


The Effect of Information Quality on Social Networking Site (SNS)-Based Commerce: From the Perspective of Malaysian SNS Users

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ABSTRACT

This study aimed to examine how information quality (IQ) attributes affect perceived usefulness and customer satisfaction of SNS-based commerce from the perspective of Malaysian SNS users. Although many studies have been conducted to identify possible IQ attributes in the context of e-commerce, only a limited number of studies have tested and examined the direct effects of the IQ attributes on perceived usefulness and customer satisfaction, particularly in the s-commerce context (i.e., SNS-based commerce). The data from Malaysia respondents were collected through an online survey, using a snowball sampling technique. The hypotheses were analysed using multiple linear regression. The results indicated the perceived usefulness was significantly affected by completeness, ease of understanding, and personalization. Customer satisfaction was significantly affected by the completeness and perceived usefulness. However, neither the accuracy nor timeliness had an effect on perceived usefulness or customer satisfaction. The findings suggest that completeness is the strongest attribute of IQ.

KEYWORDS

Accuracy, Completeness, Ease of Understanding, Information quality, Perceived usefulness, Customer satisfaction, Personalization, SNS-based commerce, Social commerce, Timeliness

INTRODUCTION

The evolution of Web 2.0 and social media has caused a shift from conventional electronic commerce (e-commerce) to social commerce (s-commerce). S-commerce is a new concept in the study of e-commerce markets; as a result, it has been defined in different ways. Liang and Turban (2011) suggested that there are three essential elements (social media, community, and commerce activities) that must be considered when defining s-commerce. S-commerce can be defined as a form of online business that combines e-commerce and social media to provide consumers with daily deals and to facilitate the buying and selling of products and services (Stephen & Toubia, 2010). Social media refers to Internet-based applications operated in Web 2.0 that are designed to attract visitors (e.g., customers) to online destinations [e.g., social networking site (SNS)-based commerce]. Web 2.0 is seen as a platform for harnessing collective intelligence (Kaplan & Haenlein, 2010). One of the most popular types of social media is SNS, which consist of web-based services that allow individuals to socialize and build their own virtual network communities to communicate and share information,

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as they would in real-life (Boyd & Ellison, 2008). Hence, in the s-commerce context, SNS is defined as a tool to accomplish buying and selling-related activities that involves, sharing online shopping experiences and sharing information about the products and services.

In Malaysia, s-commerce first became popular in 2010 and grew rapidly. It has been reported that SNS, particularly Facebook, have played an important role in the growth of s-commerce. According to Wong (2014a; 2014b), 91% of Malaysian online users have shopped online, and 40% of them have used an SNS (i.e., Facebook) as an online shopping platform. 51% of these users typically start their online shopping by discovering it on Facebook. As for online sellers, 36% of them responded that an SNS is the preferred platform to sell their products and services. For sellers who are not currently selling their products online, 74% preferred to conduct their online business through SNS (e.g., Facebook and Instagram). These results imply that SNS is an acceptable e-commerce platform in Malaysia. The increased popularity and use of e-commerce in Malaysia have brought about several problems with online shopping. The major concerns of Malaysian online shoppers are fraud, trust, security, and dissatisfaction, indicating that Malaysians still lack confidence in e-commerce (Wong, 2014c). In 2012, the Companies Commission of Malaysia introduced a new regulation (Consumer Protection: Electronic Trade Transactions Regulations 2012) to protect customers and to increase their confidence in actively participating in e-commerce. This regulation went into effect in July 2013. Under this regulation, online sellers must display their business name and registration number on their SNS pages. Enforcing this regulation is expected to decrease online shopping fraud. The issue of dissatisfaction, particularly as it relates to products and services should be handled directly by the online sellers in order to ensure that they retain customers and maintain client relationships (Schaupp et al., 2009).

