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Source credibility plays the central route: an elaboration likelihood model exploration in social media environment with demographic profile analysis

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Abstract

Purpose – This study aims at building a framework for the electronic word-of-mouth (eWOM) response under the social media environment. The elaboration likelihood model was adopted to explain how message source credibility and message appeal jointly influence the eWOM response process, while source credibility provides a central route and message appeal plays a peripheral route for information processing.

Design/methodology/approach – This study used a scenario design to test the decision behavior in the Facebook environment through message content manipulation. A convenience sampling method was adopted in this study. We collected 203 valid questionnaires and tested this research model with LISREL 8.8. This study used a two-stage structural equation modeling data analysis method with LISREL 8.8, by which the measurement model was assessed through confirmatory factor analysis for the reliability and validity of the research model, and the causal relationship among factors was assessed through exploratory factor analysis .

Findings – The results showed that 53% variance of eWOM responses could be explained by message source credibility and emotional message appeal from the elaboration likelihood model perspective. Message source credibility plays a central role in the social media environment. The model was further tested with a demographic profile analysis for both gender and age. It is found that a female user is influenced by both source credibility and emotional appeal, but a male user is only influenced by message source credibility. The mature age group is more responsive to eWOM messages.

Research limitations/implications – The sample might not represent all social networking sites (SNS) users. The participants represent a small segment of the Facebook population around the globe. Secondly, this research design could be improved by using more recreational messages to test the effects of message appeal and message source credibility. Thirdly, the mobile phone is a type of physical product rather than an experiential product. Future studies could try to identify the same eWOM determinants with different SNS functions, for example, the inbox message function. Similarly, Facebook users are allowed to use both text and pictures to disseminate promotional messages.

Practical implications – This study provides an insight for SNS administrators regarding the determinants of driving more customer responses toward a message. Message source credibility and message appeal are identified as the antecedents for eWOM responses in SNS. Companies could make use of this finding to improve their marketing communication strategy in SNS. The finding can inform administrators of the importance of

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focusing on both customers' psychological state and message attributes during the dissemination of promotional messages to improve the efficiency of the promotional effort. Companies aimed at receiving different types of eWOM responses in SNS may need to consider other factors for creating their promotional messages.

Originality/value – Previous studies have mainly identified factors influencing eWOM responses from the people-centered variables such as personal traits and social relationships. This study proposes that the eWOM response is a dual information processing process that can be explained by the ELM. When a user processes information in SNS, he follows both the central route and the peripheral route (i.e. source credibility and message appeal) which can influence the eWOM response. It is the first time that the source credibility is investigated as the central route in ELM model.

Keywords Social media, eWOM, Message source credibility, Message appeal, Elaboration likelihood model, Facebook

Paper type Research paper

1. Introduction

The socialization of various internet applications has enabled many traditional customer behaviors to be observed and traced online. Marketing and branding over the social media platforms, such as Twitter (Jansen, Zhang, Sobel, & Chowdury, 2009; Saragih, 2021), Facebook, Microblogs (Li & Shiu, 2012; Zhu & Xu, 2021) and consumer-based virtual communities (Luo, Luo, Schatzberg, & Sia, 2013; Park, Kim, & Kim, 2022; Yeh & Choi, 2011), has piqued mounting attention from both organizations and researchers (De Bruyn & Lilien, 2008; Donthu, Kumar, Pandey, Pandey, & Mishra, 2021; Verma & Yadav, 2021). Word of Mouth (WOM), a traditionally important concept hard to be traced offline, could now be studied extensively as consumer data generated by various social media and technological tools becomes widely available. Electronic WOM (eWOM), which is the communication of product information by customers over the Internet (Hennig-Thurau, Gwinner, Walsh, & Gremler, 2004) mainly through actions such as liking, sharing, and comments, has been found effective in improving customers' knowledge about the firm and its products, leading to the better understanding of the overall value the firm offers, and strengthening customer loyalty (Gruen, Osmonbekov, & Czaplewski, 2006; Torres, Augusto, & Neves, 2022). However, eWOM could also generate negative impacts if not managed properly by the firm (Bae & Kim, 2013; Bambauer-Sachse & Mangold, 2011; Chang & Wu, 2014; Sussan, Gould, & Weisfeld-Spolter, 2006; Talwar, Talwar, Kaur, Islam, & Dhir, 2021). For example, Park and Lee (2009) reported that eWOM is greater in spreading negative effects of products than positive effects and that eWOM has greater effects on experience products than search products. This is congruent with Bambauer-Sachse and Mangold (2011) that the positive brand impression could be diluted through negative eWOM. It has also been empirically reported that positive WOM could enhance the continuous intention to use the mobile wallet (Talwar *et al.*, 2021).

It is thus of paramount importance for firms to manage the eWOM process so that it will usher positive rather than negative impacts to the products as discussed above. It is even more essential to explore how eWOM, as a marketing mechanism, could be further utilized and fathomed by information systems researchers. The literature review also suggested that firms adopt eWOM to fulfill their corporation social responsibility role by engaging not only with customers but also with the general public (Talwar *et al.*, 2021). Prior studies in marketing have investigated factors influencing eWOM response mainly from two perspectives the social relationship direction (Zhang, Liang, & Qi, 2021) and the message direction (Sohn, 2009; Verma & Yadav, 2021). In essence, the social relationship direction treats the motivation of the eWOM spreading process as a dynamic mechanism to strengthen consumers' social ties via an array of theoretical lenses including social relationships (Chu & Kim, 2011; You, He, Chen, & Hu, 2021; Zhang *et al.*, 2021), personal traits (Chen, Chen, Chen, Chen, & Yu, 2013), social network analysis (Sohn, 2009), self-interest, and social benefits, etc. (Hennig-Thurau *et al.*, 2004). Yet another emerging strand of literature sheds light on how

eWOM is influenced by the messages communicated during the eWOM process rather than the human in the process. This direction regards source credibility as an important role in artifacts such as hotel booking reviews (Miao, Kuo, & Lee, 2011), brand attitude (Wu & Wang, 2011), and travel booking preferences (Llamero & Gorman, 2014).

However, it is criticized that there lacks a theoretical framework to explain the cohort of variables such as message source credibility vis-à-vis social media response (Lu, Wu, & Hsiao, 2019). It is proposed that social media response can be explained from the information processing perspective with the elaboration likelihood model. To further advance this line of research and to fill the key void, this study endeavors to answer three research questions in the social media response, including

RQ1. How do users react to the information in the social media environment?

RQ2. If there is a framework to explain user response in the social media environment, what are the main factors to explain this phenomenon?

RQ3. Will these effects be different across different user profile groups?

