AN EXPLORATORY ANALYSIS OF BRAND EQUITY BASED ON TANGIBLE AND INTANGIBLE ATTRIBUTES ON TWEETS OF THE LARGEST WESTERN EUROPE MANUFACTURING COMPANIES

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Abstract: *Social networks have become a means of interaction between companies or organizations and consumers. However, few studies have dealt with the use of tangible and intangible attributes on social networks of manufacturing companies. This work deepens the concept of brand equity of European manufacturing companies through the analysis of brand engagement and electronic word-of-mouth (eWOM) generated by social media posts. Firstly, tangible and intangible attributes have been identified on tweets. Secondly, it has been analysed if there is a link between tweets based on tangible and intangible attributes and number of likes (brand engagement) or retweets (eWOM). The multivariate analysis results show relationships between publications including the analysed attributes and brand equity. In contrast, eWOM is only related with tangible attributes. Conclusions are discussed.*

Keywords: *Brand equity, Social networks, Manufacturing sector, Tangible and intangible, Brand engagement and eWOM.*

1. INTRODUCTION

In the last decade, information and communication technology (ICT) have had a huge impact on our society (Servera Francés, Gil Saura, & Fuentes Blasco, 2009). Specifically, social networks have played a leading role in the advancement of ICT since the early 2000s (Campos Freire, 2008). The availability, thanks to the variety and diversification of social networks (Parveen, Jaafar, & Sulaiman, 2015) and information dissemination capacity (González Hernando, Valdivieso-León, & Velasco González, 2020) allow their use in different forms of communication (Bernal Triviño, 2010).

In addition to connecting people with family and friends, the use of social media has evolved over time (Kwak, Lee, Park & Moon, 2010). For instance, Twitter is a social networking platform in which branding depends on increasing social and economic gain (Page, 2012). This virtual environment where companies and consumers are related can be especially useful at the business level (Culnan, McHugh & Zubilaga, 2010), since it provides an ideal space for communication with which to deepen the knowledge of consumer needs and opinions.

Business benefits of this virtual communication channel have been widely studied in the last ten years (e.g. Hanna, Rohm & Critenden, 2011; Michaelidou, Siamagka & Christodoulides, 2011; Capriotti & Ruesja, 2018). Specifically, previous studies of business Twitter accounts examine their use in strategic communication (Hanna, Rohm & Critenden, 2011; Capriotti & Ruesja, 2018). Also, literature refers to the use of Twitter for business purposes as an engagement tool

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(Rybalko & Seltzer, 2010); promotion tool (Greer & Ferguson, 2011); branding tool (Cui, Zhang, Qin, Sellis & Wu, 2017); customer service enquiries tool (Xiong & Mackenzie, 2015); or even a distraction tool (Schneiker, Dau, Joachim, Martin & Lange, 2019).

The available literature with regard to the use of Twitter by the manufacturing or industry sector is scarce, however some studies stand out (e.g. He, Zha & Li, 2013; Linvill & Warren, 2020; Rodriguez & Chalmeta, 2020; Rybalko & Seltzer, 2010; and Xiong & Mackenzie, 2015). These studies on tweets by manufacturing or industry sector provide guidelines for developing a competitive analysis strategy (He, Zha & Li, 2013) and offer insights into the adoption and interaction with customers on Twitter (Xiong & Mackenzie, 2015).

This study contributes to industrial marketing literature by identifying attributes in the tweets published by manufacturing firms and relating those attributes with consumer behaviour. The objective of this study is to determine the relationship between the content of the tweets (referring to tangible or intangible attributes) and brand equity. To do so, the relationship between the number of likes (brand Engagement) and retweets (eWOM) of tweets published by the largest Western European manufacturing firms and the content of these tweets is empirically tested.

This paper is structured as follows: first, we provide a literature review of brand equity, theoretical framework and hypotheses development. Then, methodology and results are presented. Finally, we offer some concluding remarks that can be of use for manufacturing and industrial businesses in defining customer interaction in Twitter.

2. LITERATURE REVIEW

2.1. Brand Equity in Social Networks

Brand has been defined as: "a name, term, sign, symbol or design, or some combination of these elements, intended to identify the products or services of one seller or group of sellers and to differentiate them from those of competitors" (Kotler & Armstrong, 2008). On the other hand, the American Marketing Association (AMA) defines it as: "a name, term, design, symbol, or any other feature that identifies one seller's good or service as distinct from those of other sellers" (American Marketing Association, 2017). In both cases, the brand is considered as a distinguishing element that affects consumer perception.

