Potential uses of Big Data in Corporate Communication for Better Decision-Making

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Abstract:- Information systems along with the internet, cloud services, mobiles, Artificial Intelligence, Virtual Reality, and the Internet of Things have led to enormous volumes of data, frequently referred to as big data. This paper investigates the potential uses of Big Data in corporate communications, and its lack of research in Public relations, and will try to give a systematic and comprehensive overview of corporate communication in organizations dealing with big data. The aim of the review is to explore decision-making in corporate communication, primarily through the study of internal communication, marketing communication, and public relation in organizations. It delves deep into the present condition of research in big data and introduces a framework for further points in research. This is accomplished by briefing and studying the insights provided by concerned articles in the most significant scholarly journals published between 2012 and 2022. The paper also explores trends in the literature on how big data can be used to make smart and profitable decisions making by companies by managing data. Furthermore, a background and definition of a methodical application process of big data in corporate communication are also included in the paper for a better understanding of the past scenario, the present dilemmas, and the futuristic decision-making by organizations.

Keywords:- Public Relations, Marketing Communications, Corporate Communications, Big Data, Decision Making.

I. INTRODUCTION

Huge amounts of data are being produced every day from financial transactions, sales statistics, customer records, consumer feedback, product reviews, shareholders' accounts, and so on. This data is unmistakably the fuel that drives businesses across the globe and has an urgent requirement to be examined to improve the decision-making abilities of organizations. This decision-making includes collecting data from various sources, its storage capacity, increasing the workforce of data scientists to analyze the collected data, and most importantly segregating the quality of accumulated data before its application. Handling this diverse and increasing amount of data is a crucial challenge faced by companies. Scrutinizing this data and segregating what matters and transforming it into decision-making are two aspects that will define the future of an organization (Loebbecke and Picot, 2015).

The technologies and approaches related to Big Data not only initiate the innovativeness of companies but hugely contributes to their competitiveness as well. For an instance, corporations can utilize this big data in including a new objective in their strategic communication plans and thereby develop and expand their corporate communications. It is due to these new opinions and perceptions that big data offers, promises a huge potential for expansion in the field of communication science (Al-Qirim et al., 2017; Constantiou and Kallinikos, 2015).

The focus of this paper is, first, to study the importance of big data in and for the scopes of corporate communication, specifically, in marketing communication, public relations (PR), and internal communication of companies. Next, to present an outline of big data uses in corporate communication to interpret detailed statistics for future research. Since the past decade, companies were able to identify the growing significance of big data from the rising numbers of scientific papers on big data (Jaiswal, 2018), but the literature is still inadequate in showing early research activities, especially when it comes to corporate communication.

Through an interdisciplinary consolidative literature review, this paper aims to accumulate earlier incongruent pieces of work in communication science, marketing, and information support systems about the applications of big data in corporate communication. This approach will also emphasize big data's fast-growing significance among businesses. Moreover, the study includes proper scrutiny of journal pieces between 2012 to 2022 and was categorized into three main types of corporate communication, namely internal communication, marketing communication, and public relation; corresponding to their fields of action, that is, customer communication, brand communication, and media relations. Furthermore, a background and definition of a methodical application process of big data in corporate communication are also included in the paper for a better understanding of the past scenario, the present dilemmas, and the futuristic decision-making.

II. LITERATURE REVIEW

A. Understanding corporate communication and utility of big data in it

To have a better understanding of the potentialities and limitations of the applications of big data in corporate communication, it is essential to deal with the three categories of corporate communication. The main three sections are public relations, internal communication, and marketing communication (Argenti, 2014). While marketing communication indicates mainly the market condition and assists in both the sale and acquisition of products and their services, public relations emphases on the other hand is more about tactics in the socio-political and economic setting of the current time. The focus of public relations is to set up a

background for action and act accordingly to validate robust plans through media incorporation. On the other hand, internal communication is focused inward in the direction of the corporate community and aims to empower and assist the shared, and collective performance of an organization (Kaisler et al., 2013).