Despite the potential benefits (e.g., saving time and money and easily accessing information) of SNS-based commerce in Malaysia, there is no guarantee that customers will not experience problems. In fact, customers are often exposed to problems such as online fraud (Wong, 2014c). SNS-based commerce is an information center where irresponsible sellers can take advantage of the opportunity to persuade customers by manipulating information. Failure to control these problems will lead to a bad reputation for SNS-based commerce. As a result, offline customers will feel reluctant to shop online and will lose their confidence in SNS-based commerce. This is supported by Wong (2014a), who reported that 37% of customers in Malaysia do not shop online owing to security concerns, and that 35% do not trust online sellers. As for current online customers, the problems they face may lead them to become dissatisfied with SNS-based commerce. Dissatisfaction is sometimes caused by the way the information is presented in SNS.

Based on the above discussion, information is considered to be the important element that customers need to make e-commerce decisions. Therefore, the information quality of online sellers affects customer satisfaction. This is widely supported by most of the studies (Wang & Liao, 2008; Sharkey et al., 2010; Zaied, 2012; Filieri & McLeay, 2013; Chen et al., 2016; Ghasemaghahi and Hassanein, 2016) that have been conducted in this area. When customers are satisfied with the information provided by online sellers, they start to perceive SNS-based commerce as useful. When this happens, SNS-based commerce becomes beneficial to the customers, and they might use it continuously. This leads to customer loyalty and repurchase behaviors, consequently enabling sellers to establish and maintain the client relationships while sustaining a profit (Schaupp et al., 2009). Hence, priority should be given to understanding the information quality determinants that affect customer satisfaction from the customers' perspective. S-commerce is still developing and is a new sales platform in Malaysia. Therefore, very few studies have been conducted in the field of s-commerce, particularly studies related to information quality. Little is known of consumers' perceptions toward the information quality of SNS-based commerce. We employed and adapted the IS (Information System) success model (DeLone & McLean, 2004) to examine the effects of information quality attributes on customer satisfaction in SNS-based commerce from the customers' perspective.

To achieve the aim of our study, we introduced the term “SNS-based commerce.” In this study, SNS-based commerce includes the use of a seller’s SNS (e.g., Facebook, Instagram, and Twitter) page by users (i.e., customers) when shopping online. The purpose of the seller’s SNS page is to promote and sell products and services. The users’ shopping activities are related to searching, ordering, booking, and buying products and services from the SNS or are initiated by the SNS, which involve i) ordering or booking products or services through the seller’s SNS page and paying for the purchase through an online banking transaction, manually transferring the payment to the seller’s bank account, or paying for the product or service upon delivery; ii) searching for products and services via the SNS with the intention to make a purchase; and iii) finding the seller’s SNS page leads the customer to the seller’s online shopping website, where the customer can shop online and complete his or her transaction. SNS-based commerce can take the form of customer-to-customer (C2C) or business-to-customer (B2C) commerce (Shanmugam & Jusoh, 2014). This study focuses on these two types of commerce.

The rest of this paper is organized as follows. Section 2 offers a brief overview of the theoretical background of the study, focusing mainly on previous models to investigate customer satisfaction of s-commerce. Section 3 presents the current research model and hypotheses. Section 4 explains the research method and contains our data collection, online survey, and data analysis. Section 5 presents the results analysis of the study. Section 6 discusses the study findings, and Section 7 provides the conclusion of the paper.

THEORETICAL FOUNDATION

Information Systems (IS) Success Model

In the e-commerce research context, the IS success model (DeLone & McLean, 1992; 2003) is constantly referred to by researchers measuring customer satisfaction, particularly when measuring e-commerce success factors. The model (DeLone & McLean, 1992) consists of six interrelated variables of system quality, information quality, use, and user satisfaction on the left-hand side of the model, and individual impact and organizational impact on the right-hand side of the model. In response to dramatic changes in IS practice, especially with the advent and explosive growth of e-commerce, DeLone and McLean (2003) updated the IS success model to include some minor refinements. The intention to use dimension has been proposed as an alternative to the use dimension to deal with the multidimensional aspects of use. A service quality dimension was added as an independent variable to measure the dimensions of use or the intention to use. In addition, the net benefits dimension was added to replace the individual and organizational impact dimensions because it is better to group them into a single impact or benefit since the impact or benefit depends on the system evaluation purpose. This model was expanded by providing and suggesting appropriate and possible measures for each dimension of the IS success model to address the needs of the e-commerce environment (DeLone & McLean, 2004). Owing to the ability of the IS success model to measure e-commerce success, many studies (e.g., as in Table 1) have used the model to investigate e-commerce-related customer satisfaction.

