Cars and Social media: A Greener Future

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ABSTRACT

The age of electric vehicles looms closer. Yet, the world still does not know what to expect in terms of zero carbon emission transportation. Environmental regulations are being tightened globally and automotive manufacturers are under pressure to capitalize on the age of green transportation. Despite all the investments being made, clear communication is going to be vital for the survival of some of the most well known brands in the world. One way of communication is via social media. The audience in this space continues to grow and should be a key focus for leading car manufacturers. This paper investigates the bilateral communication between automotive companies and consumers and investigates how this should be approached in the following years to achieve sustainability and commercial goals. This is done by collecting tweets of three automotive companies on Twitter by means of a crawler. These companies being Tesla, Mercedes-Benz and Toyota. The collected data is analyzed for the content it contains and the reception received from consumers by means of a sentiment analysis. The results showed that each company had different approaches when it came to posting content on Twitter. On the reception side, it was found that Tesla received the most engagement with their CEO, Elon Musk being a key factor.

Keywords

Social media, transparent supply chain, supply chain, social media crawling, social media data analysis, Twitter, automotive industry, electric vehicles

1. INTRODUCTION

In the early part of the 19th century, Robert Anderson developed the first crude electric carriage. This momentous breakthrough was followed by the production of various electric vehicles that were in popular demand in the dawn of the 20th century. Emitting little pollutants, low noise and easy drivability meant that electric cars were able to prosper along with gasoline and steam vehicles. However, the improvement in road infrastructure, discovery of oil reserves and introduction of mass produced vehicles such as the Ford Model T resulted in electric vehicles being driven out of the market by the 1930s [19]. '

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Almost a century later, the landscape has changed for electric vehicles. Environmental Regulations and advancement in battery technology now means that a future of electric cars is near. In addition, faster ways of communication now exist in the form of social media. This means business in this day and age has transformed from a transactional relationship to a social relationship [8]. With increasing awareness about the environment, social media can influence the trajectory of automotive companies.

The rise of social media has allowed for a more personal connection between firms and consumers. Over time, consumer behaviour has evolved towards a more environmental approach and they have demanded the same of corporations [27]. Social media has become that medium for consumers to voice their opinions whilst corporations have a greater responsibility to be transparent about their supply chain operations.

The automotive industry in particular has been regularly forced to make supply chain changes as regulations are constantly updated. The transition towards EV (Electric Vehicles) has caused major disruptions as new players in the form of Tesla have availed their early investments, with the rest attempting to follow suit. All automotive manufacturers are adopting different strategies, each aiming to capture market share [28], stay competitive and at the same time become sustainable.

In addition, it is pivotal for the companies to convey these developments and inform consumers as to how they can actively participate in supply chain transformations [29]. Social media provides valuable information in the form of consumer behavior but content needs to be posted on the corporations' behalf to create an environment to receive effective feedback by consumers on the environmental measures that automotive manufacturers take. Afterwards, the reception can be utilized for sustainable planning [15].

2. RELATED WORK

Social media is rich in data. Its place as a database of human interaction has allowed for various analysis to be done in order to aid in developing frameworks [36]. One of the biggest platforms, Twitter, has an Application Programming Interface (API) that allows for ease in crawling and data collection. As a result, it is chosen over the likes of Facebook and Instagram for this research [16]. Over time, social media has been used in various ways from marketing, networking and utilizing user generated content to revising business processes [18].

Furthermore, social media's influence has extended to it having major potential in the development of sustainable supply chains. Key trends and themes are always developing and changing [25], resulting in vast amounts of data being generated, an essential input for corporate decisions in

these days and age [9]. Various industries have been looked at through the lens of social media in order to highlight various metrics that are effected along with the ability to understand consumers' perceptions [24] [26]. With supply chains evolving to include elements from the forward and reverse supply chain for sustainability purposes [11], social media can prove to be a vital element to help enabling the transformation towards a circular economy. In turn, social media data can undergo multiple forms of analysis that can aid companies such as influence analysis, reputation and partner analysis and sentiment analysis [23]. Sentiment analysis is one of the focuses of this paper. It allows companies to comprehend the perception of consumers. Therefore, a company should aim to be transparent on social media platforms. Accountability then comes into play as higher commitment by members in a supply chains towards social media is attributed with higher supply chain performance [31].