We conjecture that social media response could be elicited by a central route information processing variable (i.e. message source credibility) and a peripheral route variable (i.e. message appeal). A scenario design for a social network website was conducted and 203 valid questionnaires were collected. The structural equation modeling (SEM) method through LISREL 8.8 was employed to analyze the data. The results showed that the ELM model is effective in explaining the social media response. Both source credibility and source appeal have positive effects leading to social media responses and that message source credibility plays a central role in eliciting social media response.

2. Literature review

2.1 WOM and eWOM

Katz, Lazarsfeld, and Roper (2017) defined traditional word-of-mouth as the exchange of market-related information between users, which influences the attitude and behavior other customers have towards a product and their decisions on the purchase of the product. The main rationale receivers consider WOM as a more credible source of information (Brown & Reingen, 1987; Chu & Kim, 2018; Kunz, Hackworth, Osborne, & High, 2011) lies in the fact that the exchanged messages are not created by the company for the commercial interest but by consumers who have commented and given opinions on the product after experiences. WOM is thus considered more effective than traditional advertising (Bickart & Schindler, 2001; Chu & Kim, 2018; Feick & Price, 1987; Feldman & Spencer, 1965; Goldsmith & Horowitz, 2006). Prior studies have also found that WOM not only influences the input of consumers' information-seeking process about a product but also influences their decisions on product purchasing either through short-term or long-term judgments on products (Bone, 1995), which is regarded as the post-purchase communication (Swan & Oliver, 1989). Furthermore, it is reported that the integration of WOM with the advertising process could significantly change consumers' perceptions of the product (Chu & Kim, 2018; Smith & Vogt, 1995). If properly managed, WOM as a communication process among customers could either enhance or deteriorate the perception of a product or brand by a customer and this effect remains true in the online environment (Bambauer-Sachse & Mangold, 2011).

As such, the expenses of advertising on social networking sites (SNS) are growing (Chu & Kim, 2011) and WOM research has gained mounting attention over the last decade. Proper management of customers' exchange of eWOM in SNS has thus become an important marketing strategy to achieve the business competitive advantages (Bonston Consulting Group, 2016; Coulter & Roggeveen, 2012; Donthu *et al.*, 2021; Kelly, 2007). Chu and Kim (2011)

classified eWOM in SNS into three types, including opinion-seeking, opinion-giving, and opinion-passing. In essence, *Like*, *Share*, and *Comment* are considered a part of the eWOM communication process in SNS platforms such as Facebook. According to Chauhan and Pillai (2013), likes given by users are considered as their appreciation of the content. People tend to share a message on Facebook when it is relevant to the content and would like to spread the information to other friends. Also, people having the intention to share their own opinion towards the content would post comments. José-Cabezudo and Camarero-Izquierdo (2012) have highlighted that message-forwarding action requires message senders' voluntary exposure, given that the action of giving Likes, Shares, and Comments is visible to others.

Given the mushrooming prevalence of social media and virtual communities in recent years, eWOM has piqued increasing attention from scholars in marketing and information systems. Accordingly, the literature indicates that eWOM has an impact on consumers' purchase intention (Godes & Mayzlin, 2004; Gupta & Harris, 2010; Park, Lee, & Han, 2007) and the effect of positive and negative comments on eWOM varies (Park & Lee, 2009; Park *et al.*, 2022; Purnawirawan, Dens, & De Pelsmacker, 2012). Extant studies have found that negative comments for a product can generate more detrimental effects than positive comments during the eWOM processes (Bambauer-Sachse & Mangold, 2011; Chang & Wu, 2014; Lee, Park, & Han, 2008; Nam, Baker, Ahmad, & Goo, 2020; Park & Lee, 2009; Park *et al.*, 2022) and that the effect of eWOM is more effective for established websites and experience products than those without websites and search products (Park & Lee, 2009).

Considering eWOM effects, scholars investigated what factors influence eWOM behavior (i.e. opinion-seeking, opinion-passing, and opinion-giving behaviors). As such, tie strength (Aghakhani, Karimi, & Salehan, 2018; De Bruyn & Lilien, 2008; De Keyzer, Dens, & De Pelsmacker, 2019; Mittal, Huppertz, & Khare, 2008; Tan & Lee, 2018), the role of visuals (Lin, Lu, & Wu, 2012), social cognitive (Cheung & Thadani, 2012), homophily (Brown, Broderick, & Lee, 2007), and source credibility (Cheng, Gu, Hua, & Luo, 2021; De Keyzer *et al.*, 2019; Ohanian, 1990; Pigg & Crank, 2004), have been identified and investigated. These factors, in general, fall into two streams including 1) social dynamic mechanism through strengthening social ties (Aghakhani *et al.*, 2018; Chu & Kim, 2011; De Bruyn & Lilien, 2008; De Keyzer *et al.*, 2019; Mittal *et al.*, 2008; Tan & Lee, 2018), relationship building and personal traits (Chen *et al.*, 2013), and social cognitive (Cheung & Thadani, 2012) and 2) the content of the message where source credibility is a main factor (Cheng *et al.*, 2021; Lu *et al.*, 2019; Luo *et al.*, 2013; Miao *et al.*, 2011; Wu & Wang, 2011).

From the source credibility perspective, consumers not only care about the direction (negative versus positive) of the opinion but also the source of information. Source credibility has been widely reported to have positive effects on eWOM response (Aghakhani *et al.*, 2018; Cheng *et al.*, 2021; Dobele, Toleman, & Beverland, 2005; Miao *et al.*, 2011; Tien, Rivas, & Liao, 2019). For instance, Dobele *et al.* (2005) indicated that a successful eWOM process involves engaging customers with messages from credible sources in a review. Moreover, Wu and Wang (2011) tested the effects of source credibility and appeal on brand attitude in an e-mail forwarding context. They found that source credibility plays a stable role across different user involvement scenarios and that increased consumers' perception of brand quality, in lieu of source appeal, is only significant under higher user involvement scenarios. Miao *et al.* (2011) further tested the effect of source credibility as a mediating variable and found that perceived source credibility will positively influence consumers' intention to book hotels, which is further supported by Aghakhani *et al.* (2018) and Tien *et al.* (2019).

Taking those prior studies together, it is noted that these identified factors for influencing eWOM responses have been from different angles. There lacks a theoretical framework to integrate these factors, especially for source credibility, originally a concept from the Elaboration Likelihood Model (Petty & Cacioppo, 1986).

