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Data analytics to support social media marketing: challenges and opportunities

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Abstract

Social media technologies and services have empowered individuals and organisations by revolutionalising the way people communicate, socialise and conduct business. Two examples of social media services are Facebook and Twitter. Many organisations have been quick to realise the potential benefits of social media and have adopted social media marketing practices. Social media analytics are conducted by organisations to analyse social media data in order to determine the influence of their marketing activities as well as those of their competitors. The discussion in this paper stresses the widespread adoption of social media on the African continent and the usage of social media by marketing departments in organisations. An assessment is conducted on the usefulness of online social media analytics services, and finally, the paper identifies some challenges and opportunities for social network data analytics.

Keywords

social media, social networks, social media marketing, social media analytics, sentiment analysis, text analysis, Twitter, Facebook.

1. Introduction

Social media may be defined as Internet-based services that enable users to create and share different types of content, and to form social networks. In recent years, social media technologies and services have revolutionalised the way people communicate and socialise. These technologies and services have also made a big impact on the way businesses market their products and services. Social networks are one category of social media that facilitates the formation of communities and sharing of content and meeting people. Twitter (http://www.twitter.com) and Facebook (http://www.facebook.com) are two social networking services that have become very popular services in many countries including African countries. Organisations in the public and private sectors have been quick to realise the value of social media. Business organisations are routinely using social media for marketing and branding purposes (Stelzner, 2013; Jansen et. al, 2009). Many online services are available for the analysis of social media data. Organisations typically use these services to assess the effectiveness of their social media marketing activities. Organisations are not limited to the use of online services for social media analytics. Data can be downloaded from a social network website and analysed in-house using statistical, data mining, and machine learning methods (Bifet & Frank, 2010).

The objectives of the research reported in this paper were to assess the usefulness of online analytics services and to identify challenges and opportunities for social network data analytics. The paper provides a brief discussion of the widespread adoption of social media on the African continent, the role and adoption of social media in marketing, and, three types

of analysis that can be conducted on social media data. The results of exploratory studies on the assessment of the usefulness of online analytics services also presented. The rest of the paper is organised as follows: Sections 2 and 3 provide background on social media, social media marketing, and analysis methods for social media data. Section 4 presents the results for the assessment of online social media analytics services. Section 5 discusses challenges and opportunities in social media analytics. Section 6 concludes the paper.

2. Social media

Gartner (2016) have defined social media as "an online environment in which content is created, consumed, promoted, distributed, discovered or shared for purposes that are primarily related to communities and social activities rather than functional task-oriented objectives". Some examples of social media are Twitter, Facebook, LinkedIn, Google+, YouTube, and Instagram. Social networks are one category of social media that facilitates the formation of communities and sharing of content such as microblogging (Twitter), meeting people and sharing content (Facebook, Twitter, LinkedIn). Twitter, Facebook and LinkedIn have become very popular with individuals and organisations in many countries including African countries. The research reported in this paper is directed at social networking services. Twitter and Facebook were selected for the reported studies due to their high popularity in African countries, as reported by Deloitte and Frontier Advisory (2012), and, Fuseware and World Wide Worx (2014).

2.1 Social networking services: Facebook and Twitter

Twitter was launched in 2006 as a micro-blogging and social networking service where users share opinions on what is happening at present (Bifet & Frank, 2010). Twitter allows users to send updates (tweets) to a network of friends (followers) from a variety of devices (Jansen et. al, 2009). Twitter users need a subscription in order to receive updates and tweets are delivered instantly. Tweets are displayed on the user's profile page on Twitter, and they can be delivered via instant messaging (SMS – short message service), Really Simple Syndication (RSS), e-mail, or through an application such as Facebook (Jansen et. al, 2009). Tweets are at most 140 characters. The users interact by *following* updates of people who post interesting tweets. Users can pass along interesting pieces of information to their *followers*. This is known as *retweeting*. Users can also *reply* to, or comment on, other people's tweets which is called *mentioning*. The following is an example of a tweet: *RT @thandi has a cool #job.* RT is used at the beginning of a tweet to indicate that the message is a *retweet*. Users can reply to (*mention*) other users by indicating user names prefixed with the @ character (e.g. @thandi). Hashtags (#) are used to denote subjects or categories (e.g. #job) (Bifet & Frank, 2010). The Twitter service is characterised by a large numbers of users who generate very large volumes of data. In April 2010, Twitter reported various statistics on the users of Twitter as follows (Bifet & Frank, 2010). There were 106 million registered users, 180 million unique visitors every month, and 300,000 new users signing up every day. There were 600 million queries being received daily via Twitter's search engine and three billion requests per day based on the Twitter Application Programming Interface (API). It was also noted that 37% of active users used mobile phones to send requests. More recently, the number of regular Twitter users has been estimated at 200 million.