The main argument when adopting the IS success model is whether to use the dimension of use or intention to use. Rather than choosing the dimension of use or intention to use, some studies (e.g., Brown & Jayakody, 2008; Chen et al., 2013) substituted the perceived usefulness dimension owing to the argument that, in e-commerce systems, high perceived usefulness leads to customer satisfaction. It has been argued that the use dimension is a behavior that is appropriate for the process model. However, the perceived usefulness dimension is an attitude that is appropriate for the causal model (Seddon & Kiew, 1996). Rai et al. (2002) validated these two constructs (use and perceived usefulness) and found that they are meaningful measures of IS success, depending on the delivery type. In summary, the perceived usefulness construct is used when it relates to an attitude derived from the perceptions of benefits gained from the use of a previous IS (Rai et al., 2002; Lai et al.,

2006). Meanwhile, the use construct is used to measure an actual behavior rather than the perception of a behavior (Rai et al., 2002; DeLone & McLean, 2003; Wang & Liao, 2008).

Some researchers have used models other than the IS success model. The technology acceptance model (TAM) has been widely used in IS-related areas as well as e-commerce. TAM was introduced in order to explain and predict the adoption of information technology (Davis, 1989). According to TAM, the perceived ease of use and perceived usefulness influence attitude toward use. This influences behavior intention, which then influences actual usage. The perceived ease of use and perceived usefulness are affected by external variables. Therefore, some researchers modified the TAM by tailoring it to the context of their research. For example, i) Zaied (2012) using an integrated success model that was derived from the DeLone and McLean IS success model and TAM, and found out that information quality has a strong significant effect on IS success. However, this model is most likely to be used in evaluating information systems in an organization, especially as related to the initial adoption of IS systems. ii) Wang and Chou (2014) used a modified TAM, inserting information quality as one of the external variables to indicate the factors that affected repurchasing intention on online group-buying. Although the modified TAM has been widely used in the e-commerce context, the purpose of the model is to evaluate the initial adoption of the system. Therefore, satisfaction is not measured since satisfaction happens after the post-adoption of the system. In addition, Xu et al. (2013) used the Wixom and Todd model (Wixom and Todd, 2005) to study the role of service quality,

Table 1. Previous studies of IS success model in e-commerce

Study	Brief description	Finding
DeLone and McLean (2004)	Adopted the IS success model by proposing possible attributes for each dimension to measure e-commerce success, then tested the model via a consumer electronics retail chain and the Barnes and Noble online bookstore.	The IS success model was a flexible and relevant framework to measure e-commerce success. Information quality (IQ) with relevance and completeness attributes was found to affect user satisfaction.
Brown and Jayakody (2008)	Tested and validated a revised conceptual model of B2C e-commerce success using the IS success model. The intention of use and use dimensions were replaced with the perceived usefulness dimension, and dimensions for loyalty incentives and trust were added. Some modifications were made to the dimension relationship.	IQ with accuracy and completeness attributes had a significant effect on perceived usefulness, which affected user satisfaction.
Wang and Liao (2008)	Tested DeLone and McLean's adaptation of the IS success model in the context of government-to-customer (G2C) e-government.	IQ affected user satisfaction with precise, sufficient, and timeliness attributes
Sharkey et al.(2010)	Measured the IQ and service quality attributes of an e-commerce model that affects user satisfaction, based on the DeLone and McLean IS success model.	IQ with ease of understanding, personalization, completeness, relevance, and security attributes influenced user satisfaction. User satisfaction was most influenced by ease of understanding and personalization.
Fang et al. (2011)	Extended the IS success model by introducing justice, trust, and repurchase intention dimensions to study customer satisfaction and repurchase intention.	IQ with relevant, easy to comprehend, accurate, complete, and timeliness attributes was a significant determinant of customer satisfaction.
Chen et al. (2013)	Adapted the IS success model by proposing two new quality dimensions (process and collaboration qualities) to understand a key IS factor and improve B2B e-commerce. Perceived usefulness was used in place of a use dimension.	IQ had a significant effect on perceived usefulness. Customer satisfaction was also affected by perceived usefulness.