2.2 Elaboration likelihood model

The Elaboration Likelihood Model (ELM) was proposed by Petty and Cacioppo to explain the inconsistent research results from motivation and persuasion studies. Petty and Cacioppo indicated that motivation and persuasion is a dual process through which people usually adopt a central route in processing messages together with a peripheral route (Petty and Cacioppo, 1984, 1986; Petty, Cacioppo, & Goldman, 1981). The elaboration likelihood describes people's possibility of elaborating on the topic or information. However, people might show low involvement or elaboration likelihood in topics they are not interested in. From the ELM perspective, people's attitudes might be influenced by two routes, a central route involving strong cognitive arguments and a peripheral route involving heuristic cues. Whether a peripheral or a central route is taken is determined by two dimensions of the elaboration likelihood, motivation, and ability to elaborate (Petty & Cacioppo, 1986). The motivation is highly influenced by the personal relevance of the topic and the ability to elaborate is influenced by prior experience with the topic.

ELM has been widely used in the marketing area for the explanation of advertising and mass media persuasion (Bitner & Obermiller, 1985; Cacioppo & Petty, 1984; Cho, 1999; Lord, Lee, & Sauer, 1995). According to the ELM applications, consumers will use their rational and cognitive processing power when they have a high ability to process the message, and vice versa, when their involvement with the product is low they will use the peripheral route to make purchasing decisions (Cho, 1999; Lord *et al.*, 1995). There are several studies discussing the application of ELM on information technology acceptance, especially Bhattacherjee and Sanford (2006) who investigated the acceptance of the document management system in the large public organization. ELM has also been increasingly employed to explain IS artifacts such as user participation in expert system recommendation (Mak, Schmitt, & Lyytinen, 1997), a user agreement with expert system advice (Dijkstra, 1999), knowledge adoption in an accounting firm (Sussman & Siegal, 2003), and adoption of health record system (Angst & Agarwal, 2009). Recently, the ELM theory has been further applied and extended in the social media context to explain customer reviews (Cheung *et al.*, 2009, 2012; Filieri & McLeay, 2014; Putra & Suprapti, 2020). These studies prove that source credibility is treated either as a peripheral cue (Putra & Suprapti, 2020) or a mediation variable between other variables despite that source credibility could be either treated as a central variable or a peripheral variable (Ismagilova, Dwivedi, & Rana, 2021; Petty, Kasmer, Haugtvedt, & Cacioppo, 1987).

2.3 Message source credibility and message appeal

Message source credibility has long been regarded as an important factor in the marketing field (Hovland & Weiss, 1951). Message source credibility refers to the degree of believability the message receiver ascribes to the message sender and the message source sender is like the communicator in the traditional communication process. Thus, the persuasiveness of a message would be enhanced by the positive attitude developed toward the message source's credibility (Hovland & Weiss, 1951). Source credibility could be indicated by the utilitarian value of the message, i.e. the extent to which the message could satisfy message recipients' needs. Internalization of messages is more likely to occur when recipients have a positive attitude toward the credibility of the message (Teng, Khong, Goh, Chong, & Gorman, 2014). Product-related decisions (e.g. product preference) are more likely to be reached when recipients consider the message source to be credible (Eagly & Chaiken, 1993).

It's commonly identified that source credibility consists of two dimensions including expertise and trustworthiness (Pornpitakpan, 2004). Source expertise is defined as the perceived competence the message sender has on a particular knowledge area, especially those related to products or services (Gotlieb & Sarel, 1991). Source expertise could be manifested through one's status, for example, occupation and social experience (Schiffman & Wisenblit, 2014). As mentioned previously, eWOM is important in reducing the risk involved

before product purchase (Gershoff & Johar, 2006; Still, Barnes, & Kooyman, 1984). Experience sharing provided by experts is considered credible and reliable to mitigate purchasing risk (Wangenheim & Bayon, 2004). Trustworthiness, on the other hand, is defined as the extent that a message receiver accepts and is confident in the message sender (Ohanian, 1990). If a message sender is trustworthy, others are more likely to internalize his suggestions (Moorman, Deshpande, & Zaltman, 1993), as the suggestions are considered to have less bias or compensation (Schiffman & Wisenblit, 2014). It was suggested that a message from a source of stronger ties is more influential in terms of trustworthiness (De Bruyn & Lilien, 2008). It has also been reported that messages from Facebook users are regarded as trustworthy (McLaughlin, 2016). With the recent movement toward social media influencers, it is found that trustworthiness is improved with friends and social media influencers (Wellman, 2023). In this research, we adopted the trustworthiness dimension of the source credibility because it is more relevant to social networking website users.

In addition, message appeal refers to the attractiveness of the content of the message. It consists of rational appeal and emotional appeal (Kotler, 2009) dimensions. While rational appeal refers to the factual or beneficial information provided by the message, emotional appeal refers to the emotional side elicited by the message. Previous studies have found that both rational appeal and emotional appeal have persuasive effects on consumer buying decision making but rational appeal plays a more important role when product involvement is high (Flora & Maibach, 1990; Holmes & Crocker, 1987; Wu & Wang, 2011). The alignment of message type and the customer needs plays a crucial role in the consequence of eWOM messages (Kotler, 2009). Messages focusing more on the customer's emotions are more effective in increasing awareness or attention from people (Baker & Churchill, 1977) and public service announcements (Flora & Maibach, 1990). Recently, the message appeal is more relevant to images designed on the website because images are regularly regarded as attracting more attention from customers (Cyr, Head, Lim, & Stibe, 2018).

3. Conceptual framework and hypothesis development

In this study, we propose that the eWOM response is a dual information processing process that could be properly explained by the ELM theory in that those responses are influenced by

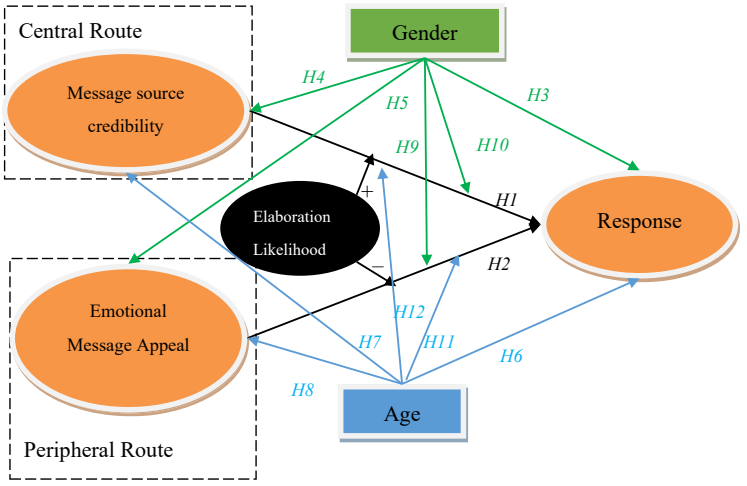

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Figure 1. Proposed conceptual model

