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A study on the influence of eWOM using content analysis: How do comments on value for money, product sophistication and experiential feeling affect our choices?

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Short biography of Vincent Cho

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Abstract

The influence of electronic word of mouth (eWOM) has been heavily investigated in relation to online ratings. However, only a few studies examined the content of eWOM. From the perspective of the consideration sets model, consumers formulate an awareness set, a consideration set and a choice set before making a purchase. We argue that the formulation of these sets is influenced by eWOM based on its volume, valance and content relating to product attributes such as value for money, product sophistication, and experiential feeling. In this study, the content of posts relating to Shure professional earphones in the online forum Mingo (www.mingo-hmw.com/forum) was captured and annotated. During the data collection period, Mingo was the sole online forum relating to professional earphones. Without much interference from other online forums, the circumstances of this study closely approximate a laboratory setting. In addition, we collected the actual sales, marketing costs, fault rates and number of retail stores selling the Shure professional earphones for 126 weeks. Our findings show that the weekly volume of posts, their relative number of positive (negative) comments, especially regarding value for money and sound quality, and those posts from the earlier week impinged strongly on weekly sales of Shure products. From the regression models, the explained variance in sales jumps from 0.236 to 0.732 due to the influence of eWOM.

Keywords: electronic word of mouth, content analysis, value for money, product sophistication, experiential feeling, consideration sets model.

Introduction

Seeking product information is often critical in making a purchase decision. Using the Internet, consumers easily obtain the latest product information from the official website of a manufacturer or from discussions in a third party online forum. In general, consumers perceive the electronic word of mouth (eWOM) spread through online forums to be more credible than marketers' advertisements (Xia and Bechwati, 2008; Gu, Park and Konana, 2012). In this vein, past studies of eWOM have focused mainly on the influence of online ratings on product awareness and sales (e.g. You, Vadakkepatt & Joshi,

2015; Gopinath, Thomas ad Krishnamurthi, 2014; Zhang, Guo & Goes, 2013; Gu, Park and Konana, 2012; Amblee and Bui, 2012; Zhu and Zhang, 2010; Berger et al. 2010; Zhang et al. 2010; Vermeulen and Seegers, 2009; Chen and Xie, 2008; Duan et al. 2008; Dellarocas et al. 2007; Liu, 2006). Nevertheless, these studies mainly accounted on ratings, which refer to the overall evaluation of online posts. Below we highlight three essential limitations of the existing research on eWOM.

Qu et al. (2008) and Duan et al. (2008) suggested that the rich content of online posts would be used to elaborate on the overall recommendation rating for a product. To date, however, content analysis of online posts is limited to a few studies in the USA market (e.g. Gopinath, Thomas & Krishnamurthi, 2014; Zhang, Li and Chen, 2012; Willemsen et al. 2011; Liu, 2006). This is because automated natural language interpreters can not accurately interpret posts in online forums especially Chinese forums, which usually contain abbreviations, localized slogans, and icons. To gain a detailed understanding of the influence of eWOM, tedious manual annotation of its content is necessary.

To our knowledge, a few studies start to explore the influence of eWOM on product nature such as hedonic and functional (e.g. Huang and Korfiatis, 2015). However, no studies have explored the content of eWOM in terms of comments about product sophistication, value for money, and experiential feeling. According to the consideration sets model of Roberts and Lattin (1991), a consumer will compare different aspects of a product in a choice set when making a purchase decision. Besides seeking advice from others based on their experiential feeling of using a product, a consumer may also consider the product's sophistication and value for money. These three essential product attributes concur with the framework of Sweeney and Soutar (2001) in exploring the consumption values that drive purchase attitudes. This decision making process should be especially valid for sophisticated, experiential, and expensive products such as HiFi stereos and automobiles, for which consumption evokes mental representations in both mind and body (Rosa and Malter, 2003). In particular, sophisticated products are those specified by numerous technical features, while experiential products are those that evoke experiential feelings such as enjoyment.

Information recency is another emerging issue in eWOM (e.g. Westerman et al., 2014). Though Beaudoin (2008) showed that the perception of information overload is reduced when a consumer is motivated by online social resources, too many online posts of an extended period may not help in making a purchase decision. Does the influence of a post diminish over time? To move another step towards understanding information recency, it is essential to identify whether there is an effective time frame governing the influence of online posts on decision making.

To fill the above gaps, this study investigated the content of online posts in Mingo, a renowned online forum for audio and visual equipment in Hong Kong, and analyzed their impacts on the sales of a professional earphone brand. In the process, factual data on sales and marketing were solicited and tedious annotations of online posts carried out. Our framework was built on traditional marketing concerns such as marketing expenditure, the number of retail stores, and the fault rate. To revalidate the findings of past studies, the influence of volume (total number) and valence (overall ratings) of online posts were included. We also explored the differential impacts of eWOM comments relating to product sophistication, experiential feeling, and value for money on the product sales. Regarding information recency, we examined the effect of online posts from different periods on the sales. In sum, this study elaborates on the influence of eWOM on actual sales of a professional earphone brand by exploring the content of posts in an online forum.

The rest of this paper is organized as follows. The following section provides the background on eWOM. Next, the conceptual framework and related hypotheses are proposed and the methodology and data collection sections described. Afterwards, the analyses and findings are discussed highlighting the theoretical contribution and practical implications of this study.

Electronic Word of Mouth

Traditionally, WOM can be broadly defined as “all information communications directed at other consumers about the ownership, usage, or characteristics of particular goods and services or their sellers” (Hennig-Thurau and Walsh, 2004). More specifically, it is an “informal, person-to-person communication between a perceived non-commercial communicator and a receiver regarding a brand, a

product, an organization, or a service" (Harrison-Walker, 2001; Arndt, 1967). Word of mouth is particular important when consumers possess limited product knowledge (Gilly et al., 1998), perceive consumption choices as high risk (Hennig-Thurau, 2004; Bansal and Voyer, 2000; Murray, 1991; Kiel and Layton, 1981); or are highly involved in the purchase decision (Beatty and Smith, 1987). Traditional WOM, owing to the perceived source reliability and the flexibility of interpersonal communication, has a distinct ability to affect consumer decisions (Day, 1971). However, the influence of traditional WOM is limited to a local social network; information travels quickly within social communities but moves slowly out across social networks (Brown and Reingen, 1987). Additionally, as WOM relies on face-to-face and private communications, such as talking to family, friends and acquaintances, its spontaneous and short-range nature makes it difficult to keep records of conversations among parties (Stern, 1994).

