



Qualimetrics: Linking Twitter data to brand performance

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Customer conversations uncovered

Customers have always talked to each other about brands. Humans are social animals and it is natural to express our thoughts and feelings to each other as we go about our lives experiencing those who serve us. Marketers have long understood the value of a brand recommendation from a 'close tie', an individual with whom a person feels connected and whose opinion is respected.

Traditionally, these conversations occurred when the brand manager was not present. Brand owners tried to capture the impact of peer-to-peer conversations using surveys and focus groups. These methods typically asked individuals to recall past encounters and report where there was any 'word of mouth' activity, or to assess 'in general' how frequently they engage in word of mouth for a brand. But today's managers can listen in on customer's publicly available conversations via a number of online social media.

But how can marketers make the best use of this rich insight source? Brand managers struggle to make sense of Twitter because consumer comments are abbreviated, raw and fleeting – and arrive in vast quantities! Working with social media insight specialist SpectrumInsight, Cranfield has been piloting some leading-edge methods for systematically analysing Twitter texts. This paper illustrates how this 'buzz mining' can be used to answer some key customer management questions.

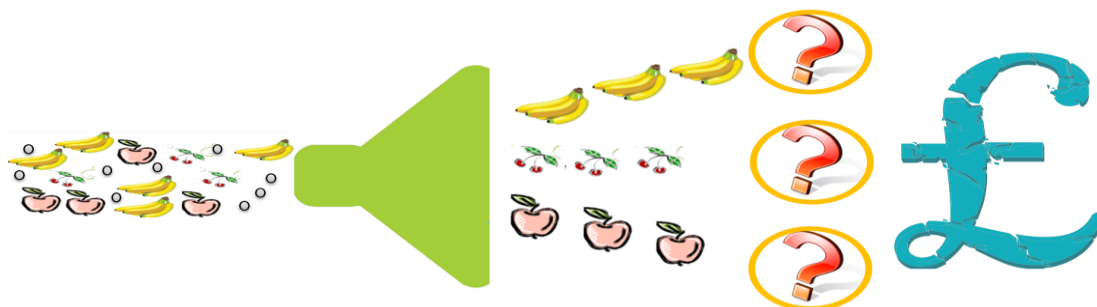
Qualimetrics using Twitter data

Analysing social media data, or buzz mining, has the benefit that views have been expressed without the biases that may come from questioning by a researcher. Mostly, though, this analysis is either purely qualitative or purely quantitative. The former makes it difficult to assess the importance of the comments made in driving outcomes. The latter gives overall figures on how positive sentiment is without much actionable insight. The Cranfield team, though, was attracted by SpectrumInsight's blended approach, termed qualimetrics. This paper road-tests this approach. Here's how it works in brief:

1. Twitter texts are captured by web crawlers. The information in these Tweets includes individuals' real-time emotional and perceptual responses.
2. The Tweets are subjected to content analysis. There are established techniques for analysing texts that have been used by qualitative researchers for decades. SpectrumInsight's qualimetrics approach uses a form of text mining known as semantic association, which in simple terms analyses the relationship between words. For example, if you asked people to write down the first thing they think of when you say "Barack Obama", most would probably answer "US President". Applying this principle, qualimetrics can analyse huge volumes of Tweets that mention both a brand and a brand attribute –

good or bad. This uses ‘dictionaries’, which are built for each study according to the objectives of the research. So, for example, if a brand seeks to be exciting, an ‘Excitement’ dictionary would look out for Tweets mentioning not just “exciting” and “excited” but also related words like “awesome” and “fantastic”. In the case studies presented here, an existing dictionary is used in the first two cases. A new dictionary of dimensions of customer value is created directly from the data in the third case.