The Facebook service was launched in 2005 as a social network for use by university and college students in the USA. The inventor of Facebook is Mark Zuckerberg, a former student at Harvard University. Facebook opened its services to non-academic users for the first time in 2007. By 2008, Facebook had grown to be the second largest social network with more than 30 million users (Graham, 2008). As a social networking site, Facebook facilitates

meeting people and sharing content such as photographs, blogs, microblogs, and Facebook applications developed by the users. A Facebook user can *post* items on his/her page and the user's *friends* or *fans* can *post*, *comment* on, or indicate that they *like* the *posts* and *comments* on the page. A user's *fans* can also *share* a post by showing it on their Facebook page.

2.2 Social media adoption in organisations

On the African continent, there has been a widespread adoption of social media in recent years, and Facebook has become the most visited website. It was reported in 2012 (Deloitte & Frontier Advisory, 2012) that for the African continent, the users of the Facebook website were estimated at 44.9 million people. Fuseware and World Wide Worx (2014) have reported that in 2014, there were 9.4 million active users of Facebook and 5.5 million users of Twitter in South Africa. In the private sector, African businesses are increasingly employing social media strategies to engage more effectively with consumers through continuous interaction and engagement (Deloitte & Frontier Advisory, 2012; Fuseware & World Wide Worx, 2014). Fuseware and World Wide Worx (2014) have reported that, in South Africa, 93% of South African corporations that are major brands use Facebook and 79% use Twitter. Fuseware and World Wide Worx have further reported that a survey conducted in 2014, of South Africa's top 50 brands revealed that, on average, they each had 58,000 Facebook fans and 12,785 Twitter followers. In the public sector, many organisations are also using social media to engage with the public. Many public sector and higher education institutions in Africa also have a Facebook and Twitter presence.

2.3 Social media marketing

Social media marketing (SMM) is conducted in the context of social customer relationship management (Social CRM), (Gartner, 2016). SMM is the process of using social media websites in order to gain the attention of consumers and increase traffic to an organisation's website (Trattner & Kappe, 2013). Organisations join social networks (e.g. Twitter, Facebook) so that they can continuously engage with consumers. Advertising is one of the major objectives of SMM. The use of social media enables business organisations to reach much wider audiences compared to the use of traditional advertising (print/TV/radio) at a fraction of the cost, as most social networking services can be used at no cost. Two basic approaches for using social media as marketing services have been reported in the literature (Constantinides, 2008). These are: (1) the passive approach and (2) the active approach. Blogs and forums are platforms where individuals share their reviews and recommendations of brands, products and services. In the passive approach, organisations monitor these resources and analyse the comments of the customers for marketing purposes. In the active approach organisations use social media as public relations tools, direct marketing tools, communication channels for targeting specific audiences (e.g. influencers: popular bloggers), and, customer engagement tools (Constantinides, 2008).

In the active approach, marketers use various tactics to create 'buzz' in social networks in order to target and learn from consumers. Organisations typically place icons on their websites, for Twitter, Facebook, LinkedIn, Google+, and other social networks, and invitation messages to the public to follow them on these social networks. Marketers use Twitter to promote their products by sending tweets to their followers. A tweet may include the URL to the organisations webpage (e.g. for purchases of a product). Twitter is also used to provide customer services. Some businesses make customer support available 24/7 via Twitter. Facebook pages enable marketers to provide more detailed content than Twitter messages. Marketers can provide videos, photographs, and long product descriptions on a Facebook page. Fans (followers) can provide testimonials as comments on the product page

for marketers and other consumers to read. Twitter provides its users with simple counts of followers. Facebook provides simple counts of fans, likes, and comments. These simple counts provide marketers with an indication of the size of their audience, but they are not sufficient to assess the effectiveness of SMM. The next section provides a brief discussion of three analysis methods for social networks data, online services that provide various types of data analytics tools, off-line data analysis, and metrics for social media marketing.