Moreover, reports are regularly published highlighting developments in the automotive sector. One of these reports has emphasized the lack of excitement that customers are showing towards the current sustainability experience available [32]. With the electric vehicle space receiving a lot of investment in recent years, there is also focus on the potential development of supply chains in the coming EV era [12]. Even though sustainability has been proven to be a source of competitive advantage for firms [7], firms are prioritizing other aspects over transparency on sustainability. Historically, price has not been the defining factor when it comes to making the decision on which car to purchase. Customers consider multiple variables such as performance, durability, reliability and other characteristics [35]. This will continue during the EV stage as customers inform themselves of the latest developments to be able to transition to a greener lifestyle. The relationship of the automotive industry with social media can give more insight into this problem.

3. PROBLEM STATEMENT

3.1 Research Goal

Companies within the same industry use their social media presence in various ways. Therefore, three different automotive companies were selected based on their products, electric vehicle investments and the amount of social media followers. These companies being Toyota, Mercedes-Benz and Tesla, with a focus on the accounts @Toyota, @MercedesBenz and @Tesla respectively. The main goal of this research is to analyze and compare their posts and engagement received from consumers. From this, it can be gathered how selected firms interact with their stakeholders regarding sustainability and determine which methods are effective and perceived valuable from the consumers.

3.2 Research Questions

In order to achieve the research goal, a research question needs to be established. The aim of the research will be to provide an answer to the research question and therefore meet the research goal. The research question is defined as follows:

- How should a firm in the automotive sector utilize social media to convey sustainability practices?

This question concerns multiple elements and therefore can be divided into several sub questions. Each sub question serves to explore a different aspect of the research question. Firstly, social media involves transparency about one's supply chain, so the question is:

- SQ1: What does supply chain transparency entail?

Secondly, the research investigates what content corporations are posting on their Twitter pages in regard to informing about sustainability which involves EV updates.

- SQ2: What types of content are firms posting on social media?

Lastly, the engagement will be analyzed as consumers will interact with the posts that have been put up. These will provide insight into the sentiment the consumers have about the information provided to them.

- SQ3: What is the perception and how can it be interpreted?

By answering all the sub questions, comparisons can be drawn and reveal how differently each of the firms are approaching sustainability.

4. METHODOLOGIES

The research involves a mixture of qualitative and quantitative analysis. In order to answer the first sub question, a literature review was conducted in order to define the topic of "Transparent Sustainability" in the context of the automotive industry. This was done to provide an understanding as to how this topic should be approached in the automotive sector.

For the second sub question, tweets were collected from the Twitter accounts of Toyota, Mercedes-Benz and Tesla. This was done through the use of Tweepy, Twitter's official Python library that can access the API. Tweepy has a built in timeline functionality that allows the collection of up to 200 of the most recent tweets posted by a chosen account. This was utilized for the collection of tweets for each company. As companies are continuously posting new content on their Twitter pages, the collected data is reflective of that certain point in time. Next, these tweets needed to undergo data processing to compile a set of the most frequently used words. Firstly, punctuation was removed by using regular expressions. Secondly, tokenization was employed where the words are separated from each tweet. This was followed by stemming or lemmatizing which involves taking all the variations of one word and and breaking it down to the root e.g analysis and analyzing to analyse. Lastly, stop words were removed. These are common words such as 'a', 'the', 'when' etc. Subsequently, the occurrences of the words are then tallied and plotted on a graph displaying a count of the most common words.

For the third sub question, the replies to the posts by the three companies were collected. However, Twitter's API restricts us to collection in the last seven days The sentiment ranges from positive, neutral and negative. From this, an understanding can be gathered on the interaction and feedback that consumers have for each of the companies [21]. It involved making use of Twitter's Version 2 API which allows the collection of replies through "Conversation ids". At the time of writing, Tweepy is missing functionalities which are provided by the Version 2 API and therefore "twarc" was used. Twarc is a command line and Python library that can be used for the collection of Twitter data in a JSON format [2].

5. RESULTS

5.1 Supply Chain Transparency

Research on transparent supply chains covers a broad range of topics. Therefore, firstly we will define what a supply chain is. Afterwards, the transparent supply chain will be defined which will then be followed by the connection to the sustainable supply chain, evolution and the use of digital tools for further progression. Lastly, the literature on automotive supply chains will be reviewed.