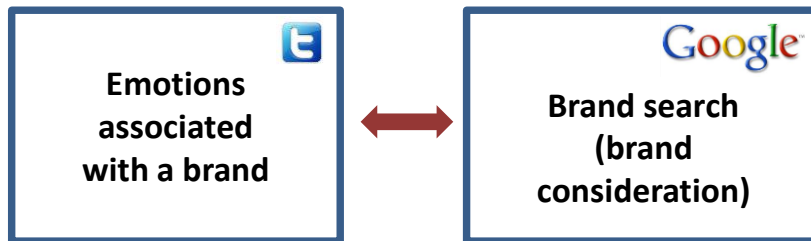
3. All the Tweets on a particular theme, such as excitement, bad service, high prices or executive pay, are then divided into time periods, such as weeks or days (or even hours of the day). In the three cases that follow, the unit of time is either a week or a fortnight. Increasing or decreasing volumes of Tweets can help spot critical trends such as the failure of a newly created marketing campaign or a potential PR crisis boiling up.
4. This qualimetric data quantifying volumes of Tweets on important qualitative themes can then be matched statistically with measures of brand performance, such as brand consideration and sales, to see how much these trends matter.



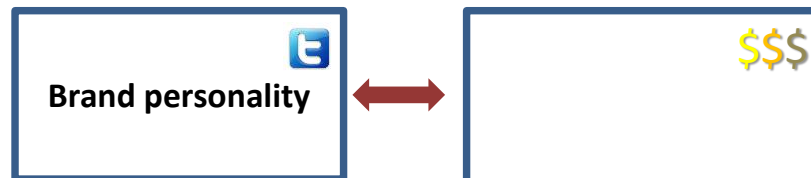
Linking qualimetrics to brand performance: Three case studies

The three case studies that follow show the results of Cranfield’s road-testing of SpectrumInsight’s qualimetrics approach to understanding brand health and its impact on brand performance. Each case study takes a different approach to brand health: brand personality, emotions, and customer perceived value. That is, each uses a different way of thinking about what kind of brand attributes we are interested in.

CASE 1: Car brands



CASE 2: Supermarket brands



CASE 3: Waitrose

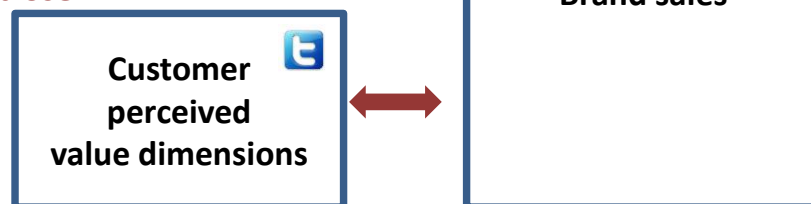


Figure 1: Linking Twitter qualimetrics to brand performance

These topics often require 'projective' research techniques as they are challenging to assess using direct questioning in surveys. These projective techniques necessitate individual depth interviews asking non-direct questions – not just involving high expense but also relying on consumers' recollections. By contrast, reviewing spontaneously generated comments of consumers en masse ensures their feelings and perceptions are captured without bias and at low cost.

Furthermore, as each Twitter comment is date-stamped it is feasible to match aggregated Twitter data with aggregate behavioural measures at specific points in time. Plotting these measures over time allows us to draw conclusions about the impact of consumer feelings and perceptions on brand performance (see Figure 1). In the first case study, we correlate brand emotions with Google search (as a proxy for brand consideration). In the other two cases we correlate, firstly, brand personality, and secondly, dimensions of customer perceived value, with brand sales.

Case 1: Linking brand emotions with brand consideration for car brands

Consumers choose a car brand for many reasons, beyond basic features such as fuel economy and safety. Design features play a role in determining preference but more often than not these are indistinguishable between brands. So the important differentiator may be simply how the individual *feels* about the brand. This is particularly the case in a category where the product is publicly consumed and so closely linked to the consumer's own self-identify.

Given the close connection between the emotions surrounding a brand and subsequent brand preference, it appears that access to ready insight about brand emotions would provide a useful way of predicting brand purchase intention. However, gaining access to consumers' emotions is challenging. Most existing techniques (such as interviews and surveys) are intrusive. By contrast the comments that an individual makes via Twitter represent a spontaneous expression of their brand emotions.

