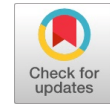# Social Media Analytics and New Product Development

Tarun Kumar Singhal

*Abstract***:** *Social Media, due to its ubiquitous nature, has permeated into the daily lives of the customers of the organizations. The existing and prospective customers are increasingly engaged with the organizations through a two-way communication channel, which is almost always available to them. Through these engagements, an enormous level of data (big data) is being generated on social media platforms. However, this data, generated on social media platforms, is highly unstructured in nature that needs to be organized before suitable inferences can be drawn to facilitate the decision making by the organizations. This data is analyzed through social media analytics to understand the experiences, expectations, user behaviors, among others to improvise or innovate the existing product/service portfolio or to develop new products. This paper has attempted to understand the impact of social media analytics on the effectiveness of new product development activities and has also tried to emphasize the need for analyzing the data being generated on social media for enhancing the new product development process.*

*Keywords***:** *Social Media, Social Media Analytics, Big Data, New Product Development.*

I. INTRODUCTION

Social media has allowed the organizations to look beyond traditional mechanisms of collecting feedback directly from the customers or conducting surveys.

A few organizations are now mining the social media data to significantly decrease the time taken for releasing, assessing, and collecting immediate feedback of the product.

Social media analytics broadly refers to the activities undertaken in analyzing the data generated through social media and sharing the findings to streamline and support business decisions. Social media analytics also identifies opportunities and problems and can facilitate in leveraging opportunities while mitigating issues [1].

The analytics operations in social media can generate pinpointed knowledge or intelligence, which can help the adopting organizations in understanding possible situations/problems and help in addressing these with effective business decisions. Further, social media analytics can accurately measure feedback of the customers and support the organizations in streamlining the marketing strategies [2].However, the adoption of social media analytics by the organizations is not all encouraging because of the adverse outcomes exhibited by a few research studies.

Like a survey concluded that 50% of the respondents (out of the surveyed 600) failed to establish linkage between social media and business outcomes [3].

II. SOCIAL MEDIA ANALYTICS

Social media content is available on multiple platforms such as blogs, social network sites, and multimedia content sharing sites. Social media analytics aims to analyze this user-generated content to address a few specific queries or to give certain directives in decision making [4].

Social media analytics screens the user-generated content available on social media and tries to make sense of this unstructured content for recommending a course of action for the organizations. Social media analytics has assumed a greater interest among corporate practitioners because of the speed, depth, and reach of the user-generated content in engaging the stakeholders on social media.

The user-generated content carries both relevant and irrelevant content, which can make the job of social media analytics pretty tricky. Also, the nature of user-generated content makes it challenging to be analyzed by social media systems. Still, the value associated with social media data despite several drawbacks makes the practitioners in dedicating time and resources for analytics activities.

A research study has highlighted that effective implementation of social media analytics can contribute the following deliverables for the adopting organizations: (1) improvement in marketing strategy, (2) uncovering new business opportunities, (3) reputation management, (4) customer engagement, (5) customer service, product innovation, and (6) improvement in business process. The innovation has received fourth-highest rankings under the deployment of social media analytics [5].

Despite offering several advantages as described above, social media analytics has a distinct set of challenges as well. The challenges have been categorized under two broad heads - the first head refers to the challenges experienced before analytical processing activities, whereas the second head considers the challenges during the analytical processing activities.

The first head needs to deal with varied content, use of jargons and abbreviations, the validity of data, different data sizes, the challenges of data extraction, and complexities involved in processing.

The second head examines the challenges emanating from time-variable data, limited/short life of usability of data, scalability for multidisciplinary big data and limitations in developing integrative processing approach.

The above-mentioned head (pre-analytical processing) has to deal with several micro-challenges such as brevity of messages, informal nature of data, unstructured and distributed content, use of special symbols, slangs, use of abbreviations, typos, data extraction, etc.

On the other hand (analytical processing) has to deal with micro-challenges such as time variance, the impact of analysis, limited data life, scalability, multidisciplinary data, integrative approach, etc.

III. BIG DATA AND SOCIAL MEDIA ANALYTICS

The organizations wish to understand their respective customers in depth through monitoring of online behavior of the customers. This online behavior of customers produces vast volumes of data, which can be analyzed by organizations using analytical tools to make sense and take corrective/preventive measures. This enormous volume of data (also known as big data) generally originates from social media entities like Instagram, Facebook, LinkedIn, Twitter, etc. [6].