A supply chain concerns the entire process from the extraction of raw materials all the way to the consumption by the consumer. More specifically, it is defined as follows: *"A set of three or more companies directly linked by one or more of the upstream and downstream flows of products, services, finances, and information from a source to a customer"* [30, p. 20]. Having a functional supply chain is integral towards the success of any business. The objective of a supply chain is customer satisfaction by minimizing system-wide costs. However, consumers are becoming more aware of companies' impact towards environmental issues regarding globalization and along with institutions tightening regulations, businesses are having to adapt their supply chain. The primary change is by being more transparent about the processes that happen in the supply chain.

Supply chain transparency is defined as *"the practice of disclosing detailed and accurate information about operations and products, such as their origin and sourcing, manufacturing processes, costs, and logistics"* [22, p. 2]. Therefore two key characteristics emerge from this, disclosure and visibility. Disclosure being the act of communicating information to the necessary detail whilst visibility involves the accurate identification and collection of data [14].

In addition, it is recommended that supply chain transparency should also be included as part of the digital transformation strategy that companies are undergoing [14]. The use of digital tools such as social media allows for greater transparency and information exchange between companies and their customers. Companies are able to collect various information with the aid of these tools that allows them to adapt their supply chains to meet evolving customer needs. Integral parts of digital transformation are shared customer insights and an accountability framework [20]. The various platforms of social media provide a suitable setting for these blocks to be established. By maintaining a social media presence and posting content on the latest developments, new products and business initiatives, companies are disclosing key business elements to the consumers who are able to provide feedback that can be utilized to adapt existing systems.

Moreover, transparency is an essential element of sustainability which brings us to the concept of supply chain sustainability. *"Supply chain sustainability is defined as the management of environmental and social impacts within and across networks consisting of suppliers, manufacturers, distributors, and customers in line with the UN Sustainable Development Goals"* [4, p. 6]. Supply chains have to evolve to keep up with consumer demand but also to meet regulation and consumer standards. As a result, innovations such as the reverse supply chain have appeared. This leads to a more circular approach where products at their end-of-life or end-of-use are kept in the supply chain for as long as possible through reusing products or disassembling components and recycling materials [10]. In turn, this results in a decrease in carbon emissions being produced in the supply chain. Sustainability is linked with corporate social responsibility where businesses take part in ethically-oriented practices. In terms of social media, socially responsible firms are able to achieve more effective transfer of information thus allowing them to find more success when posting content on social networking sites. As a result, they are able to gain greater benefits through their social media presence in comparison to socially irresponsible firms [17].

Even though internal and external pressures such as customers and non-governmental organizations push businesses towards sustainability [33], it is ultimately the executives that lead these commitments [4]. Therefore, it is up to the higher management of companies to take a holistic view on the supply chain by taking into account all relevant stakeholders involved in the process [13]. Through the use of social media, customers can push businesses towards a sustainable route and companies can employ the real time data generated by consumers on social media to build the new age supply chain model.

Furthermore, the automotive sector is one which has been regularly researched upon. However, the constant need to evolve as technology advances and regulations get updated means that very little research has been done on supply chains in the age of electric vehicles as this is a transtionary period. As a result, the literature is outdated but provides suggestions on to how automotive supply chain models can be adapted to keep pace with time and developments. One point was the shift towards a demand driven environment and increasing competition due to globalisation [5]. Automotive companies have to look beyond the lean and agile supply chain strategies that were used in previous decades and become more flexible and responsive than the combined leagile framework [6].

Embracing the technological resources will prove critical for the development of a successful supply chain model. The age of electric vehicles will demand a greater commitment to transparency from companies to reach a favorable outcome. In order to do that, automotive manufacturers need to be active and engaging on social platforms as that is where they can gain insight towards building a supply chain model for a new age.

5.2 Social Media Content

The aim of this section is to explore the types of content that is posted on the Twitter pages for each of the chosen companies. In addition, the frequency of tweeting was also calculated for each of the automotive companies. This shows how regularly each of the companies post on Twitter.

Twitter has specific terminology for the various types of tweets. These have been defined as follows:

- Tweet: A message posted to Twitter containing text, photos, a GIF, and/or video [1].
- Mentions: A Tweet containing another account's Twitter username, preceded by the "@" symbol. For example: "Hello @TwitterSupport!" [1]
- Reply: A reply is when you respond to another person's Tweet [1].
- Retweet: A re-posting of a Tweet. Twitter's Retweet feature helps you and others quickly share that Tweet with all of your followers [3].
- Content: All tweets appearing on a specified account

During collection of content, replies to mentions involving the three companies were excluded as they comprise of interactions with accounts in order to address complaints, concerns and questions. These tend to be personal and therefore not of interest to the general followers. Furthermore, the processing of the tweets means words were converted to their roots and then tallied. These words are shown in their standard forms in tables for readability.