Compared to traditional WOM, eWOM has the advantages of facilitating massive spread of information at a fast pace, transcending space, time, social class barriers, and cultural differences (Hennig-Thurau et al., 2004; Wellman, 2001; Armstrong and Hagel, 1996; Rheingold, 1993). Post-purchase consumers may generate a lot of buzz, which serves as a kind of viral marketing (Kirby and Marsden, 2006). Consumers can rely on eWOM to surmount most information asymmetries that characterize traditional consumer markets (Rezabakhsh et al., 2006). Furthermore, consumers may play a more active role in the value chain and influence product design and pricing (Pitta and Fowler, 2005). In essence, eWOM in online discussions vastly enhances consumer information about products. Through archived records in online forums, researchers can access these WOM communications effectively and begin to explore their influence (Kozinets et al., 2010; Chu and Lu, 2007; Chen et al., 2004). This has spurred scholars to re-examine the effects of WOM in the cyber age. Apart from studies on the antecedents and consequences of eWOM based on questionnaire surveys (e.g. Lim and Van Der Heide, 2015; Lee, et al., 2012; Chai and Kim, 2012; Lee et al., 2011; Campbell and Cecez-Kecmanovic, 2011; Hung et al., 2011; Mo and Coulson, 2010; Ho and Dempsey, 2010; Smith et al., 2005), most scholars have focused maily on the influence of the volume and valence of reviewer ratings (e.g. You, Vadakkepatt & Joshi, 2015; Gopinath, Thomas & Krishnamurthi, 2014; Zhang, Guo & Goes, 2013; Gu, Park and Konana, 2012; Amblee and Bui, 2012; Zhu and Zhang, 2010; Berger et al. 2010; Zhang et al.,

2010; Vermeulen and Seegers, 2009; Chen and Xie, 2008; Duan et al., 2008; Dellarocas et al. 2007; Liu, 2006).

Nevertheless, very few studies have analyzed the content details of each post in a discussion forum. Liu (2006) studied the weekly sales data for 40 movies over a five-month period in 2002 using the movie reviews from Yahoo!Movie. He employed three judges to code reviewer messages. Each judge read each of the 12,136 messages independently and assigned them to one of five categories: positive, negative, mixed, neutral, and irrelevant. He suggested that review volume has the most explanatory power for aggregate and weekly revenue; but that positive and negative reviews are not significantly correlated with movie revenue. Recently, Willemsen et al (2011) showed that content characteristics are paramount in understanding the perceived usefulness of reviews. Specifically, argument density and diversity serve as significant predictors of perceived usefulness. However, these few studies may be unable to capture a holistic picture of consumer-to-consumer interaction (Ngai and Chan, 2011). Hence, we attempt to elucidate consumer-generated comments in terms of product sophistication, experiential feeling and value for money and to investigate their effects on product sales.

The consideration sets model

This study attempts to explain the consumer purchase decision-making process using the consideration sets model based on the concepts of awareness, consideration, and choice, which are the mental steps of making a choice (Shocker et al., 1991; Roberts and Lattin, 1991). The awareness set, the first mental step in decision making, consists of the subset of brands or products in the universal set that consumers can access via their memory from exposure. This is the set of products directly connected to the available alternatives that can be recalled from exposure via various means (e.g. traditional face-to-face communications and virtual online forums). The consideration set consists of a subset of products in the awareness set that are scrutinized carefully. The choice set refers to a small subset of products from the consideration set. The entries in the choice set are those products with unique attributes that are highly congruent with the consumer's needs. When consumers participate in an online forum, these three mental steps somehow evolve in their brains. In this vein, our framework as shown in Figure 1 illustrates

how eWOM influences the formation of awareness, consideration and choice sets, which eventually lead to the purchase of a brand.

INSERT FIGURE 1 HERE

The effect of review volume on formulating an awareness set

According to Torres and Briggs (2007), when making a purchase decision on an expensive and sophisticated product that is purchased only after long and careful consideration, consumers are more rational and thoughtful. They may start searching for product information on the Internet and tap into popular online forums. If consumers find a thread in an online forum interesting, they may open the thread and read the posts. A thread is a single conversation topic in a forum, and a post is a user-submitted message within the thread (Pitta and Fowler, 2005). It is reasonable to assume that the number of posts, which is represented by the volume of a thread, is related to the number of consumers who have bought the product and shared their opinions along with those who have not bought the product but want to know more about it. This somehow represents its attractiveness, which further enhances the product's exposure and consumer awareness of it (Chevalier and Mayzlin, 2006; Liu, 2006; Basuroy et al., 2003; Chatterjee, 2001; Chen & Xie, 2005). This is especially valid for a newly launched product on the market. Hence, products with intensive exposure in online forums have a higher probability of being recognized, recalled, and echoed, thus forming an awareness set (Alba and Chattopadhyay, 1986). The more discussion about the product and its brand, the greater the chance of customers becomes aware of its presence, thus increasing sales.

Prior studies have suggested that the volume of online posts about product is highly correlated with product sales (Amblee and Bui 2012; Dellarocas et al., 2007; Liu, 2006). As suggested by Liu's (2006) cognition-behavior model, the volume of online posts, even if some posts contain negative comments, drives awareness of the product and in turn pushes up sales. Amblee and Bui (2012) showed that the number of book's short on Amazon.com helps to convey the book's reputation and sales. Vermeulen and Seegers (2009) conducted an experimental study on hotel reviews and found that review volume has a greater effect in improving awareness of hotels that are less-known. Dellarocas et al. (2007) collected

reviews of 80 movies in 2002 from Yahoo!Movie. Their results indicated that the volume of online reviews exerts a significant effect on movie revenue. Similarly, Liu (2006) found that review volume had the most explanatory power for a move's aggregate and weekly revenue. Hence, the volume of online reviews helps to boost product sales by arousing awareness of the product.

H1: Within a given period, the number of posts related to the products in a brand will have a positive influence on brand sales.

The effect of positive/negative posts on formulating a consideration set

To a certain extent, when individuals perceive a product as positive for intended purposes, this product is likely to be taken into their consideration set, which is a subset of their awareness set (Posavac et al., 1997; Priester, et al., 2004; Ratneshwar & Shocker, 1991; Barsalou, 1985). In other words, a product is more likely to be taken into the consideration set, if it is exposed via discussion in a positive way. Based on the cognition-behavior model (Liu, 2006; Priester et al., 2004), consumers process their alternatives regarding positive (negative) perceptions and form a positive (negative) attitude, adding or deleting alternatives as necessary. As a result, positive posts strengthen perceptions of a product while negative posts decrease their perceived value of the product. Consumers continuously make comparisons among various brands or the products of a given brand (Putsis and Srinivasan, 1994). The number of positive and negative views among the posts exerts a strong influence on a prospective consumer's consideration of the product (Berger et al., 2010). The consideration set is formed from those products with more positive than negative posts (Priester et al., 2004).

Zhu and Zhang (2010) and Berger et al. (2010) found that a positive valence promotes a product, while conversely, a negative valence has an adverse and more serious effect on a product. This is because dissatisfied consumers tend to voice their complaints to more people than do those who are satisfied or even delighted (Bolfing, 1989; Buttle, 1998; Arndt, 1967). Moreover, Willemsen et al. (2011) found that a positive valence is perceived to be more useful for a search product than for an experiential product. After including the volume of online posts in the regression model, we propose that the ratio of

positive (negative) posts to total volume boosts (diminishes) product value and has a positive (negative) effect on product sales.

H2: Within a given period, the number of positive (negative) posts of products in a brand relative to the total volume of posts will have a positive (negative) influence on brand sales.

The effect of positive/negative posts about value for money, product sophistication and experiential feeling on formulating a choice set

Shocker et al. (1991) found that consumers may eliminate alternatives in the consideration sets and perform a more effortful comparative analysis of the few remaining options, which is a choice set. Products in the choice set are highly congruent with the consumer's needs. Sweeney and Soutar (2001) identified performance details, experiential feeling, and value for money as significant influences on the consumer's perceived value of a product. These three attributes assess the value of a utilitarian and hedonic product in terms of expected performance and enjoyment for its given price level. As a result, we propose that consumers who are formulating a choice set and close to the point of making a purchase will focus closely on these three product attributes in an online forum or other information source.