system quality and information quality in website adoption. The idea of the model is to integrate the user satisfaction with the TAM. Although satisfaction is addressed in this model, it is addressed as an object-based attitude rather than as overall satisfaction with the system. The signaling theory (Connelly et al., 2011) has been used in discussing information in e-commerce, for example, in studies by Mavlanova et al. (2012) and Benlian and Hess (2011). These studies emphasized the behavior of two parties (seller and buyer) in accessing different information. Signaling theory in the context of e-commerce suggests that website features play an important role in signaling the information from seller to buyer (Mavlanova et al., 2012). This theory is most likely applicable for e-commerce sites. However, in s-commerce, particularly SNS-based commerce, it is quite challenging to define the signal as mostly content based on user-generated content (UGC). Moreover, Filieri and McLeay (2013) adopted the elaboration likelihood model (ELM) to identify the information adoption from online reviews. ELM aims to explain attitude change which is out of the scope of this study. E-Image model that was adapted by other researchers (e.g., Walczak & Gregg, 2009; Opuni et al., 2014) explains the consumer's impression toward e-commerce and e-business. This model emphasizes how e-commerce and e-business images can attract consumers doing their online activity. While s-commerce (i.e., SNS-based commerce) based on UGC mostly facilitates C2C, it is quite difficult to adapt the model because SNS-based commerce represents one individual seller, but many sellers and a function for the sellers to build their own image are limited, especially when displaying their product images. In addition, in most cases, information cannot be controlled by the seller.

As e-commerce is an IS-related field, s-commerce is a subset of e-commerce (Liang & Turban, 2011), and SNS is an application of s-commerce. Thus, the IS model can be adapted and used in SNS-based commerce. The IS success model is the most appropriate model to be adapted, herein because this study focuses on post-adoption of the technology, and one of the most important components of this study is customer satisfaction.

Information Quality in S-commerce

Although IQ has become one role of the fundamental general website as well e-commerce design, the role of IQ in the s-commerce context is different, taking into consideration three key reasons (Chen et al., 2016). First, unlike e-commerce, s-commerce focuses entirely on UGC, whereby the s-commerce users are the main content creators. Hence, there is limited control over the content (Zheng et al., 2013). The content may vary not only for the product information (how the sellers promote their products), which can be in the form of text-based products but also the buying process information. The latter includes how the transaction will be conducted, owing to the fact that there is not only one seller in the s-commerce system and the sellers may be there.

Second, s-commerce has limited function to support “buy and sell” activity (Chen et al., 2016). For example, a C2C Facebook page, as form of SNS-based-commerce has limited function to sellers to post advertising information online. Moreover, a function to conduct transactions is not provided. In other words, sellers have no right to change the environment of the page (Chen et al., 2016). This situation becomes the biggest challenge faced by sellers when determining how to create and display contents in such limited function in order to encourage impulse buying.

Third, taking into consideration the differences between e-commerce and s-commerce, there may be different findings when the IQ is conceptualized to s-commerce. One of the biggest factors contributing this situation is that s-commerce users consist of many sellers and many buyers. Therefore, the interpretation of information, which comes from a variety of sources, may lead to uncertainty (Chen et al., 2016). There have been discussions on IQ in s-commerce, including the following: i) Zheng et al. (2013) conducted a study to investigate users' continuance intentions in virtual communities from a quality perspective, but did not look into the dimensions of IQ in detail. ii) Huang and Benyoucef (2013) proposed s-commerce design principles and included the IQ as one of the important components, but since this was early development, the validation has not yet been conducted. iii) Chen et al. (2016) conducted a study to investigate the effect of IQ on consumers' impulsiveness and urge to buy in

s-commerce by using Facebook as a platform. The perceived usefulness and customers' satisfaction are included in this study. Few prior studies on IQ in a s-commerce context i.e., SNS-based commerce have been conducted, in particularly, investigating the IQ dimension effect on perceived usefulness and customers' satisfaction with s-commerce. This motivated us to conduct the research in this paper.