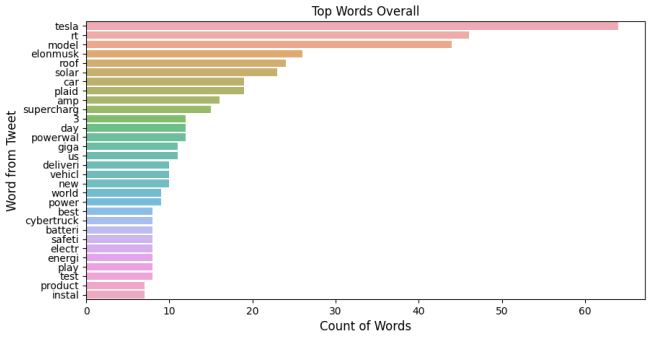

Figure 1. A rank of most occurring words in Tesla's tweets

Table 1. Root and Standard forms for words in Figure 1

Root Word	Standard Form
amp	ampersand symbol: &
3	The model 3 car by Tesla
plaid	Model S plaid car by Tesla
electr	electric,electricity, electrical
giga	Name of the Tesla production factories
deliveri	delivery, deliveries
instal	install, installation

The first company to be analyzed is Tesla, a manufacturer of electric cars and battery grid storage based in the United States of America. Out of the three selected automotive companies, Tesla has the most followers at the time of writing with 12.4 million followers. It is also the front-runner in terms of sales and market share in the market of electric vehicles by capitalizing on their innovation in the space and gaining a first mover advantage. Figure 1 shows that multiple words fall under the electric energy space. These include 'supercharger', 'powerwalll', 'power' and 'battery'. These words revolve around the operations that Tesla partakes in such as building power grids and new technology revolved around renewable energy as they focus on making vehicles charged by batteries instead of fossil fuels. The words '3', 'model' and 'deliver' display the updates which are provided on their vehicles in order to inform customers on availability and sales.

In addition, Tesla also regularly utilizes retweets ('rt') to display the ways customers interact with their products along with updates from their CEO, Elon Musk. Having one of the most followed accounts on Twitter, Musk is strongly associated with the development of Tesla and therefore directs traffic towards the vehicle manufacturer. His large group of followers is responsible for Tesla being the most followed automotive company on Twitter. In terms of tweet frequency, on average Tesla's account tweets once every four days.

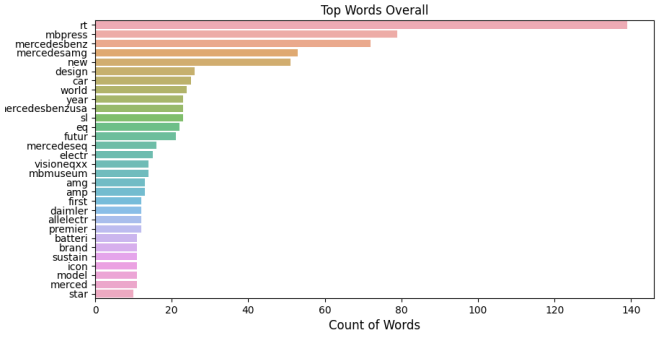

Figure 2. A rank of most occurring words in Mercedes-Benz's tweets

Table 2. Root and Standard forms for words in Figure 2

Root Word	Standard Form
sl	Mercedes SL model car
amp	ampersand symbol: &

Next we take a look at Mercedes-Benz also known by just Mercedes, a German automotive manufacturer that produces luxury and commercial vehicles. It is the most well-known subsidiary of Daimler AG. At the moment it ranks second in terms of followers with 3.7 million. Figure 2 shows that Mercedes' tweets are focused on providing announcements and updates on the companies' electric vehicles. Usage of root words such as 'sustainable', 'battery', 'allelectric' exhibit the newer age of vehicles that Mercedes is revealing to their audience. This is further highlighted by the use of 'visioneqxx' and 'eq' which is the name of their latest electric concept car and their product brand for electric mobility respectively. It can be derived that Mercedes is showing that it has a foundation ready for the future that is in line with their brand vision.