Roberts and Urban (1988) suggested that consumers choose good value on some product attributes to compensate for poor value on others. Brands or products with sophisticated features that maximize consumer utility may trigger the final consumption choice (Wangenheim, 2005; Hauser and Wernerfelt, 1990). When consumers plan to acquire a sophisticated product that is complex in nature (e.g., professional earphones), they may limit their choice to these products with some special features. Apart from the technical sophistication of a product, a person may also seek advice on the experiential feeling of using the product. This is especially valid for those hedonic products that provide enjoyment. Simultaneously, customers may focus on comments about value for money, which is the product's derived utility due to the reduction of perceived costs, for the cost-benefit trade off when making a purchase decision in a choice set (Kardes and Kalyanaram, 1992; Hauser and Wernerfelt, 1990). Hence, any positive comments on the product's sophistication, experiential feeling, and value for money will

drive people towards a choice. In contrast, any negative comment on the above three attributes of a product will discourage people from buying it.

H3a: Within a given period, the number of positive (negative) posts about the value for money of a brand relative to the total number of positive (negative) posts will have a positive (negative) influence on brand sales.

H3b: Within a given period, the number of positive (negative) posts about product sophistication of a brand relative to the total number of positive (negative) posts will have a positive (negative) influence on brand sales.

H3c: Within a given period, the number of positive (negative) posts about experiential feeling of a brand relative to the total number of positive (negative) posts will have a positive (negative) influence on brand sales.

The effect of earlier online posts

Because of the sophistication of search engines in online forums, posts from earlier dates remain influential. This is especially valid for sophisticated, experiential, and expensive products where consumers are concerned about their unique and sophisticated features, and their post-purchase evaluation. According to Beaudoin (2008), information overload may not be a concern if the user is looking for social resources such as word of mouth about a product on the Internet. However, Westerman et al. (2014) found that only recent tweets are credible. Thus, we suspect there is a significant influence of earlier posts on brand sales, and propose the following hypothesis:

H4: The number of positive (negative) posts from an earlier period on value for money, product sophistication, and experiential feeling of a brand relative to the total number of positive (negative) posts in that period will have a positive (negative) influence on brand sales.

Traditional marketing concerns

The traditional marketing literature stresses that business success relies heavily on three essential steps: promotion, accessibility, and post-purchase evaluation. Promotion refers to marketing activities to advertise a product via traditional media such as magazines and newspapers. Accessibility of the product is related to the number of physical sales channels and how easily customers can obtain the product (Hoch and Ha, 1986; Deighton, 1984; Gorn and Weinberg, 1984). Certainly more retailers selling the product allow more customers to buy the product. Last but not least, post-purchase evaluation can be reflected by the fault rate, which is the ratio of faulty cases reported to the product distributor to the number of products sold in a week (Hellofs and Jacobson, 1999; Jacobson and Aaker, 1987). This is a proxy for product quality and a form of post-purchase feedback on customer satisfaction. If a product has a high probability of breakdown, a drop in customer satisfaction is likely. Discontented customers will tend to persuade their friends not to purchase the product, by spreading negative WOM (Folkes, 1984). In contrast, there are referrals for high quality products from time to time (Caminal and Vives, 1996). In summary, marketing expenditure, the number of retail stores, and the fault rate of a brand are respective measures of product promotion, accessibility, and post-purchase evaluation that influence its sales.

H5a: Marketing expenditure has a positive influence on brand sales.

H5b: The fault rate has a negative influence on brand sales.

H5c: The number of retail stores has a positive influence on brand sales.

Methodology

Shure as an experiential, technically sophisticated. and expensive professional earphone brand

This study focused on the sales of Shure, a famous American brand of professional earphones. Shure has been manufacturing microphones, earphones, and audio electronic devices for over 80 years. Countless popular and famous international and local artists who possess their own acoustic equipment have experienced Shure (e.g., Stevie Wonder and Jacky Cheung, a famous singer in Hong Kong). In 2004, Shure introduced their professional earphones to Hong Kong targeting middle and high-end users with price ranging from US$100 to US$500. With their sophisticated technology and expensive price

range (Poiescz and deBont, 1995), Shure earphones filled a gap in the market for music lovers who care about the finer details of pitch and note. These pioneer consumers have been eager to share their experiences via the online forum. Along with the boom in Apple iPod in 2006, many music lovers switched to Shure because of its sophisticated design and quality. Shure is one of the top brands in the Hong Kong headphone market as reported by GFK in 2009.

When a product or an innovation is not easy to evaluate, customers often rely on WOM for their purchase decisions (Rogers, 2003). There are three major characteristics of professional earphones that make WOM important for sales. First, the hedonic nature of professional earphones makes this product experience-based and difficult to assess without actual use. Second, without somebody to explain and elaborate on the technical details, it is difficult to thoroughly understand its features. Third, it is expensive. Hence, people may like to hear more comments about whether it is worth buying. These three characteristics suggest the possible generalizability of our findings to other products such as professional cameras or expensive watches with special functions that are also experiential, technically sophisticated, and expensive.

According to a preliminary scan of the posts in the most popular online forum for earphones - www.mingo-hmw.com/forum, most concerns relate to sound quality, wearing comfort, and value for money. Conversely, other aspects of earphone design such as aesthetics, bulkiness, trendiness, and weight are seldom mentioned in the online forum.

The sales value of professional earphones priced over HK$750 was around HK$173 million in 2012 (GFK, 2013). This clearly indicates that professional earphones are popular in the Hong Kong market. Nevertheless, whether the earphones are worth their price remains an important concern widely discussed in the online forum. The question is whether the earphones offer value for money and are reasonably priced.

Relating to the technical specifications of professional earphones, sound quality is an important attribute. To reflect its importance, the author of the earphone yearbook *Headphone Collectable*, Mr.

Mak divides sound quality into five dimensions, namely sound stage, high pitch extension, middle frequency layering, bass saturation, and sound resolution. In terms of design, professional earphones tend to be more “linear” in their frequency response, which provides faithful reproduction and exhibits no additional boosting or damping of the original recording. Moreover, some manufacturers stress that the wiring of their earphones is specially designed to reduce transmission loss and sound distortion. To guarantee good sound quality, some professional earphones have electronic circuits that cancel out environmental noise around the user, and some even have three micro speakers within each earphone for high, mid-range, and low frequencies. In sum, the technical specifications of sound quality are an essential element when making a purchase decision for professional earphones. Hence, consumers look into the technical sophistication related to the sound quality in the online forum.

Regarding the experiential feeling of professional earphones, a common topic is wearer comfort derived from using the earphones (Sweeney and Soutar, 2001) because professional earphone users tend to wear them for extended periods as part of their lifestyle. Unlike economical brands that have universal-fit earbuds, professional earphones are either equipped with wedge-shaped sleeves in different sizes for diverse ear canals, or with a special waxy material that melds to the individual ear canal to enhance wearing comfort. Since this is an experiential evaluation, it is usually raised in the online forum as a kind of feeling.