Information Quality Dimensions

From Table 1, previous studies of the IS success model in e-commerce indicate that information quality is one of the most important components affecting the perceived usefulness and customer satisfaction with e-commerce. This is in accordance with a study by Zaied (2012), who stated that information has a significant influence on IS success. Owing to the nature of the e-commerce environment, in which the system provides information to its customers, the quality of the information plays an important role in customer satisfaction. In the context of e-commerce, IQ refers to the content of an e-commerce site (Molla & Licker, 2001; DeLone & McLean, 2004) and the information that is presented on an e-commerce site (i.e., SNS-based commerce). This information is related to the core business (i.e., product and service information) and, includes outside information that is found on the SNS (e.g., reviews and opinions from SNS members). This information triggers and assists customers to initiate online transactions and to return to the e-commerce site on a regular basis (Molla & Licker, 2001). IQ has been found to have a major influence on (i) a website's perceived usefulness, as suggested by Seddon and Kiew (1996) and validated by Lederer et al. (2000). In addition, research by Ghasemaghahi and Hassanein (2016) found that 17 of 20 studies stated that IQ has a significant relationship with perceived usefulness. (ii) The use of an e-commerce system, as suggested by Molla and Licker (2001) and DeLone and McLean (2004) and validated by Brown and Jayakody (2008). Some studies (Rai et al., 2002; Wang & Liao, 2008) also validated the relationship between IQ and user satisfaction. The results found that IQ has a strong influence on user satisfaction with a system. Since the advent of the Internet, exploring and investigating the IQ attributes of use and user satisfaction with a system has received a lot of attention. In the e-commerce field, IQ attributes such as completeness (Nelson et al., 2005; Schaupp et al., 2009), ease of understanding (Fang et al., 2011), accuracy (Nelson et al., 2005; Kim et al., 2012), timeliness (Nelson et al., 2005; Kim et al., 2012), and personalization (Fan & Poole, 2006; Liang et al., 2009) should be considered when expecting prospective buyers to initiate online transactions and return to the site on a regular basis (Molla & Licker, 2001; DeLone & McLean, 2004). In addition, Ghasemaghahi and Hassanein (2016) stated that information that is complete, accurate, understandable, current, and relevant to consumers is needed for the success of a website.

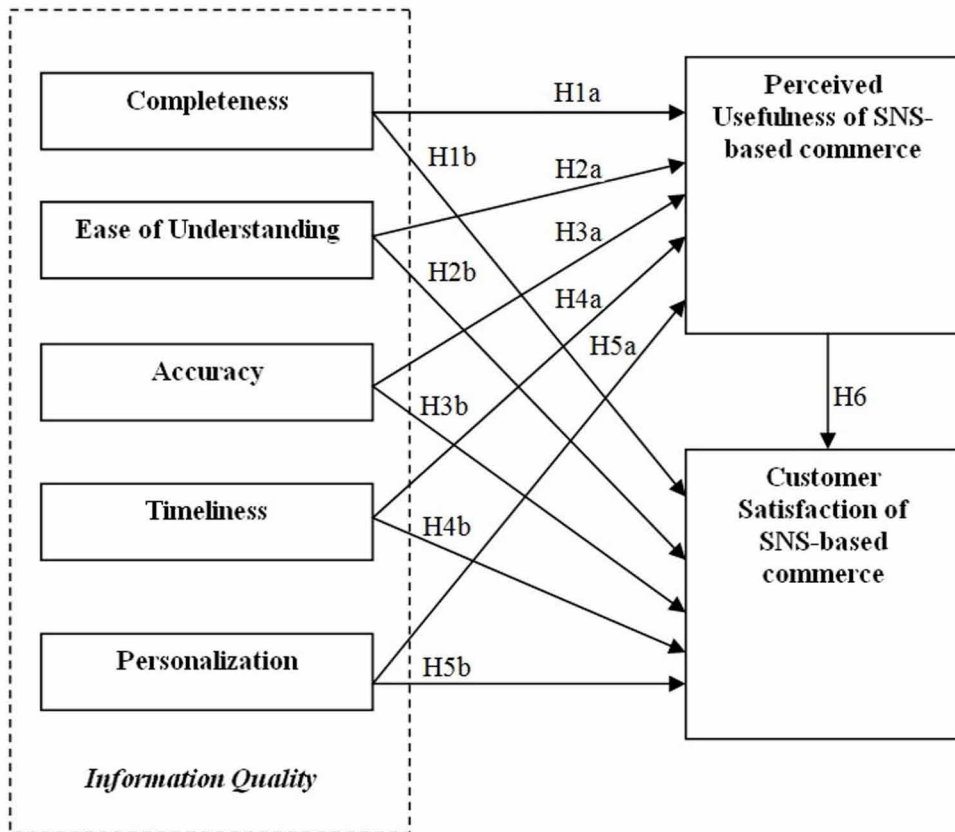
RESEARCH MODEL AND HYPOTHESES DEVELOPMENT