Social media analytics refers to the capabilities of analyzing user-generated social media content to answer questions or to achieve specific goals. Since social media users generate relevant, irrelevant, ad hoc and free-form content, the analysis poses several challenges before social media analytics.

Social media analytics is also represented as the capability to trace and shape meaning in data gathered from social media platforms for supporting business decisions. This capability is also instrumental in measuring the performance of decisions/actions executed through social media.

The analytical operations performed on big data generated on social media platforms (social media analytics) provides valuable insights to the organizations regarding product/service performance, expected deliverables, purchase intentions, pricing, etc. Using these insights, the organizations can deploy various strategies to ensure successful launches, smooth sales, uninterrupted followups, positive usage experience, increased customer loyalty while remaining competitive among market trends for higher profitability [7].

Social media analytics additionally incorporates the concept of social listening, which is represented as monitoring social media platforms/channels for various problems and opportunities. Social media analytics tools typically incorporate listening into more comprehensive reporting that involves listening and performance analysis. Listening to the consumer remains the core expectations, around which social media analytics can be conceptualized. In other words, the organizations mine the 'sentiment analysis' to listen to the customers and understand their perceptions about the products/services being offered. Sentiment analysis has assumed greater significance in recent times because of its raw and unadulterated nature [8].

Successful sentiment analysis can help an organization in deploying personalized strategies to ensure positive customer experience on the products/services being offered. This is done through social media analytics to getting a clearer picture out of vast volumes of data being analyzed [8].

The concept of data analytics has been further classified into the following three subtypes of data analytics:

Descriptive analytics: what happened in the past.
Predictive analytics: what might happen in the future.
Prescriptive analytics: which courses of action are likely to give the best outcomes [9].

Social media analytics extends its scope beyond collecting intelligence for insight generation, making sense of data, recognition of problem and solution, detection of opportunity and exploitation, and finally, decision making [10].

Social media analytics, when applied in the right context, can help the organizations in improving marketing strategies, engaging the customers, providing good customer service, managing reputation, creating awareness regarding brands, innovating products, improving business process and identifying new business opportunities [11].

Social media analytics adopted over big data collected from social media platforms has been able to predict revenues of the movies, sales of Apple iPhone and outbreaks of the epidemic [12] [13] [14].

Consolidating the findings above, it can be safely assumed that social media analytics examines the social media data to understand the usage experiences, expected behaviors, sentiments, referral possibilities, innovation insights while creating sufficient ground for the adopting organizations to use the above and deliver the expected behaviors and creating new products [15].The following figure depicts the Social Media Analytics Framework, which elaborates the involvement of stakeholders, managing unstructured data on social media, incorporating approaches to search on specific topics, identifying opinions/sentiments, introducing structure and finally analyzing for creating a summary or pinpointed analysis for decision making [15].
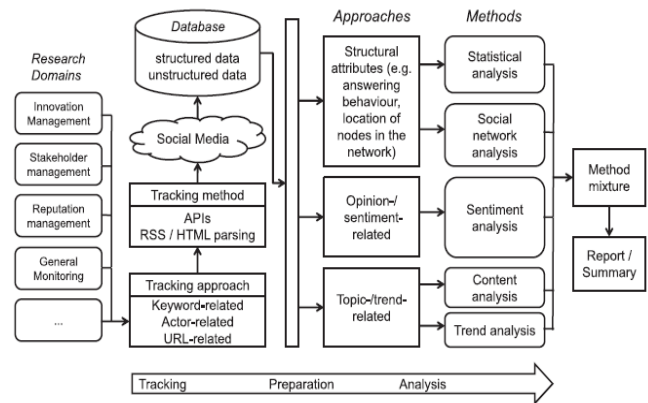

Fig. 1. The Social Media Analytics Framework [15]

This framework is quite capable for social media data analysts to start with. However, caution needs to be exercised on several fronts such as allocation of resources to important sub-activities, tracking the progress of analytical operations, setting off weightage criteria for different issues of social media analytics and finally producing results in a simple summary form to help the decision-makers without confusing him/her further.

