Smart Analytics of Social Networking Trends

("How connected are we?" & "How are we connected?")

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Abstract

The current era of Information Technology has enabled one to access a wealth of information regarding public opinion and market trends through web search behavior exploring tools such as Google Trends. As a testimony to this fact, the present work purports to encouraging the use of such "Smart Analytics" techniques by presenting Trend Search based inferences and discussion of interest in the four social networking sites Facebook, Twitter, YouTube and Snapchat in 30 different countries around the world. The results provide valuable insights into group trends such as the rise, saturation and decline in the interests of such services and their dependence on various factors such as internet connection speeds and penetration rates, while also exploring exceptional cases and other individual aspects of social networking trends. While from a managerial perspective, such results can be used to assess market trends and demands, the inferences also provide useful information to administrators and governments, as well as the common man to understand the current trends and plan investments of time and money accordingly.

Keywords: ***Smart Analytics, Google Trends, Facebook, Twitter, YouTube, Snapchat***

1. Introduction

The significance of data and statistics in the current era of information technology cannot be over-emphasized [1-5]. The organization of data into meaningful tables, charts and graphs, termed in general "Data Analytics" has given rise to a diverse variety of applications including among other things, epidemic control, organized crime detection and identification of market trends and people sentiment [6-13]. Over the years, the internet behavior of people all around the world has become so profound that knowledge of the very terms they search for reveals a lot of information about the behavior, both at individual and societal levels [14-16].

It can thus be stated that the treasure of such vital social information lies in the hands of internet search engines, of which Google stands as the frontrunner [17-19]. Fortunately, Google has developed tools to provide such insights of which the NGram viewer and Google Trends stand out [19-27].

The present article explores the significance of what can be called "Smart Analytics" to understand behavior and culture at national level. Specifically, four of the top internet services, most of them pertaining to social networking using various levels of multimedia content (text, images, and video), namely Facebook, Twitter, YouTube and Snapchat form the focus areas of the Trend Search explored in

the present article. Thirty countries around the world are considered, in various economic brackets, but having one common feature – they all use the Roman Alphabet in one form or the other [28]. The results presented portray various interesting nuggets of information such as level of usage and interest towards the various services, dependence on the observed behavior on economic and demographic conditions, current perception of the various services, culminating at hints at the prediction of the future trends.

The objective of the present article is to recognize the value of and encourage such trend searches in context of various applications, to reveal vital information from the internet search data.

2. Methodology

In the present work, Thirty countries around the world are considered, all of them using the Latin script, since this makes search comparisons easier. The thirty countries are viewed as six geographical groups of five countries each, and these are tabulated below. Beside each country, the corresponding internet penetration Rates, as of 2013 obtained from the ITU website link www.itu.int/en/ITU-D/Statistics/Documents/statistics/2014/Individuals_Internet_2000-2013.xls are also given in parantheses [29]. The countries are chosen so as to cover a wide variety of cultures and behavior, which would typically reflect on their internet habits [30].

Table 1 Countries considered in the Trend Search Study, along with the Internet Penetration Rates (%)

THE WESTERN FIFTEEN		
The American Five	**The European Five**	**The African Five**
United States of America (84.2)	France (81.92)	Nigeria (38)
Canada (85.8)	Germany (83.96)	Egypt (49.56)
Mexico (43.46)	United Kingdom (89.84)	Morocco (56)
Brazil (51.6)	Sweden (94.78)	Ethiopia (1.9)
Argentina (59.9)	Turkey (46.25)	South Africa (48.9)
THE EASTERN FIFTEEN		
West Asian Five	**East Asian Five**	**The Pacific Five**
Israel (70.8)	Japan (86.25)	New Zealand (82.78)
United Arab Emirates (88)	South Korea (84.77)	Australia (83)
India (24.1)	Indonesia (15.82)	Papa New Guinea (6.5)
Pakistan (10.9)	Vietnam (43.9)	Fiji (37.1)
Iran (31.4)	Thailand (28.94)	Samoa (15.3)

The tool used for the Trend Search is the Google Trends Website, a tool analyzing Google searches and reports a normalized version of the percentage of the total searches that have been done for a given term during a given timescale. The trends results are in relative terms, which mean that a line trending downward would not indicate actual decrease of total number of searches, but a decrease in relative popularity to other searches. The time scale in consideration for the present article is the last 10 years (2005-2015), since this timescale conveniently encompasses the rise of most of the popular sites on the internet. It must be noted that searches and trend data in this timescale includes both computer/laptop based internet and the more recent smartphones/tablet based internet [31].

The focus search terms of the present work are four trending social websites, as follows:

1. Facebook: An online social networking service headquartered in California, USA, Facebook had over 1.44 billion monthly active users as of March 2015. The simple concept of a platform for people across the world to connect with family and friends and share information through texts, pictures and videos has ensured that for most people around the world, Facebook is often viewed as an integral part of their life. While Facebook was popular as a website, the recent years have been witnessing a transitional shift from Computers and Laptops to Mobile Phones and Tablets as the primary internet usage device. In this light, Facebook has offered a variety of "apps" for IPhones, Androids and other Smartphones such as Facebook, Facebook Home, Facebook Lite and so on [32-34].
2. Twitter: This is an online social networking website focusing on 140-character messages, called "Tweets". Based on San Francisco, California, USA, Twitter is often called the "SMS of the Internet", and had around 500 Million Users as of May 2015. Twitter has been popular as a platform to instantly recognize trending and viral topics, and has been seen as the face of the public during times of breaking news. Apart from this, Twitter also offers an integrated photo sharing service [35-37].
3. YouTube: A Video Sharing Website hosted in California, USA, YouTube was bought by Google in November 2006. The primary content hosted are videos, uploaded and shared by users all over the world. Consequently, the videos in the site range from documentaries to public talks and seminars, to TV shows to important announcements to home-recorded videos [38-42].
4. Snapchat: A Video messaging application, Snapchat allows users to send photos and videos known as "Snaps", which are visible for a short time (1-10 seconds) for the recipients, after which the content is removed. As of May 2014, around 700 million photos and videos were being sent every day, with the main demographic being teenagers between 13 and 21 years of age. While the short viewing span is often seen as a factor favoring privacy, the same reason has led to multiple hacking attempts revealing to the public, photos and videos once believed to be private by Snapchat users [43-47].

The four internet services can be broadly classified into text and image dominated services (Facebook and Twitter) and Multimedia (Image/Video) dominated services (YouTube and Snapchat).

3. Trend Search Results and Discussion

In this section, the Trend search results for the abovementioned services for the thirty nations listed in Table 1 are provided with inferences and discussion.

A. Facebook

The trend search results for Facebook are illustrated in Fig. 1 to 7, grouped by geography as mentioned in Table 1.