Our research model is based on the IS success model (DeLeon & McLean, 2004). Rather than adopting and adapting the entire model, we focused on the relationship between the IQ and the dimensions of perceived usefulness and customer satisfaction by thoroughly examining the IQ attributes. We used the customer satisfaction construct instead of user satisfaction after considering the customer e-commerce satisfaction construct by Molla and Licker (2001). Instead of using the use construct, we adopted perceived usefulness, as proposed by Seddon and Kiew (1996), since our main concern was to measure attitudes rather than behaviors (Rai et al., 2002; Lai et al., 2006). The current research model is presented in Figure 1.

In this study, the definition of customer satisfaction is derived from Molla and Licker (2001) and is defined as the degree of customer response related to his/her experience in all aspects of commerce activities (such as information, transaction, and service and support of products and services) that are conducted via SNS. When customers experience the pleasure they expected from the benefits, they are more likely to be satisfied (Lai et al., 2006). IQ is explained by the following five selected constructs:

Completeness. Completeness refers to the extent to which information is available and has sufficient breadth and depth for the task at hand (Nelson et al., 2005). In this context, the information

Figure 1. Research model: IQ effect on perceived usefulness and customer satisfaction in SNS-based commerce



provided by sellers in SNS-based commerce is considered to be complete if the information sufficiently assists customers in making decisions on commerce activities (Wang & Liao, 2008; Chen et al., 2013). Therefore, it can be concluded that the completeness of information of the highest quality will simplify customer commerce activities, leading to perceived usefulness and customer satisfaction with the system. This is supported by previous studies that included completeness as an informative attribute of IQ, which was found to be a determinant of perceived usefulness (DeLone & McLean, 2004; Brown & Jayakody, 2008) and customer satisfaction in e-commerce systems (DeLone & McLean, 2004; Sharkey et al., 2010). Thus, we formed the following hypotheses:

H1a: Completeness has a positive effect on the perceived usefulness of SNS-based commerce.

H1b: Completeness has a positive effect on the customer satisfaction of SNS-based commerce.

Ease of understanding. Ease of understanding is the clarity of the information, meaning that the information is easy to comprehend (Fang et al., 2011). This is particularly important in SNS-based commerce systems, where the products, services, and commerce process information should be as accessible and simple as possible to help SNS users make important commerce decisions. Thus, the ease of understanding the information affects the perceived usefulness and customer satisfaction with online systems (Sharkey et al., 2010; Fang et al., 2011). Thus, we hypothesized:

H2a: Ease of understanding has a positive effect on the perceived usefulness of SNS-based commerce.

H2b: Ease of understanding has a positive effect on the customer satisfaction of SNS-based commerce.