There is no unique criterion in the literature to measure brand equity, its sources, determinants or drivers (Davcik, Da Silva & Hair, 2015). Also, brand equity is a term associated with customers' feelings and perceptions about the brand (Pride & Ferrell, 2003). It is made up of attributes associated with the brand, name or symbols that can add or remove value to the product or service offered (Aaker, 1991). Particularly, both tangible and intangible attributes have been considered as important contributors to brand choice and brand equity (Myers, 2003).

On the other hand, social networks are presented as a great option to increase brand equity of companies through their publications. Some studies have verified the ability of companies to generate brand equity through social networks, such as in the mobile (As'ad & Alhadid, 2014), luxury (Godey, Manthiou, Pederzoli, Rokka, Aiello, Donvito, & Singh, 2016), hotel (Callarisa, García, Cardiff, & Roshchina, 2012), or fashion (Sharma & Sahni, 2015) industries.

Specifically, brand loyalty is seen as a key factor of brand equity (Severi, Ling & Naseroadeli, 2014), while eWOM is considered to be a measure of brand equity (Callarisa, Sánches, Cardiff & Roshchina, 2012). Brand loyalty is the ability of companies to generate a relationship with their audience, which creates a commitment to the brand which leads to purchase intention (Kuvykaite & Piligrimiene, 2014). This interaction or commitment to the brand can be key in purchase decisions (Peri & Lepe, 2010). In turn, eWOM is the process that is carried out by consumers electronically, when they share information and opinions about the brand, products, and services offered.

Nevertheless, previous literature on social networks use different metrics to assess brand engagement and eWOM, depending on the network analysed. For instance, number of references for blogs, incoming links or number of likes for forums, number of reviews or balance of reviews for review sites, number of posts or reposts for social networks or number of likes for video sharing sites (Hoffman & Fodor, 2010). Thus, in this study, drawing on Hoffman and Fodor's (2010) study "Can you measure the ROI of your social media marketing?" we used the number of tweet likes to measure brand engagement and the number of retweets per tweet to measure word-of-mouth in social media Twitter.

2.2. Conceptual Framework and Hypotheses Development

Different theoretical frameworks are currently used to investigate branding and eWOM behaviours in social networks, such as socialization theories (Chu & Sung, 2015; de Vries, Peluso, Romani, Leeflang & Marcati, 2017; Zhang, Jansem & Chowdhury, 2011; Zhang, Omran & Cobanoglu, 2017), attribution theory (Qiu & Li, 2010), theory of planned behaviour and justice theory (Fu, Ju & Hsu, 2015).

In socialization theories, Chu and Sung (2015) draw on social learning theory (Moschis, 1987), largely used in the study of consumption roles (Moschis & Churchill, 1978). According to Moschis, social learning theory highlights external sources of socialization, like peers (de Gregoria & Sung, 2010). Within this framework, they concluded that those brand followers who heavily use Twitter and follow many brands were most likely to tweet and retweet brands. In this line, the study of de Vries, Peluso, Romani, Leeflang and Marcati (2017) found that socializing with others promotes participation in engaging activities and encourages people to contribute content. In the work of Zhang, Omran and Cobanoglu, social exchange theory focuses on reciprocity to explain how a person could engage in eWOM (Zhang, Omran & Cobanoglu, 2017).

The last social theory analysed is social interaction (Godes, Mayzlin, Chen, Das, Dellarocas, Pfeiffer & Verlegh, 2005) used by Zhang, Jansen and Chowdhury (2011). Their study draws on previous literature assumptions, such as considering consumer reactions to brand tweets as eWOM forms (Jansen, Zhang, Sobel & Chowdhury, 2009) and promotion materials as driving factors of WOM communication (Keller, 2007). Their study addresses Twitter as a tool for online WOM communication and the influence of company engagement on eWOM communication. By studying the diffusion of messages of different brands they conclude that retweeting tweets is a clear response to business engagement.

On the other hand, according to Qui and Li (2010), when a positive review has negative ratings, consumers are more likely to attribute that review to non-product-related factors. Furthermore, for Fu, Ju and Hsu (2015), underlying attitudinal factors appear to drive consumers who intend

to post positive eWOM and satisfaction appear to be influenced by interactional and procedural justice perceptions in positive shopping experiences.