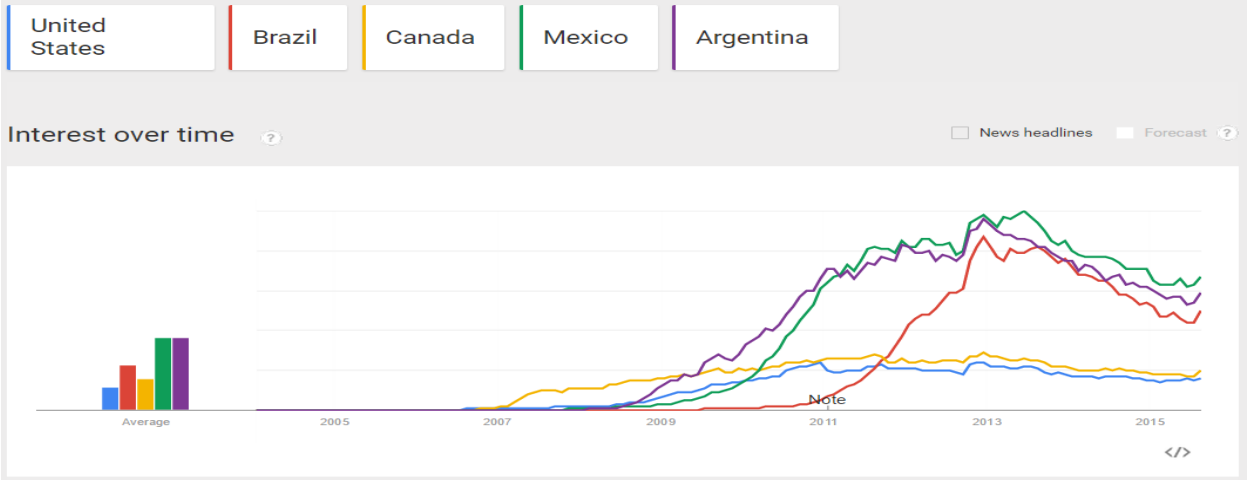

Figure 1 Trend Search Results for Facebook – The Americas

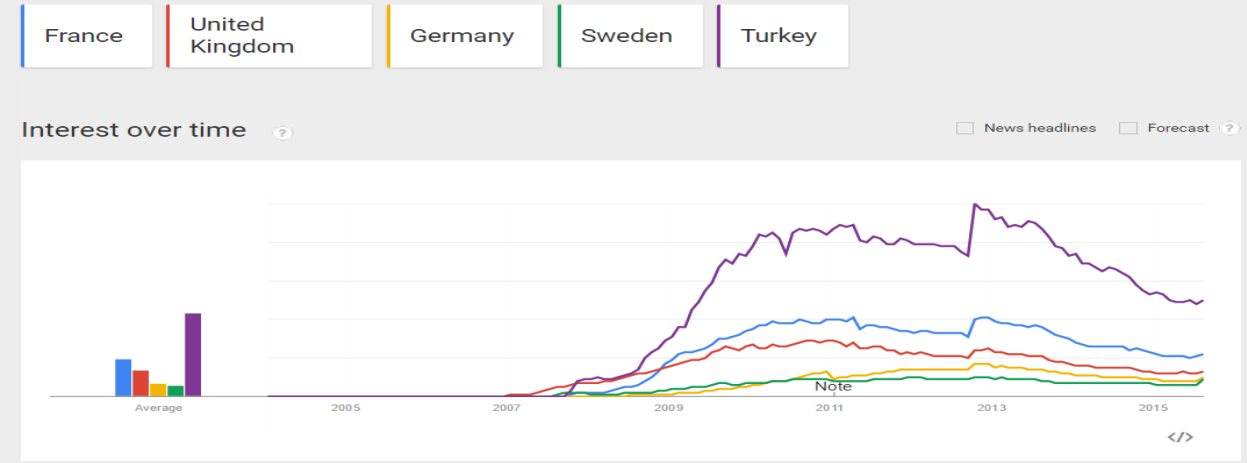

Figure 2 Trend Search Results for Facebook - Europe

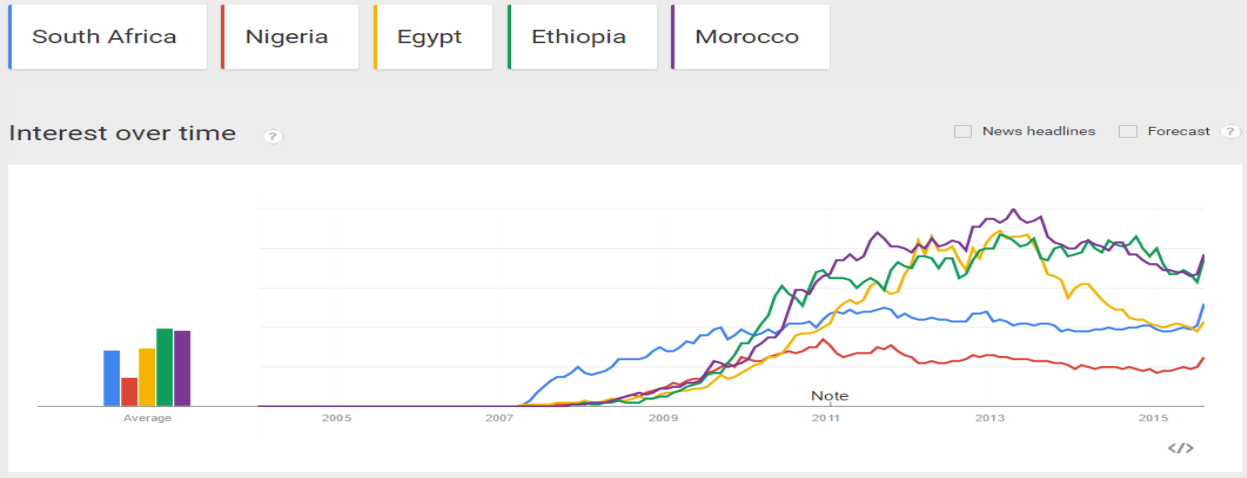

Figure 3 Trend Search Results for Facebook - Africa

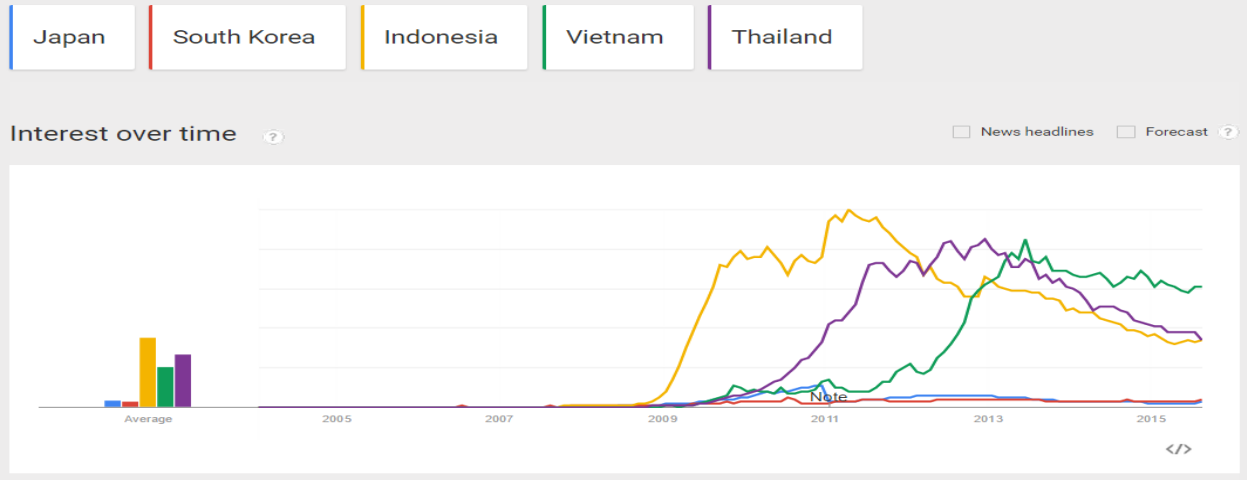

Figure 4 Trend Search Results for Facebook - East Asia

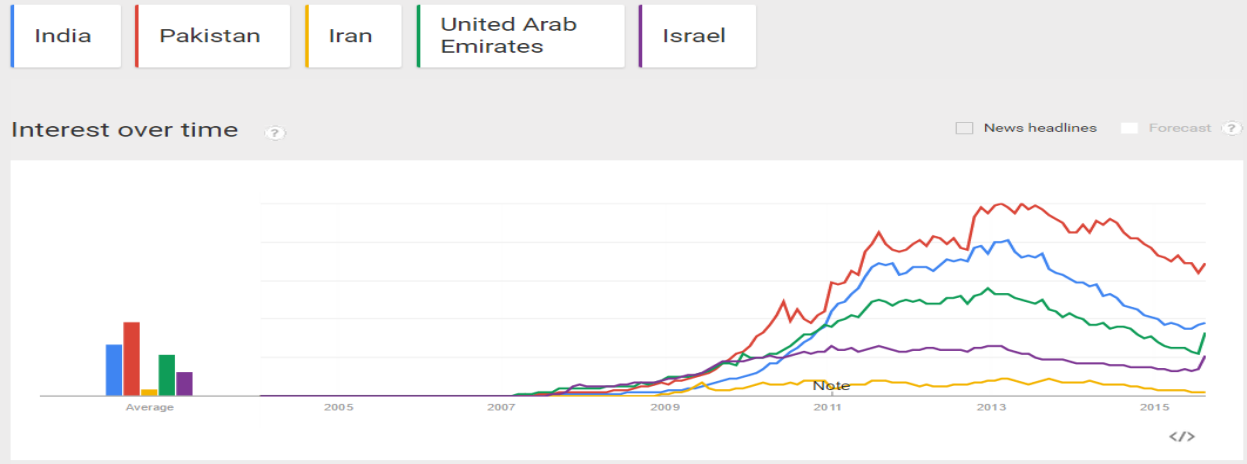

Figure 5 Trend Search Results for Facebook - West Asia

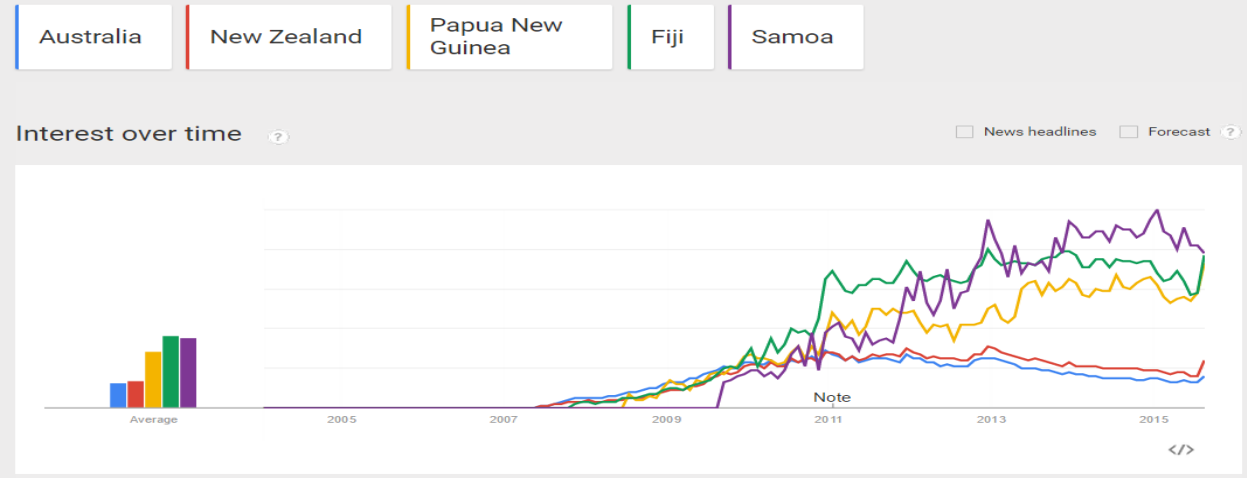

Figure 6 Trend Search Results for Facebook - The Pacific

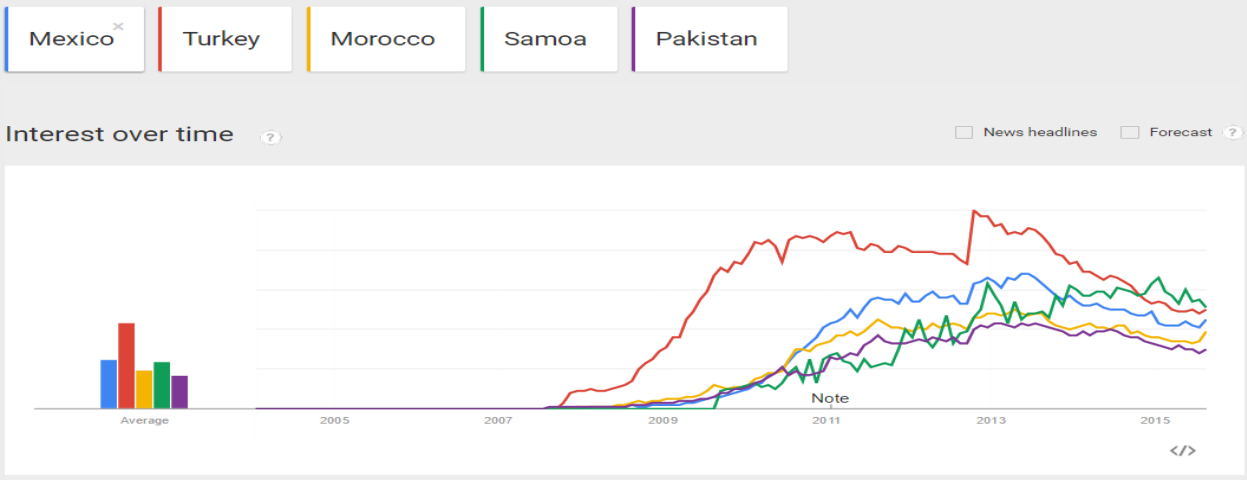

Figure 7 Trend Search Results for Facebook - Global Leaders

The inferences from these results are summarized as follows:

1. Though Facebook as a service was launched in early 2004, it was not until 2007 that a rising trend started to appear, with Canada, UK and South Africa some of the earliest countries to exhibit such a trend.
2. The trends of Facebook searches can be broadly grouped into three categories – trends that rise moderately and have almost saturated over time, such as the US, most of Europe and Israel; trends that rise rather steeply and have exhibit a declining trend in recent years, such as Brazil, Turkey, Thailand and South Asia; and trends that are on the rise, as in Fiji, Samoa and Papua New Guinea.
3. In the Americas, it is surprising that Canada hopped onto the Facebook bandwagon earlier than the US itself, the originator of Facebook, while trends in the Latin nations (Mexico, Argentina and especially Brazil) rose later, rose higher and declined in recent years. The highest American trend, namely Mexico is reasonably high on the global platform, as seen in Fig. 7.
4. Most of the European trends show a similar behavior, moderate rise starting from 2007-2009 and saturation/slight decline in recent years. However, Turkey is an exception and as seen from Fig. 7, Turkey is the country with highest interest in Facebook among all selected nations. UK is the first to show a rising trend, probably owing to the early popularity of Facebook with the English-speaking community.
5. While South African trends rose early in 2007, trends of most other nations in Africa showed a much later rise, by about 2009. However, the levels to which trends rose greatly differ among countries, with Morocco and Nigeria registering the highest and lowest trends respectively. On the global platform however, Moroccan trends are just moderately high.