3. Analysis of social media data

Various types of analysis can be conducted on social media data. A detailed discussion of social media data analysis methods is beyond the scope of this paper. The reader is referred to Aggarwal (2011) for detailed discussions. Three data analysis methods that have been applied to social networks data are: generation of descriptive statistics, sentiment analysis, and graph mining. This section briefly discusses these analysis methods, some of the available online services for data analytics, approaches that can be used to download social media data and conduct off-line (in-house) analysis of the data, and metrics for social media marketing.

3.1. Descriptive statistics

Descriptive statistics (e.g. Twitonomy, 2014) are generated to provide summaries of various activities for social network accounts and to provide various measures on participants in social network communication. For Twitter data, the number of *followers, replies, retweets*, *mentions*, and *favorited* tweets are useful indicators of the level of engagement with consumers. For Facebook data, the number of fans, the number of *posts*, *comments*, *likes* and *shares* have been reported as useful indicators of the level of engagement with consumers (FuseWare and World Wide Worx, 2014). For Twitter data, three measures of user influence that have been reported in the literature are: *indegree*, *retweets* and *mentions. Indegree influence* is the number of followers of a user and directly indicates the size of the audience of that user. *Retweet influence* is measured through the number of retweets containing a user's name. This measure indicates the ability of a user to generate content which has pass-along value. *Mention influence* is measured through the number of mentions containing a user's name. This measure indicates the ability of a user to engage other users in a conversation (Cha et.al, 2010). Organisations are interested in their own levels of influence as well as the levels of influence of their followers.

3.2 Sentiment analysis

In the context of social media data analysis to support marketing activities, text analysis methods have been used for two categories of analysis activities. The first category involves identifying blog posts (e.g. at web forums) that express opinions about specific brands, and the nature of the discussion (e.g. comparison of specific products, such as shoes, cars, etc.) (Feldman et. al, 2008). The second category involves determining the sentiment (or opinion) expressed in a message (Bifet & Frank, 2010; Wakade et. al, 2012). Examples of messages are: blog posts, micro-blogs (e.g. tweets), Facebook posts and comments. The purpose of sentiment analysis (or opinion mining) is to analyse a piece of text (about a specific topic) in order to determine the type of sentiment conveyed about the topic. Sentiment analysis involves the creation of a predictive classification model which takes a piece of text (e.g. tweet, blog, etc.) and assigns it to one of three sentiment categories: {positive, negative, neutral}, or one of five categories: {strongly-positive, positive, strongly-negative, negative, neutral}.

3.3 Graph mining

Graph mining involves the analysis of links between social media users (Bifet & Frank, 2010; Aggarwal, 2011). Bifet and Frank (2010) have reported that Twitter graph mining has been used to investigate interesting problems such as measuring user influence and the dynamics of popularity (Cha et al., 2010), community discovery, and community formation in social networks (Java et al.,2007; Romero & Kleinberg, 2010). These types of analysis can benefit organisations to better understand the characteristics of their fans or followers, and to possibly target their most influential fans or followers for purposes of enhancing their online word-of-mouth branding activities.

3.4 Online services for analysis of social media data

Many analytics services for social media data are available on the web (RazorSocial, 2016). There are services that specialise in the analysis of data for a specific service, e.g. Sentiment140 (http://www.twittersentiment.appspot.com) and Twitonomy (http://www.twitonomy.com) for Twitter data analysis. There are also services that provide analysis reports for all the social networks of an organisation, e.g. SimplyMeasured (http://www.simplymeasured.com). The services can further be divided into several categories based on the types of analysis that they provide. There are services that provide comprehensive descriptive statistics about the activities of a social network account. An example of such a service is Twitonomy which can be used to analyse a Twitter account. A second example is SimplyMeasured which can be used to analyse the activities on all social networks accounts of an organisation including Twitter, Facebook, Google+, LinkedIn, and others. There are many services that provide text analysis and sentiment analysis (Ismael, 2016). Sentigem (http://sentigem.com) and Bitext (http://bitext.com) are examples of services in this category. An application programming interface (API) is a software library which provides software developers with class definitions and functions that can be used to access the functionality of a given system. Online services for sentiment analysis (e.g. Sentigem, Bitext) provide APIs that can be used to request for sentiment analysis of text.