the trustworthy dimension of message source credibility and emotional message appeal, as depicted in Figure 1. We choose the trustworthy dimension and the emotional message appeal because the main purpose for people to stay in a SNS environment is to build relationships and most people on their friend lists are people in their real lives. We infer that the expertise dimension of the source credibility is not as salient as the trustworthiness dimension. For the message appeal dimension, it has also been found that emotional appeal messages such as coupons and discounts are more significant in eliciting recipients to give a Like (Vorvoreanu, 2009). Meanwhile, when individuals are not actively requesting an advertising message, they have low involvement either toward the product or the message as they are passively receiving the promotional messages (Maclnnis & Jaworski, 1989). As the literature supports that emotional/recreational appeal messages are more effective in persuading people to be interested in the product (Holmes & Crocker, 1987), we choose emotional appeal as the conceptual factor to investigate the effectiveness of message design. When the elaboration likelihood of the information is high, users would rely on the message source route to process the information; when the elaboration likelihood of the information is low, users would rely on the peripheral route to process the information and respond accordingly. As it has been proposed that source credibility could play either a central role or the peripheral role (Petty & Cacioppo, 1986), previous studies neglected the central role source credibility might play. In this study, message source credibility is proposed to be a central route variable rather than a peripheral variable. We hereby argue that the message source in the SNS comes from friends and acquaintances and users know those friends which would lead to the high elaboration ability for the message source. Meanwhile, gender and age as profile variables are tested on each factor, and the multiple-group analysis is conducted to examine the strengths of the relationships in different profile groups.

3.1 ELM variables on WOM response

With social networks in the friend list, SNS users could spread their messages to anyone. In the case of email, the message forwarding mechanism is under a relatively private condition. In contrast, SNS allows the message forwarding action to be broadcast to different people, even to those that the users do not intend to send due to the high visibility of their action in SNS. Interactions among friends could be observed in the Newsfeed section by a group of people. In both email and SNS messages, recipients may receive unsolicited messages from commercial companies either in the form of spam emails or as sponsored advertising banners in SNS. eWOM responses in SNS resemble the opening and forwarding process of email messages. These similarities imply that findings from the email forwarding context may be applicable in the SNS context such as Facebook. Although SNS has created different interacting tools for its users, for example, inbox messages and walls, Facebook remains the most popular social networking website. This study focuses on Facebook functions such as Like, Share, and Comment which do not appear in the private inbox message. Therefore, the message forwarding action is defined in users' walls. Unlike email messages, Facebook users do not need to open a message to view the message content.

eWOM in some virtual community platforms, for instance, discussion forums, is usually provided by users whose identities are unknown. In the context of SNS, however, one's identity could be viewed from the profile page. It is reported that the average number of friends a Facebook user has normally is over a hundred (Manago, Taylor, & Greenfield, 2012). In general, the friend list of a Facebook user consists of close friends and acquaintances. It has been discussed in previous studies that the strength of social relationships in SNS could be classified as strong and weak ties based on the connections (Chang & Wu, 2014). Due to security reasons or personal preferences, a Facebook user may choose to disclose part of his profile information based on the strength of social ties. It is inferred that trust among

acquaintances may be lower than among close friend groups as the social ties are not as strong as among close friends and family members (Ellison, Steinfield, & Lampe, 2007). Brown and Reingen (1987) reported that WOM referral behavior is stronger in strong social ties at the micro level, i.e. it's easier for WOM behavior between close friends and family members, which has been tested in Chu and Kim's (2011) study on eWOM engagement in SNS. It can also be argued that users have more knowledge of messages from friends and have higher elaboration ability (Wellman, 2023). Message source credibility increases receivers' attention toward the message and intention to forward the advertising messages to others (José-Cabezudo & Camarero-Izquierdo, 2012). We thus propose that.

H1. When receiving promotional messages sent from close friends, the SNS user's intention to give an eWOM response is enhanced.

As the literature indicates, the recreational or emotional message appeal is associated with the pleasure, joy, or emotions of the message contents. The type of messages focusing on message appeal could be realized through visual effects such as photos, bright colors, sound effects, and engagement statements to arouse the audience's attention. The emotions used to construct a message appeal could be the emotion dimensions such as fear, anger, and happiness (Schlosberg, 1954). Previous studies have continuously reported that emotional appeal tends to increase attention or awareness of products (Baker & Churchill, 1977), increase emotional response toward products (Liu & Stout, 1987), and stimulate the desire to know more about the public service (Flora & Maibach, 1990). Recent studies report that emotional appeal can also increase brand attitude toward products through WOM (Wu & Wang, 2011). Emotion as an important factor in IS has received massive attention since the 1980s. Various emotional variables such as hedonic needs (Wang and Fesenmaier, 2004a, b), perceived playfulness (Agarwal & Karahanna, 2000; Hackbarth, Grover, & Yi, 2003; Roca & Gagne, 2008), and emotions (de Guinea & Markus, 2009; Koufaris, 2002; Venkatesh, 2000) have all led to behavioral intention. We thus infer that the emotional message appeal will arouse members' emotions in the social networking website, which will lead to higher intention to give eWOM. Hence, the following hypothesis is proposed.

H2. When receiving recreational-type promotional messages, the SNS user's intention to give an eWOM response is enhanced.

3.2 Gender and age on eWOM response

It is well established that demographic information influences IT usage (Li & Lai, 2011) but not very well studied in early eWOM literature. Recently, it has been reported that gender has significant differences in EWOM behavior (Mladenović, Bruni, & Kalia, 2021). It is generally believed that female tends to focus on messages about emotional, social care, etc, while male tends to focus more on information about the functions of products (Mladenović *et al.*, 2021). Here we regarded that female likes more for the emotional message appeal, at the same time, female tends to talk more than male. It is easy to propose that.

H3. Female tends to have more active eWOM response than male.

H4. Male tends to trust the source credibility more than female.

H5. Female tends to have a high score for emotional message appeal.

Age has long been regarded as a significant predictor of eWOM behavior. It is believed that elder people tend to be slower in accepting technologies (Li & Lai, 2011). From the WOM perspective, it is reported that age has a positive effect in predicting negative WOM (Fails & Francis, 1996). In this paper, we would proposed that age could be classified as young and mature rather than the classical young and old classification. It is argued that mature people

tend to have a more structured reasoning process than younger people. And young people are more influenced by the emotional messages. We would propose that.

H6. Age has a positive effect on eWOM responses.

H7. Age has a positive effect on message source credibility.

H8. Age has a negative effect on the emotional message appeal.