The dependent variable for this study is the weekly sales of Shure, and data were collected from two main sources: sales and related information from a distributor; and messages posted in a public online discussion forum. Unless sales data are available to the public, researchers cannot easily access real sales figures because private firms generally treat this as sensitive information. However, as the second author of this study was Shure’s Hong Kong distributor from Janurary 2007 to May 2009, he was able to collect the valuable sales data for this period covering 126 weeks. Apart from normal business, on some occasions a special single transaction dramatically increased sales. As this study focuses on sales from local retail stores, business transactions that did not relate to local retailing were excluded. For example, a special transaction worth HK$41,580 from an acoustic project in July 2007 was excluded. In addition,

marketing costs, that is, the marketing expenditure to promote Shure using traditional public media (e.g. in a hi-fi magazine), was also collected. This was extracted from the marketing department of the distributor and accounted for the expenditure to promote all Shure's earphones on a weekly basis. The number of retail stores, which indicates channel intensity, was also tracked on a weekly basis. This number was deduced from those retail stores that kept placing orders without returning Shure earphones to the distributor. Lastly, the fault rate of Shure earphones was included as a control on its sales, expressed as the ratio of defective units to total unit sold per week (Maynes, 1976). Table 1 shows the descriptive statistics of these variables. As usual, marketing expenditure was around 8.6% of sales. In particular, the fault rate was quite high at around 27%. This reflects the sophisticated nature of the Shure brand.

INSERT TABLE 1 HERE

Mingo, an online forum for studying eWOM

Online forums, which act as interactive platforms to facilitate informational and social connection among fellow consumers, evoke greater empathy and motivation from consumers than does the official information from marketers (Chiou and Cheng, 2003; Bickart and Schindler, 2001). Some online forums have reputation mechanisms on their recommendations or product ratings (e.g., Yahoo's movie comments and Open Rice www.openrice.com in Hong Kong), which is updated regularly. Rather than merely listing the product ratings, most online forums provide collaborative discussion and experiential feelings about the products. These conversations contain fine-grained product information that provides evidence for the numerical ratings. Online forums, therefore, are more pertinent to potential consumers and a good platform for exploring eWOM (Trusov et al., 2009; Bickart and Schindler, 2001).

The market for professional earphone has been expanding in Hong Kong since 2005 (GFK, 2009). With a growing number of customers in the marketplace and a large number of sales channels, professional earphones, which are both an experiential and technically sophisticated products, trigger rich discussion and information sharing traffic in the online forum. In particular, we are interested in the discussion of professional earphones in the online forum Mingo (www.mingo-hmw.com/forum), which

was launched in December 2003, and is the *only* website offering a discussion platform covering the entire topic of headphones, earphones, and related matters. Mingo was the most popular and virtually the *sole* platform for sharing headphone and earphone information in Hong Kong from 2004 to 2009. By being the sole online forum, Mingo approximates a laboratory setting for studying the influence of eWOM on the sales of Shure products during this period.

Mingo publishes consumer product reviews and hosts forums and message boards to allow fellow consumers to interact by viewing and replying to each other's opinions. The forum is a specific discussion board that attracts music lovers to share their common interest in professional earphones. Exploring the content of this particular forum provides us with a true picture of product performance in terms of utilitarian and hedonic perspectives.

The member pool was sufficiently large with more than 26,000 unique registered members. Using Mingo, consumers could reduce the effort of searching for external advice (Lynch and Ariely, 2000). Moreover, the registration policy of Mingo only accepts participants with Internet domains from the twelve major Hong Kong Internet service providers (e.g., PCCW, HKBN, and HGC), and users with popular email accounts such as Hotmail, Gmail, and Yahoo Mail are not accepted. This strategy prevents members from participating under several pseudonyms to manipulate messages in favour of personal benefits or act in the interests of corporations. This policy ensures that the messages delivered in Mingo are perceived as highly reliable. In summary, Mingo (www.mingo-hmw.com/forum) is the most suitable for our research purpose because of its popularity and uniqueness in this niche market.

Data collection in Mingo

The structure of Mingo is well organized. Posts are well placed with spacious row-to-row margins and indexed sequentially by date. It is easy to track past posts by searching and browsing in the online forum. Nevertheless, it is difficult to capture the meaning of the posts. Nowadays, computer software translation still has a number of limitations and problems, including decontextualization, designer imposed bias, poor usability, and inefficiency (Rettie et al., 2008). Moreover, the popularity of various unique emoticons and abbreviations, which are to an extent specific to the Hong Kong context, to

express the author's mood makes accurate software interpretation nearly impossible. We therefore annotated and coded the forum posts manually. The process of annotating eWOM messages is tedious, time-consuming, and laborious, especially when the messages are contextual (Miles and Huberman, 1994; Hong, 1984). To ensure the accuracy of the data collected, we employ multiple annotators to increase the reliability and validity of coding (Vargo et al., 2003). To interpret posts in the online forum precisely, the annotators put great effort into recording message composition, interaction, and meaning (Kozinets et al, 2010). The steps involved in this process are outlined below.

From January 2007 to May 2009, there were 68,253 posts over the 29-months covering all earphone brands on the topic "Earphone and Portable Headphones" in Mingo. By verbal consent between the second author who owns the Shure distributor and the host of Mingo, the data collected from the discussion posts were used purely for research purpose and individual identities were kept confidential. There were around 543.1 weekly posts in the online forum covering around 20.9 web pages. Thirty-nine percent (26,669/68,253) of the posts focused on the top five brands: 10,163 posts related to Shure, 5,211 to Sennheiser, 4,889 to Ultimate Ear, 3,751 to Audio-technica and 2,655 to AKG. Only 203 posts related to multiple brands and these were omitted from this study. We also discarded duplicate posts that were reposted without much additional information. For the data coding, an experienced researcher first captured the posting identity and date of the 10,163 Shure posts on an Excel spreadsheet. It took a whole month to scan the posts related to Shure in the online forum. The final template with 10,163 rows labelled with posting identity and date was then passed to the three annotators for coding. Each annotator followed a sequence to code the posts according to their overall comments and specific comments on value for money, technical sophistication of sound quality, and experiential feeling of wearing comfort.

During the coding process, each annotator used two computers side by side. One computer display the coding template and the other displayed the forum posts. Annotators could systematically interpret posts according to the sequence in the coding template. In this way, human errors could be minimized because the annotator was reminded to fill in the coding of the post according to its sequence.

To ensure the reliability of interpretation, knowledge of professional earphones was important among the annotators evaluating the posts (McDowell and Acklin, 1996). The three annotators, who were university graduates, were trained by an industrial expert before their actual coding. The first 1,000 posts were used for training the annotators. These posts were later re-interpreted individually when the annotators were used to the coding process.

For each post, three annotators carried out the coding individually according to its comments on value for money, technical sophistication of sound quality, and experiential feeling of wearing comfort. Value for money relates to the perception of product discounts, price comparison with other brands, and price-quality performance. Technical sophistication of sound quality reflects objective judgments of sound performance. Experiential feelings of wearing comfort involve about the after-use evaluation of whether the earphone fit their ears comfortably when worn for extensive periods. For each aspect, a "1", "0", or "-1" was assigned if the comment was favourable, mixed, or unfavourable respectively. If a post addressed only on one aspect (e.g., value for money), that aspect and the overall perception were evaluated, while the remaining aspects (i.e. technical sophistication of sound quality and experiential feeling of wearing comfort) were assigned a "9" meaning irrelevant. Furthermore, if a post discussed other aspects rather than technical sophistication of sound quality, experiential feeling of wearing comfort, or value for money, only the overall perception was assessed and the three key dimensions were assigned a "9".