IV. USING SOCIAL MEDIA ANALYTICS FOR NEW PRODUCT DEVELOPMENT

The data available on social media or allied platforms are characterized by humongous volume (Big Data) capable of offering valuable insights to the organizations. Joining two massive data sets from electronic health records and genomics has enabled the medical practitioners in predicting the disease and recommending specific drug use for its effective treatment.Similarly, the data being generated in real-time through sensors is enabling the organizations in carrying out improvements in products or innovating the same. Tesla and Rolls Royce are putting Big Data to the best use in predicting features and components for their respective products. Also, the data having maintenance as the origin is helping the organizations in reducing the Mean Time Between Failures.Social media analytics can analyze Facebook posts, tweets, and product reviews collectively to give a clear picture of customer pain points, changing needs, and desired features. These trends can be tracked against the existing product lines to identify the gaps and initiate the process of new product development.The customers are consciously or sub-consciously participating in the generation of new product ideas on social media platforms while enabling the process of new product development. The customers need to be treated as co-creators in this process of new product development [16].Another supporting argument behind treating the customers as co-creators is the content created, diffused, and opinions influenced on the social media [17]. The level of influence can be gauged from the number of followers an influencer has. More number of followers would indicate more significant influence [18].

The process of new product development, among other factors, is influenced by the impact of an influencer on the network. This influencer shall put forward or diffuse specific demands or expectations in the network of influence, which the current offerings of products and services are not able to support thus creating demands for improvement or innovation [19].The data available on social media has traditionally been used for creating a two-way interface with the customers. Several research studies have revealed that customers like to remain engaged with organizations through social media platforms. However, this interface does not remain confined to communication. Instead, this interface participates in research on the existing products and services and then creates a platform for the existing users to express new expectations from the products and services thus paving the way for new product development [20].

Obtaining quality data, which is of very high importance for social media analytics, remains a big challenge. The data collected from social media is generally incomplete and carries noise as well, which is considered unreliable. Further, the collection of missing pieces of information is cost-ineffective and is, therefore, discouraged [21].

Social media analytics can also be instrumental in performing competitive analysis for the organizations to keep their products/services contemporary and relevant. In the wake of competitive analysis, new mechanisms in social media analytics can recommend new or niche markets for the products/services. Additionally, possible disruptions in the near future can also be cited using social media analytics to help the organizations prepare for such disruptions.

The organizations, therefore, look forward to using social media inside, outside (customers, suppliers, partners, stakeholders, etc.) to create a complete view of the data collected from social media. This practice helps organizations in increasing their reach while addressing interaction and socialization needs [22].

Social media analytics predominantly used clustering analysis for uncovering hidden conversations and unexpected insights. This analysis uses associations involving keywords/phrases that frequently appear together for shaping/directing new topics, issues, and opportunities. Several associations found earlier during the natural course of action have suggested different uses of products/services or new products/services.

A research study also found a positive influence of social media data (comments, expressions, complaints, suggestions, usage experiences, etc.) on the process of new product development. This study also highlighted the concept of open innovation, where all stakeholders can jointly participate in bringing improvement, innovation, and a new product [23].

Social media content can facilitate in building perceptions of product/service quality underlining the needs for improving/innovating the existing portfolio of products/services or creating a new product/service altogether. Social media content (primarily the portion generated by the users) is deemed trustworthy, which further helps in demand analysis while creating a suitable business case or developing motivation for an organization to undertake the process of development of new product [24].

Analyzing social media content is a big challenge due to the challenges of data visualization, data quality, software architecture, interdisciplinary nature, and event detection. Several moderation exercises are taken into consideration to address the above-mentioned challenges [15].
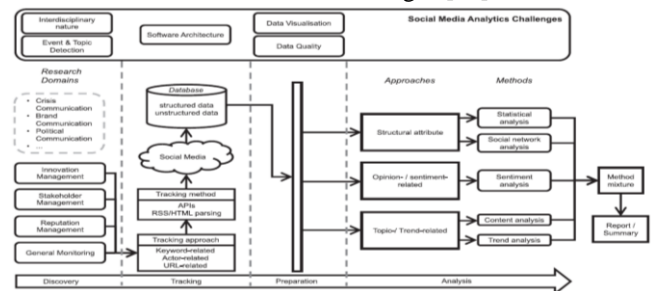

Fig. 2. The Social Media Analytics Challenges [15]

Social media analytics can help organizations in achieving goals ranging from increased revenue to highlighted service issues. These achievements are made possible through the selection of keywords, influencing a problem, or an opportunity. Social media analytics also exercises greater control on feedbacks emerging as responses to YouTube videos, Twitter interactions, Facebook conversations, Flipkart/Amazon product reviews, etc while selecting the right source for the right improvements or innovations.