In this case study we explore the use of Twitter data as a source of brand insight. And in the absence of sales data for car brands, we apply Google search data as a proxy for brand consideration. We then examine the correlation between these two data sources (i.e. the brand emotions implicit in Twitter comments and the active searching for a brand using search engine Google) to explore the link between brand emotions and brand consideration.

Measuring emotions using Twitter data

Emotions can be identified in Twitter data using a computerised content-analysis tool called the Regressive-Imagery Dictionary (RID). The RID tool was developed and verified by academics several decades ago (Martindale 1975). This dictionary contains 3200 words and seven emotional categories shown in Table 1 (below).

Table 1: Emotional categories in Martindale’s dictionary

Emotion	Example words
POSITIVE AFFECT	Cheerful, enjoy, fun
ANXIETY	Afraid, fear, phobic
SADNESS	Depression, dissatisfied, lonely
AFFECTION	Affectionate, marriage, sweetheart
AGGRESSION	Angry, harsh, sarcasm
EXPRESSIVE BEHAVIOUR	Art, dance, sing
GLORY	Admirable, hero, royal

Three car brands (BMW, Audi, Ford) were selected for this study. Tweets that were posted for these brands between March 2011 and February 2012 were analysed. Prior to analysis, the data set was cleaned to remove promotional Tweets such as those advertising websites or particular car deals. Additionally Tweets that had nothing to do with the study needed to be removed. For instance, when searching for ‘Ford’, Tweets including Bedford and Crawford were picked up; when searching for ‘Audi’,

Tweets including Saudi were found. After completing the clean-up the data set was ready.

Search data was extracted from *Google Insights for Search*, a resource which is publicly available online.

Emotions that featured most frequently for each brand are summarised in Table 2:

Table 2: Ranking of emotions in Twitter for three car brands (March 2011 – February 2012)


Frequency of mentions	Audi	BMW	Ford
Most mentioned	1. Aggression 2. Expressive behaviour 3. Affection 4. Glory 5. Positive affect	1. Expressive behaviour 2. Aggression 3. Affection 4. Glory 5. Positive affect	1. Aggression 2. Affection 3. Glory 4. Expressive behaviour 5. Positive affect
Least mentioned	6. Anxiety 7. Sadness	6. Sadness 7. Anxiety	6. Anxiety 7. Sadness

The most frequently expressed emotion for Audi and for Ford is AGGRESSION. This is also the second most frequently expressed emotion for BMW. The emotion most frequently mentioned for BMW is EXPRESSIVE BEHAVIOUR, the same kind of emotion that is associated with enjoyment of art, music and sport.


Linking brand emotions to brand consideration

Having identified the frequency of emotions for each brand, this data was then correlated with Google search data. Linear Regression analysis was run comparing the occurrence of brand emotions (expressed via Twitter) with the amount of brand search (on Google).

In the case of Audi, the emotion ANXIETY was found to significantly predict search behaviour. During the period of tracking, Audi's new advertising campaign coincided with a major crash of an Audi car at the Le Mans motor race. This may explain why ANXIETY predicted Google Search behaviour for the brand during the period. Examples of Tweets are shown below:



"What the hell is up with the Audi's at Le Mans? Two cars destroyed, and this one seems to have a scarier outcome."




"Bad commercial timing....Audi commercial with one of the R18 race cars while the driver of one just had a horrific crash!"

For the BMW brand, despite other emotions being expressed with higher frequency, it was the emotion of GLORY – associated with admiration, pride and superiority - which was a significant predictor of Google search.

For the Ford brand, once again despite other emotions being expressed with higher frequency, it was

the emotion of ANXIETY which was significantly associated with Google search. However, unlike for the other brands, this association showed a significant negative association. This may be due to some technological innovations Ford had been promoting which helped to prevent collisions. For example:

A small blue square icon with a white lowercase 't', representing the Twitter logo.

“Ford tech allows vehicles to communicate via Wi-Fi to avoid collisions autonomously”.”