Since the objective of this study is to investigate consumer social interactions to brand communication activities on Twitter, we follow the theory of social interactions (Godes, Mayzlin, Chen, Das, Dellarocas, Pfeiffer & Verlegh, 2005). In particular, this research extends the study of Zhang, Jansen, and Crowdhury (2011) by highlighting the use of tangible and intangible attributes in brand tweets and investigating consumer reactions, retweets (eWOM), or likes (brand engagement).

Previous literature has linked brand engagement on Twitter to the number of tweet likes (Hoffman & Fodor, 2010). Recent studies on this linkage was applied in different industries, such as alcohol companies (Carrotte, et al. 2016); movie box offices (Oh, et al. 2017); and healthcare businesses (Leek, Houghton & Canning, 2019). Particularly, the study of Leek, Houghton and Canning (2019), based on a sample of 838 tweets, examines if the content of tweets posted by product and service companies drives engagement in terms of likes on Twitter. Their results suggest that engagement depends on the type of company and the tweet function analysed. According to these studies it can be hypothesized that:

H1: There is a relationship between industry tweets containing tangible attributes and the number of likes (brand engagement) received.

H2: There is a relationship between industry tweets containing intangible attributes and the number of likes (brand engagement) received.

Regarding eWOM in Twitter, the study by Hoffman and Fodor (2010) links eWOM to the number of retweets. In addition, studies linking different tweet contents and eWOM were encouraging (Adnan, et al. 2019; Cork & Eddy, 2017; Soboleva, et al. 2017). Specifically, the results of Adnan et al. (2019) state that promoting intervention, or including vaccine price in the content of a tweet about World Pneumonia Day has more retweet count than when the tweet content is a personal experience. According to the results of Cork and Eddy (2017), levels of high vividness or high interactivity in the content of the tweets from athletes generates a higher number of retweets. Furthermore, Sovoleva et al. (2017) find that including a retweet request or a photo in a tweet from industry companies are predictors of the number of retweets, regardless of the industry. In this context, the following hypotheses were tested:

H3: There is a relationship between industry tweets containing tangible attributes and the number of retweets (eWOM) received.

H4: There is a relationship between industry tweets containing intangible attributes and the number of retweets (eWOM) received.

2.3. Methodology

The goal of this research is to study the relationship between tweets content and consumer reaction (Figure 1). To achieve this objective, we developed an explorative and descriptive analysis of data collected from different manufacturing companies in Western Europe.

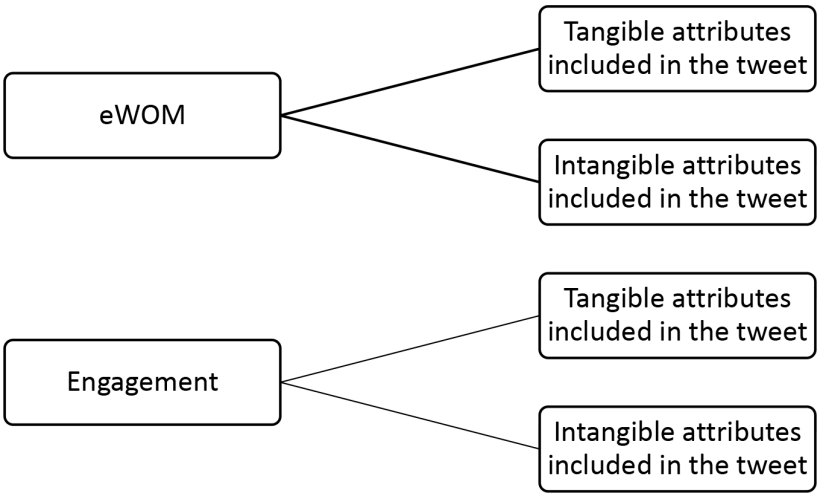

Figure 1. Research model
Source: The authors

2.4 Sample and Data Collection

To test the hypotheses, we carried out an investigation consisting of four phases: research design, data collection, data analysis, and treatment and interpretation of the results (Green & Tull, 1978). In the first phase, a cross-sectional design was used to examine the relationship between the frequency of occurrence of attributes in the publications (tangible or intangible) and the variables of study, i.e. number of retweets (eWOM) and number of likes (brand engagement). This data set is primary data of a quantitative nature, which means that it is specific to this research and analysed statistically. Data collected from observation were entered into a database which totalled more than 5,000 publications to be content analysed.

