Research in the Instagram Context: Approaches and Methods

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Abstract

Social media is not only an important component for mass communication but also a toolkit to provide people with various services. As the most representative visual-oriented social networking site in the world, Instagram enables users to take photos and videos, as well as share them on other platforms with its accurate target user positioning. There have been many researchers involving with studies on Instagram's development from different perspectives. This paper conducts an extensive literature review of Instagram, focusing on the research methods that researchers use to collect and analyze data. Based on the review, it can be seen that most scholars collect Instagram data by capturing API data, designing questionnaires, and face-to-face interviews. Both quantitative methods such as data modeling and regression analysis and qualitative methods such as text analysis and context analysis are used to analyze Instagram features. Researchers also utilized advanced technical tools and analytical methods, such as face recognition, comparative analysis, and case studies, to gain a more insightful perception on Instagram.

Keywords: Social media; Instagram; Literature review; Research methods.

1. Introduction

With the rapid development of mobile Internet technology in the world, social media has played a more important role in people's life. It has been playing an increasingly diversified role in the society after years of development. Nowadays, social media is not only a platform for mass communication, but also a tool to provide various services for people. Instagram, which is the world's fastest-growing social network, can be seen as a typical representative of social media in the modern society (Sheldon and Bryant, 2016). It not only enables its users to take pictures and videos, but also assists its users to share them on other platforms. In the past few years, many researchers had followed its progress and wrote many research papers to discuss its development. In this paper, a critical review of the researches on Instagram will be analysed to have a deeper understanding of Instagram from different aspects, and the focus of this paper will be on the research methods used in collecting and analysing data.

In order to review literature in a more holistic approach, this paper will be divided into four parts. In the first part, the development of social media will be discussed as the background of the whole article. Then an introduction of Instagram will be analysed in the second part, and thus the methodology, the significance and the literature analysis methods of the study are presented. In the following part, the research methods that researchers adopted will be discussed and analysed according to different categories. Then in the last part, a summary will be given as a conclusion.

2. The Development of Social Media
2.1. Definition of Social Media

As the earliest scholars to study social media, Boyd and Ellison (2007) defined social network as a web-based service, which allowed the users to build their own public web page in an interconnected system and enabled them to browse and access the information of other users who were linked to them within this system. According to their research, this service has opened the new era of mankind in the trend of digitalization and mobility.

Broadly speaking, the social media has several unique features. First of all, social media covers both the user-generated content and user-to-user relationships (Boyd and Ellison, 2007). People can express their thoughts and feelings on the social media, which promotes the deepening of social relations through the interaction on the platforms. Besides, it establishes and maintains the user-to-user relationships through abundant user-generated content. With the help of social media, people can produce information, share information, and filter and disseminate information through evaluation and discussion. Moreover, social media is a highly technology-dependent information medium as well (Shirky, 2011). On the one hand, the development of technology ensures the

effectiveness and timeliness of information dissemination; on the other hand, it ensures the confidentiality of users' information as well.

2.2. A Flourishing Industry

During the past decades, the change of information technology made all kinds of network applications open up the number of users thoroughly. Under this background, social media has undergone a long period of development and innovation. The development and transformation of social media have changed the way of information dissemination, and gradually form a new information ecosystem, which integrates into people's social life and affects their behaviors. Meanwhile, the rapid development of social media highlights its broad market value at the same time.

According to the report published by *We Are Social and Hootsuite*, the number of Internet users worldwide has exceeded 4 billion in 2019. Moreover, the use of social media is growing rapidly. According to the report, 3.48 billion people were using social media to interact with each other from all over the world at the end of 2018. At the same time, with the development of mobile technology, the era of mobile social networking has come as well. In the report, *We Are Social and Hootsuite* (2019) concluded that about 5.11 billion people used smart phones to access the Internet on account of the development of mobile networks and smart devices in recent decades. Among these people, there were 3.25 billion active social media users on mobile devices *(We Are Social and Hootsuite*, 2019). It is precisely because of the huge market potential the major foreign network giants are spared no effort to attract more users and develop their own platform to seize the profit opportunities, which promote the development of social media conversely. Nowadays, major social media platforms, such as Facebook, Twitter, Instagram, Weibo, and Myspace, have already occupied most of people's leisure time and become an indispensable part of people's daily life.

2.3. Previous Research

Scholars have conducted extensive and in-depth research on social media in the meantime. Effing and Spil (2016), established the Social Media Strategy Cone to evaluate the strategies of different social media platforms. Besides, Wang *et al.* (2015) put forward the theory of rational addiction by analysing the development process of users' dependence on social media. Moreover, Asur and Huberman (2010) demonstrated the predictive function of social media by using the chat on Twitter.com to predict box-office revenues for movies. Overall, there are a lot of research literature on social media, covering the strategic research of social media, its impact on different users and some other aspects.