Managerial implications

This case study has demonstrated that content analysis of Twitter can be used to analyse emotions associated with brands. This Twitter insight can then be used to explain which emotions drive brand consideration. The availability of Twitter analytics means that brand owners have the potential to become more effective at harnessing the subtleties of emotion in communicating about their brand with customers. These emotions in turn have a direct impact on brand consideration, and may subsequently be shown to have a real impact on bottom line sales.

Case 2: Brand personality as a predictor of supermarket sales

In a highly competitive sector like the UK supermarket industry, brand differentiation is important but challenging as the market becomes increasingly commoditised. A brand with a distinctive brand personality - ‘a set of human personality traits that are both applicable to and relevant for brands’ (Azoulay and Kapferer, 2004) – has the opportunity to build a strong positioning which contributes to brand loyalty and overall brand equity.

Aaker’s (1997) five dimensions are the best established typology of brand personality (Table 3).

Table 3: Aaker's (1997) brand personality dimensions

Brand personality dimension	Traits
COMPETENCE	Reliable, responsible, dependable and efficient
SINCERITY	Domestic, honest, genuine, cheerful
EXCITEMENT	Daring, spirited, imaginative, up-to-date,
SOPHISTICATION	Glamorous, pretentious, charming, romantic
RUGGEDNESS	Tough, strong, outdoorsy, rugged

Brand personality is typically measured at a point in time using qualitative techniques such as card sorting and imagery. However, the technique of Twitter qualimetrics provides the opportunity to track brand personality over time. This is what we did for two UK

supermarket brands, Waitrose and Tesco. In addition, because we had the data available for Waitrose we were able to correlate weekly brand personality with weekly sales.

Using Twitter to measure brand personality

First of all, in order to set up the study, we took a sub-set of Tweets for the two brands from March 2011 and using the WordStat content analysis software programme developed a dictionary for each of the five brand personality dimensions. The dictionary was checked by selecting a random sample of Tweets to be manually coded independently by two researchers. During this validation stage it became evident that Aaker's fifth dimension of 'ruggedness' was not applicable to either of the supermarket brands. Therefore, it was dropped so only four of Aaker's brand personality dimensions were used in the final analysis.

Having developed the dictionaries for each personality dimension, occurrence of Tweets was plotted over a 12 month period from April 2011 to March 2012. Figure 2 plots monthly brand personality for Waitrose. Figure 3 shows how Tesco's brand personality is perceived over the same period.

Correlating brand personality with brand performance

Using publicly available sales data for Waitrose it was then possible to compare Waitrose weekly sales with weekly brand personality. The relationship between these measures was compared using

correlation and regression analyses. The brand personality dimensions highly correlated with Waitrose sales are EXCITEMENT and COMPETENCE. The best predictor of Waitrose sales is EXCITEMENT, followed by COMPETENCE.

For comparison this analysis was also conducted for the Tesco brand. However instead of sales data, Tesco’s brand personality was tested against weekly Google search data (as in Case Study 1). EXCITEMENT was the brand personality dimension most associated with the Tesco brand and was also the best predictor of Google Search.