Furthermore, Mercedes heavily utilizes retweets with almost 140 of the 200 tweets being retweets. These retweets are all from various accounts associated with the company such as 'mbmuseum', 'mercedesamg' and 'mbpress' that focus on the history of the brand, the performance division and news related to the company respectively. The account also posts regularly with a tweet frequency of 1.8 tweets a day. Given the high retweet count, most of the tweets are posted by the other accounts just mentioned which the main account retweets from in order to inform consumers on operations happening in their company.

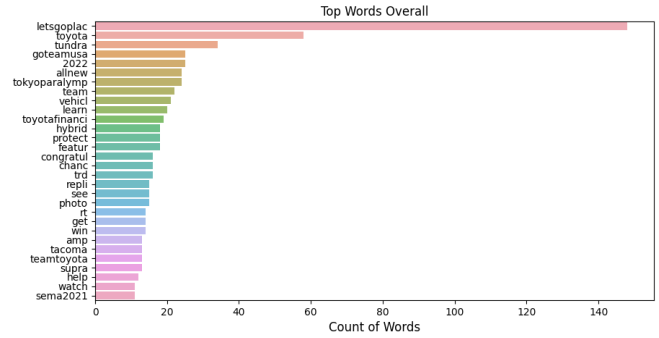

Figure 3. A rank of most occurring words in Toyota's tweets

Table 3. Root and Standard forms for words in Figure 3

Root Word	Standard Form
letsgoplaces	#letsgoplaces
featur	feature, featured
congratul	congratulations, congratulate
trd	Toyota Racing Department
amp	ampersand symbol: &
deliveri	delivery, deliveries
instal	install, installation

Moreover, there is Toyota, a Japanese automotive manufacturer regarded as the largest car company in the world. Out of the three, Toyota has the least amount of followers with around 865.3 thousand. Figure 3 indicates that the company is also heading towards the electric vehicle age with usage of 'hybrid'. Just prior to the data collection, the company announced their plans to produce 30 battery electric models by 2030. Apart from that, the content focuses on the promotion of various car models such as 'tacoma', 'tundra' and 'supra'. Along with that the company regularly makes use of its slogan 'lets go places' in hashtag form as a way to get customers involved. This is further emphasized with the use of 'reply', 'photo', 'feature' which refer to tweets in which customers are asked to reply with a photo of their Toyota cars. They are then given a chance to be featured on the main Twitter page of Toyota. 'Congratulations' is also appearing which involves the company showing their support to personnel which they have sponsored.

Additionally, the company does not utilize the retweets as much as the other two. The main account which gets retweeted is the @ToyotaFinancial which exists to provide information regarding financial matters on owning a Toyota vehicle. Along with that the account posts 1.46 tweets per day which is similar to the frequency shown by Mercedes.

Each company uses social media to inform their followers on their plans towards making electric vehicles. Along with that, they each use social media differently which is seen through their tweet frequency and the content that they relay to their followers. Due to the varying brand identities, they post different types of content which would best portray them to their targeted customers. It can be seen that they all do actively report on the EV developments. Although it is a long term project due to the regulation targets, they are getting consumers involved in the product life cycle right from the development phase. Over time, their followers can then be informed about various aspects about the vehicles which can then lead to a potential purchase.

5.3 Consumer Perception

This section looks at the reception the automotive companies receive on social media. The primary way this is done is through replies on the tweets posted by the companies. Other forms of engagement include likes which serve as a form of appreciation for a tweet along with retweets which have been discussed prior. The 7 day limitation of the Twitter API means equal sets of replies could not be collected for each company as the levels of engagement in that time period differ for each company.

The results of the sentiment analysis for Tesla can be seen in Figure 4. The pie chart displays the division between the positive, negative and neutral replies. Figure 4 alone is