This paper also emphasizes the thematic approach to differentiate the usage of big data across various fields of corporate communication. For example, customer communication, product communication, and brand communication are distinctive areas of action in marketing communication, and employee communication and administration communication fall under the responsibility of internal communication in an organization. Moreover, public relation is multi-layered and more complex. It consists of media relations, stakeholders and investor relations, and even crisis or problem management. At this juncture, it is crucial to point out that the areas of work are not always so distinct, for instance in the brand and product communication the operational part often overlaps each other (Frith, 2017). Additionally, a few areas of activity in corporate communication overlap each other– let us say, brand identity, and communication regulations, CEO communication is part of internal communication along with part of public relations.

Brand and product communication are areas that principally have their place in marketing communication, but they also consist of media relation responsibilities – such as, when the message is intended at representing the status or image of the company or product.

Although the name big data is comparatively new, the operations of accumulating and storage of vast amounts of data for subsequent examination are quite old. The term big data was popularized in the early 2000s when business analyst Doug Laney voiced the present-day description of big data, which chiefly consists of a volume of data, the velocity with which it can be stored and accessed, and the variety of this information. With information becoming more complex, 2Vs were later added- the veracity of the data for decision-making and the value of the heterogeneous data. Similarly, the word big data is well-defined compared to traditional information systems. It comprises huge, complex, and heterogenous volumes of information. The data here is usually in varied formats, semantics, and structures. Therefore, retrieving or accessing any information from this huge pile requires technologies and tools equipped for quick and methodical storage, breakdown, maintenance, and retrieval of this heterogeneous data within a few micro-seconds (Murtarelli, 2017; Saura et al., 2019).

| Features	Explanation
Volume	Vast quantity of information in terabytes or petabytes have been doubling every forty months (Yaqoob et al., 2016)
Velocity	Rate of data gathering is growing in every industry
Variety	There are huge information sources such as, enterprise systems, social media, software applications, text, audio and video, and other digital devices
Veracity	Quality of information is crucial in decision making for an organization
Value	Socio-economic consequences can be made better by procuring the right value of the diverse information
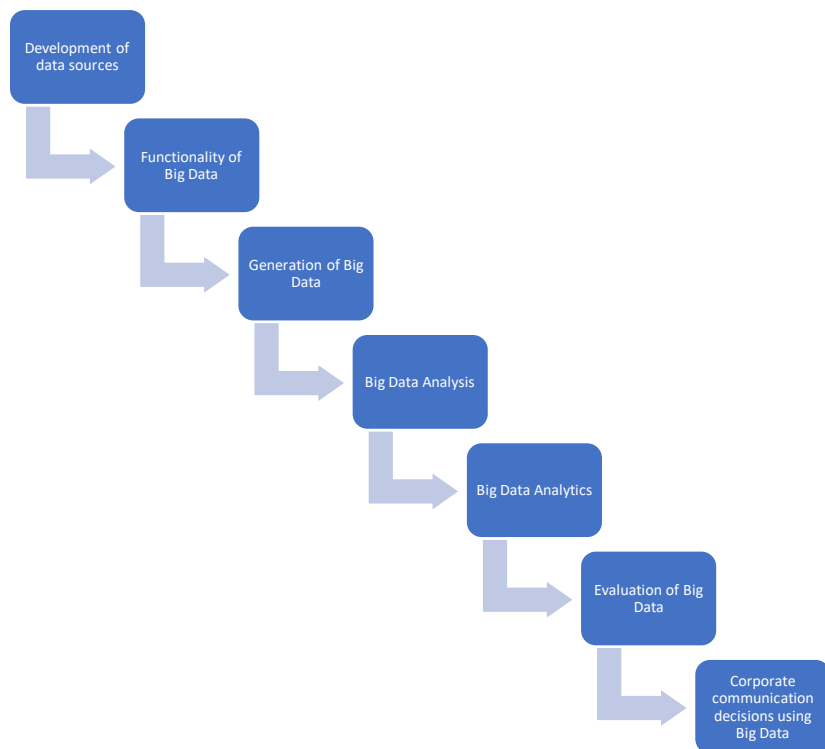
Fig 1: A typical-conceptual framework on how to make big data manageable and then use it in corporate communication activities