6. Most of East Asian nations, owing to a predominantly non-English and non-Romance language community, show rising trends much later than the rest of the world. With Indonesia and Vietnam the earliest and latest among them respectively. It is significant that most of the high trends seen in Fig. 4 are of Southeast Asia than of East Asia, since the former has a higher proportion of European language speakers.
7. Most of West Asia showed similar trends – a rise by late 2008 and 2009, high rise except for Iran,

and a decline by late 2013. Pakistani trends have seen the growth in leaps and bounds; trends in India and UAE are much more gradual; Israel and Iran show rather saturating trends. As seen from Fig. 7, even the highest trends in West Asia, namely Pakistan are among the lowest among the global leaders with the highest trend in the whole of Asia barely crossing 40%.

8. Perhaps the most interesting results of all the geographical locations of Table 1 is the Pacific, as seen from Fig. 6. While the trends of most nations are declining or saturating, the trends of Pacific nations such as Samoa, Fiji and Papua New Guinea are on the rise, even though the Fijian trend was a "late riser". Australia and New Zealand however, exhibit trends typically seen in Europe and US – a moderate rise followed by saturation. On a global scale, the trends of Samoa indeed make a statement, with the Samoan trend the highest among all global leaders as of July 2015.

In general, most of Facebook trends are on the decline. This is indicative of an overall transition from a website based access of Facebook to an app-based one. However, an interesting fact revealed from the search results is that while most of English speaking nations adopted Facebook early, the trends later on are by large, moderate and saturating. It is the Latin, Southeast Asian and Pacific nations that show the most usage of Facebook, albeit with late rising trends. Overall, most of the trends presented can be fitted to Gaussian based curves, with different tails and variance levels.

B. Twitter

The trend search results for Twitter grouped by locations are illustrated in Fig. 8 to 14.