3.2.1 Moderation effects of gender and age. The moderation effects of demographic variables have been tested for different strengths of variables on eWOM responses. Sometimes, it is reported that both gender and age have no moderation effects on eWOM responses (Cetin & Dincer, 2014). However, Mihić and Kursan Milaković (2017) found that shopping enjoyment and eWOM relationship are stronger for men than women. There is not much previous research to support the moderation effects of both gender and age. It is worth it for us to test here to provide more literature support. For gender, we would suppose that emotional message appeal and eWOM relationships tend to be stronger for women. Source credibility and eWOM relationship will be stronger for men. As for age's effect, we would believe that younger people tend to be more emotional than more mature people. We proposed that.

H9. The source credibility and eWOM relationship is stronger for men than for women.

H10. The emotional message appeal and eWOM relationship is stronger for women than for men.

H11. The source credibility and eWOM relationship is stronger for more mature than for younger users.

H12. The emotional message appeal and eWOM relationship is stronger for younger users than for more mature users.

4. Research methodology

This study used a scenario design to test the decision behavior in the Facebook environment through message content manipulation (Yang, 2012). For the easy manipulation of content, the simulated Facebook environment was created rather than the real Facebook environment. The introduction of the research purpose printed on a cover page was distributed to the survey participants. Participants were given information on the ethical issue of the study to guarantee that their personal information would be kept confidential, and participation in the study was voluntary. The survey was conducted at a major public university in Hong Kong for a month and each of the survey duration was within five minutes. The participants are from a public university in Hong Kong and are studying undergraduate or postgraduate studies there. Each participant was required to complete a questionnaire with a total of 11 questions.

Various literature were reviewed to develop measurements for this study and to measure message source credibility, message appeal, and eWOM response. To measure the eWOM response, the unique Facebook functions, including Like, Share, and Comment, were applied as the indicators of eWOM response. This study is explanatory to identify the relationship among variables when studying a situation (Saunders, Lewis, & Thornhill, 2007). A self-reported questionnaire with a five-point Likert scale was then conducted to collect the necessary data from the respondents. Message source credibility was adapted from Ohanian (1990) where the trustworthiness dimension is adopted; message appeal was adopted from Yang (2012); and eWOM consisted of the following three items: "After browsing the message, I choose "Like" as my response", "After browsing the message, I choose "Share" as my response", and "After browsing the message, I choose "Comment" as the response.

To identify the variations in eWOM response regarding message source credibility, respondents were classified into two groups. One group of respondents was required to complete the questionnaire with the assumption that the message was sent from an unfamiliar friend, while the other group of respondents was required to complete the questionnaire with the assumption that the message was sent from a close friend. These assumptions were adopted from the scenario design in the study of Yang (2012). The assumption was written as a sentence and shown on the questionnaire.

To reduce the ambiguity of the respondents on the constructs, a sample message was developed and modified from messages available on Facebook as shown in Appendix 1. Respondents were asked to read the message, which was recreational, before filling in the questionnaire. The message was designed like a real Facebook message. The message was written in Chinese to simulate the real messaging condition on Facebook. It was designed as a promotional message for a trendy new mobile phone. Modification of the promotional message was made based on the suggestion from Yang (2012).

A convenience sampling method was adopted in this study. According to Schiffman and Wisenblit (2014), convenience sampling is a continuous process to find participants for a survey until the sample size requirement is attained. Low operation cost and time are the advantages of this sampling method. In this study, questionnaires were distributed on the university campus. According to the study of SNS usage by Nielsen (2014), females are more active users of SNS. However, the differences are not very significant as compared with males. Therefore, both genders were considered in this study. It revealed that the majority of female SNS users are between the ages of 18 and 34. This serves as a large and appropriate pool of participants for this study. Two questions were asked in the questionnaire to collect the demographic information of the participants, including their age and gender. An additional question was asked to identify whether the participants have a Facebook account.

5. Data analysis

A total of 203 valid questionnaires were collected at the end of the sampling period. 107 of the participants were female and 96 of them were male. Ninety of the subjects were aged between 17 and 21, while 113 of them were at age between 22 and 26. We classified them as young (17-21) and mature (22-26) age group. All the participants had a Facebook account. This study used a two-stage SEM data analysis method with LISREL 8.8, by which the measurement model was assessed through confirmatory factor analysis (CFA) for the reliability and validity of the research model, and the causal relationship among factors was assessed through exploratory factor analysis (EFA) (Thompson, 2004). This method has been recommended and widely used by a plethora of studies examining the causal relationships among factors (Cheung, Chang, & Lai, 2000).

5.1 Measurement model analysis

The research model was first assessed through CFA for reliability and validity test. As there are controversial discussions on the selection of goodness of fit index with the SEM method, we choose a combination of fit index recommended by Hu and Bentler (1999) including the relative fit indices and non-centrality-based fit indices to minimize Type I and Type II errors. Consequently, we chose the GFI, the adjusted goodness-of-fit index (AGFI), and the root mean square residual (RMSR) from the absolute fit indices; the non-normalized fit index (NNFI) and the incremental fit index (IFI) from the relative fit indices; and the comparative fit index (CFI) and root mean square error of approximation (RMSEA) from the no centrality fit indices. The NNFI and IFI were chosen because they are relatively unaffected by sample size (Gerbing & Anderson, 1993; Hu & Bentler, 1995; Marsh, Balla, & McDonald, 1988). As this study has a

large sample size, this combination is well suited to objectively reporting the research results. The cut-off criteria for the fit indices were based on Hu and Bentler (1998, 1999) who recommended that when the sample size is equal to or greater than 1,000, a combination rules of TLI cutoff value < 0.96 and SRMR > 0.06 (0.07, 0.08, 0.09, 0.10, or 0.11) are preferable. We thus used the cutoff value of 0.90 for NNFI, CFI, and IFI, 0.11 for SRMR, 0.80 for GFI and AGFI, and 0.10 for RMSEA.

The overall fitness of both the measurement and the structural models are reported in Table 1, with all fit indices above the recommended thresholds. The NNFI, CFI, and IFI have all exceeded the acceptable level of 0.90 and even exceeded the recently recommended threshold of 0.95 (Hu & Bentler, 1999). Both GFI and AGFI have exceeded the recommended 0.80. Similarly, RMSR and RMSEA are above the recommended 0.10 level except for the structural model with profile variables (0.11). However - as this is in opposition to the results of GFI and AGFI, where above the cut-off is a good result.

The model was further assessed for the reliability test and validity test. The reliability test was achieved through three levels, Cronbach's alpha, item reliability, and composite reliability. Item reliability evaluates how much of the variance of the observed variable can be explained by the latent variable rather than by random error (Long, 1983), which is measured through the factor loading in the measurement model. The purpose of composite reliability is like that of Cronbach's alpha, but the former takes the factor loadings into account rather than assuming that each item has an equal loading on the construct. As indicated in Table 2, Cronbach's alpha values for all of our scales are above 0.80, which is significantly above the 0.70 level suggested for exploratory research (Nunnally & Bernstein, 1994). The factor loading is well above the recommended 0.70 for all items of the three constructs (Fornell & Larcker, 1981).