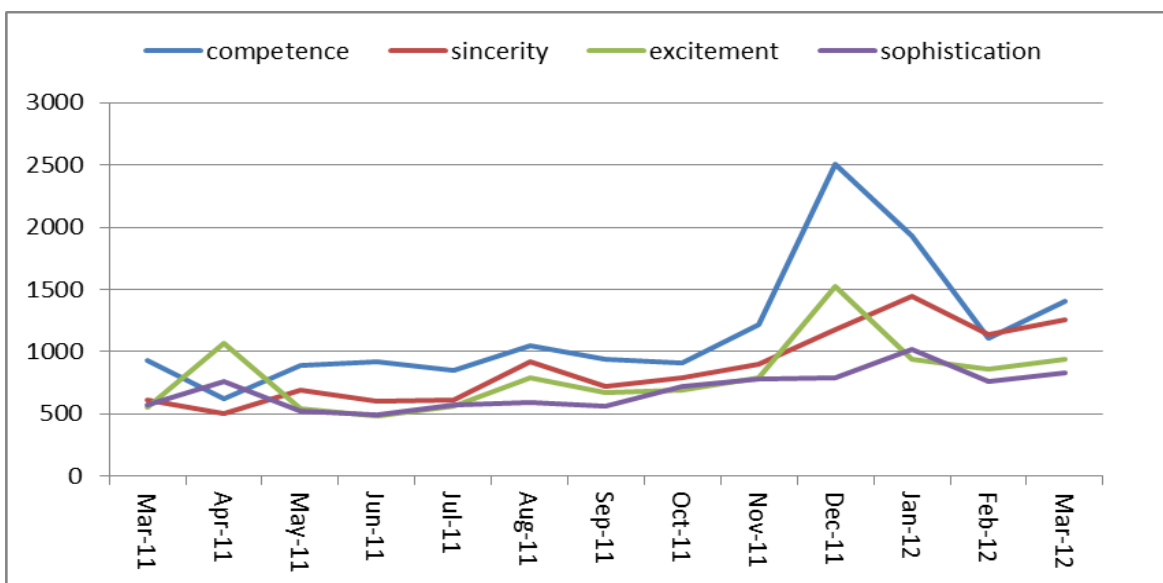


Figure 2: Waitrose brand personality dimensions (monthly)

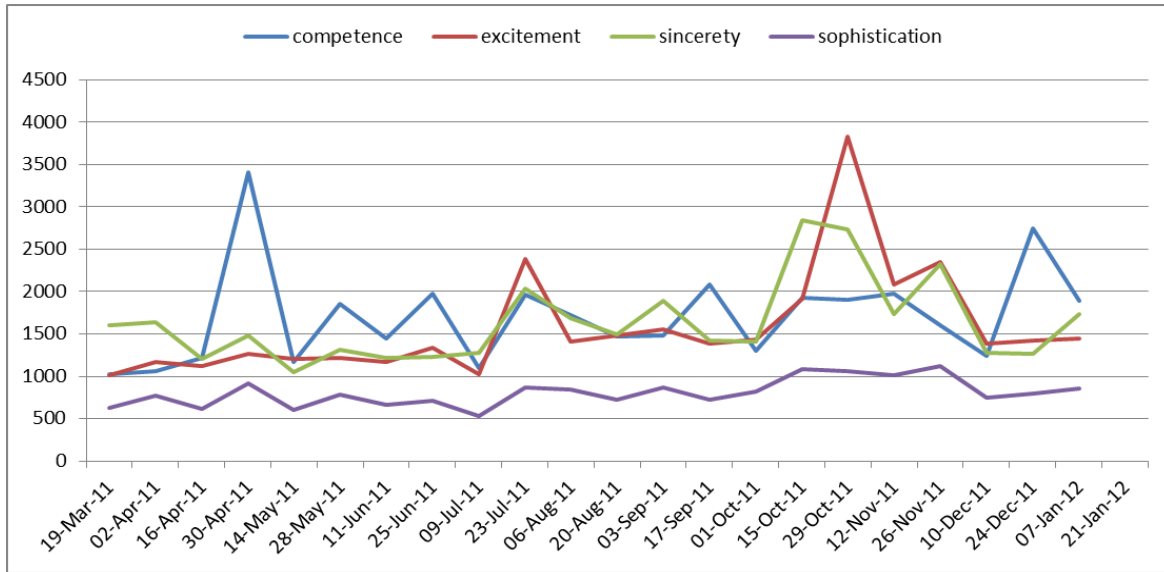


Figure 3: Tesco brand personality dimensions (fortnightly)

Further investigating the drivers of brand personality

Having identified EXCITEMENT as the brand personality dimension that most significantly predicts Waitrose sales, further investigation was conducted to understand what ‘excitement’ means for this brand. This was achieved through qualitative analysis of the texts.

For each brand, frequently mentioned drivers of EXCITEMENT were gathered and contrasted. The analysis (summarised in Table 4) shows that while there are some common drivers, the dominant drivers of excitement for Waitrose are different to those for Tesco.