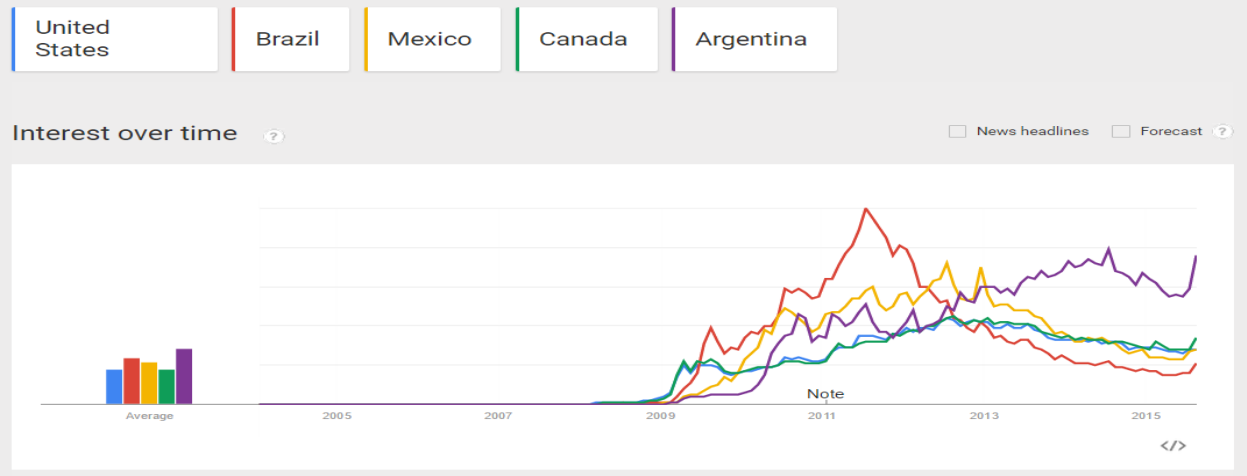

Figure 8 Trend Search Results for Twitter – The Americas

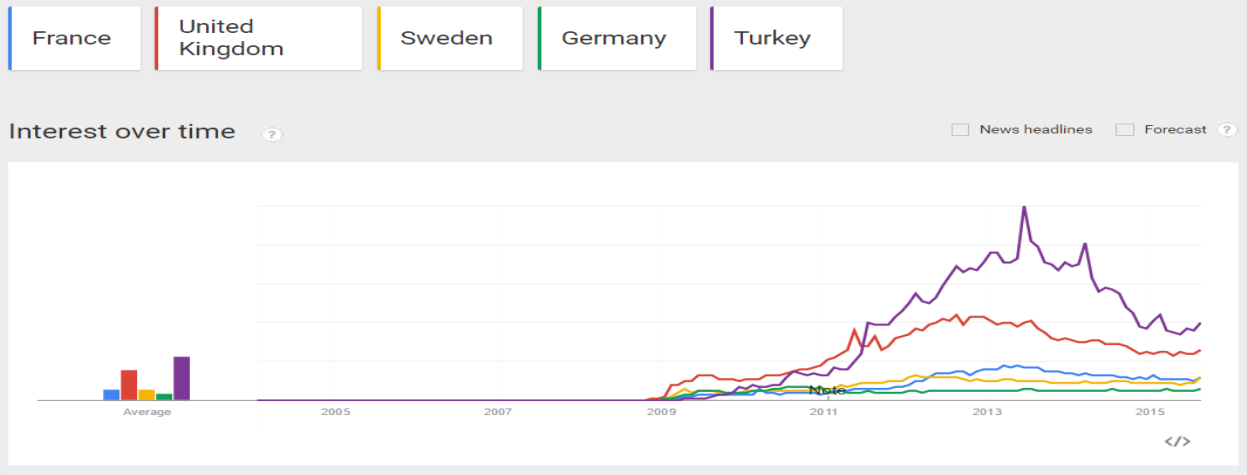

Figure 9 Trend Search Results for Twitter – Europe

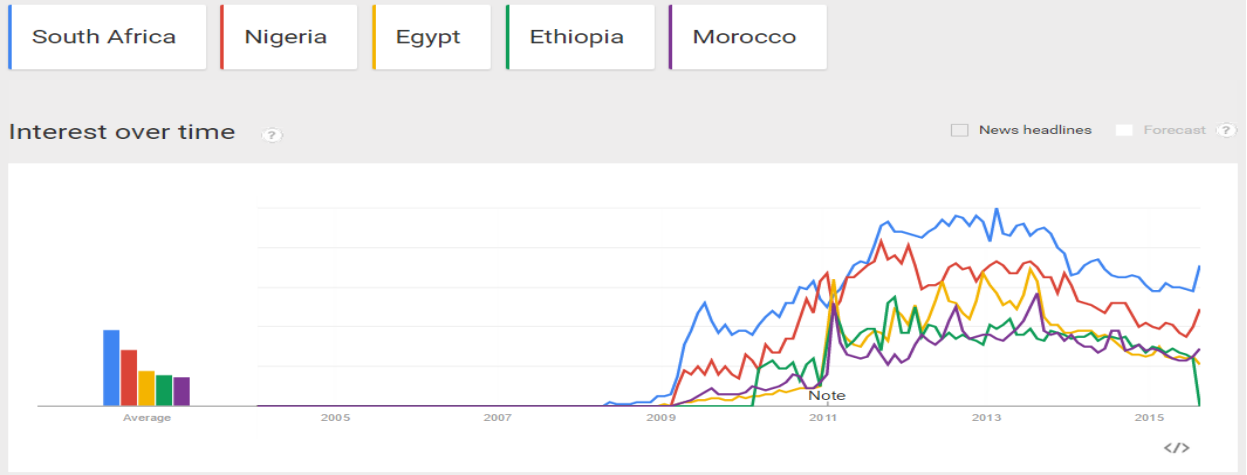

Figure 10 Trend Search Results for Twitter – Africa

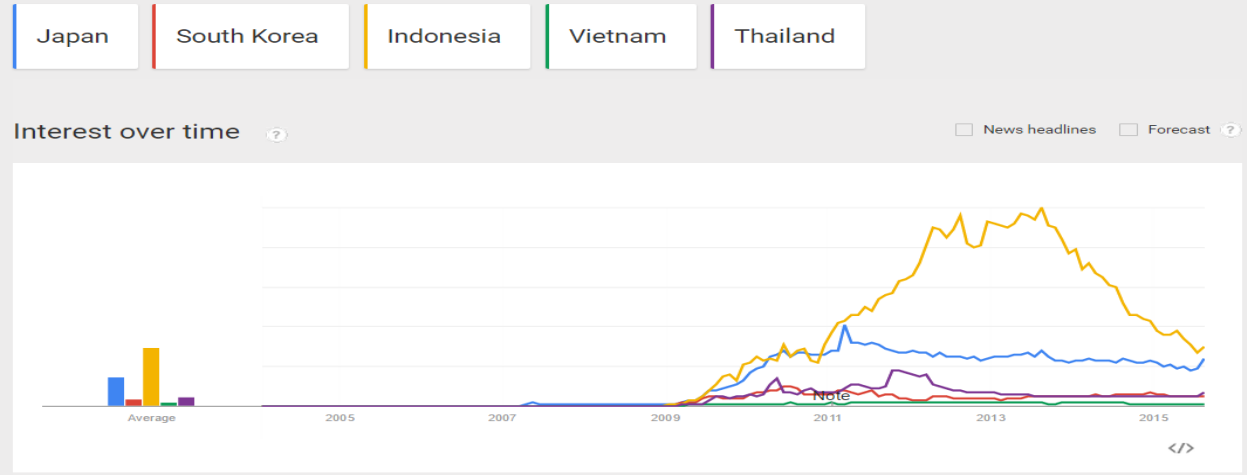

Figure 11 Trend Search Results for Twitter – East Asia

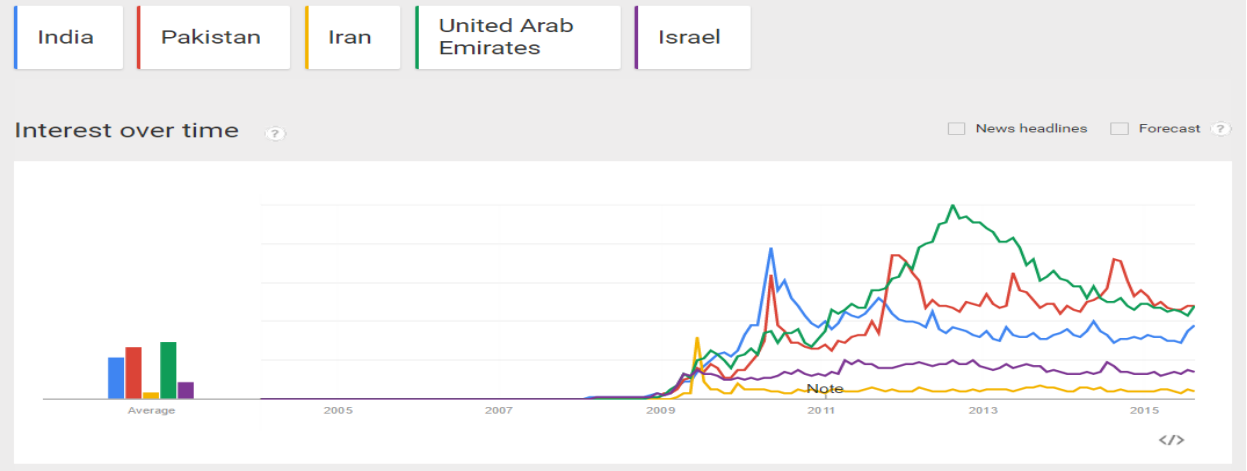

Figure 12 Trend Search Results for Twitter – West Asia

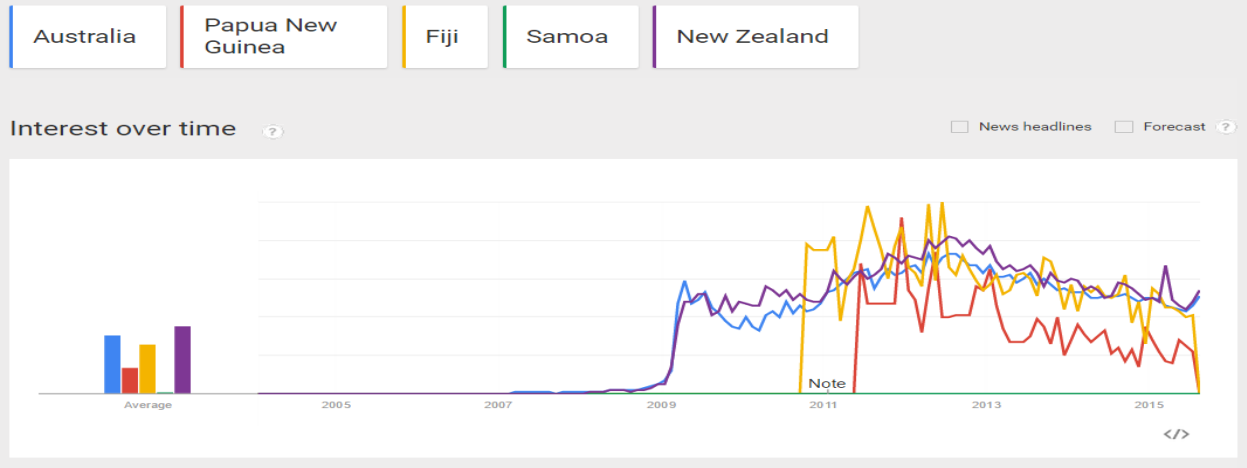

Figure 13 Trend Search Results for Twitter – The Pacific

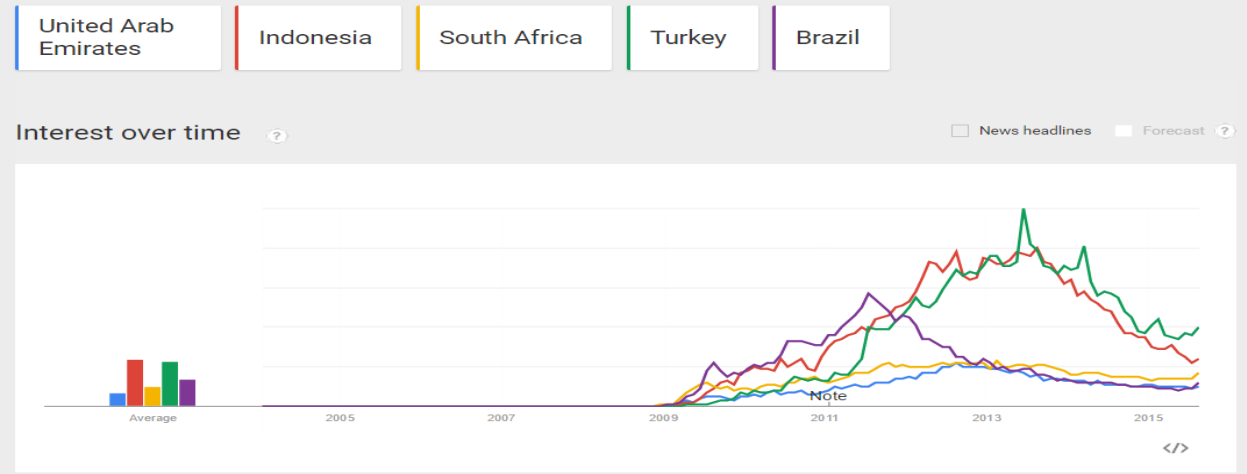

Figure 14 Trend Search Results for Twitter – Global Leaders

The inferences are summarized below:

1. Unlike the trends of Facebook, most of the Twitter trends show a rise in 2009-2010, though the service was launched in 2006. However, the diversity of trends is much more than Facebook, ranging from rising trends such as Argentina, Morocco and Pakistan to sharply declining ones such as Turkey, Indonesia and the UAE.
2. In the Americas, US and Canadian trends rose early to moderate levels and saturated whereas Mexican and Brazilian trends rose much later, albeit to different heights, before declining in late 2012-2013. Argentine trends however, rose late by 2010, and except for a slight decline in early 2015, have been on the rise ever since.
3. In Europe, most countries exhibit trends that rise by 2009-2010 to moderate levels and saturate. However, the trends of UK rise significantly higher than most other European nations, probably due to the well-connected network of English speaking nations across America, Asia, Europe and Australia. However, as with Facebook trends, the Turkish trend is the clear exception with a significant high usage seen in 2012-2014.
4. In Africa, the trends of Twitter are by large turbulent, with South Africa and Nigeria following the most regulated of all the five trends. On the whole however, apart from an early peak in 2011-2012, no commonality i trend can be discerned among African nations.
5. Perhaps the most 'unison' behavior of trends is seen in East Asia, with almost all countries showing a moderate rise, followed by saturation or a gradual decline. It is indeed interesting to see Japan posting a reasonably high trend, suggesting the nation's preference of short Tweets rather than media filled Facebook posts. However, even this trend is easily eclipsed by Indonesian trend, which soared high in 2011-2012, only to slide down in 2013-2015. It is seen that Southeast Asian nations, whose trends were prominent in Facebook, are not that actively interested in Twitter.
6. In West Asian Twitter trends, saturation, rather than decline seems to be the norm, with the exception of UAE. While Iranian and Israeli trends maintain a relatively low profile, Indian and Pakistani trends are moderately high. However, UAE trend shows an almost monotonic increase climaxing at a peak in early 2013, only to almost monotonically decrease thereafter.
7. While Australia and New Zealand Twitter trends started to rise in 2009, it was not until 2011 that other Pacific nations such as Papua New Guinea and Fiji hopped on the Twitter bandwagon. Even then, Samoan trend has been virtually nonexistent. However, the declines in Twitter trends have already started to show beginning in late2011-2012.
8. On the global platform, the nations that stand out most in Twitter trends are Turkey and Indonesia, with South Africa, UAE and Brazil taking second stage. However, none of the global leaders show any increase in trend since 2014.

It is clearly seen that most of the nations showing Twitter trends are from Asia, Africa and Latin America, probably owing to the preference of short text based Tweets due to slower internet speeds. However, except for Argentina, Pakistan and to a lesser extent Morocco, rising trends in the post 2013 period are hard to come by. While this certainly does not suggest a general decline in the total number of Twitter users, the trends do indicate that interest in other forms of social networking have grown in recent years. Finally, as is the case with Facebook, most of the Twitter trends do follow Gaussian based curves, with

various variances and skewness rates.

C. YouTube

The trend search results for YouTube are shown in Fig. 15 to 21.