In the context of the fierce competition in social media industry, Instagram stands out successfully. From its inception in 2010 to its acquisition by Facebook in 2012, Instagram spent two years in writing a myth of Internet social media development. Then from the next part, this paper will focus on Instagram, and the different studies on Instagram will be discussed as well.

3. Instagram: The World-Famous Photo-Sharing Social Network
3.1. Introduction of Instagram

Instagram is a photo social application with functions of photo shooting, photo beautifying and sharing. It can also be seen as a new type of social media based on picture interaction because of its functions to assist people build social networking based on pictures (Jin *et al.*, 2015). This mobile app was officially published in Apple Appstore in October 2010. Its users' number grew rapidly after the app launched, with more than 100 thousand users registered in just one week. Afterwards Instagram became the focus of public attention on April 10, 2012. On that day, Facebook bought this company, which had only 551 days and 13 employees, for $1 billion in cash and stock. Nowadays, the number of Instagram users has exceeded 1 billion (Constine, 2018). With various types of maps and videos, it is not only a tool for social networking among friends, but also an important platform for bloggers to work. Meanwhile, in the business world, it is also a channel for global enterprises to attract web traffic and interact with consumers. As a social platform, the Instagram's success of standing out in the fierce competition is mainly because of its clear product positioning and prominent advantages when comparing with other social media platforms.

3.2. Clear Product Positioning

Compared with traditional social media software, which have a series of powerful functions, such as instant chat, personal status publishing, photo publishing and so on, Instagram abandons comprehensive functions and focuses only on the production of pictures (Smith, 2014). In order to make full use of the convenience of mobile terminal and simplify its application function as much as possible, Instagram only retains many basic functions, such as capture, photo makeover, photo sharing and commenting. This strategy makes it easy to learn and operate (Manovich, 2016). This clear product positioning helps users who like photo shooting and sharing quickly gather together on this app, and thus makes it a unique photo social network platform among the numerous social media platforms. Simultaneously, Instagram also associates with other social media applications, such as Facebook, Twitter and so on, to better extend the users' social activity by allowing users to share photos with friends on these platforms with only one click. Therefore, the strong professionalism and clear product positioning enable Instagram to achieve product differentiation and strong brand influence in a short time, thus making it stand out in the intense market competition.

As far as the product is concerned, Instagram also has many strong functional advantages. First of all, Instagram has a very high level of photo filters as a photo social platform, especially at that time when it launched the Apple store. Because of this reason, Instagram has attracted the attention of photo enthusiasts in a short period (Handayani, 2015). Besides, the upgrading and perfecting of this app pay close attention to users' preferences. Even now, there are few products like Instagram that are built around a single core function. The centralization of functions makes Instagram easy to operate, and thus enables new users to quickly grasp the method of using the product (Manovich, 2016). Moreover, the one-click sharing function allows users to share photos they like with users on other social platforms, which not only expands the scope of users' social networking, but also helps Instagram publicize among greater social groups for free (Handayani, 2015).

With the rapid development of mobile Internet technology and smart mobile terminals, the characteristics of social networks are changing slowly. Relying on the popularity of smart mobile terminals, the specificity and mobility of Instagram have enabled it to achieve bigger successes in the modern world. For the same reason, the success of Instagram has got attention from more and more researchers.

3.3. Instagram as a Site of Research

Utilization of this rich and huge data on Instagram is rather important for researchers. Based on Gillian Rose's conclusion in her book Visual Methodologies (Rose, 2012), I propose this revised model to look into the visual information on Instagram, and the interpretation of Instagram data could happen at four distinct sites: 1) process, the site how images are generated; 2) product, the site of an image itself and its content; 3) participants, the site where images encounter publisher and audience; 4) context, the site of production where images are created.

3.4. Literature on Instagram: Various Dimensions

With the popularity of Instagram, more and more literature on Instagram have been published in recent years. These literatures are belonging to different fields. As I conducted a brief search on Web of Science with topic "Instagram" (title, abstract, and keywords) and a time span between 2010 and 2019, *Computer Science, Communication, and Business* seem to be identified as the three most significant dimensions and disciplines to investigate on Instagram in the result of total 1226 publications (Figure 1 & 2).