3.5 Off-line analysis of social media data

Social media service providers such as Twitter and Facebook provide APIs that enable developers to create applications that can access data stored by the service, filter and analyse the data in various ways, and enable other users of the service to use the application. Some of the online services for analysis of social media data (e.g. Twitonomy) also enable users (e.g. marketers) to download data in MS Excel format for purposes of further analysis. When data has been downloaded and stored in an appropriate format, any of the three types of analysis discussed in Sections 3.1, 3.2, 3.3 and other types of analysis (Aggarwal, 2011), can be applied to this data. This is especially useful for those types of analysis that are not supported by online analytics services. The RazorSocial website was used to search for online tools that provide graph mining capabilities. However, no tools that provide this type of analysis were found. Downloading social networks data makes it possible to store the data in an appropriate database (e.g. a graph database) and then conducting graph mining activities on the data.

3.6 Metrics for social media marketing

Business organisations typically use metrics to assess and quantify the effect (value) of marketing activities. In the context of social media marketing (SMM), three metrics that have been reported in the literature are: (1) website activity (2) customer response rates, and (3) reach and virality. An organisation can monitor their website and track the volume of visits that originate from social media channels. Google Analytics is a free tool for tracking website

visits and generating reports which provide information on social networks where visits originate from, visitor demographics, and the device types used by visitors from the social networks. Customer response rates are measured in terms of the frequency of customer discussions relating to a given brand. This gives an indication of ongoing (and possibly increasing) brand awareness and loyalty. Material (e.g. tweet, comment, video) that is posted on social media websites can go 'viral' or become classified as 'trending'. This means that the material has reached a record number of users. 'Viral' and 'trending' communications indicate the vigour of audience activity.

4. Investigation of data analytics services
This section presents the research methods, as well as a discussion of the five online analytics services that were selected for this study. Two of these services provide tools for generating descriptive statistics while the other three provide tools for sentiment analysis.

4. 1 Research methods
The research reported in this paper is of an exploratory nature. The objectives of the research were to assess the usefulness of the online services, identify challenges in data analysis and identify useful research directions for social network data analysis. The research methods that were used involved conducting a small-scale survey of online services for social media data analysis. Data analysis was conducted using the selected services and the usefulness of the reports provided was assessed. Usefulness was assessed in terms of whether the analysis reports provide useful information for computing social media marketing metrics, and whether reliable sentiment analysis results are provided to marketers. The services that were selected enable potential users to test the capabilities of their analytics tools. A major limitation to the research was that the reports provided for free are limited in scope.

4.2 Analytics services
Five services were used for the research to assess the usefulness of online data analytics services. Table 1 provides a summary of these services. Two services (Twitonomy and TweetReach) provide descriptive statistics. Three services (Sentiment 140, Sentigem, and Bitext) provide sentiment analysis. All the five services provide for free trials of their tools. The analysis results reported in this section were obtained using the free trial facilities.

Service name (URL)	Examples of services provided / report types
Twitonomy http://www.twitonomy.com	Analyses a given Twitter account and provides descriptive statistics (for a given period) on tweets and users.
TweetReach http://www.tweetreach.com	Analyses a given Twitter account, tweet or hashtag and provides descriptive statistics (for a given period) on the reach of tweets and users involved.
Sentiment140 http://www.twittersentiment.appspot.com	Performs sentiment analysis on the tweets returned for a query supplied by the user.
Sentigem http://sentigem.com	Performs sentiment analysis on a string of text passed in an HTTPS GET request.
Bitext http://bitext.com	Performs sentiment analysis on a string of text passed in a an HTTPS GET request.