Furthermore, to assess the validity of the measurement model, convergent and discriminant validity were examined. Convergent validity can be assessed by examining the factor loading of the constructs and the average variance extracted (AVE) (>0.50). The factor loading of a construct greater than 0.70 is considered significant convergent validity. As demonstrated in Tables 2 and 3, all factor loadings are greater than the recommended 0.70, and all values of AVE for construct reliability are above the corresponding threshold values of 0.5. Therefore, the model demonstrates adequate convergent validity (Fornell & Larcker, 1981).

A model is considered to have good discriminant validity if the square root of the average variance explained by a construct is greater than the corresponding correlation estimates of the model (Fornell & Larcker, 1981). Table 3 lists the correlation estimates and square root of the AVE of the model. The diagonal values represent the square root of the average variance, and the non-diagonal value represents the correlation estimates. All the diagonal values are

The goodness of fit index		χ^2	df	NNFI	CFI	IFI	GFI	AGFI	RMSR	RMSEA
Recommended value				≥0.90	≥0.90	>0.90	≥0.80	≥0.80	≤0.10	≤0.10
Measurement model		33.80	17	0.98	0.99	0.99	0.96	0.91	0.053	0.073
Structural model		33.80	17	0.98	0.99	0.99	0.96	0.91	0.053	0.073
Structural model with profile variables		73.02	28	0.95	0.97	0.97	0.93	0.87	0.11	0.089
Multiple group gender	Male	63.94	46	0.98	0.99	0.99	0.90	NA	0.083	0.060
	Female	62.37	46	0.98	0.99	0.99	0.95	NA	0.067	0.060
Multiple group age	Matured	66.32	46	0.98	0.98	0.98	0.90	NA	0.073	0.061
	Young	63.43	46	0.98	0.98	0.98	0.94	NA	0.085	0.061

Source(s): Table by authors

Table 1.
The goodness of fit indices for the measurement model and structural model

Construct	Mean	Standard deviation	Cronbach's alpha	Factor loading	Composite reliability	Average v ariance extracted
Message appeal			0.88		0.88	0.79
(A1) The message is interesting to me	2.93	1.04		0.90		
(A2) The message is recreational to me	2.79	0.93		0.87		
Message source credibility			0.90		0.91	0.76
(B1) I believe the sender is sincere	2.89	1.03		0.86		
(B2) I believe the sender is trustworthy	2.83	1.00		0.90		
(B3) I believe the sender is honest	2.85	1.04		0.86		
eWOM response			0.82		0.83	0.62
(R1) After browsing the message, I choose "Like" as my response	2.65	1.22		0.75		
(R2) After browsing the message, I choose "Share" as my response	2.24	1.10		0.84		
(R3) After browsing the message, I choose "Comment" as my response	2.04	1.02		0.78		

Source(s): Table by authors

Table 2. Summary of measurement scales

Construct	Message appeal	Message source credibility	eWOM response
Message appeal	0.87		
Message source credibility	0.33	0.87	
eWOM response	0.39	0.72	0.79

Source(s): Table by authors

Table 3. The square root of AVE and correlation coefficient

greater than the non-diagonal value, which demonstrates a good level of discriminant validity.

5.2 Structural model testing results

The structural model was further tested with LISREL 8.8 using the covariance matrix in Appendix 2. The overall goodness of fit of the research model was examined using the same fit measures as those used for the measurement model. The results, as shown in Table 2, are all within acceptable levels, thus suggesting the adequacy of our research model for further statistical analyses including the causal link evaluation.

The overall explanatory power of the research model was examined using the R-square and the individual path coefficients. As reported in Figure 2 and Table 4, both hypotheses 1 and 2 are supported and 52% variance of eWOM has been explained by message appeal and message source credibility. Both message appeal and message source credibility have positive effects on Facebook responses. The coefficient of message appeal on eWOM response is 0.23, significant at $p < 0.001$ level. The path for message source credibility is 0.66,

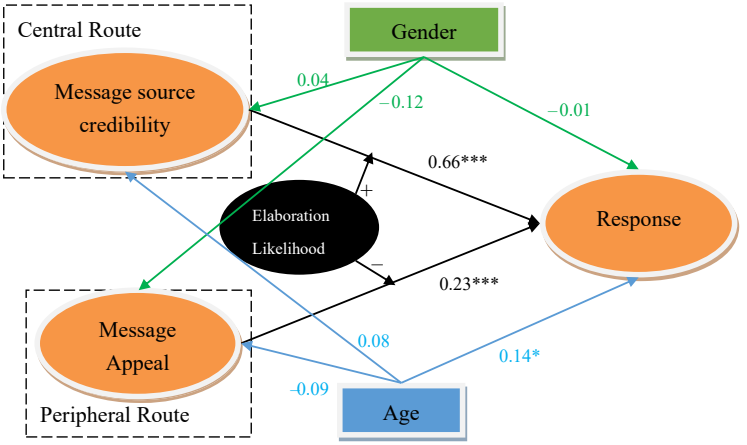

Figure 2.
Structural model testing results

Note(s): *significant at 0.05 level, *** significant at 0.001 level
Source(s): Figure created by authors

No.	Statement	Supported
H1	Source credibility → responses	Yes
H2	Emotional message appeal → responses	Yes
H3	Female tends to have more active eWOM response than male	No
H4	Female tends to trust the source's credibility more than male	No
H5	Female tends to have a high score for emotional message appeal	No
H6	Age has a positive effect on eWOM responses	Yes
H7	Age has a positive effect on message source credibility	No
H8	Age has a negative effect on emotional message appeal	No
H9	The source credibility and eWOM relationship is stronger for men than for women	No
H10	The emotional message appeal and eWOM relationship is stronger for women than for men	Yes
H11	The source credibility and eWOM relationship is stronger for mature than for younger users	Yes
H12	Emotional message appeal and eWOM relationship is stronger for the younger user than for the mature	No

Table 4.
Hypothesis testing results

Source(s): Table by authors

also significant at $p < 0.001$ level too. Gender and age were tested in the model by constraining the error variances to be 0. Gender does not have significant effects in all three variables, but age has a positive effect on the response, implying H3-H5 are not supported. It suggests that mature users (22-26) are more active in responding to messages than younger users (18-21), implying that H6 is supported but H7-H8 is not supported.