Table 4: Contributors to EXCITEMENT for supermarket brands

Drivers of EXCITEMENT	Waitrose	Tesco
Shared	cheerful, fresh, cool, exciting/excited, awesome, young/youth, fantastic, crazy, wonderful, brave	
Dominant	cheerful, wonderful, fantastic	young, crazy

In addition, by tracing back the meaningful phrases that frequently appear together with the brand personality dimension, it is possible to better understand the consumer experiences that help shape their perceptions of the brand. Table 5 provides an illustration of the analysis of customer experiences driving the perceptions of Waitrose’s COMPETENCE.

Findings for Waitrose

We found that Waitrose emphasises the brand personality dimension of COMPETENCE. Customers notice and mention this in their Tweets. However although COMPETENCE is significantly correlated with sales, the best predictor of Waitrose sales is EXCITEMENT. Based on our analysis we would recommend that Waitrose increase its emphasis on the brand personality dimension of EXCITEMENT. When its customers report that Waitrose is cheerful, wonderful or fantastic this is uniquely and positively associated with increased sales.

Table 5: Associations with Waitrose’s COMPETENCE

COMPETENCE dimension	Experience components	Examples of activities
‘Good quality’	Food Service In-store staff Reliable	Food is guaranteed British, organic or local. Staff are friendly, helpful and nice-looking.

Managerial implications

Twitter qualimetrics enable managers to track the dimensions of brand personality over time. This provides a reading of not just sentiment but also of our brand’s unique positioning relative to competitors. These brand personality dimensions can be correlated with sales data to tell us which dimensions are significant drivers of brand performance. Furthermore, qualitative interrogation of the content of Tweets makes it possible to understand which activities are the important contributors to building brand personality.

Case 3: Unpacking dimensions of value that relate to Waitrose sales

Companies don't need to be told the obvious: we all know that good sales performance is based on giving customers what they want. But how do we know what customers want? What is it that customers value? In the past, all sorts of complicated market research techniques have been used to determine this. Today, in an era where social media is ubiquitous and omnipresent, we have an entirely new way to track and measure customer value. Companies know that the data which can be collected from social media has the potential to be useful but don't know exactly what to *do* with it.

Using Twitter data to understand customer perceived value

In this study, we take the supermarket Waitrose as our example, and show just how useful social media data mining can be. In this instance, research was conducted to track customer value and relate this directly back to sales performance, with some fascinating results.


From prior research we know that what constitutes value is highly personal and idiosyncratic. A customer expects to achieve value in every interaction they have with a company – including the whole range of pre-sales to post-sales experiences. The term we can use for this is 'value-in-use', i.e. value is the fulfilment of higher-order goals or objectives which customers seek

to achieve, where ‘a customer’s functional outcome, purpose or objective...is directly served through the product/service consumption’ (Macdonald, Wilson, Martinez and Toossi 2011).


Creating a dictionary of value-in-use

As no existing dictionary of value-in-use exists, the analysis for this study involved a few more steps than the two other studies. Firstly, a year’s worth of Twitter data relating to Waitrose was gathered into one central spreadsheet. Then using a random number generator, around 1300 Tweets were selected. These randomly selected Tweets were analysed using thematic content analysis. Initially eight value-in-use categories were identified by the researcher. A check of this analysis was conducted by having another researcher independently allocate a sub-set of these Tweets to the eight categories. (This is known as an ‘inter-coder reliability’ check). As a result of this check stage, the value-in-use categories were narrowed down from eight to seven final categories. Examples of each are shown below:


a. Excitement of new and rare foods

 *“Merchant Gourmet Spiced Rice vinegar is selling in Waitrose. It is one of those WOW products. You must try it.”*


b. Fulfil ethical, altruistic or patriotic motives

 *“Not just a moral and quality line. We are a Waitrose family – Tesco is not my bag – didn’t even stock organic milk – v poor”.*