Table 1: Examples of online data analytics services

4.3 Descriptive analytics reports for social media accounts

For a given Twitter account, the reports provided by Twitonomy include analysis results on tweets, the Twitter users who participated in the tweeting activities, periodic tweet frequencies, and the platforms tweeted from. The 'free trial' facility currently provides a report for a fixed time period for the specified account name. For the tweets, the report shows the number of tweets that have been used in the analysis, tweets per day, mentions, retweets, and favorited tweets, hashtags most mentioned, etc., and details of the most retweeted and most favorited tweets. The report also shows charts for tweet frequencies by month of the year, day of the week, and time of day, and the platforms most tweeted from (e.g. Hootsuite, Twitter for iPhone, Twitter web client). For the Twitter users who participated in the tweeting activities, the report shows a list of the most retweeted, most replied to, and most mentioned users. The report also shows a list of followers for the account. Figure 1 gives an example of a descriptive statistics report from Twitonomy. The report was generated for the Twitter account of an educational institution. Table 2 provides examples of additional results provided by Twitonomy.
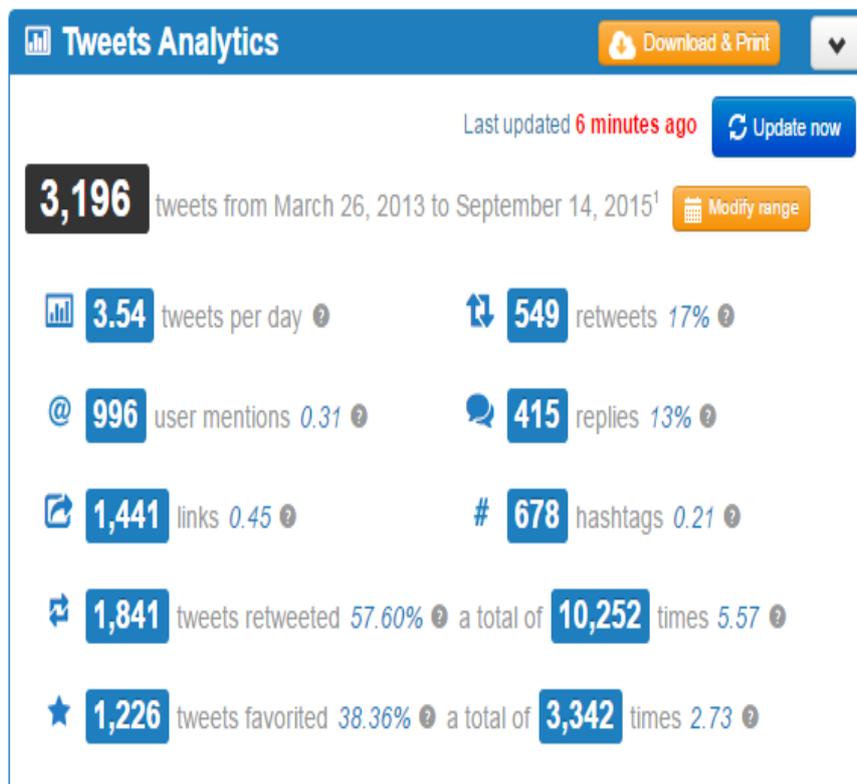
Figure 1: Tweet analysis results from Twitonomy

TweetReach is a Twitter analytics tool currently provided by Union Metrics (http://www.unionmetrics.com). The tool enables users to conduct analysis on the *reach* of an individual tweet or the *reach* of several tweets for a given time period, and the ability to track the tweets for an account in real time. For a given Twitter account, the reports provided by TweetReach include analysis results on tweets and the Twitter users who participated in the tweeting activities. The 'free trial' facility currently provides a report on 100 recent tweets for an account. For the tweets, the report shows the number of tweets that have been used in the analysis, number of Twitter accounts that these tweets reached, number of replies, retweets,

mentions, etc., and details of the most retweeted tweets. For the Twitter users who participated in the tweeting activities, the report shows a list of the top contributors, number of tweets, retweets, mentions, and the number of followers that each participating user has. Table 2 provides extracts of some of the report contents for the Twitter account of an educational institution. The reports were obtained using the 'free trial' facilities of Twitonomy and TweetReach. For reasons of anonymity, the account name, tweet text and user names of contributors are not shown in the results. Two social media marketing metrics that were discussed in Section 3.6 are *customer response rate* and *reach and virality*. The counts that are shown in Figure 1 and Table 2 are useful for determining the values for these metrics. When descriptive statistics are monitored over time, they provide useful information about the trends in customer engagement. Time series analysis can be used to formally model these trends over time (O'Connor et. al, 2010).