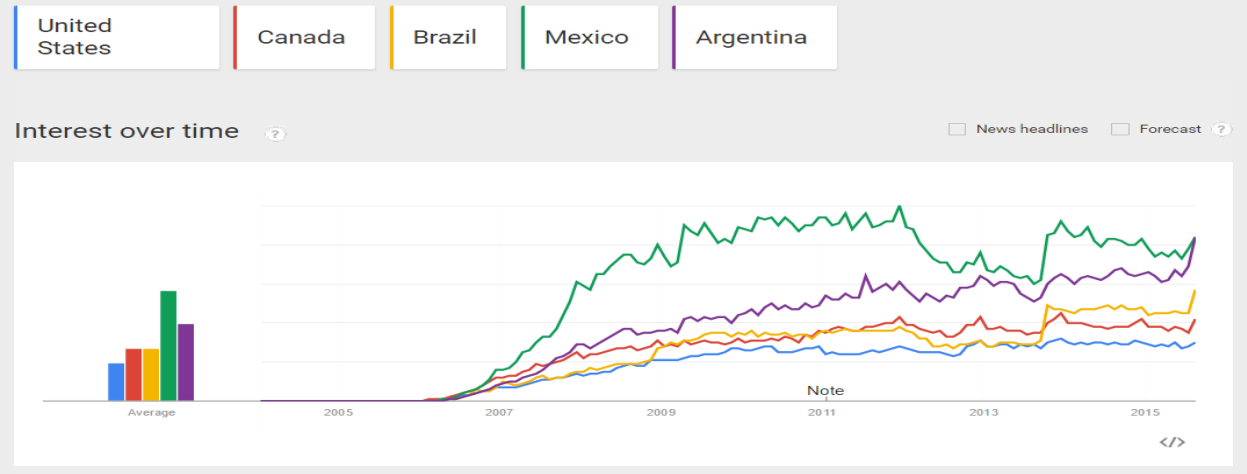

Figure 15 Trend Search Results for YouTube – The Americas

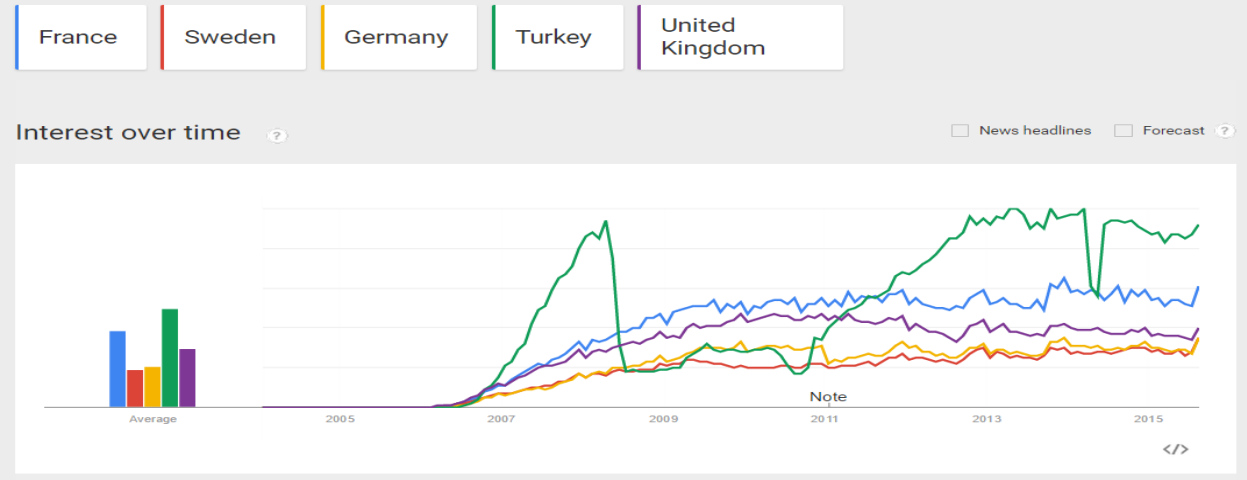

Figure 16 Trend Search Results for YouTube – Europe

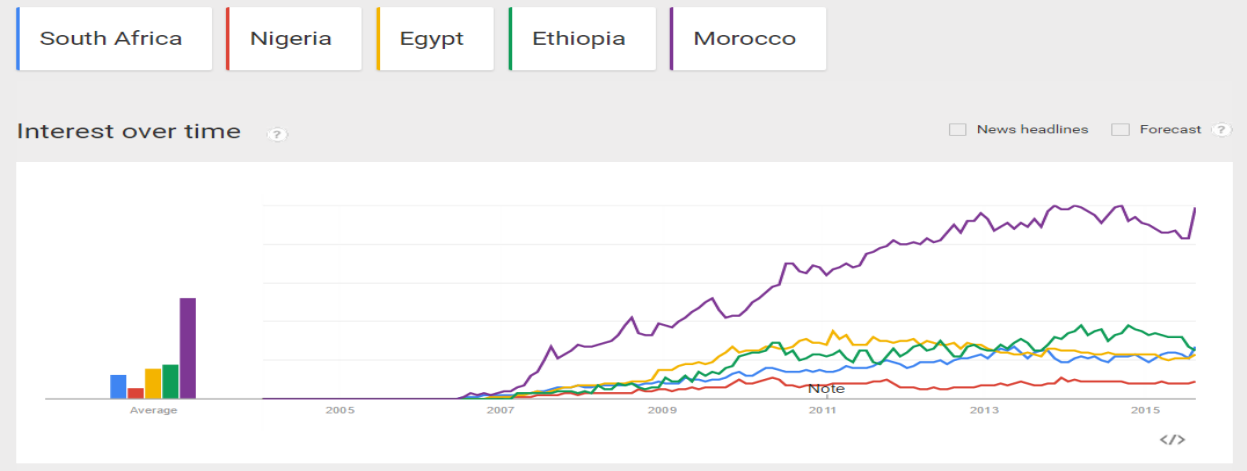

Figure 17 Trend Search Results for YouTube – Africa

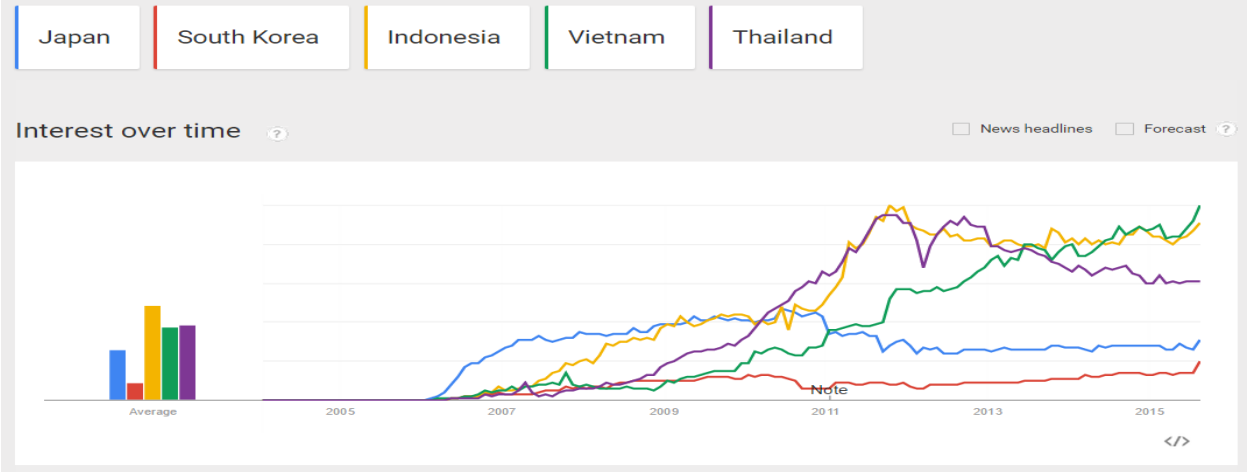

Figure 18 Trend Search Results for YouTube – East Asia

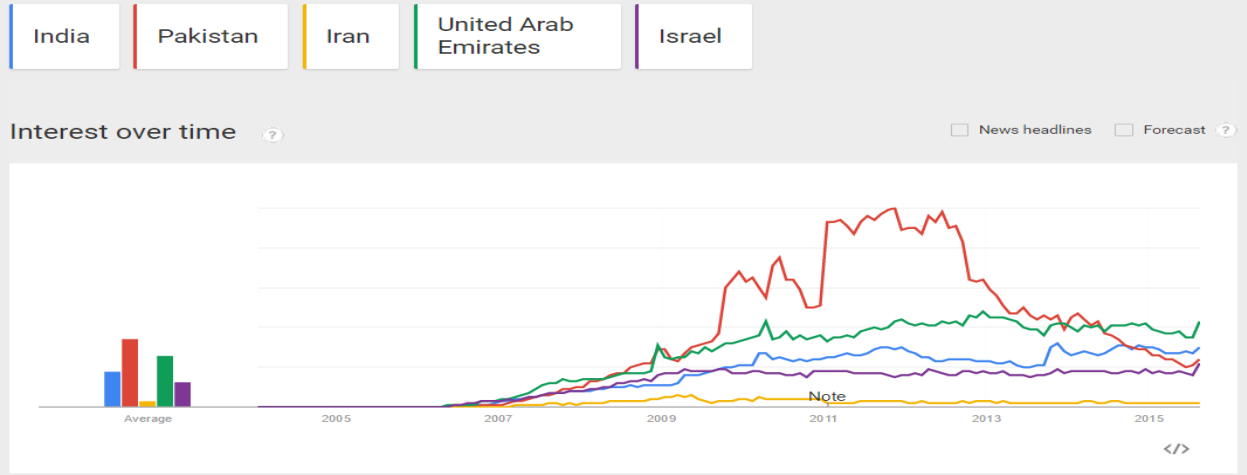

Figure 19 Trend Search Results for YouTube – West Asia

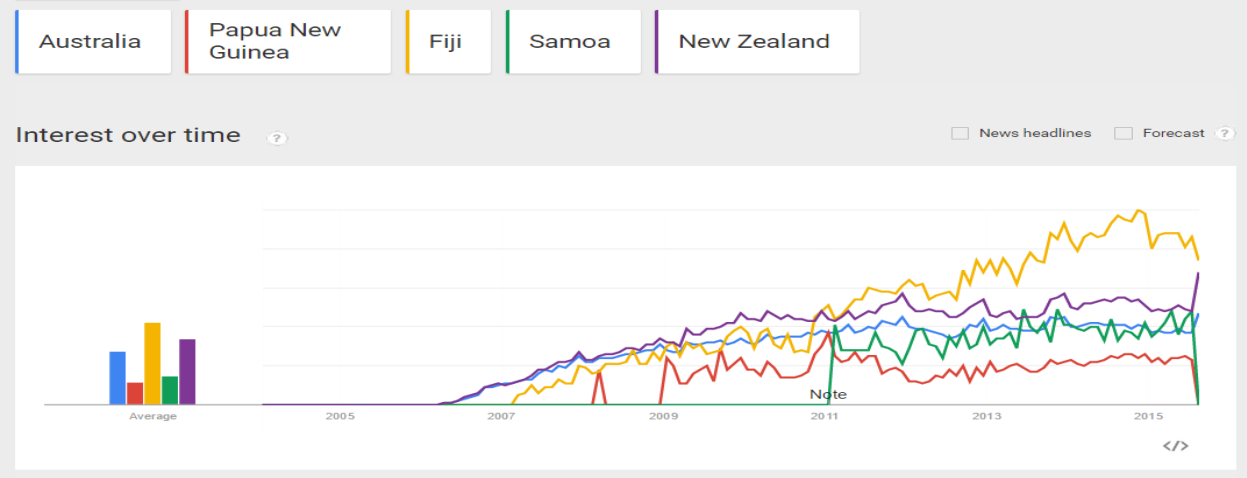

Figure 20 Trend Search Results for YouTube – The Pacific

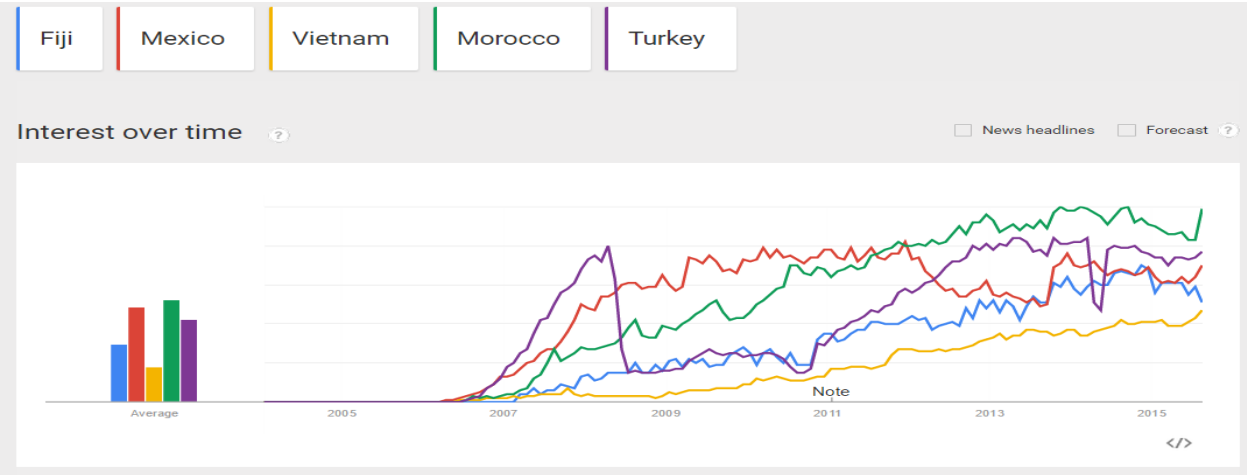

Figure 21 Trend Search Results for YouTube – Global Leaders

From the graphs, it is seen that except for nations where YouTube is/has been in history blocked such as Pakistan and Turkey, most of the YouTube trends are on the rise, with different rates. The key inferences are summarized below:

1. In the Americas, all the trends started to rise by 2006, albeit with different rates. It is interesting to note that Brazilian trends of YouTube rise much more gradually than the Facebook and Twitter counterparts, probably owing to the fact that YouTube is a primarily video based service requiring a much higher internet speed than for Facebook and Twitter. Overall, it is seen that Spanish speaking nations, Mexico and Argentina have the highest trends of the lot.
2. In Europe, most YouTube trends are characterized by moderate rise and saturation by around 2010, with the clear exception of Turkey. Owing to the repeated banning and unbanning of YouTube in the nation, the Turkish trend of YouTube has been extremely turbulent. Also, it is interesting that the English speaking advantage of UK, which gave it high European trends for Facebook and Twitter, clearly does not hold in YouTube trends, with France, rather than UK showing the highest of the moderate European trends.