The next section of the paper includes discussions on Figure 1 to highlight the research gaps in this field and systematically try to offer productive outcomes in the field of corporate communications. This pattern is inspired by Bunte and Krohn-Grimberghe's (2014) account of overall applications of big data, which this paper has applied to corporate communication. The first two stages emphasize a problem requiring a solution-based approach. This is done by the collection of resources and setting precise goals by the means of big data. In the next two stages, it is essential to postulate which communication courses are to be accommodated (variety), how recurrently and expansively they are to be reckoned (volume), and at what pace they are to be evaluated (velocity). Additionally, the dependability (veracity) of the calculated information needs to be confirmed. Big data is only advantageous to businesses if they gain intelligence from the statistics to influence their decision-making (Murtarelli, 2017; Saura et al., 2019). Data mining is an organized, computer-based system of analysis that is used to extract huge volumes of information for knowledge. Hence, in stage five, big data analytic systems are applied to handle large quantities of data to detect irregularities, designs, and any concealed transactions in the big data. The methods that are used here are diagnostic, predictive, and prescriptive analysis. And when it comes to the communication methods that are to be applied by corporate communication teams, it is important to elucidate what was conveyed (descriptive analysis) before it is possible to investigate why it was shared (diagnostic analysis). Further, it is crucial to explore what is to be conveyed (predictive analysis) before any suggestions that can be made for any action by the corporate communication team (prescriptive analysis) (Popovič et al., 2018; Seiffert et al., 2021). Conclusively, an examination of the applications of big data should be held within the limits of the sixth and final stage.

B. *Methodical review of the use of big data in corporate communication*

To provide an overview of big data applications associated with corporate communication a systematic, interdisciplinary literature review is done as recommended by Webster and Watson (2020). The review primarily refers to the importance of big data in and for corporate communication. The review focuses on good-quality articles from reputed journals. Usually, in communication science, research associates hardly scrutinize the quality of journals, especially their ranking. Therefore, this study specifically considered journals by Scopus, Science Direct, and Google Scholar database for the most impact. Also keeping in mind, the interdisciplinary angle, the review has considered well-versed articles concentrating on marketing and big data from conference papers and web sources. The investigated time was between 2012 and 2022. The paper did not consider journals that had been published before 2012 as it wanted to focus on the last decade's developments.

III. RESULTS

❖ *Application of big data in corporate communication*

➤ *Marketing communication*

The articles referred to in the review depict that big data will restructure business knowledge, which includes gathering and processing information pertinent to a company's market to have insights assisting in decision-making, for example, to enhance their marketing communication (Venkatasawmy, 2018). The articles related to marketing communication depict a specific inclination towards the significance of selling a larger number of products and services by improving brand communication and product communication. These functions primarily take place through the applications of big data. Particularly promotional actions can be adjusted by big data to uphold or shape brand equity (Colleoni, 2013), come up with new inventions more efficiently (Hariharan et al., 2015), and expand customer acquisition through well-directed advertisements (Sun and Pang, 2021) over and above introduce a new point of views into advertising efficacy in combination with in-store marketing strategies (Troise and Camilleri, 2021). Kilgour et al., (2015) exhibit a big data approach which is usually used to evaluate web page content. Through this tactic, the web pages become classified enabling advertisers to choose where they want to showcase their ads. Wazurkar et al., (2017) share that big data offers communication specialists a background that they can use to monitor product reviews of relevant as well as rival brands, which empowers professionals to track from point to point, graphically represent the marketplace, and how competition has changed from time to time.

Similarly, as per Al-Qirim et al., (2017) communication managers can observe the dispersal of information and statistics about brands and products in worldwide interlinked networks by using a semantic network analysis approach and text mining tools. The managers can even gauge brand sentiments by checking word of mouth with social media analytics software if required. Mostly the journals from this section of the paper confer about the application possibilities of big data in marketing communication, thereby insinuating that the potential of big data in marketing communication lies mainly in enhancing communication observation, regulation, and assessment, especially in the advertising segment.