Analysis category	Example of analysis results from:	
	Twitonomy	**TweetReach**
Tweet statistics	As shown in Figure 1	Tweets: 100, contributors: 81, hours: 21, estimated reach: 46,470
	Most retweeted, most favorited: @Accountname, tweet text, 249 retweets @Accountname, tweet text, favorited by 83	Most retweeted: @Accountname, tweet text, 24 retweets @Accountname, tweet text, 8 retweets
User statistics	Users most retweeted, replied to, mentioned: @userA: 43 retweets @userB: 14 replies @userC: 106 mentions	Top contributors: @userD: 6,282 impressions, 2,094 followers @userE: 4 retweets, 224 followers @userF: 7 mentions, 6,770 followers

Table 2: Summary of analysis results for a Twitter account

4.4 Sentiment analysis

The Sentiment140 service provides a 'free trial' user interface on their website. The interface enables a user to enter the Twitter account name for which sentiment analysis is required. A limited number of tweets are analysed and the results are presented as charts together with a colour coded list of the analysed tweets indicating the sentiment of each tweet. Figure 2 gives an extract from a tweet analysis report for an educational institution. The Twitter account name has been replaced with *@OurAccount* for reasons of anonymity.
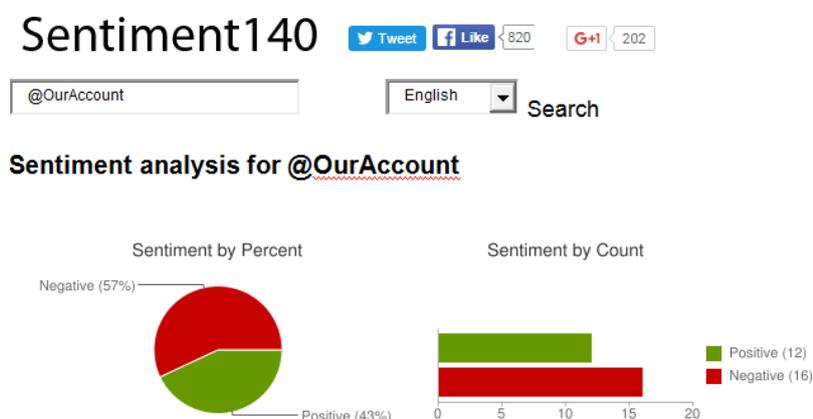
Figure 2: Sentiment analysis results from Sentiment140

The Sentigem and Bitext services provide tools for sentiment analysis. Additionally, Bitext provides tools for text categorisation, entity extraction, and concept extraction. These services provide RESTful APIs that can be used to obtain the sentiment for one tweet at a time using HTTPS GET requests. This arrangement enables developers to create in-house applications for conducting social network data analysis. Sentiment analysis is performed on a string of text passed in an HTTPS GET request. An example request to the Sentigem API for sentiment analysis is:

https://api.sentigem.com/external/getsentiment?api-key =
<your-api-key>&text=<text-to-analyse-for-sentiment>

The sentiment analysis result is returned as a JavaScript Object Notation (JSON) object containing key-value pairs to indicate success or failure of the analysis, and the polarity of the sentiment as positive, negative or neutral. Given that the REST APIs receive one request at a time, it is necessary to write a program that sends the GET requests to the API and processes the results received from the service. The services also provide an API test interface on their websites, where a prospective user can enter a piece of text and request for analysis of the text, in order to assess the quality of the service. Table 3 shows examples of sentiment analysis results using the Sentigem and Bitext services. The results were obtained using the API test interfaces at the Sentigem and Bitext websites. Again, for reasons of anonymity, some of the text has been replaced with strings consisting of the same letter (e.g. Rrrrrrr).

Text for analysis (The italicised names were changed to maintain anonymity)	Sentiment analysis service	Analysis result
1. Just a piece of text: The good cat jumped over the bad dog	Sentigem	neutral
	Bitext	neutral
2. Just a piece of text: The very good cat jumped over the bad dog	Sentigem	positive
	Bitext	positive
3. Blog message (from Samsung website): Samsung's Galaxy Note 5 is excellent overall, and the only phone to buy if you want to write by hand. However, you'll pay a huge premium for a modest upgrade from last year's model, and less pricey competitors will satisfy many.	Sentigem	positive
	Bitext	positive
4. Facebook comment (for a TV station): *Ccccc* only exist whn things suit them. Come to *Rrrrr* in *WardX Gggggg* clinic which accomodate hundreds of people per day with 1 nurse. Patient who wait for 10 hours before assisted. *Llllll* ppl in villages whn thy complain thy will tell them about channel of lodging a complain but those in *mmmmm* whn thy lodge two days is enough n d cimplain will b reachd in their desk. Agaaa soka *HHHHH* ga le dire nex.	Sentigem	negative
	Bitext	positive
5. Twitter message: Luxury, Technology & Practicality. Test Drive The New Kia Sorento https://cards.twitter.com/cards/18ce546941s/1442l	Sentigem	positive
	Bitext	neutral
6. Twitter message: On eFinancialCareers: Is *Aaaaaa* about to make 30% of its equities staff redundant? http://ow.ly/Vzfxy pic.twitter.com/FNu2VEn72CC	Sentigem	negative
	Bitext	negative