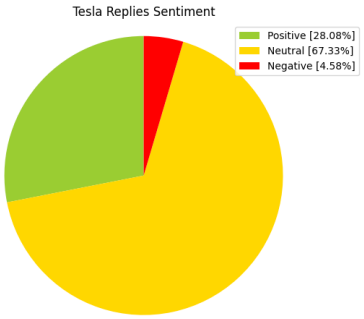

Figure 4. Pie chart showing the distribution of sentiment in replies to Tesla

Table 4. Top words for each sentiment for Tesla

Sentiment		
Positive	Neutral	Negative
Elon Musk Buy	Elon Musk shinja shiba dogecoin bitcoin doge	Elon Musk car electric battery supercharger doge roof

not informative enough and therefore each sentiment section was looked at more closely to understand the types of things being mentioned in the specific categories. These words can be seen in Table 4. In Tesla's case, the negative replies contain opinions about Tesla's products with mention of words related to the charging of batteries. Furthermore, Elon Musk is consistently mentioned in each category . Addtionally, there are multiple mentions of words which have ties with the area of crypto currencies such as doge, shiba, shinja and bitcoin, an area which Musk regularly tweets about. This further emphasizes the linkage that exists with Elon Musk and the company. Over time, Musk has developed a reputation of being able to build successful businesses aiming to solve unique challenges and gained a following for his tweets. The following that he has been able to gather has been translated towards excitement for the developments he has in place.

Furthermore, Tesla attracts plenty of engagement on its posts. From the 200 tweets collected on their account, they receive an average retweet count of 3447 and managed to get a minimum of 3067 likes for a post. The maximum likes they received were 187039.

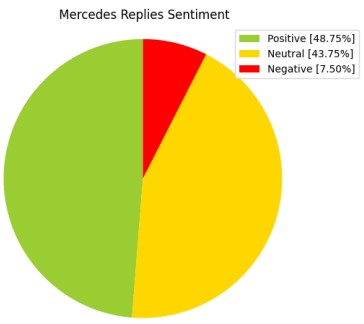

Figure 5. Pie chart showing the distribution of sentiment in replies to Mercedes

Table 5. Top words for each sentiment for Mercedes

Sentiment		
Positive	Neutral	Negative
car	car	car
tesla	tesla	seat
beautiful	design	hate
happy	airflow	screen
like		tesla
awesome		ugly
eqxx		roof

Next, we have Mercedes. The pie chart in Figure 5 shows that it comprises primarily of positive and neutral replies with a small percentage of negative ones. Overall, the replies are related to elements of the car such as the design, seat, screen etc. As with all products, people have differing opinions and experiences and therefore will express varied opinions. The most interesting mention is the one of Tesla. It shows that a standard does exist in the eyes of the consumers and means comparisons have to be made. It is mentioned in each of the sentiment categories which reveals that opinions are diverse but that there is a need to express opinions and compare the product of Mercedes-Benz to the leader in the EV market, in Tesla. In terms of engagement, Mercedes gets an average retweet count of 204. On the side of likes, they had a minimum of 142 and a maximum of 1647 on their tweets.

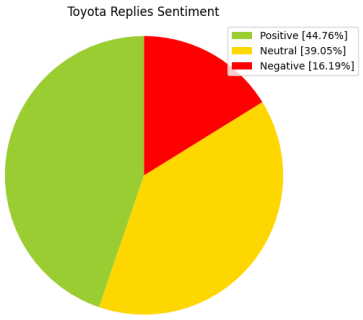

Figure 6. Pie chart showing the distribution of sentiment in replies to Toyota

Table 6. Top words for each sentiment for Toyota

Sentiment		
Positive	Neutral	Negative
like	Toyota Financial	corolla
great	Tundra	dealership
car	design	car
love	airflow	brand
dealer		turbo

Moreover, a similar scenario can be seen with Toyota. The sentiment is primarily positive and neutral. Additionally, the replies focus towards features of their products such as mentioning the Tundra and the Corolla models. The rest is general division of sentiment such as seen with Mercedes with consumers sharing their experiences and opinion on Toyota's services. On the side of engagement, they have an average retweet count of 27 and accumulated a maximum of 2726 likes and a minimum of 17 likes.

Furthermore, the greatest difference that exists are the figures when it comes to engagement. Only 105 and 160 replies were able to be collected for Toyota and Mercedes respectively. Meanwhile, 1200 replies were able to be collected for Tesla. The greater engagement is also reflected in the likes and retweets which are overwhelmingly in Tesla's favor. This can can be ascribed to the influence of Elon Musk. His regular use of Twitter along with leading Tesla and his other companies towards producing world-changing technology has allowed him to gain a large group of followers (70.9 million). On the contrary, CEOs of Toyota and Mercedes-Benz do not have a social media presence the size of Musk's. His tweets display transparency as he reveals details about sustainability endeavours that his company are committed towards and produce products that aim to fulfill those commitments.