The initial sample consisted of the top 250 companies with the largest market capitalization in Western Europe (Peiro Ucha, 2015). However, the final sample was reduced to 100 because companies had to meet three criteria. The first criterion is that only industrial companies were included, the second is that said companies must have a Twitter account and, finally, the company must be active in Twitter. That is, we included companies with a minimum of 1,000 tweets and publications made in the weeks preceding this study. Sample collection took place in two one-week periods, in which the first ten publications of each company were compiled in the period analysed (Swani, Brown, & Milne, 2014). This is to improve the representativeness of all the companies analysed in the sample and take into account the time factor. Table 1 presents the fieldwork data.

Table 1. Datasheet

Geographic scope	Western Europe
Population	Industrial companies in Europe present on Twitter
Methodology	Observation/ Content analysis
Sample period	01/03/2017 - 07/03/2017 01/09/2016 - 07/09/2016
Sample size	100 companies
Sampling	Non probability by convenience

Source: The authors

2.5. Variables and Dimensions

As can be seen in Table 2, the study variables are related to company brand value. In addition, the measures of the variables are based on the use of tangible and intangible elements in tweets, the number of retweets and number of likes on tweets published by the company on its Twitter account.

Table 2. Study variables

Variables	Metrics	Authors
Engagement eWOM	Number of retweets Number of tweet likes	**Hoffman & Fodor, 2010**
Tangible attributes Intangible attributes	Tangible attributes in the tweet Intangible attributes in the tweet	**Myers, 2003**

Source: The authors.

When analysing the publications, we collected the number of retweets and the number of tweet likes at the time of data collection. For attributes the following coding and tabulation was performed:

Table 3. Codification of variables

Codification 1	Codification 2	
1= Tangible attributes 2= Intangible attributes 3= Both attributes 4= None	Tangible attributes	1=1, 3=YES 2=2, 4=NO
	Intangible attributes	1=2, 3=YES 2=1, 4=NO

Source: The authors

3. RESULTS

3.1. Descriptive Results

Table 4 shows the results of the descriptive analysis of the variables 'number of retweets' and 'number of likes'. It can be observed that, in the 889 tweets studied in the first period and the 804 tweets of the second period, the standard deviation for both variables is between 75 and 207, which suggests that some companies, or some types of publications, have much more impact than others. Asymmetry of distribution in both variables is due to high values that affect the mean, while not affecting the median as much.

Table 4. Descriptive analysis, retweets and likes

Period			
First week	Tweets frequency	889	889
	Retweets Mean/ Likes mean	19.09	39.75
	Retweets Standard Deviation / Likes standard deviation	97.305	169.665
	Retweets Asymmetry / Likes asymmetry	11.019	8.556
Second week	Tweets frequency	804	804
	Retweets Mean/ Likes mean	20.30	49.79
	Retweets Standard Deviation / Likes standard deviation	75.622	207.286
	Retweets Asymmetry / Likes asymmetry	7.279	6.859

Source: The authors

The results in Table 5 show the descriptive analysis carried out with the aim of determining the profile of the tweets written by the companies that make up the sample.

Table 5. Descriptive analysis of coded attributes

Period	Attribute	Frequency	Percentage (%)	Attribute	Frequency	Percentage (%)
First week	Tangible	231	26	Tangible	336	37.8
	Intangible	196	22	No tangible	553	62.2
	Both	105	11.8	Intangible	301	33.9
	None	357	40.2	No intangible	588	66.1
Second week	Tangible	210	26.1	Tangible	282	35.1
	Intangible	178	22.1	No tangible	522	64.9
	Both	72	9	Intangible	250	31.1
	None	344	42.8	No intangible	554	68.9

Source: The authors

It is observed that the sample, in both observation periods, is made up of tweets in which tangible attributes appear in a 26% of cases, intangible attributes in a 22% of cases, both in a 10% of cases and none in a 40% of cases, approximately. It is also perceived that the appearance of these elements in tweets is similar in the two periods.

In addition, to focus the study on the content that generates the most interaction with the consumer, the variables 'number of retweets' and 'number of likes' were classified according to their frequencies. The procedure was as follows. The analysis showed that, independently of attributes included, approximately 80% of the sample has between 0 to 10 retweets, and the remaining 20% has more than 10 retweets. In the case of the variable 'number of likes', approximately 70% of tweets have received between 0 and 10 likes, thus leaving 30% of the remaining sample in the ranking of high number of likes. Table 6 shows the frequencies for this new rank.