c. Value for money

 *“Yeah, I prefer the Waitrose branded ones. A lot cheaper and actually salted”.*


d. Shopping experience, including store ambience and staff

 *“Yeah but we needed loo roll, nuts and kabanos. Back to the safe haven and tranquillity of Waitrose next time”.*


e. Ease of access i.e. the store is nearby or stocks the desired product

 *“I may have to pop to my local Waitrose this week and see if they have them in. X”.*

f. For reasons of self-esteem and social recognition

 *“Are you a Waitrose or an Asda shopper? Class lives on in the supermarket aisle”.*

g. For a 'treat' or for delicious, ready-made food

 *"Parents got massive fab birthday cake from Waitrose for Alexandra, iced with her name and butterflies #willbebeatingforweeks".*

Correlating value-in-use with brand performance

Using the computer software programme WordStat, a comprehensive dictionary was built to analyse the Twitter data, and build a picture of Waitrose customer experiences, desires and values. The data was analysed by week. Each weekly Twitter data set was compared against Waitrose weekly sales performance (Figure 4).

The analysis of the value categories demonstrated that Waitrose customers are motivated by a number of different types of value-in-use. Some of these types of value were found to be more significant than others for predicting Waitrose sales performance.

- Neither the ETHICAL CATEGORY nor the TREAT category were significant predictors of sales for Waitrose.
- By contrast, the EXCITEMENT category, SELF-ESTEEM category and EXPERIENCE category were all significantly linked to sales.