5.4 Implications

The results have given a brief insight into how social media is being utilized in the automotive industry. They show that companies are keeping transparency in mind when posting these tweets as regular updates are provided on any developments in the electric vehicle space. In Tesla's case, these are only updates on their products as they just produce electric vehicles. The mass adoption of Tesla's products does mean that they have set the standard so far in the EV market. This is further emphasized by the large engagement received on their Twitter page which trumps the ones received by Mercedes-Benz and Toyota. In turn, they are also ahead of the rest of the competitors as overall, Mercedes-Benz comes second in terms of follower count in the automotive industry.

Electric vehicles are the future and every major automotive company has expressed intent to transform their product line steadily in to fully electric. Whilst the rise of Tesla may not have forced changes in development plans for their competitors, it does mean that a power shift will be visible once electric vehicles become vastly adopted. In turn, some companies may lose out on the market share they are currently holding on to. Combining that with the fact that social media is likely going to overtake traditional media when it comes to generating awareness, Tesla has placed itself in a strong position as cars go electric.

It is important for these legacy automotive manufacturers to be transparent about their operations as the primary aim of electric vehicles is to achieve sustainable mobility. As a result, they are revealing long term electric plans on social media. However, as EVs are a long term project, they do not have products to show for it which is what has given Tesla the upper hand. Once electric vehicles start getting produced regularly, then the role of social media will be critical to a company's success. Social media by then maybe the most used tool for spreading awareness and then engagement will prove to be a differentiating factor. For now, automotive companies should be looking to gradually increase their social media following and maintain a positive reputation so that they can capitalize in the age of electric vehicles. Transparency should be showcased over the long term as the growing group of conscious consumers are more likely to buy an electric vehicle produced by a company with a sustainable supply chain.

6. CONCLUSION

This paper investigated the social media practices of three automotive companies in order to understand how they are conveying sustainability practices with a major focus being the transition towards electric vehicles. This was

achieved through literature review to provide an understanding of transparency in supply chains. That was followed by the collection of tweets posted by Tesla, Toyota and Mercedes-Benz from which the top words were tallied and then ranked. Lastly, the reception was looked at which was done through the collection of replies, likes and retweets.

From the results and analysis conducted, it can be seen that each of the companies are approaching the transition differently. Along with that they have their financial targets to meet. Toyota plans to have 5.5 million total EV sales by 2025. Daimler the owner of Mercedes-Benz, expects EVs to make up more than 50% of sales [34]. At the moment, Tesla is the only one which has a lineup consisting only of electric vehicles. These targets reveal that the companies have strong intents on establishing themselves in the electric vehicles market but the upcoming years will reveal how this pans out.

In terms of social media statistics, Tesla is the clear frontrunner with their innovative products and charismatic CEO allowing them to gain large amounts of followers. The breakthrough into the EV market means they have set the standard for the rest of the legacy manufacturers to follow up with. Combining this with their following means Tesla has placed itself in a position as a leader in the industry. In turn, this has major ramifications as companies are looking to secure the market share in the EV market before their competitors.

The research has revealed there does not seem to be a clear method to convey sustainability practices on social media in the automotive industry. Although the analysis shows that Elon Musk's social media presence gives Tesla a clear advantage, the other companies do not have a sustainable product to post about like Tesla does. Tesla has found success through its early entry in the EV market which allows them to capture a large audience who are looking towards the future. However, Mercedes and Toyota are providing their audience with updates on their electric vehicle plans. For this moment in time, Tesla's approach results in the highest engagement but once legacy car manufacturers are able to put their electric vehicles on the market, the landscape is likely to change.

7. FUTURE WORK

The research conducted has brought new insights into the way social media is used currently in the context of automotive industry. Similarly, it has opened up a vast array of questions to explore regarding this field in the future. More automotive manufacturers can be researched to understand how all the companies are approaching the electric vehicle transition on social media. Along with that, other social media platforms should also be investigated as companies may be viewed differently on other applications.

Furthermore, the research can also be combined with company's financial performances over the years to track the evolution that is taking place in the industry with the greater use of social media. In addition, the different demographics can be looked at to understand their perception of electric vehicles as that is another factor that will influence the success of companies. In addition, once the world has reached a stage where electric vehicles are a common part of society, the social media space can be revisited to understand the developments and perceptions which contributed to reaching that stage.

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