Table 6. Frequencies, after reordering

			No. retweets		No. likes	
			Low	High	Low	High
Tangible	**YES**	Frequency	392	226	311	307
		Percentage (%)	23.2	13.3	18.4	18.1
	NO	Frequency	919	156	834	241
		Percentage (%)	53.4	9.2	49.3	14.2
Intangible	**YES**	Frequency	422	129	347	204
		Percentage (%)	24.9	7.6	20.5	12.0
	NO	Frequency	889	253	798	344
		Percentage (%)	52.5	14.9	47.1	20.3

Source: The authors.

3.2. The Chi-Square Test of Independence

The relationship between the number of retweets and the number of likes with tangible and intangible attributes was investigated with non-parametric (distribution free) test of independence. Therefore, as they are dichotomous nominal variables, we used the Pearson's Chi-square test to determine if there is a significant relationship between the variables.

Table 7 shows the asymptotic (bilateral) significance between tangible attributes and the high number of retweets and likes received. The results are significant in both cases since the bilateral asymptotic significance is less than 0.05, which suggests that there is a relationship between the variables.

Table 7. Association testing of tangible attributes

	Tangible attributes – No. retweets				Tangible attributes – No. likes			
	Value	df	Asymptotic significance (bilateral)	Exact significance (bilateral)	Value	df	Asymptotic significance (bilateral)	Exact significance (bilateral)
Pearson's Chi-square	109.274	1	0.000		133.183	1	0.000	
Continuity correction	108.016	1	0.000		131.941	1	0.000	
Likelihood ratio	105.951	1	0.000		131.044	1	0.000	
Fisher's exact test				0.000				0.000
Linear-by-linear association	109.21	1	0.000		133.104	1	0.000	

Source: The authors

Table 8. Association testing of intangible attributes

	Intangible attributes - No. retweets				Intangible attributes - No. likes			
	Value	df	Asymptotic significance (bilateral)	Exact significance (bilateral)	Value	df	Asymptotic significance (bilateral)	Exact significance (bilateral)
Pearson's Chi-square	0.337	1	0.562		8.086	1	0.004	
Continuity correction	0.268	1	0.604		7.773	1	0.005	
Likelihood ratio	0.335	1	0.563		7.996	1	0.005	
Fisher's exact test				0.577				0.005
Linear-by-linear association	0.336	1	0.562		8.081	1	0.004	

Source: The authors

Table 8 shows the analysis of the intangible elements and the high number of retweets and likes received. The results obtained in the asymptotic significance (bilateral) suggest that there is a relationship between intangible attributes and a high number of likes. On the other hand, it is concluded that there is no relationship between intangible attributes and a high number of retweets.

4, CONCLUSION AND FUTURE RESEARCH DIRECTIONS

Interesting conclusions can be drawn from the results of the different analyses that have been carried out. The descriptive analysis showed that the companies in the sample do not vary much their tangible and intangible contents over time, since the presence of those elements in the publications in both periods is similar. The companies seem to prefer to include some attribute – be it tangible, intangible or both – rather than none in their publications. Finally, we found that companies are more prone to include tangible than intangibles attributes.

To test the hypotheses, and to investigate the relationships between the elements included in the tweets (tangible and intangible) and brand value generated (eWOM and brand engagement), a multivariate analysis was performed using the Chi-square test. Table 9 summarizes the hypotheses testing results.

In view of the results obtained with this sample, there is a relationship between the tweets that contain or mention company's tangible and intangible attributes and a high number of likes. On the contrary, there is a relationship between tweets that contain or mention company's tangible and intangible attributes and a high number of retweets in the case of tangible attributes. Therefore, tangible and intangible attributes in the content of tweets are variables that are related to brand engagement. In turn, only tangible attributes in the content of tweets are related to eWOM.

Table 9. Summary of hypotheses testing

Hypothesis		Result
H1:	There is a relationship between industry tweets containing tangible attributes and the number of likes (brand engagement) received.	Supported
H2:	There is a relationship between industry tweets containing intangible attributes and the number of likes (brand engagement) received.	Supported
H3:	There is a relationship between industry tweets containing tangible attributes and the number of retweets (eWOM) received.	Supported
H4:	There is a relationship between industry tweets containing intangible attributes and the number of retweets (eWOM) received.	Not Supported

Source: The authors

There are several limitations in this study. The first one, is the size of the sample that includes companies from a single geographic area. Secondly, given the importance that social networks are gaining, conducting this study on another social network or on several at the same time could provide more information on how industrial companies can develop their brand equity. Finally, this study only performs an exploratory and descriptive approach to the analysed phenomenon. Future studies could include other industries, use different social networks to collect information, and further the study by including explanatory variables and cause-effect relationships in the analysis.

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