3. In Africa, while most trends show either saturation or rise, Egyptian trends show a slight decline. However, the nation trend with the highest rate and extent of rise in Africa is undoubtedly Morocco. The low profile trends of most African nations owes itself to the low internet connection speeds found in most of Africa, with such speeds being insufficient or barely sufficient to stream YouTube videos.
4. In East Asia, trends are highly diverse, with a South Korean low rise-saturation, Japanese moderate rise-saturation, Indonesian high rise-saturation, Thai high rise-decline and Vietnam's almost monotonous rise. These trends are owing to multiple factors such as internet speed and penetration, censorship and age demographics. However, the most promising East Asian markets for YouTube would be Indonesia and Vietnam.
5. In West Asia, most nation trends for YouTube show moderate rise and saturation. The only exception to this norm is Pakistan, which has a history of YouTube Censorship. Of all the other trends, India shows a gradual, albeit only slight. It is also interesting to note that UAE leads the trends, owing to high internet penetration rate (88% as of 2014).
6. In the Pacific nations, most trends are on the rise, with the highest rate of increase seen in Fiji. Notable are the late starts of Papua New Guinea and Samoa. Australian and Kiwi trends are however reflective of their counterparts in Europe and North America.

On the global platform, the most notable trends are the high rising Morocco and Mexico, and the fact that most YouTube trends are generally on the rise, unlike the observations of Facebook and Twitter trends. This might be indicative of a general increase in internet speeds and video streaming capabilities across the globe. It is indeed logical that given adequate capabilities, most of the internet using population prefers video-based content, which potentially carry much more information than texts and images.

D. Snapchat

The trend search results for Snapchat are presented in Fig. 22 to 28. Owing to the fact that Snapchat was launched in 2011, the time range is chosen as 2011-2015.