Figure-1. Numbers of publications in "Instagram" research on WoS (2010-2019)
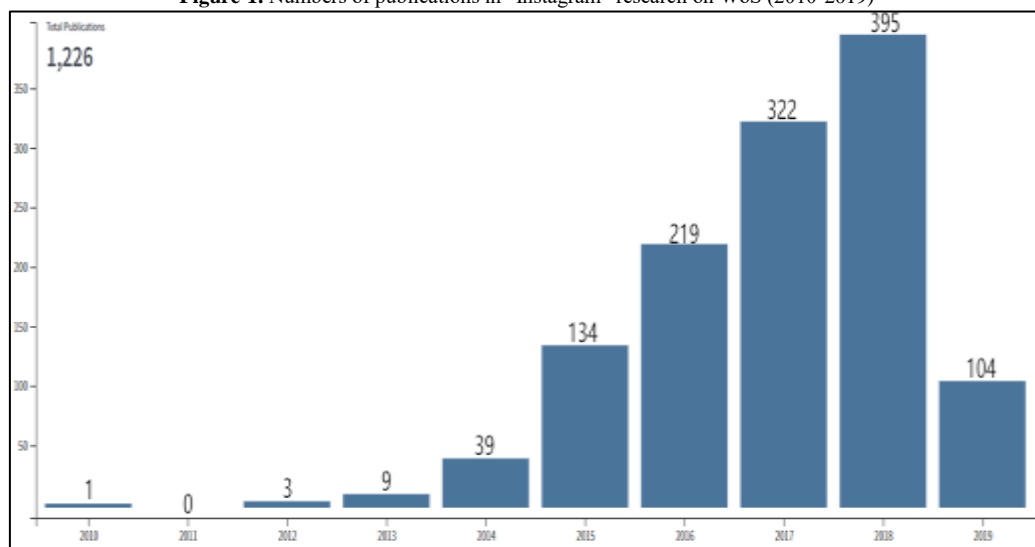
Figure-2. Proportion of "Instagram" research in different fields on WoS (2010-2019)

Field: Web of Science Categories	Record Count	% of 1,226
COMPUTER SCIENCE INFORMATION SYSTEMS	202	16.476 %
COMPUTER SCIENCE THEORY METHODS	158	12.887 %
COMMUNICATION	156	12.724 %
ENGINEERING ELECTRICAL ELECTRONIC	132	10.767 %
COMPUTER SCIENCE ARTIFICIAL INTELLIGENCE	98	7.993 %
BUSINESS	79	6.444 %
COMPUTER SCIENCE INTERDISCIPLINARY APPLICATIONS	74	6.036 %
SOCIAL SCIENCES INTERDISCIPLINARY	67	5.465 %
EDUCATION EDUCATIONAL RESEARCH	62	5.057 %
PSYCHOLOGY MULTIDISCIPLINARY	59	4.812 %

The researchers in the field of computer science are very concerned about the development of Instagram. Silva et al. (2013) and his partners used to study the potential of participatory sensing systems (PSSs) for supporting the study of urban social behavior and city dynamics by analysing the dataset of Instagram. After characterizing of the users' behavior on Instagram, they not only found advantages of the application of PSS, but also observed that cultural behaviors could be traced through the temporal photo sharing pattern. In another report, Manikonda et al. (2014) analysed not only the user activities, demographics, but also their social network structure on Instagram. In their research, they presented a quantitative analysis on millions of users and pictures collected from Instagram. After the careful analysis, they got the peroration that the social network properties on Instagram were different from other social media, and people were intended to share their locations with their friends on Instagram.

In the field of communication, especially health communication, the researchers pay attention to the relationship between the use of Instagram and some diseases, the effectiveness of people's access to medical information with the help of Instagram, and the treatment experience sharing condition on Instagram, etc. For instance, Turner and Lefevre (2017) discussed the relationship between Instagram use and symptoms of orthorexia nervosa in their paper. According to their research, they found that symptoms of orthorexia nervosa had a close relationship with higher Instagram use, while no other social media channel had this effect. Meanwhile, Jacobs et al. (2018) evaluated how to better understand the patients' experience regarding Gamma Knife with the help of social media, such as Instagram. After a study of the relevant posts queried on Instagram and Twitter, they concluded that social media made it easier for the patients to share their reactions to Gamma Knife radiosurgery.

Moreover, the research on Instagram is also one of the concerns in the field of business. As what is mentioned above, Instagram is not only a social platform for the users to share pictures and their emotions with their friends, but also a marketing and business promotion platform for the enterprises to promote their company's brands and products. For example, De Veirman et al. (2017) discussed the customers' experiences posted on the Instagram and other social media. In his opinion, the social media triggered the development of experience economy. Therefore, the businessmen should take into consideration of how to use this trend into their marketing strategies. In another paper, Greer and Ferguson (2017) discussed the application of Instagram to attract clients and promote corporate image. After analysing more than four thousand visuals from TV stations posted on Instagram, they found the top themes of these posts were news and promotion.