Similar to the procedures of prior studies (Liu, 2006; Eliashberg and Shugan, 1997), each post was assigned an overall value: positive "1", negative "-1", and mixed "0". A post was classified as either positive or negative if there was a directional recommendation to a product. A message was classified as mixed if the post contained both positive and negative opinions for different .aspects. However, posts coded "0" were not common.

According to our records, only 983 of 10,163 posts related to other aspects such as experiential feeling of sound quality, service quality of the store, or quality of accessories, with each aspect gaining

less than 100 posts. Hence, only the three essential attributes, namely technical sophistication of sound quality, experiential feeling of wearing comfort, and value for money are assessed in this study.

Illustrations of the coding of product attributes include the following. “The SE530 is very expensive, but I like its sound quality. Thus I shall buy it.” The product “SE530” is a model of Shure’s earphones. As this post contains multiple evaluations, the value for money was coded “-1”, sound quality “1”, and overall perception “1”. Another post stated: “I am satisfied with the high pitch domain of SE530 but not with its bass.” As this post carried two opposing evaluations of sound quality, this aspect was coded “0”. Posts coded “0” were rather vague as they carry no clear preference. Moreover, if a post addressed only one aspect (e.g., value for money), this aspect and the overall perception were evaluated while the remaining aspects (i.e. sound quality and wearing comfort) were coded “9” as irrelevant. Furthermore, if a post discussed aspects other than sound quality, wearing comfort, and value for money, only the overall perception was assessed and the three key dimensions was coded “9”. In general, the meaning of a post rather than its length was evaluated. Even though a post attempts to elaborate how sophisticated on the technologies related to the sound quality of an earphone in a lengthy manner, we still regard this post as other shorter post with positive comment on sound quality. We will assign “1” on the comment on sound quality without much additional weighting. This is a limitation in this annotation process. However, posts with a single word such as “ok,” which were ambiguous regarding the aspect being evaluated, were omitted from the evaluation.

Each annotator had to code 10,163 posts independently. In total, the entire process took 95 days to complete including the drafting of the coding template and the detailed coding of all Shure related posts. Following the recommendations of Shrout and Fleiss (1979), inter-annotator reliability was assessed by the average absolute agreement of the intraclass correlation coefficient (ICC) in a two-way random-mixed model (McGraw and Wong, 1996). The ICCs for the coding of the 10,163 posts by the three annotators on overall rating, value for money, technical sophistication of sound quality, and experiential feeling of wearing comfort were found to be 0.594 (95% Confidence Interval [CI]: .468, .683), 0.631

(95% CI: .511, .705), 0.531 (95% CI, .428, .612), and 0.552 (95% CI, .405, .598) respectively. Fleiss (1986) considered the level of agreement as fair to good when the ICC was between 0.40 and 0.75.

Consistent with the procedures of Liu (2006), the mechanism of majority rule on inter-annotator agreement was adopted. If three annotators assigned different values for a post, the post was discarded. If two annotators had the same interpretation on a post, the post was retained for subsequent analyses in which all three annotators managed to reach a consensus on coding on the post. As a result, 8,156 posts that were coded consensually by the three annotators, which resulted in an agreement level of 80.25%. For clarity, Figure 2 captures the flowchart of the data collection process in this study.

INSERT FIGURE 2 HERE

Analyses and findings

Following prior eWOM studies for controlling the skewness and heteroscedasticity of variables, we took the logarithmic value of the number of posts (Liu, 2006; Elberse and Eliashberg, 2003). As suggested by Liu (2006), Basuroy et al. (2003) and Eliashberg and Shugan (1997), we took the arithmetic ratio of the number of positive (negative) posts to the total number of posts within a week to deduce the variable for the overall positive (negative) posts in a week. An alternative approach to deduce the variable is to take the actual number (i.e. the number of positive (negative) posts in a week) instead of the arithmetic ratio. However, this approach can not clearly distinguish the effect of the number of posts from those of its components – the number of positive and negative posts in a week. Our preliminary regression model using actual numbers (instead of ratios) for positive (negative) posts in a week also showed an unacceptable variance inflation factor indicating high collinearity. Therefore, the variables of positive (negative) posts in a week was deduced from the proportion of positive (negative) posts among the total number of posts in the week.

Similar ratios with respect to the positive (negative) number of posts in a week were deduced for the variables of value for money, technical sophistication of sound quality, and experiential feeling of wearing comfort. That is, the ratio of positive posts on price value is deduced by taking the ratio of

number of positive posts of value for money in a week to the number of positive posts in that week. This is an indication of the dominance of value for money with respect to the overall evaluation within the positive comments.

To analyze the cumulative influence of eWOM on product sales, the lagged terms with one and two week delays of the positive (negative) posts ratio on value for money, technical sophistication of sound quality, and experiential feeling of wearing comfort were taken into account. After removing the first two weeks' data, which could not be analyzed for delayed effects, 124 instead of 126 weeks of data were used for the regression analyses.

INSERT TABLE 2 HERE

As shown in Table 2, product sales reflect a relatively high correlation with five major variables: marketing expenditure (.330**), positive post ratio (.399**), negative post ratio (-.663**), value for money (+ve post ratio) (.315**), and sound quality (+ve post ratio) (.241**). These show a close connection between product sales and both posts as well as marketing expenditure. Most variables show low correlations with each other. In the subsequent regression analysis, their Variance of Inflation Factor (VIF) does not exceed 10.0 and the tolerance values show that in no case does collinearity explain more than 10% of any variance in product sales.

Product sales often result from traditional marketing promotions, channel intensity, and product quality (Hoch and Ha, 1986; Deighton, 1984; Gorn and Weinberg, 1984). In this regard, model 1 followed the traditional framework, which comprises the basic business elements as three independent variables: marketing expenditure, number of retail stores and fault rate. In model 2, four independent variables were added: log(number of posts in a week), positive post ratio and negative post ratio. In model 3, three pairs of positive and negative post ratios related to the product attributes were included: value for money (+/- ve post ratios), technical sophistication of sound quality (+/- ve post ratios) and experiential feeling of wearing comfort (+/- ve post ratios). In models 4 and 5, the earlier one and two week post ratios for the product attributes were considered. This approach as shown in Table 3 reflects

the influence of both traditional marketing factors and eWOM on product sales. From all five models, we observe that the significant variables remain significant and the insignificant variables remain insignificant. Hence, the influences of those significant variables on sales are confirmed across different regression models. Moreover, we can observe the change in R square and identify how much increase of the sales variance is explained by the additional variables.

INSERT TABLE 3 HERE

To ensure that the regression result is robust, we shifted the time period of the product sales so that it was away from its influencing factors by one to five week delay, as suggested by the *robustness check* of Goh et al. (2011). That is, instead of using the marketing expenditure of current week, we tested the effect of marketing expenditure with n weeks' delay on the product sales, where n was 1 to 5. Accordingly, the marketing expenditure of last week may have less or no impact on the product sales of current week. Moreover, the impact of marketing expenditure of the last two week on product sales should be further diminished. Similarly, the other influences were also shifted by n weeks to test their delay effect. In this arrangement, each regression model is to test the delay effect of the influencing factors on the product sales of current week. If our model is robust, the delay effects of those influencing factors are not relevant.