Table 3: Sentiment analysis results

It should be noted from the analysis results of Table 3, that sentiment analysis is a challenging task. For example, a human reader would most likely assign both positive and negative sentiment to items 1, 2, and 3. However, the tools assigned neutral sentiment to item 1 and positive sentiment to items 2 and 3. It should also be noted that the tools do not always agree on the sentiment label. For example, each tool assigns a different sentiment label for items 4 and 5. Cieliebak et. al (2013) and (Rhodes, 2010) have reported that even though the

research literature on sentiment analysis of microblogs has reported many successful methods and experimental studies which provide accuracy levels in the range of 80% and above, real world applications of sentiment analysis appear to provide a much lower level of accuracy. Cieliebak et. al (2013) have suggested the use of 'voting' to overcome the weaknesses of individual sentiment analysis tools. This involves combining the predictions (sentiment labels) provided by the tools from different services, and selecting the sentiment label that gets the majority vote. Metrics for social media marketing were discussed in Section 3.6. Sentiment analysis results do not per se contribute to the calculation of metrics such as *customer response rates*, *reach and virality*. However, these results provide useful feedback on consumer opinions about a brand. This enables an organisation to make informed decisions about their product and service offerings, as well as their social media marketing activities.

5. Challenges and opportunities

FuseWare and World Wide Worx (2014) have reported that in South Africa big businesses which are regarded as major brands rely heavily on social media agencies for social media content creation and social media monitoring. They have further reported that the measurement of social media effectiveness by big businesses remains relatively unsophisticated. For Twitter, 83% of these businesses measure effectiveness by the number of followers while only 48% conduct sentiment analysis. For Facebook, 87% of these businesses measure the number of fans, 79% measure the number of posts and comments, and only 54% are assessing the tone of these posts and comments through sentiment analysis. An assessment of the sample of online analytics services presented in the last section indicates that online services taken together generally cover a wide spectrum of the types of analysis that can be conducted on social networks data, even though individual services will each cover only a subset of the types of required analysis. The generation of descriptive statistics for social network accounts appears to be a straight forward activity for analytics services. However, sentiment analysis appears to be a challenging activity for analytics services. Graph mining has been reported in the literature as a useful type of analysis for social networks data. However, a search on the web did not yield any results for online services that provide this type of analysis. Given the foregoing discussion, there are various research opportunities in social network data analytics, especially in the areas of sentiment analysis and graph mining. For sentiment analysis, publically accessible social media text data can be downloaded and used in research activities as opposed to data which is specifically provided for research purposes. This type of research has the potential to produce methods and tools that can handle real-life social media data which is not linguistically 'perfect' or 'nearly-perfect'. For graph mining, social networks data can be downloaded and processed off-line using software for graph processing. High quality sentiment analysis and graph mining have the potential of increasing the value of social media analytics.

6. Conclusions

The discussion in this paper has highlight the widespread adoption of social media on the African continent, the role of social media in brand marketing, and three useful types of analytics for social media data. A study was conducted to assess the usefulness of online analytics services in supporting social media marketing. It was found that in general online services provide analytics reports that provide useful information for computing values for social media marketing metrics. However, sentiment analysis remains a challenge for online analytics tools. It was also found that there are hardly any online analytics services that provide tools for graph mining. Finally, it was argued that organisations can create in-house

software applications to conduct reliable sentiment analysis and graph mining of social media data. From a research perspective, researchers should embrace the opportunities of investigating effective data analysis methods, especially in the challenging areas of text analysis, sentiment analysis and graph mining.

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