Overall, with the massive data on Instagram, researchers from different fields have studied the Instagram from different perspectives during the past several years. Although the researchers belong to different fields, they all adopt professional research methods, such as qualitative methods and quantitative methods, to ensure the scientific nature of research and the accuracy of conclusions (Jick, 1979). In the general research process, the researchers first collect data and information through questionnaires, data crawlers, interviews and other means. The massive data on the Instagram allows them to filter out the data and information they need after conditional screening. After that, some of the researchers adopt the quantitative methods to establish mathematical models, and then use them to calculate the various indicators and the numerical values of the analytic objects based on the data they collected (Ragin, 2014). Some other the researchers choose qualitative analysis to analyse the Instagram as the application of non-quantitative means, such as historical review, literature analysis, and comparative research, is also convincing in the process of research. It is without doubt that these two methods are not completely independent (Ragin, 2014). Many researchers use both these two methods to better analyse their problems. Some other diverse methods, such as case study and antitheses, are also used by some researchers to better explore the world of Instagram (Jick, 1979). Then in the next part, the attention will be put on the different approaches the researchers adopted in their latest literature.

4. Research Methods Adopted to Instagram Studies

Quantitative analysis methods are traditional research methods used by researchers. However, the number, scale and scope of social media data have created a demand for methodological innovation, which is uniquely suited to the examination of social media data in the modern world (Luke and Haase, 2017). Then in this part, a literature review will be done with the attention on the research methods they adopted to better understand how researchers analyse the Instagram from different perspectives.

4.1. Quantitative Approaches to Instagram Data

Quantitative analysis is a method of establishing mathematical models based on statistical data, calculating the various indicators, and evaluating their numerical values in analysing objects with mathematical models (Jick, 1979). It is one of most common methods for researchers to analyse the massive data on social media (Brannen, 2017). In the process of studying the Instagram data, many researchers have chosen the quantitative analysis methods to quantify information collected on the platform.

In the paper *Online Popularity and Topical Interests through the Lens of Instagram*, researchers tried to study the users' interaction network, social tagging activities and topic interests on Instagram (Ferrara et al., 2014). To achieve this goal, they first collected a sample by querying the Instagram API. Then in order to test the hypothesis that the users, which took pictures in limited areas, were more likely to attract more followers, they first tried to crawling location data from a list of popular locations. However, after some analysis, they found that it was hard to define followers' relationships with the data collected. Therefore, they changed their crawling strategy with new crawling program. Finally, they selected 72 popular contests and picked up about 2,100 users who participated in at least one of these contests. Through data modeling method, the collected data were analysed quantitatively to illustrate the characteristics of Instagram. During this research process, two algorithms, both the Louvain method and OSLOM, were carried out to analyse the structural features of Instagram. Some other quantitative analysis tools,

such as CLUTO clustering toolkit and point diagram, were also used to analyse the characteristics of Instagram (Ferrara *et al.*, 2014). To study the topical clusters of interest of users on Instagram, both the quantitative and qualitative methods were both used, which will be discussed in the next part.

In another paper, Bakhshi *et al.* (2014) investigated the relationship between facial photos and the participation passion of comments and likes from other users. According to the authors, the number of preference signals and comments is a quantitative indicator of the degree of social network discussion. Then in this paper, the researchers first collected images from Instagram API and then used the face detect tool to decide whether there was anyone in the photo. They collected 2000 popular images from the Instagram and evaluated each of these images. Then they presented statistical methods to model the two dependent variables, the number of likes and comments. Finally, they achieved their research goals by establishing regression equation. According to their research, the number of followers is the core driving factor of participation and the existence of faces really matters.

In addition, some other researchers also adopted the quantitative methods to study the Instagram from different angles. For instance, as what is mentioned above, the Silva *et al.* (2013) used to study of urban social behavior and city dynamics with the help of quantitative methods. In another similar article, Pittman and Reich (2016) studied how the image-based platforms ameliorate loneliness mainly with quantitative methods by using the SPSS. Then after a detailed data analysis, a conclusion was got that the more image-based platforms one uses, the less loneness one feels from their research.

Furthermore, the questionnaire methods are often used by researchers to collect data for quantitative analysis. For example, Lup *et al.* (2015) tested a model of the relationship between the usage of Instagram and depression. To collect useful data for the research, the researchers designed online questionnaires that contained demographics, Instagram use frequency and other information to verify their tests. According to their research, frequent use of Instagram has a negative impact on those who follows more strangers, while it has a positive impact on those who follows fewer strangers.