Table 4 shows that most of the influences were not significant after an extensive time delay and that those were significant were not very consistent. As shown in Table 2, the average number of posts in a week was around 260.9 and covered 10 web pages in the online forum. Thus, unless people are highly involved, they will not be interested in reading more than 2 weeks' posts or 20 web pages. This is why explained variances from those of delayed influences are greatly reduced compared with that in Table 4. Hence, this supports the robustness of the results in Table 3 that product sales of a brand are influenced mainly by current marketing expenditure, number of retail stores, fault rate and online posts within the most recent week.

INSERT TABLE 4 HERE

Taking all independent variables into account, the regression results are shown in Table 3. This shows that two out of the three traditional factors (marketing expenditure and fault rate) are significant and support H5a and H5b. Nevertheless, the number of retail stores did not significantly affect the sales of Shure, and H5c is not supported. This is because that number of retail stores remained almost constant compared with sales. Hence, the effect of channel intensity is not reflected in this study. Concerning the influence of eWOM, the log(number of posts in a week) is statistically significant and thus provides support for H1. We also found both the positive and the negative post ratios statistically significant. Hence hypothesis H2 is supported. Positive posts tend to bring more business while negative posts decrease product sales (Chen et al., 2004). This study attempts to extend previous studies (Duan et al. 2008; Liu, 2006) by conceptualizing eWOM based on information cues (e.g., value for money, product sophistication) and examine the influence of these cues on product sales. Our analyses indicate that value for money (+/- ve post ratios) and technical sophistication of sound quality (+ve post ratio) significantly influenced product sales, whereas the technical sophistication of sound quality (-ve post ratio) and the experiential feeling of wearing comfort (+/- ve post ratios) had no significant influence. These results support H3a, partially support H3b, and do not support H3c. For information recency, the numbers of posts related to positive value for money and positive comments on the technical sophistication of sound quality in an earlier week are proven to significantly affect weekly product sales. Hence H4 is partially supported.

In terms of explanatory power, the traditional factors explain around 23.6% of product sales. In addition, the volume of posts and the positive (negative) post ratio raised the R^2 by 23.6% to 55.0%. Furthermore, inclusion of the positive (negative) post ratio for product attributes boosted the R^2 to 67.9%. Finally including the cumulative posts for the prior two weeks raised the explained variance to 73.2%, which is highly accurate. Hence, we state that the influence of eWOM explain 50% of variance in sales. A similar magnitude of R^2 for explaining product sales or ranking was also found in studies such as Gu et al., (2012), Chen, Fay and Wang (2011), Chen, Wang and Xie (2011), and Liu (2006).

Discussion

Prior studies of eWOM volume, have established that a high volume of eWOM always benefits sales (Khare et al., 2011; Chevalier and Mayzlin, 2006; Liu, 2006; Basuroy et al., 2003). Our study also shows that product sales are strongly influenced by the volume of forum discussions, which induce awareness.

Positive posts increase the preferences of eWOM seekers (Duan et al., 2008; Chevalier and Mayzlin, 2006; Basuroy et al., 2003), and not surprisingly, rumours or negative posts harm product evaluations and reduce the likelihood of purchases and sales (Huang and Chen, 2006). In this study, consumers could spend US$100 or more to purchase a set of earphones; therefore, needed to reduce their risk by ensuring they understood the benefits of the product. They were willing to listen to both positive and negative comments from fellow consumers. Among three essential concerns, this study shows that both positive and negative post ratios on value for money were significant and that value for money was the dominant information cue influencing consumer intention. Moreover, sales of Shure were affected by positive posts relating to the technical sophistication of sound quality.

Our findings also show that earlier posts in the past week influenced product sales, partially supporting H4. This was due to the nature of professional earphones, which are expensive, technical sophisticated, and experiential products. With around 260.9 posts per week, as indicated in Table 1, customers sought a lot of information including posts from the prior week before making a purchase decision (Beaudoin, 2008; Park and Kim, 2008; Charters and Pettigrew, 2006). In particular, a consumer might want to compare the value for money and technical sophistication of sound quality of the professional earphones with other models. These details in earlier posts had a significant influence on product sales.

Nevertheless, posts from more than two weeks did not affect the product sales of Shure. Only recent information from the current and previous week were important for making a purchase decision. This is consistent with the findings of Westerman et al. (2014) that the recency of tweets affects source credibility. Since consumers have limited cognitive capability and time, they attempt to skip outdated information. Pavlou and Dimoka (2006) also suggested that consumers hardly view online opinions (e.g., eBay's consumer feedback) beyond the first two web pages. Even when consumers find a thread

interesting, they tend to read just enough (but not all) posts to acquire sufficient information to resolve their hesitation and queries.

Theoretical implications

This study introduces the consideration sets model from an information processing approach to explain how eWOM helps in the selection process. Prior studies have discussed the dynamic formation of consideration sets (Hauser and Wernerfelt, 1990; Bettman, 1979). The duration taken to formulate a purchase decision in a multistage process (i.e. awareness, consideration, and choice) depends heavily on context specific and personal preferences (Putsis and Srinivasan, 1994). Nevertheless, the issue appears to vary in the Internet setting. This is because eWOM reduces the cost and time of information-seeking (Zhang et al., 2010). Although information seeking and gathering are just a few mouse-clicks away, in complex situations, such as the purchase of professional earphones, or a professional digital camera, posts relating to the three-mental steps in the consideration sets model, which are considered simultaneously in our brain (awareness based on the number of posts; consideration based on positive (negative) posts and choice set based on positive (negative) posts about product attributes) are mostly shown to have significant effects on the product sales of a brand. In particular, our findings show that both technical sophistication of sound quality and value for money influence the sales of a professional earphone brand. Hence, the product review content of online posts is a valid influence on the choice and purchase of a product. In terms of information recency, online posts from the current and prior week are found to be influential. Moreover, these posts explain a large percentage of the variance, and thus our model, which elaborates on the content of posts, gives a holistic view of the influence of eWOM.

Managerial implications

This study has important practical implications for marketing managers dealing with the breathtaking speed of the Internet environment, and provides several practical insights to help market practitioners understand the ever-changing consumer behavior in the cyber world.

First, the study demonstrates that eWOM exerts an influence on product sales. Traditional marketing methodology promotes products via unilateral spending on advertisements in magazines and on TV or

by organizing seminars in the ordinary mass media, a rather single-sided push methodology to consumers. There is no certainty that the messages can be delivered to the targets precisely or that true customer feedback can be obtained instantly. Given that Internet technology cannibalizes consumer attention by converting consumers from passive receivers of promotional information to active participants sharing opinions online, marketers have to contemplate converting their marketing expenditure from traditional print advertisements to interactive "conversations" with their customers via online media, such as online forums. Marketers should encourage highly involved and experienced fellow consumers to share their usage experiences in support of their brands.

Marketers need to develop a unique strategic response and make better use of consumer-generated information. They may need to elicit salient product dimensions as key determinants that are industry-specific and of greatest concern to consumers. In this study, value for money was always a consumer topic in the forum. In fact, some consumers do not mind paying more to acquire a desired product, but marketers need to help them recognize the value they are paying for.