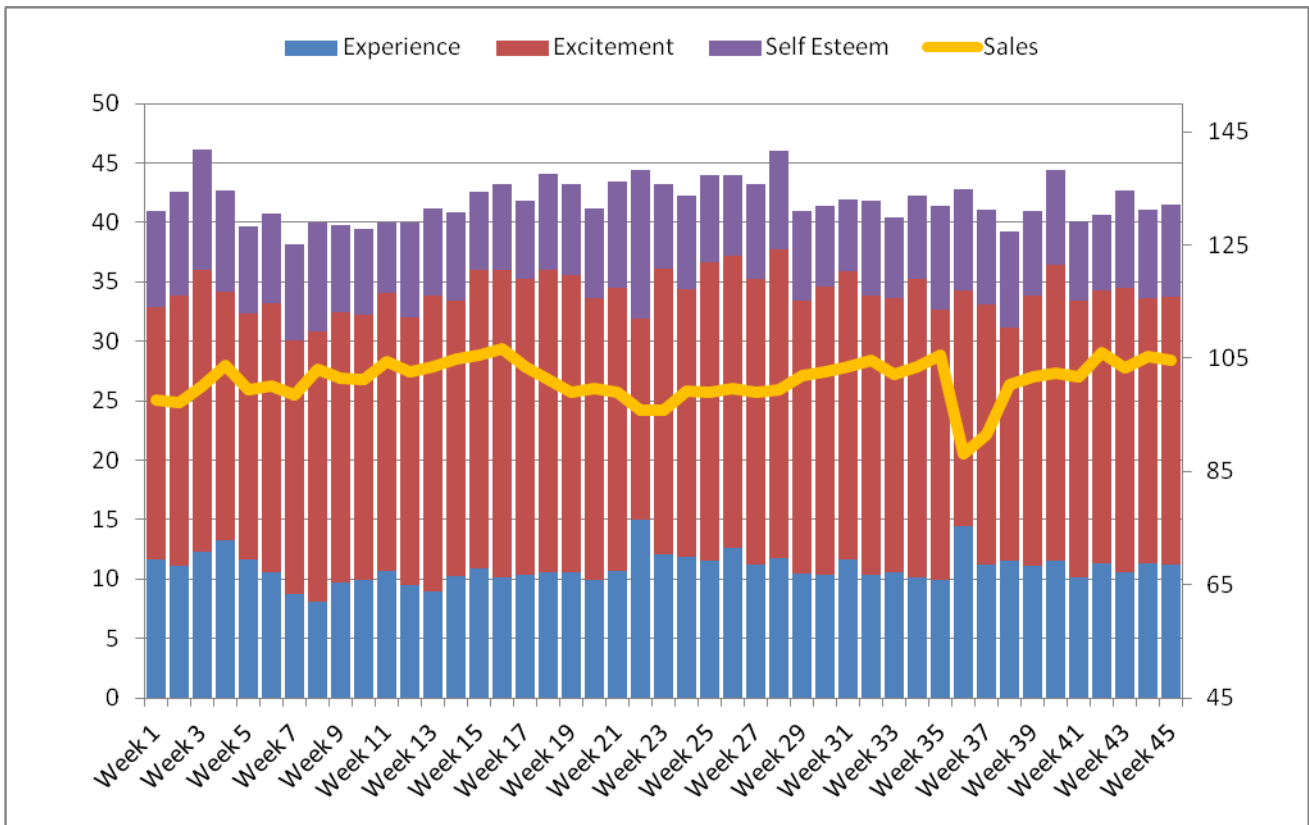


Figure 4: Correlation of Waitrose value dimensions (expressed via Twitter) with Waitrose sales data

- **EXCITEMENT** was the only category with a strong positive correlation with sales performance, meaning that as the percentage frequency of Tweets regarding the ‘*excitement of new and rare foods*’ increases, so too does sales performance.
- **SELF-ESTEEM** was negatively correlated with sales and the **EXPERIENCE** category emerged as having a particularly strong negative correlation with sales performance.



Figure 5: Value dimensions that significantly impact Waitrose sales

The implications of these findings for Waitrose are illustrated in Figure 5. To summarise, feeling excited about the range of food products available at Waitrose leads to increased sales. This is a value dimension that Waitrose should continue to boost through their promotions, range of foods and activities (such as recipes, etc.). Self-esteem benefits and a pleasant shopping experience are hygiene factors for the Waitrose brand, meaning that customers expect these benefits as a matter of course. Failure to meet these expectations has a detrimental impact on Waitrose brand performance.

Managerial Implications

The strong statistical significance of the link between the Waitrose value-in-use categories and sales performance demonstrates the usefulness of eWOM (online word-of-mouth) for customer insight. Not only are these findings relevant for organisations like Waitrose and Tesco, but they also have implications for other supermarket and retail brands.

Although marketers might worry about the loss of control engendered by online social media we can also recognise that social media give unprecedented insight into consumers' thoughts, habits and communication patterns. With further refinement, the data mining method used in this study could be replicated to allow other retailers to estimate sales performance based on key customer perceived value dimensions.

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Biographies

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Venetia Ellis is a graduate of the MSc Strategic Marketing programme at Cranfield. Her MSc thesis developed a new method for analysing Twitter data to assess the link between customer perceived value and sales performance. She is currently participating in a twelve month rotational graduate programme at the Institute of Directors (IOD). Established by Royal Charter in 1906, and based in the heart of London, the IOD prides itself on representing and supporting directors and leaders, whilst working with the Government to promote business needs. Venetia previously completed a BA Hons in English Literature at Durham University.

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Mark WESTABY

Mark Westaby is Director and founder of SpectrumInsight, a leading provider of online and social media insight and evaluation. Mark founded Metrica – now one of the largest media evaluation companies in the world – before moving into online and social media evaluation and insight with Spectrum. A founding Fellow board member of the International Association for Measurement and Evaluation of Communication (AMEC), which he chaired for over four years, Mark is a frequent speaker at conferences, seminars and universities.

Hugh N. WILSON

Hugh Wilson is Professor of Strategic Marketing and Director of the Customer Management Forum at Cranfield School of Management, UK. His research interests include customer experience, marketing and sustainability, and multichannel customer management. Prior to joining the Cranfield faculty in 2004, he worked for 20 years as a practitioner with IBM, Logica CMG and others. He has published many academic papers and in Harvard Business Review (with Emma Macdonald). He also writes extensively for practitioner audiences; his books include "Multichannel Challenge" (2008, with IBM's Rod Street) and "Marketing Plans 7e" (2011, with Malcolm McDonald).



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