4.2. Qualitative Approaches to Instagram Data

Different from the quantitative methods, qualitative analysis methods are mainly based on the analyst's intuition and experience (Brannen, 2017). On the analysis of the object's past and present continuity and the latest information, the researchers may make a judgment on the nature, characteristics, development and change of one object (Brannen, 2017). Compared to the quantitative analysis methods, which is more scientific but needs advanced mathematical knowledge and abundant data resources, qualitative analysis methods are a little rough, while it can be used when the data is insufficient (Jick, 1979). Some researchers also use the qualitative methods to study the Instagram. For instance, (Smith and Sanderson, 2015) discussed the way athletes use for self-presentation on visual social media websites. In their paper, they use a mixed qualitative method in doing research. Both the content analysis method, which was used to analyse the athletes' self-presentation styles and the differences, and textual analysis, which was used to analyse the themes and patterns the athletes used on their Instagram photos, were used during their research process.

In addition, Djafarova and Rushworth (2017) also adopted one of the qualitative methods, the sampling method, to examine the effects of Instagram upon consumers. In their paper, they put most of their attention on the celebrity spokespersons and their impact on female users. To collect useful information, they conducted eighteen face-to-face interviews with female users of Instagram within the appropriate age range. By summarizing and analysing the information, they came to a conclusion that the celebrations led the participants by their fashion and styles and might stimulate the customers' consumption in this way.

In fact, modern qualitative analysis methods also need to use mathematical tools for calculation and quantitative analysis must be based on qualitative prediction. For example, Ferrara *et al.* (2014) and his partners also studied the users of Instagram about the topical clusters of interest in their paper by using the qualitative methods, which was based on the clustering features based on descriptive features and recognition features. In another paper, Hu *et al.* (2014) adopted both qualitative and quantitative analysis methods to examine the photo contents and distinguish different kinds of users on Instagram. After a detailed data collection and coding process, the paper concluded that the photos could be divided into eight different categories and the users might be divided into five types according to the photos they posted on Instagram.

4.3. Diverse Approaches to Instagram Data

Some other diverse approaches, such as case study and comparative analysis method, are also among the most popular methods for the researchers to study Instagram. For instance, the Zappavigna (2016) explored the interpersonal meaning in social media photos with the case study method. He investigated the visual choices in the images that were collected to analyse the relationships between the participants, the photographer and the surrounding social media audience by doing the case study of maternity in social photography.

Besides, in another paper *Generation Like: Comparative Characteristics in Instagram*, Jang *et al.* (2015) used a combination of textual and facial recognition methods to analyse the characteristics of teens in social media. In this paper, the researchers also adopted the programming API to collect the useful data needed. While different from the traditional research papers, the researchers used the advanced facial recognition tools to compare the difference of inclination between teens and adults. After the analysis, the researchers concluded that there were several different using habits between teenagers and adults, such as their different tendency to express themselves, the frequency of sending pictures, and so on. Meanwhile, Highfield and Leaver (2015) adopted a platform comparison method. They

proposed a method for studying Instagram's activities based on the established methodology of Twitter research and outlined methodological challenges to study Instagram and Twitter.

Moreover, Hochman and Schwartz (2012) replied on the cultural analytics tools and techniques to analyse the visual rhythm of Instagram. With the application of this method, the paper provided the first vision for visualization and investigation of visual social positioning media data.

In all these research papers, various topics, such as the social characteristics of Instagram users, the content uploads on the platform, and the relationship between platform usage and people's feelings, have been analysed by using different analysis methods. The application of models and logic analysis help readers understand this information more accurately.

5. Conclusion

With the technological innovation of the Internet, social media has developed rapidly, which promotes the formation of intricate social network ecology. It can be believed that in the near future, social media may change people's way of communication, and then change people's way of life. Instagram, as a new social network mobile application, attracts a large number of loyal users through its accurate customer positioning, perfect functions and simplified operation mode. In this paper, a literature review on Instagram is given with the focus on the research methods that the researchers have used to collect and analyse data.

From the above analysis, it can be seen that most of the scholars collect effective data by crawling API data, designing questionnaires and doing face-to-face interviews. After the data collection is completed, both the quantitative methods, such as data modeling, regression analysis and so on, and qualitative methods, such as textual analysis and context analysis method, are used to analyse the characteristics of Instagram behind the collected data and information. Some other advanced technical tools and analytical methods, such as face recognition, comparative analysis and case study, are also adopted by the researchers to do a more in-depth analysis of Instagram. With all these different analysis methods, a more comprehensive and thorough Instagram image is presented in front of the readers.

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