Third, this study has empirically illustrated the time effect of eWOM on product sales. Our findings have practical value in that managers can observe the time frame for forecasting product sales and better control inventory levels. If more positive feedback is generated, marketers can request retailers to stock higher quantities to meet the potential pending demand.

Limitations and potential extensions

While our proposed model enhances the eWOM application and explanations of eWOM, it has numerous limitations. First, as this study focused on only a single online forum, our findings are restricted to online users who chose to post in this forum. This may limit the generalizability of the results to virtual communities or similar virtual context. Second, this work was based in Hong Kong. Third, this study focused on a professional headphone brand that has sophisticated, experiential, and experience products. Hence fellow consumers were highly concentrated in just a few online forums to share their experiences and views. Our results may therefore not be applicable to mass products where consumers are spread across diverse public forums.

Nevertheless, this research on eWOM can be extended in the following ways. First, only one online forum Mingo, the sole online forum for professional earphones during the data collection period, was captured in this study. Nowadays, a variety of communities prevail in virtual space, such as weblogs, Twitter, YouTube, and Facebook, and these online groups serve as a persistent and traceable source of messages. It would be interesting to investigate how these multiple online platforms affect product sales. In this vein, there are few studies that capture the emotion-bearing patterns with multi-lingual sentiment analysis, which would speed up the annotation of the posts (e.g. Lloret et al., 2015; Argueta and Chen, 2014).

In an online community, it is assumed that users stay together so that they can collectively share and solve each other's problems (Preece, 2000). However, most participants only read messages but never contribute. Lurkers, who read others' posts without participating in communication (Schlosser, 2005), are reported as to make up over 90 percent of some online communities (Nonnecke and Preece, 2000). Studying the effects of eWOM on lurkers' purchase decisions provides a potential research track.

Third, from the perspective of innovation diffusion, opinion leaders who informally influence other people's attitudes or overt behavior in a desired way (Roger, 2003) significantly affect fellow adopters (Hazeldine and Miles, 2010). Some studies have researched opinion leaders via surveys based on subjective perceptions (Hazeldine and Miles, 2010; Lyons, 2006). Our study can be extended by examining the influence of such opinion leaders in online forums.

In conclusion, our findings show that consumers rely on current electronic word of mouth (with at most a one-week delay) for their purchase decisions. If marketers can grasp this dynamics appropriately, they may interact with consumers and tackle potential problems with prompt and relevant actions thus improving sales. Theoretically, this study advances the literature by addressing the effects of eWOM on product attributes based on a systematic annotation process. In our findings, eWOM substantially explains the variance in product sales. Hence, the content of eWOM is more influential than the online ratings. Moreover, our model indicates that product sales are significantly influenced by the volume of posts and the ratios of positive or negative comments on different product attributes. This validates the

consideration sets model, in which the purchase decision is based on the mental processes of awareness, considerations and choice.

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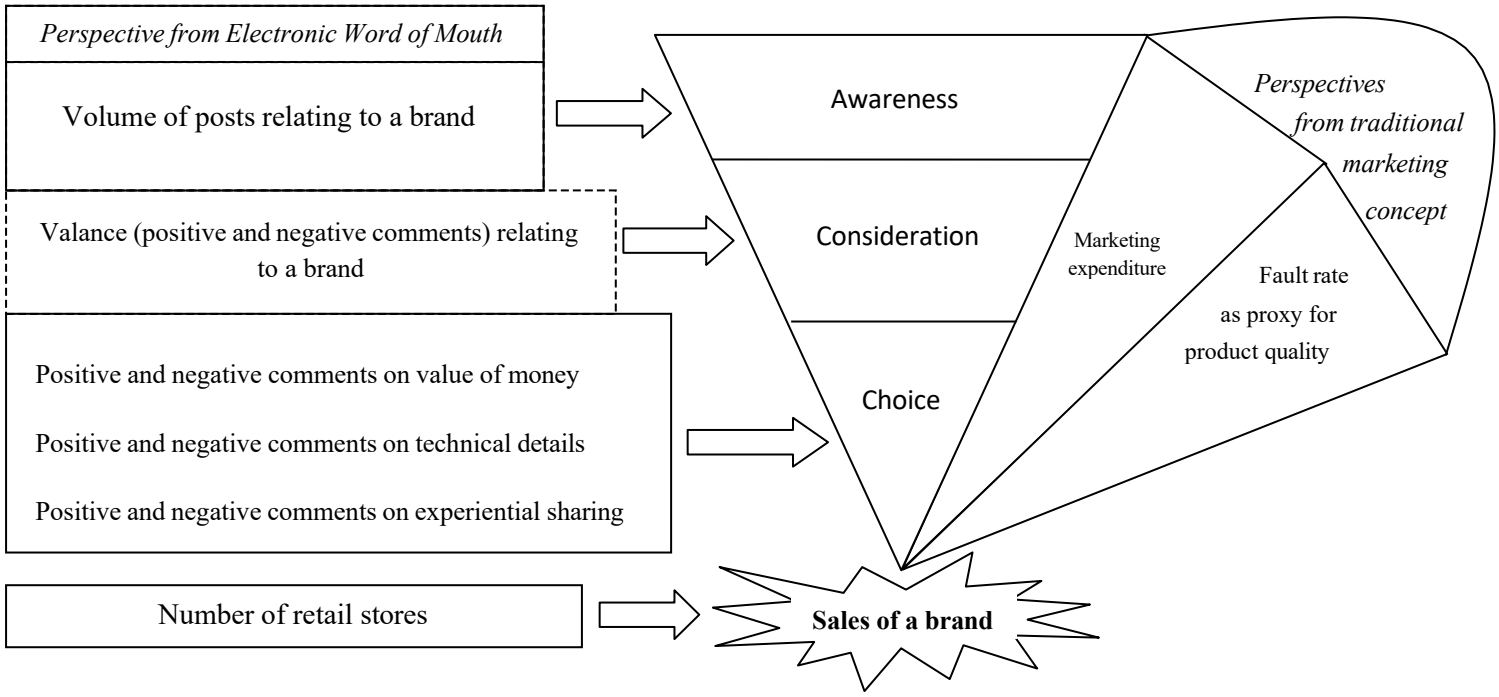

Figure 1: Conceptual framework of the influence of eWOM on sales of a brand

1. Collect data from Mingo – an online forum
   1.1. Each annotator working independently, evaluate 10,163 posts, which are related to Shure within the period from January 2007 to May 2009.