The multiple group analysis for both gender and age are displayed in Table 1, Figure 3, and Figure 4. As shown in Table 1, all fit indices for the multiple-group analysis are within the acceptable level. For the gender multiple group analysis, the relationship between message source credibility remains like the overall model and shows not much difference between males and females. However, the appeal→response relationship is not significant for males (0.05) but stronger for females (0.31), implying H9 is supported but H10 is not supported. The

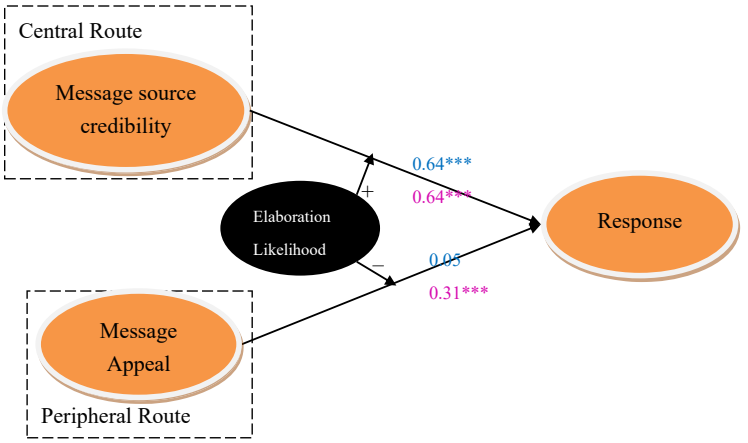

Figure 3.
Moderation effect of multi-group test for gender

Note(s): *** significant at 0.001 level The upper line represents the Male The bottom line represents the Female
Source(s): Figure created by authors

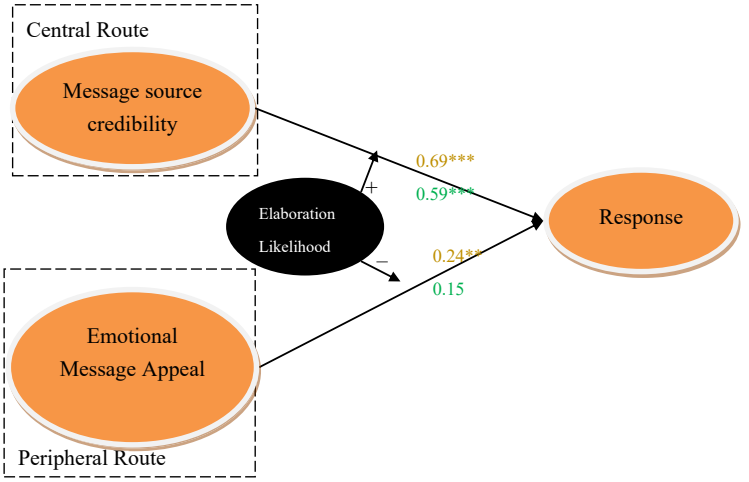

Figure 4.
Moderation effect of multi-group test for age

Note(s): ** significant at 0.01 level The upper line represents the Mature The bottom line represents the Young, *** significant at 0.001 level
Source(s): Figure created by authors

result implies that the female is influenced both by message source and appeal. In the age multiple group analysis, the source→response relationship is stronger for the mature group (0.69) than for young groups (0.59), and the appeal→response relationship is stronger for the mature group (0.24) but not significant for the young group (0.15). H11 is supported but H12 is not supported. H12 is supported in a reverse direction, i.e. the message appeal and social media response relationship are stronger for the mature user. This implies that mature people are more responsive to eWOM activities on Facebook.

6. Discussion, implications and limitations

This study aims at exploring how message source credibility and message appeal can influence eWOM response in the SNS environment from the ELM perspective. As WOM is effective in many areas of marketing management, eWOM has piqued mounting attention in the online environment. Source credibility and message appeal emerge as the new eWOM response determinants, but they have yet to be sufficiently explored because there is scarce empirical literature supporting their joint effect. To extend this line of research, this study proposes that the eWOM response is a dual information processing process that can be explained by the ELM. When a user processes information in SNS, he follows both the central route and the peripheral route (i.e. source credibility and message appeal) which can influence eWOM response. With 203 valid questionnaires collected on Facebook, our SEM data analysis indicates that 52% variance of eWOM response could be explained by both message source credibility and message appeal and that message source credibility plays a more central role. It implies that consumers are more likely to generate eWOM responses in a trustworthy environment and that the eWOM response will be generated when consumers feel the message content is interesting and fun.

ELM is effective in explaining the information processing for customers in the social media environment. We thus infer that consumers tend to relax in a safe environment by replying and responding to promotional messages. This could also be explained by Maslow's Needs for Hierarchy of Needs Theory where people seek to fulfill a high level of needs when the basic level of needs such as safety is satisfied (Maslow, 2013). In the SNS environment such as Facebook, the need for safety has been satisfied and people seek to fulfill higher levels of needs such as social, esteem, and love which are more emotional by nature. Next, we will discuss our empirical results, followed by implications to both researchers and practitioners and research limitations.

6.1 Discussion

H1 is supported as message recipients' motive to give eWOM response is significantly related to message source credibility. Our results are consistent with most previous studies on the positive effects of source credibility on eWOM responses (Dobele *et al.*, 2005; Luo *et al.*, 2013; Teng *et al.*, 2014; Wu & Wang, 2011). Our additional contribution is that we have tested specifically that message source credibility plays a more central role (0.65) in influencing eWOM responses in the SNS environment, while Wu and Wang (2011) only tested the main effect on brand attitude. As eWOM response has seldom been tested in the SNS environment, this study is probably the first attempt to empirically test the effects of source credibility and message appeal on eWOM response in the SNS environment.

H2 is supported as eWOM response is enhanced when members receive the recreational type of promotional messages. This result is consistent with major extant studies on the positive effects of message appeal on eWOM response (Baker & Churchill, 1977; Flora & Maibach, 1990; Lloyd & Clancy, 1991). Most Facebook users log in to the SNS platform to spend their leisure time viewing others' statuses. As the purpose of login is recreational, users tend to search for relaxing and interesting information. The recreational message, therefore, is more suitable for gaining awareness from Facebook users. Messages containing wording, such as lottery, could catch the attention of the message recipients as the wording is interesting as they may have the opportunity to gain benefits by responding to the message. It was found that the message content would affect customer involvement, thus, affecting the subsequent attitude and behavior.

Message source credibility has a higher impact on eWOM response, as compared with message appeal in the SNS context. The path coefficient related to message source credibility (0.66) is higher than that related to message appeal (0.23). This could be explained by the dual

information processing method with ELM. When users have a higher potential to elaborate the message from close friends, they tend to respond more. At the same time, this could also be explained by the inability of the message to enhance users' involvement in the promotional message. Involvement could be classified into three categories, product involvement, advertisement involvement, and purchase decision involvement. Advertising involvement, which refers to the degree of relevance a person perceives he has toward the advertisement (Batra & Ray, 1986; Goldsmith & Emmert, 1991), could be applied in this study, personal factors, such as the extent of personal relevance, play an important role in predicting one's involvement and the resulting attitude and behavior.