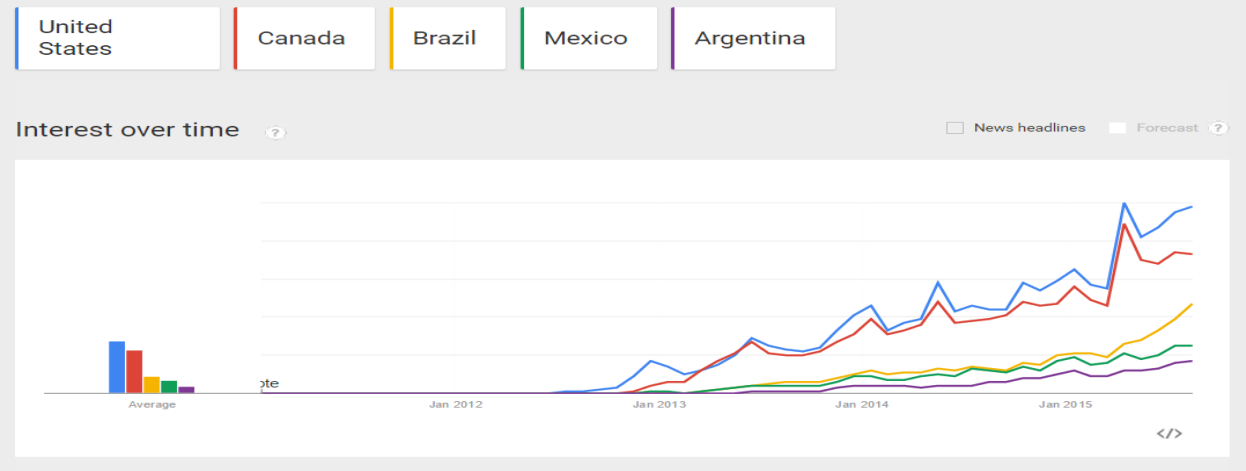

Figure 22 Trend Search Results for Snapchat – The Americas

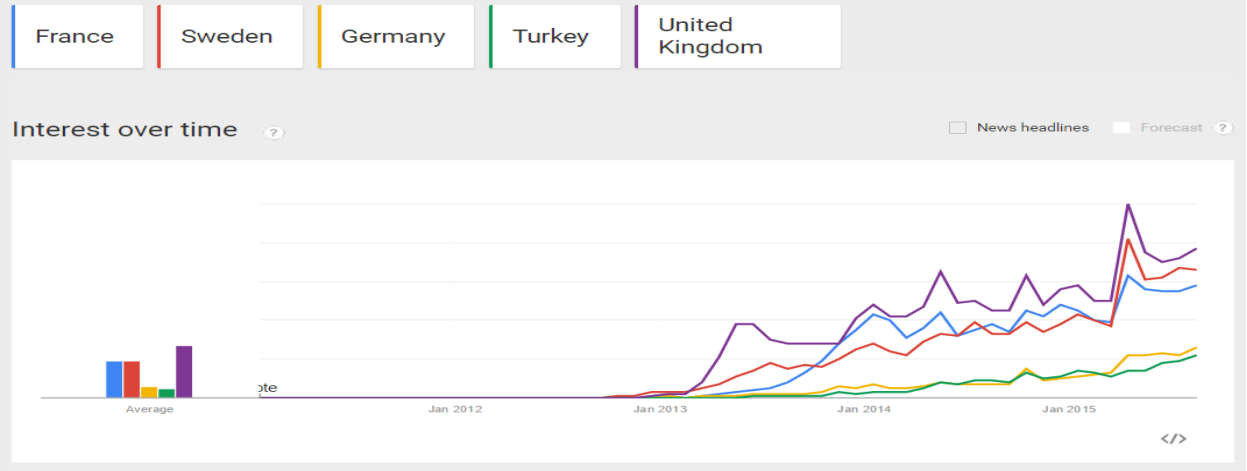

Figure 23 Trend Search Results for Snapchat – Europe

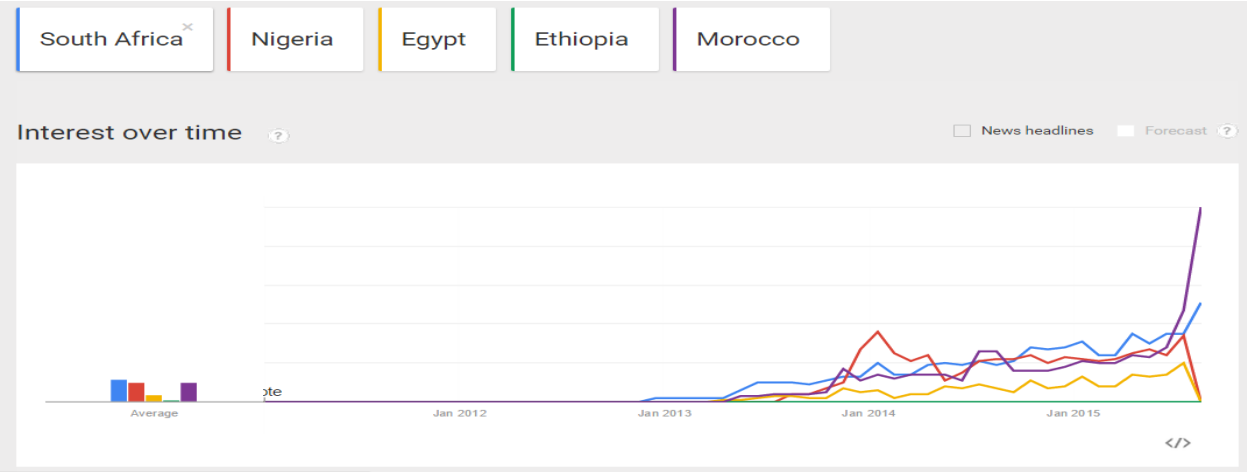

Figure 24 Trend Search Results for Snapchat – Africa

Figure 25 Trend Search Results for Snapchat – East Asia

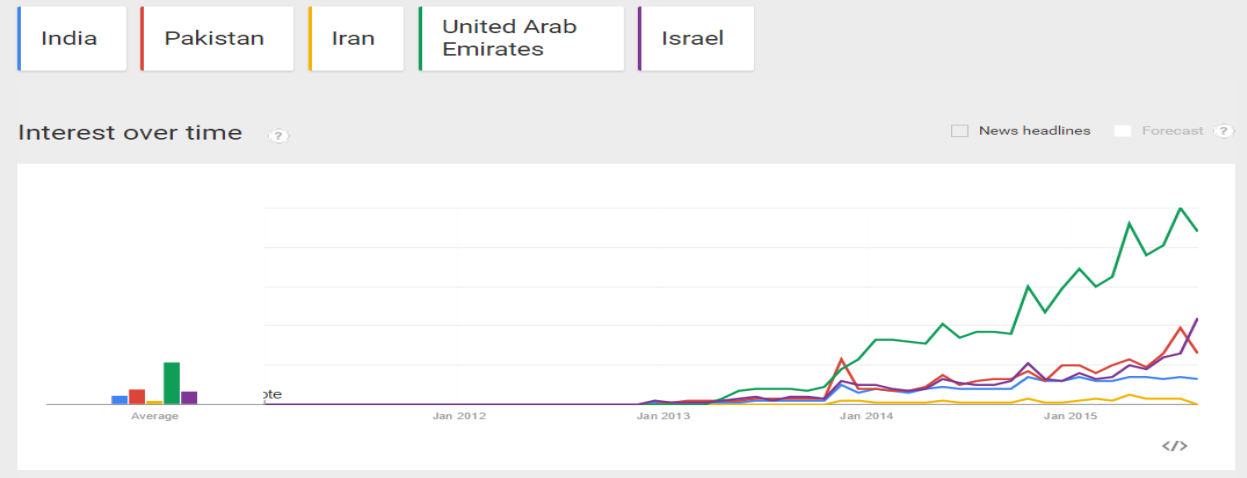

Figure 26 Trend Search Results for Snapchat – West Asia

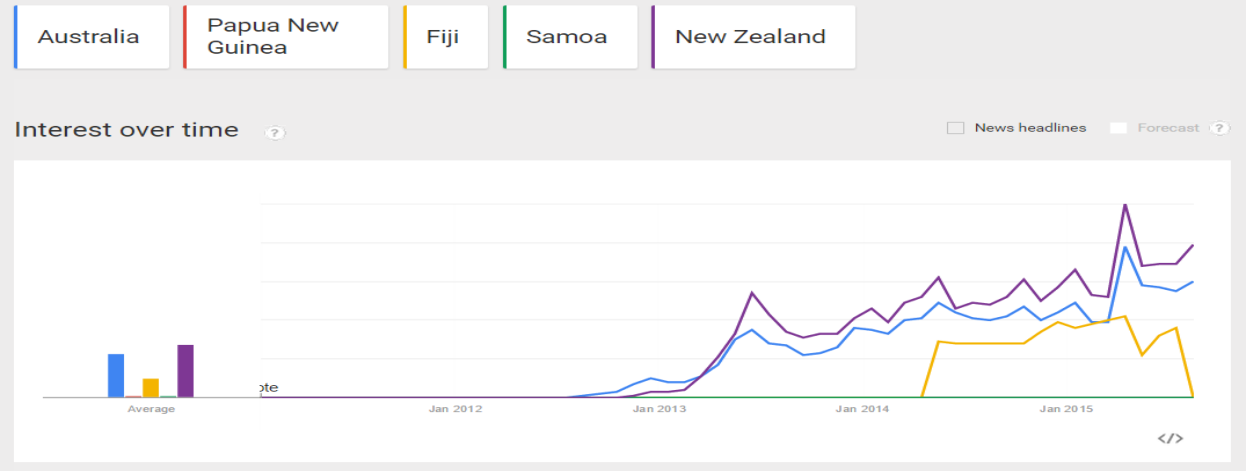

Figure 27 Trend Search Results for Snapchat – The Pacific

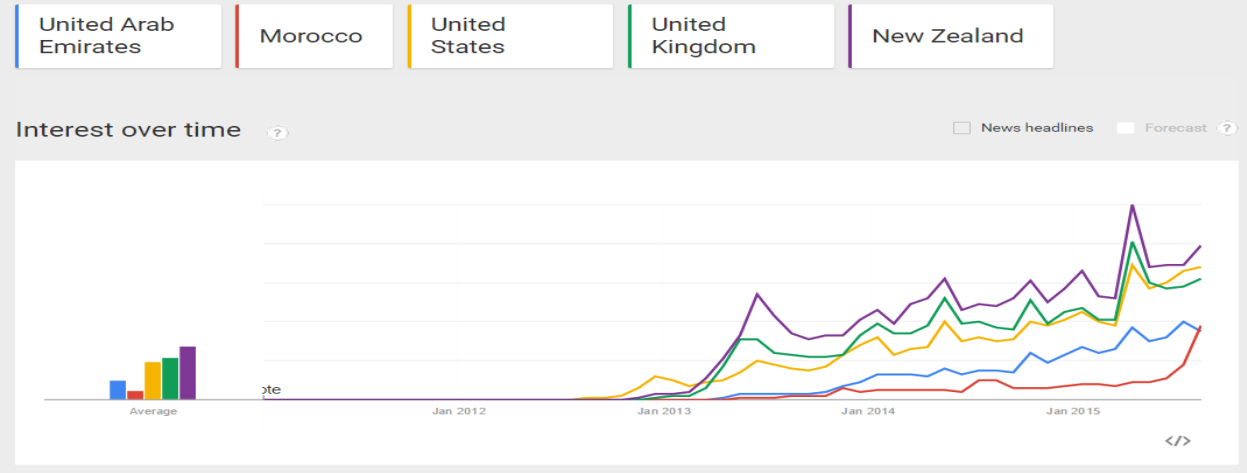

Figure 28 Trend Search Results for Snapchat – Global Leaders

Owing to the very recent launch of Snapchat (2011) compared to the other social networking service sites, most trends of the former are very much on the rise, with the exact rates however varying between countries. The key inferences are summarized below:

1. In the Americas, the US and Canada show clear leading trends with the Latin American countries taking second stage with a more gradual rise. This is directly reflective of the US and Canada having high penetration rates (above 80% as in Table 1) and consequently higher internet speed, than the other three nations (penetration below 60%).
2. In Europe, the UK leads the pack, followed closely by the much later rising France, and Sweden. It is interesting to note that Turkey, a trend leader in the earlier social networking services exhibits a much lower trend profile for Snapchat searches. However, even the leading trends of Europe pale in comparison with one country, Norway, as shown in Fig. 29.
3. In Africa, all country trends follow a moderate rise with Morocco posed to register an unprecedented high value in the forthcoming months. However, the trend for Ethiopia is nonexistent.
4. In general East Asian nation trends seem to perform better than the Southeast Asian counterparts, with South Korea registering a moderate rise. However, the exceptional case of Indonesia has posed an enormous rise, paling the optimistic rise of Thailand.
5. In West Asia, while India, Pakistan and Israel post moderate trends, one nation, the UAE has surged past, growing in leaps and bounds to almost double the value of the next highest Israel.
6. In the Pacific, Australia and New Zealand have followed high trends, mirroring their English Speaking Counterparts in Europe and America, whereas Fiji has shown a late rise by early 2014. The trends of Papua New Guinea and Samoa are virtually nonexistent.
7. In the global platform, it is clear that the trends of English speaking leaders New Zealand, the UK and the US clearly outperform the Arab counterparts, Morocco and the UAE, with the clear highlight from all the graphs analyzed being that Snapchat is not yet a language transcendent service, unlike Facebook, Twitter and YouTube.

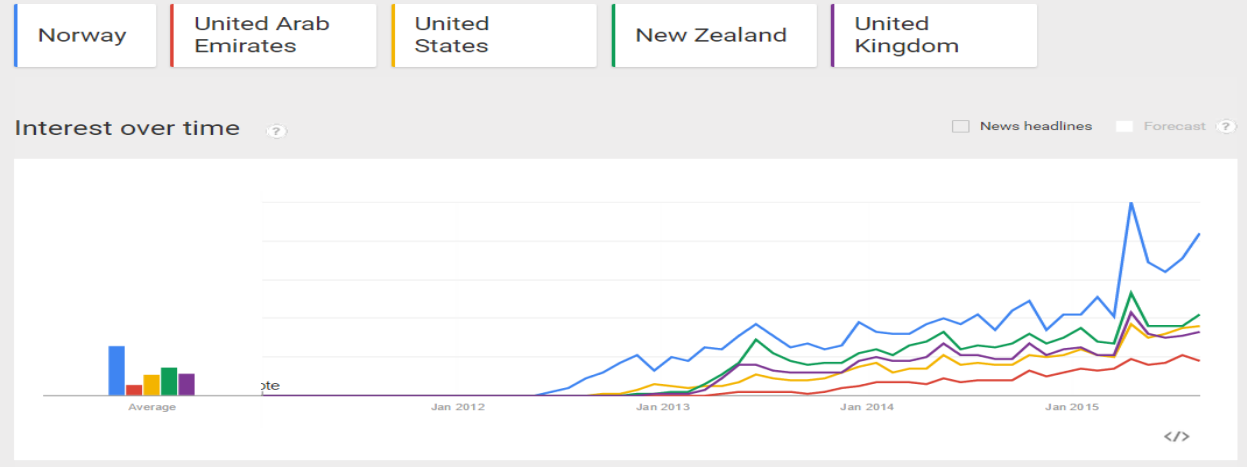

Figure 29 Trend Search Results for Snapchat – Comparing the Global Leaders with Norway

Apart from all the inferences mentioned above, the most important inference is the paling away of even the best trends of Fig. 28 in comparison to that of Norway, as seen in Fig. 29. With an internet penetration

of over 95%, and a high internet speed, it is only logical that Snapchat has been extremely popular in Norway [29]. However, overall, the biggest factors deciding Snapchat interest and popularity are Internet Speed, Penetration and Language barriers.

4. Conclusion

The present work started with a consolidation of thirty countries across the globe using the Roman Alphabet, and four popular internet social networking services – Facebook, Twitter, YouTube and Snapchat. Using the Google Trends tool the search trends for the abovementioned services are recorded and the inferences are discussed. It is seen that while Facebook trends in general showed Gaussian based curves with promising trends in the Pacific, trends of Twitter are much more diverse, showing a general decline in most countries except Pakistan and Argentina. Trends of YouTube are on the rise, reflecting general increases in internet speeds and penetration rates, with the highest trends seen in Mexico and Morocco. Snapchat trends are a direct reflection of internet speeds and penetrations, with Norway and English speaking US, UK and New Zealand trending high. The results discussed in the present work throw new light on the opinions, perspectives and public sentiment towards well established and upcoming social networking services, and it is opined that apart from highlighting the significance of web search behavior based data, the present work is a stepping stone towards using what could be called "Smart Analytics" as a supplementary, or even a complete substitute to expensive field surveys and questionnaires.

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