        For each post
            Evaluate the post on whether it has positive, neutral or negative comments on value for money
            Evaluate the post on whether it has positive, neutral or negative comments on sound quality
            Evaluate the post on whether it has positive, neutral or negative comments on wearing comfort
            Evaluate the post on whether it has positive, neutral or negative comments as a whole
        Next post

   1.2. If the evaluations of a post among all annotator are consistent, then keep its results
   1.3. Accumulate the evaluation in a weekly basis.
2. Collect data from the Shure distributor on the following variables within the period from January 2007 to May 2009.
   2.1. Weekly sales,
   2.2. Weekly marketing expenditure,
   2.3. Weekly average number of stores,
   2.4. weekly fault rate

Figure 2: flowchart of data collection

Table 1: Descriptive Statistics of the market situation in selling Shure

	Mean	Standard deviation
Weekly sales amount	US$ 12794.9	US$ 8082.9
Weekly marketing expenditure	US$1103.0	US$1557.8
Number of retail stores	119.5	15.4
Weekly fault rate	0.2704	0.2923
Number of posts in a week	260.9	110.2
Number of positive posts in a week	99.8	63.2
Number of neutral posts in a week	107.8	64.2
Number of negative posts in a week	53.3	37.9
Number of positive posts on value for money in a week	35.6	24.6
Number of neutral posts on value for money in a week	34.6	21.9
Number of negative posts on value for money in a week	18.3	14.9
Number of positive posts on sound quality in a week	36.0	22.2
Number of neutral posts on sound quality in a week	38.3	21.9
Number of negative posts on sound quality in a week	16.1	10.8
Number of positive posts on wearing comfort in a week	8.0	6.4
Number of neutral posts on wearing comfort in a week	3.7	7.3
Number of negative posts on wearing comfort in a week	11.7	8.5

Table 2: Pearson correlations of traditional factors, eWOM factors and product sales.

	1	2	3	4	5	6	7	8	9	10	11	12
1) Sales amount												
2) Marketing expenditure	.330**											
3) Number of retail stores	.143	.091										
4) fault rate	.136	.198*	.643**									
5) log(number of posts)	.093	.045	-.438**	-.322**								
6) Positive post ratio	.399**	.149	.291**	.505**	-.376**							
7) Negative post ratio	-.663**	-.268**	-.142	-.074	.019	-.346**						
8) ratio on positive posts of value for money	.315**	.147	.064	-.093	-.062	-.230*	-.240**					
9) ratio on negative posts of value for money	-.183*	-.024	-.115	-.260**	-.132	-.210*	-.221*	.085				
10) ratio on positive posts of sound quality	.241**	.049	.107	-.082	.202*	-.381**	-.172	.287**	-.109			
11) ratio on negative posts of sound quality	.123	-.103	.004	-.075	-.064	.078	-.457**	-.048	.358**	.114		
12) ratio on positive posts of wearing comfort	.107	-.009	-.148	.190*	.029	.187*	.152	.099	.084	.143	-.076	
13) ratio on negative posts of wearing comfort	.138	.005	-.168	270**	-.085	.004	.222*	.186*	.425**	.014	.418**	.091

* p<.05; ** p < .01; *** p < .001

Table 3: Regression Analyses[1]

	Model 1	Model 2	Model 3	Model 4	Model 5
Traditional Factors					
Marketing expenditure	**.297*****	**.137***	**.092**$^{\#}$	**.137***	**.127***
Number of retail stores	.141	.094	-.015	-.051	-.074
Fault rate	**-.340*****	**-.148***	**-.115***	**-.152****	**-.160****
Effects of posts					
log(No. of posts in a week)		**.225****	**.180****	**.195****	**.171***
Positive post ratio		**.274*****	**.395*****	**.492*****	**.483*****
Negative post ratio		**-.467*****	**-.414*****	**-.314*****	**-.325*****
Effects of posts related to product attributes					
Value for money (+ve post ratio)			**.243*****	**.235*****	**.222*****
Value for money (-ve post ratio)			**-.150***	**-.150***	**-.145***
Sound quality (+ve post ratio)			**.199****	**.193****	**.203****
Sound quality (-ve post ratio)			-.052	-.026	-.026
Wearing comfort (+ve post ratio)			-.059	-.057	-.068
Wearing comfort (-ve post ratio)			-.006	.010	-.001
Effect of earlier posts					
Value for money (+ve post ratio at one week earlier)				.036	.019
Value for money (-ve post ratio at one week earlier)				.038	.038
Sound quality (+ve post ratio at one week earlier)				**.204****	**.209****
Sound quality (-ve post ratio at one week earlier)				**-.139***	**-.136***
Wearing comfort (+ve post ratio at one week earlier)				-.079	-.081
Wearing comfort (-ve post ratio at one week earlier)				.095	.097
Value for money (+ve post ratio at two weeks earlier)					.059
Value for money (-ve post ratio at two weeks earlier)					.018
Sound quality (+ve post ratio at two weeks earlier)					-.008
Sound quality (-ve post ratio at two weeks earlier)					-.055
Wearing comfort (+ve post ratio at two weeks earlier)					-.031
Wearing comfort (-ve post ratio at two weeks earlier)					-.033
Model Information					
R^2	.236	.550	.679	.724	.732
Change in R^2		.314	.129	.045	.008

[1] Significant coefficients are in bold face $^{\#}$ for $p < .1$, * for $p < .05$, ** for $p < .01$ and *** for $p < .001$.

Table 4: Robustness check (influences from 1 to 5 weeks earlier)

	n=1	n=2	n=3	n=4	n=5
Traditional Factors					
Marketing expenditure (n weeks earlier)	**.237***	.143	**.240***	**.258****	-.016
Number of retail stores (n weeks earlier)	-.228	**-.285***	-.180	-.199	.024
Fault rate (n weeks earlier)	.035	-.102	-.122	-.042	.163
Effects of posts					
log(No. of posts in a week) (n weeks earlier)	-.241	-.169	**-.271***	-.165	.039
Positive post ratio (n weeks earlier)	.004	.051	-.236	-.142	-.033
Negative post ratio (n weeks earlier)	-.091	-.230	-.056	.264	-.132
Effects of posts related to product attributes					
Value for money (+ve post ratio) (n weeks earlier)	0.17	-.011	-.124	.001	-.008
Value for money (-ve post ratio) (n weeks earlier)	.051	-.026	.012	**-.294***	-.040
Sound quality (+ve post ratio) (n weeks earlier)	.211	.188	.075	-.059	.032
Sound quality (-ve post ratio) (n weeks earlier)	-.067	-.094	.156	.231	.113
Wearing comfort (+ve post ratio) (n weeks earlier)	.048	-.097	.001	.037	.217
Wearing comfort (-ve post ratio) (n weeks earlier)	.125	-.210	-.101	**-.238***	-.108
Effect of earlier posts					
Value for money (+ve post ratio at n+1 week earlier)	.019	-.052	.097	-.037	.124
Value for money (-ve post ratio at n+1 week earlier)	-.098	.051	**-.245***	-.085	-.118
Sound quality (+ve post ratio at n+1 week earlier)	.130	.115	.012	.053	-.037
Sound quality (-ve post ratio at n+1 week earlier)	-.075	.085	.210	.058	.171
Wearing comfort (+ve post ratio at n+1 week earlier)	-.160	-.022	-.030	.089	.138
Wearing comfort (-ve post ratio at n+1 week earlier)	-.016	.019	-.121	.027	-.070
Value for money (+ve post ratio at n+2 weeks earlier)	**.059**	**.231***	.108	.135	-.074
Value for money (-ve post ratio at n+2weeks earlier)	.061	-.195	-.116	-.141	.000
Sound quality (+ve post ratio at n+2weeks earlier)	.107	-.061	.049	.039	.080
Sound quality (-ve post ratio at n+2weeks earlier)	**.136**	**.259***	.127	.085	-.070
Wearing comfort (+ve post ratio at n+2weeks earlier)	.021	.000	.098	.116	-.036
Wearing comfort (-ve post ratio at n+2weeks earlier)	-.030	-.168	-.047	-.028	.001
Model Information					
R^2	.245	.304	.263	.287	.138

Significant coefficients are in bold face * for $p < .05$.