Our demographic and multiple group analysis based on gender and age provides some meaningful insights for the further analysis of eWOM response based on different customer segmentation. It's interesting to note that gender does not influence all three eWOM responses, but age has a positive effect on eWOM responses. It's expected that gender will demonstrate different tendencies in processing messages and using technologies (Venkatesh & Morris, 2000). Traditional studies reported that female normally processes information with the heuristic processing method while male tends to use the systematical processing method (Darley & Smith, 1995). It has also been found that female tends to have a low threshold in processing message cues or emotional message appeal (Meyers-Levy & Sternthal, 1991). Our multiple-group analysis confirms that message appeal is significant for females but not for males. The female has a high tendency to process messages with emotional message cues. The multiple-group analysis for age reveals that relatively mature users are more responsive to both emotional messages and messages from friends than younger ones.

6.2 Implications

This paper has several significant theoretical implications for both eWOM and information system design. The eWOM responses are reported to be affected by mainly two groups of variables, including the factors related to social dynamic variables such as tie strength (De Bruyn & Lilien, 2008; Mittal *et al.*, 2008), personal traits (Chen *et al.*, 2013) and social cognition (Cheung & Thadani, 2012) and the emerging factors related with message content such as message source credibility (Luo *et al.*, 2013; Miao *et al.*, 2011; Wu & Wang, 2011). Our results extend and confirm the existing literature on the effects of message content design on user responses, especially from message source credibility and message appeal. This result could be applied to many other emerging SNS environments such as TripAdvisor, Pinterest, and Instagram in which the purposes are more recreational than Facebook.

From the information systems perspective, user responses in the SNS environment are evolving toward a more dynamic social interaction process where more and more human emotions and social needs are sought. This trend calls for interdisciplinary theories to be used to explain the new social dynamics in the SNS environment. Theories from social science, marketing, and management might be adapted to the SNS environment to explain SNS user behavior. One possible explanation for user behavior in the SNS environment is the social needs theory such as Schutz's Fundamental Interpersonal Relationship Needs Theory (Schutz, 1966) and Maslow's hierarchy needs theory (Maslow, 2013). It would be interesting to observe and investigate how these traditional theories could be used to explain SNS user behavior.

Practically, the research findings from this study could benefit firms to design their Fan/Customer pages or advertise in an SNS environment. As source credibility is important for users to respond to the content, it's very important to design the message and advertisement so that it would be recommended and passed on to a friend list. There are many types of information available on Facebook, including those in the advertising banner, updates from

the brand profile page, or status updates from friends. Since it is difficult to grasp the attention of SNS users who log in to view the status of their friends, any recommendation or message directly sent to one's inbox or posted on the wall by one's friend probably gains greater attention than the sponsoring banner at the page border. SNS users believe that their close friends are sincerely sharing value-containing messages with them. Therefore, the message recipients are more willing to read the message and develop a positive attitude toward the message content. The message recipients may also further forward the message to other friends within their SNS friend network.

To grasp members' attention, it's very important to design the message to be recreational and interesting so that the initial attention could be aroused. This can explain why message appeal is important. The result of this study demonstrates that interesting or relaxing messages will receive more responses from members. Messages with pictures, emotional statements, and short videos will all serve that function. Besides attractiveness and interest, there are other dimensions of emotions, such as fear, joy, and happiness, which can be used to guide the message design.

6.3 Limitations

Although the hypotheses in this study are broadly supported by the findings, several limitations should be recognized. Firstly, our sample might not represent all SNS users. The target age group of the survey participants is set between 25 and 34, which is the most active Facebook user group found by Dixon (2023) [1]. In this study, only university students from Hong Kong participated in the survey. The participants represent a small segment of the Facebook population around the globe. Secondly, our research design could be improved by using more recreational messages to test the effects of message appeal and message source credibility. Thirdly, the mobile phone is a type of physical product rather than an experiential product. However, non-physical services such as experience-based travel products are difficult for people to evaluate (Litvin, Goldsmith, & Pan, 2008). Results for the experiential product might generate different research results for the role of the source credibility and message appeal in eWOM response. Future studies could try to use different products such as travel products to test the model.

6.4 Conclusions

In this study, it is found that ELM is effective in explaining SNS responses and both message source credibility and message appeal have a positive impact on the eWOM response. When a person receives a message from his close friends, the intention to provide an eWOM response is enhanced. When a person receives a message which has recreational value, the intention to provide an eWOM response would also be enhanced. The effect of message source credibility is relatively higher than message appeal on eWOM response.

Most eWOM studies in the past focused on one category at a time. This study attempts to incorporate two categorical antecedents to investigate the eWOM antecedents. This study provides insight for SNS administrators regarding the determinants of driving more customer responses toward a message. Message source credibility and message appeal are identified as the antecedents for eWOM responses in SNS. Companies could make use of this finding to improve their marketing communication strategy in SNS. The finding can inform administrators of the importance of focusing on both customers' psychological state and message attributes during the dissemination of promotional messages to improve the efficiency of the promotional effort. Companies aimed at receiving different types of eWOM responses in SNS may need to consider other factors for creating their promotional messages. Future studies could try to identify the same eWOM determinants with different SNS functions, for example, the inbox message function. Similarly, Facebook users are allowed to

use both text and pictures to disseminate promotional messages. However, they are unable to exhibit interaction with others. The research findings would be significant in identifying where differences exist between an open environment (Facebook Wall) and a private environment (Facebook inbox). Also, this study could be repeated by using different survey subjects. As eWOM covers both tangible goods and intangible services, future studies could use intangible services as the research subject, for example, content related to travel experience to investigate if the antecedents for eWOM are affected by the product type.

Note

1. https://www.statista.com/statistics/376128/facebook-global-user-age-distribution/

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(The Appendix follows overleaf)

Appendix 1

Figure A1.
Sample message

Source(s): Figure created by authors

Appendix 2

	A1	A2	B1	B2	B3	R1	R2	R3
A1	1.09							
A2	0.76	0.87						
B1	0.31	0.23	1.05					
B2	0.23	0.20	0.79	1.00				
B3	0.29	0.24	0.79	0.81	1.09			
R1	0.43	0.37	0.72	0.72	0.70	1.49		
R2	0.29	0.28	0.55	0.58	0.54	0.80	1.21	
R3	0.27	0.23	0.43	0.45	0.44	0.68	0.79	1.05

Table A1.
Covariance matrix

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