➤ *Public Relation*

Compared to marketing communication, few articles discuss in detail the varied area of Public Relation. An article by Bachmann (2019) talks about building value through knowledge management concerning marketing communication. Further, it implies that public relations plans can become beneficial through this knowledge management before moving on to the likelihood of using big data to solve problem management in the field. For instance, the oil industry states Uldam (2016) that solo players or trolls can effortlessly produce trending topics on social media by themselves and build up large public attention in favor of their protest or troll. Simultaneously, she stresses the ability of organizations to gather intelligence about such solo players

by observing social media. This observation can enable organizations to conduct risk or crisis assessments, and even emotional analyses of the situation in social media before coming up with a plan to mitigate the problem through decision-making. Moreover, Bachmann (2019) besides Doorley and Garcia (2015) proposes the prospect of using big data in controlling and refining corporate social responsibility (CSR) actions. Both Colleoni (2013) and Troise and Camilleri (2021) express the chances for exploring the competence of PR approaches in social media to attain a union between the CSR schemes of companies and the social potentials of investors. This union of CSR agendas and PR plans increases the authenticity of businesses. For this, organizations utilize data mining resources, like theme and opinion assessments.

Doorley and Garcia (2015) as well as Saura et al., (2019) recommends that information created from big data examination can improve public relation. The generated information assets can be used to manage PR in the present and the future more purposefully, especially through research on the target market areas and associated people. But both the journals judiciously bear witness that public relations managers do not completely employ the entire range of practical potentialities, like the delivery of all content through mobile devices. Saura et al., (2019) address the public relations segment through investor relations, and finance communication and goes on to emphasize the significance of focusing on the voice of stakeholders and investors for better PR activities. Therefore, most of the articles in this section consider the capacity of big data mainly in community and social relations, media relations, public affairs, CEO and other leadership communications, and the brand identity of an organization.

➤ *Internal communication*

The journals which are studied for a better understanding of internal communication share how businesses can or should build a set-up for the distribution of precise and wide-ranging data among staff or senior managers (Yaqoob et al., 2016). This is generally the gathered data after processing from raw information acquired from multiple sources (Popovič et al., 2014). Also, internal communication within a company has transformed a lot in the last decade due to new means of digital communication that are preferred by the corporates, along with declining face-to-face interaction (Loebbecke and Picot, 2015).

Here it is important to note that the literature this paper explains does not holistically illustrate the applications of big data in corporate communication. It builds on the authors' description of fractional facets of the whole process in their respective journals. Thereby, highlighting the urgent necessity for strategic agendas to be presented to explain how to make big data manageable and operational for improved usage in the field of corporate communication.

Stage 1: Obstruction of communication and problem-solving through actions

As per the above framework (Figure 1) it is vital to determine the issues related to big data, then find the objectives of the decision-making using the accumulated data, as well as to provide a solution to the backlogs found in the initial processes of big data applications (volume). The literature review in this paper explains how these problems are located in the field of marketing communication, for instance, the development of communication regulation, control, and assessment for the rise of efficiency of a brand, product, and customer interaction are areas that need to be focussed upon.

Stage 2: Generation and analysis of big data

Scholars have measured written content about products and corporations, product reviews, consumer interactions about advertisements, as well as user chats on social media for obtaining meaningful information from the accumulated data (Sestino et al., 2020). About the feature of velocity, big data functions make it possible to undertake single-point investigations, longitudinal analyses, along with actionable real-time inquiries Jagatheesaperumal et al., (2021) of a campaign or campaigns lasting for days to years. Another important point while data gathering that must be taken into account is related to veracity, i.e., how dependable is the collected data. Crosset et al., (2019) talk about this issue, especially in the context of user-generated content. As stated by all these authors, communication specialists must create strong filters for the detection of fake reviews, especially on social media platforms. The next issue that concerns here is the negligence of standards in grammatical rules (Yang and Kang, 2015). When user-generated data is processed, opines Constantiou and Kallinikos (2015) wrong-spellings, and grammatical errors ought to be considered. Finally, data security and privacy concerns of the users can also not be taken lightly. There is evidence according to Sestino et al., (2020) that information provided by all users is not always accurate due to concerns related to various levels of privacy and security threats.

