud Museum	6195	68900	16.06.2009	195
Museum of Natural History of Vienna	5667	553000	04.02.2010	797
Hofburg	5174	627000	29.04.2009	445
Architekturzentrum Wien	4698	62800	23.02.2010	435
Haus des Meeres	4694	410500	29.06.2009	426
Wien Museum	4232	216600	02.11.2011	609
Wiener Secession, Association of Visual Artists	2710	99600	09.11.2009	206
Austrian National Library	2482	241400	23.05.2012	524
Jewish Museum Vienna	2131	59900	07.10.2010	330
Austrian Film Museum	1700	54200	14.10.2011	162
Vienna Technical Museum	1372	295700	11.10.2011	43
Museum of Military History	1192	154300	08.02.2011	415
ZOOM Children's Museum	853	113400	22.11.2011	165
Imperial Crypt	17	220000	05.04.2013	8

Table A.7: Social Media Appearances of Cultural Institutions on Twitter

Museum	Followers	Visitors in 2011	Creation Date	Tweets
Kunsthalle Wien	4086	195300	04.11.2009	1323
mumok - Museum of Modern Art Foundation Ludwig	2881	148200	14.04.2009	844
Vienna Künstlerhaus	1899	52400	21.10.2009	383
Haus der Musik	1178	166800	13.02.2009	1016
Belvedere Museum	1095	888600	03.04.2009	812
Albertina	1051	574700	01.03.2010	117
Hofburg	980	627000	29.04.2009	373
Schönbrunn Palace	932	2665000	02.06.2009	602
Museum of Art History	679	1120100	20.09.2011	110
Sigmund Freud Museum	337	68900	15.09.2009	54
MAK - Museum of Applied Arts	208	156200	07.11.2011	65
Austrian Film Museum	143	54200	23.05.2009	1
Haus des Meeres	41	410500	08.11.2011	358
Schönbrunn Zoo	26	2355100	12.11.2010	1
Mozarthaus Vienna	17	130300	15.11.2011	3
Kunst Haus Wien	5	190200	28.12.2009	0
Spanish Riding School	4	343200	06.04.2013	7
Museum of Natural History of Vienna	1	553000	23.09.2012	0

Table A.8: Social Media Appearances of Cultural Institutions on Foursquare

Museum	Check-ins	Unique Users	Visitors in 2011
Schönbrunn Palace	9449	7095	2665000
St. Stephen's Cathedral	5334	3928	560000
Belvedere Museum	4019	2658	888600
Albertina	4013	3098	574700
Schönbrunn Zoo	3833	2336	2355100
Hofburg	3780	2712	627000
mumok - Museum of Modern Art Foundation Ludwig	2026	1484	148200
Austrian National Library	2010	667	241400
Museum of Art History	1824	1469	1120100
Museum of Natural History of Vienna	1711	1405	553000
Leopold Museum	1647	1482	294400
MAK - Museum of Applied Arts	1436	894	156200
Spanish Riding School	1264	1048	343200
Haus der Musik	1168	746	166800
Wiener Secession, Association of Visual Artists	965	675	99600
Vienna Technical Museum	955	644	295700
Haus des Meeres	940	772	410500
Mozarthaus Vienna	877	634	130300
Kunst Haus Wien	662	583	190200
Kunsthalle Wien	594	456	195300
Wien Museum	554	440	216600
Botanical Garden of the University of Vienna	547	225	150000
Sigmund Freud Museum	462	424	68900
Museum of Military History	439	271	154300
Vienna Künstlerhaus	432	273	52400
ZOOM Children's Museum	254	166	113400
Imperial Crypt	228	199	220000
Palmenhaus Schönbrunn	193	170	139500
Österreichisches Filmmuseum	161	91	54200
Jewish Museum Vienna	154	128	59900
Architekturzentrum Wien	142	107	62800
Planetarium Wien	45	42	62100