V. TEXT MINING FOR SOCIAL MEDIA ANALYTICS

To address the above-mentioned challenges, various approaches have been adopted by the organizations. Among all these approaches, text mining is considered to be a great approach because of its comprehensive coverage of unstructured data.The organizations carry roughly 80% of their information in the form of text documents. Extracting meaningful constructs of the information from these text documents is a slow process. To extract the useful information quickly, the decision-makers have to use automated extraction system, which is known as text mining [25].
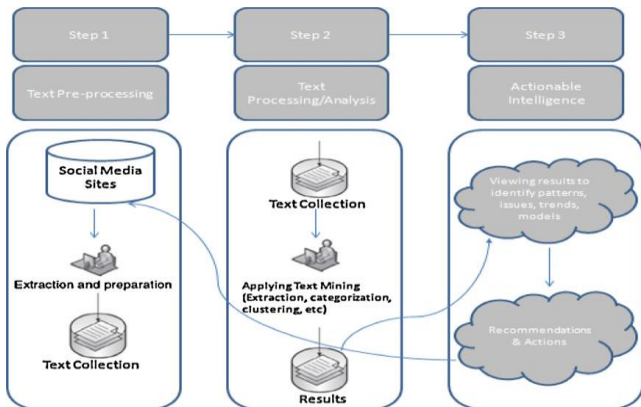

Fig. 2. Text Mining Process for Social Media Content [25]

The process of text mining is divided into three phases (Pre-processing, Processing, and Intelligence). Pre-processing phase extracts the data from various social media platforms. The extracted data is then prepared and organized as a text collection.

The text collection is then forwarded to the second phase of Processing, where the text collection is analyzed using text mining techniques (extraction, categorization, clustering, etc.) and results are produced.

In the last phase, actionable intelligence is generated through the identification of patterns, issues, trends, and models. Finally, this phase concludes with recommendations and action plans to be undertaken by the stakeholders in future. Such recommendations and action plans are also implemented at social media site levels to ensure higher efficiency and effectiveness of text mining operations to be undertaken in the future. Also, these recommendations and action plans may contribute towards the process of new product development based on experiences shared by the users.

VI. CONCLUSION

Social media analytics can provide opportunities to the organizations to get closer to their customers and identify opportunities for new product development through analysis of user-generated content available publicly on their social media platforms and competitors'.

The customers are getting demanding with each passing day with their expectations from products and services are reaching at an all-time high. However, they are willing to pay the lowest possible prices for the products/services chosen.

This situation is reflecting negatively on the bottom line of the organizations and rigorously participating in new product development process can be the only way out.

The organizations need to treat their customers as co-creators in the new product development process through their involvement on social media platforms with usage experiences and expectations. Social media analytics can also help the organizations in performing competitive analysis where their products/services are compared against their competitors' products/services. Through this competitive analysis, weaknesses, opportunities, threats, etc. are quickly identified, which can help organizations in creating plan of action.

There is a growing need on the part of the organizations to know their customers and friends of their customers, as well as the friends, are the first respondents to any social media content shared by the customers. Any positive or negative experience of the customer is made viral by his/her friends or his/her network of influence. Thus it is imperative for the customer to experience good product/service performance.

Text mining serves as a dominant social media analytics tool, which is capable of analyzing large volumes of unorganized textual data available on various social media platforms. Text mining is deemed as a critical business need for analyzing textual data from within and outside the organizations and supporting the decision-makers with crucial insights from the data.

The technological development in social media analytics may facilitate real-time data mining and text mining to facilitate real-time decision making and to create a competitive advantage for the organizations, which is difficult for the competitors to replicate. At the same time, real-time data mining and text mining are highly capable of providing personalized and differentiated products/services to the customers.

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