Stage 3: Big data analytics and its evaluation

Usually, analytics can be differentiated into three categories depending on the purpose of using it - descriptive, predictive, and prescriptive. Descriptive analytics elucidates an event from past data by the means of dashboards, and reports which aid in comprehending what has happened. For instance, in multinational companies, ethnography can be observed to help decode the flaws, difficulties, and ambiguities that lie beneath abstract representations and outlines to give managers an exclusive means of insight into market realities (Fuchs, 2018). Predictive analytics is another powerful tool that supports perceiving what can happen. It helps in forecasts based on past data, associations between variables, and patterns. Matthias et al., (2017) state the importance of social media research to conduct a prediction. For example, in the automotive market in the United States, Fisch and Block (2018) obtained empirical evidence which helped their supposition that search trends relating to product features, can be considered as insightful pointers of inclinations relating to product features. Lastly, prescriptive analytics explains executive decision-making. It generally uses various outcomes under multiple scenarios to suggest decision-making. It involves different tools like optimization, what-if-analysis scenarios, simulations, and many more while

changing the input parameters (Shvetsova, 2021). Executives can decide with a proper understanding of predictable consequences and plan contingency. The resources from where the information is gathered play an important role in analytics as well, such as text, network analysis, audio, or web and others.

Stage 4: Using Big data in decision making of corporate communication

In the final phase, the big data structures and applications that have been applied should be assessed, like the quality of the information must be regularly monitored. Hence, companies often invest in data quality assurance systems (Matthias et al., 2017) such as screening through product reviews that are not posted by real customers and not fake ones.

➢ *The potential of research on big data applications in corporate communication*

The articles studied in this literature review show that significant research related to big data in corporate science is still in its infancy. This paper vividly highlights the research gaps in the areas of PR and internal communication as compared to marketing. Consequently, future researchers can approach the issues of this field as how the problems of big data can be identified and in what ways the analysis of it is going to produce. In public relations, scholars have to assess how data mining and analysis can help to improve strategic communication. Algorithm-based systematic approaches for the identification of semantic structures, such as text mining systems, can also be applied to strategic relationship management, especially in the financial market.

IV. INFERENCES

So far, the prevalent issue faced by companies was the lack of innovative analysis processes and an absence of a universally adopted technique for successfully evaluating the relevant information at a time when there is an ongoing trend of rapid development in the volume of available information (Ward and Barker, 2013). The illustrations of big data applications demonstrated in the literature review propose that big data will lead to a huge paradigm shift in corporate communication. Measured analysis and the knowledge essential to perform mathematical representations are meaningfully transforming the actions connected to corporate communication (Ji-fan et al., 2017). In these cases, corporate communication activities can be put forward in collaboration with IT experts and analysts. Corporate communication will always require skilled professionals who are explorative in nature and can assimilate, produce, and clarify insights (Clemons et al., 2015; Fuchs, 2018). Lastly, it is essential to highlight that, concerning big data applications, businesses must always take into account a possible external confrontation because of stakeholders' and/or even shareholders' cynicism regarding the use of big data. Such disbelief grows due to privacy issues and reservations about the loss of liberty and independence (Gupta et al., 2018; Ohata and Kumar, 2012). To focus on these matters at hand and avert any misuse of information, corporate

communication professionals must discuss a framework, and review ethical rules and limitations for big data applications.

V. CONCLUSION

I am well aware that literature related to big data at large has been published in a far bigger number of journals than the ones considered here in addition to in conference proceedings, book sections, and working papers. The paper also acknowledges that the field of big data has existed for a much extended period than what is studied here. Even though few articles in the literature review emphasize that most of the articles on big data applications have been published in the recent past, it is crucial to examine a bigger volume of literature from the present and the past to showcase a wholesome picture of the utility of big data in corporate communication. However, this paper has considered most of the well-known journals in the field of communication science, marketing, and media relations, and by the usage of key terms like big data, big data analytics, data mining, and many more, the paper has been able to provide a substantial overview of the potentialities of big data in corporate communications (Boyd and Crawford, 2012). By studying the taken sample of journals, I have been able to prove that the future of corporate communication is hugely dependent on big data technologies and their associated processes. For example, Gobble (2013, p. 27) mentions, "The era of big data has already begun," which suggests that companies have only just scratched the surface of using big data technologies to enhance decision-making in corporate communication as well as to conduct deeper research in the field. Nonetheless, there are still ambiguities and noticeable gaps in research in the fields of public relations and internal communication when it comes to big data (Kache and Seuring, 2017). Therefore, the paper ends on a note pointing out that even though the future of big data is here, it is not commonly distributed as of now, and we need to keep working to fill in the gaps in the industry.

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