Accuracy. Generally, accuracy is interpreted as the degree to which information is correct, unambiguous, meaningful, believable, and consistent (Nelson et al., 2005). In this context, the accuracy of information depends on how SNS based-commerce's consumers perceive that its information is accurate, correct, and valid. Falge et al. (2012) defined accuracy as the extent to which the information correctly represents an action or real-world state. The more accurate the information, the higher is the perceived usefulness of the system. It has been said that accurate website content allows customers to perceive lower risks and usefulness in order to better justify their decisions and help them to reach optimal decisions. This in turn affects perceived usefulness (Brown & Jayakody, 2008) and customer satisfaction (Fang et al., 2011). Therefore, maintaining the accuracy of the information quality is crucial for SNS-based commerce to sustain their customers. Thus, we hypothesized:

H3a: Accuracy has a positive effect on the perceived usefulness of SNS-based commerce.

H3b: Accuracy has a positive effect on the customer satisfaction of SNS-based commerce.

Timeliness. Timeliness is defined as the extent to which access to information is sufficiently up-to-date for the task at hand (Fang et al., 2011). When a website is not consistently updated and becomes outdated, it cannot deliver the expected performance and provides no added value to users; thus, those users will not use it (Kuo & Lee, 2009). The timelier the information, the higher is the perceived usefulness, leading to customer satisfaction (Wang & Liao, 2008; Fang et al., 2011). Timeliness is essential to the usefulness of information. New information provided after the information is already in use in a pivotal decision is merely history (Kuo & Lee, 2009). Thus, we hypothesized:

H4a: Timeliness has a positive effect on perceived usefulness of SNS-based commerce.

H4b: Timeliness has a positive effect on customer satisfaction of SNS-based commerce.

Personalization. Personalization means different things to different people, and its meaning often depends on the focus of the research (Fan & Poole, 2006). Therefore, personalization is the ability of SNS-based commerce to provide content and services that are tailored to individuals based on the knowledge of their preferences and behaviors. Personalization is an important approach for web strategies to focus on managing customer relationships by delivering unique value and benefits to the individual customer (Fan & Poole, 2006). Previous studies found that personalization has a significant effect on perceived usefulness (Liang et al., 2009; Chen et al., 2013) and a direct effect on customer satisfaction (Sharkey et al., 2010). Therefore, we hypothesized:

H5a: Personalization has a positive effect on the perceived usefulness of SNS-based commerce.

H5b: Personalization has a positive effect on the customer satisfaction of SNS-based commerce.

Perceived usefulness. Commonly, perceived usefulness is defined as the degree to which a user believes that using a particular system will enhance his/her job performance (Rai et al., 2002; Lai et al., 2006). It can be explained as the benefits that users believe they will receive after utilizing a particular system. In this case, perceived usefulness is concerned with the future benefits gained by the customer after performing commerce-related tasks via SNS. This implies that customers with a higher level of perceived usefulness experience greater satisfaction. The empirical evidence related to e-commerce (e.g., Brown & Jayakody, 2008; Chen et al., 2013) supported the relationship between perceived usefulness and customer satisfaction. Hence, we hypothesized:

H6: Perceived usefulness has a positive effect on the customer satisfaction of SNS-based commerce.

METHOD

Data Collection

In this study, respondents from Malaysia with experience shopping online via SNS were selected to examine the hypothesized relationship stated in the research model. We used a snowball sampling technique to obtain the data sample. We published the survey questionnaire on our SNS pages (i.e., Facebook, Twitter, and Instagram) and asked SNS friends to share the survey questionnaire on their pages. A total of 235 responses were received. After removing incomplete and duplicate responses, a total 189 responses were included in the sample for analysis.

Survey Questionnaire

The questionnaire was divided into two main parts. The first part collected basic information about the respondent's characteristics, including sex, age, education, employment, income, and SNS usage. The second part was developed based on the IQ attribute constructs, as stated in the research model. In this part, the items for each construct were adapted from previous research to fit the context of this study. A list of items for each construct is shown in the Appendix. For all measures, a seven-point Likert-type scale, ranging from "strongly disagree" (1) to "strongly agree" (7), was employed. Before conducting the main survey, the questionnaire was pre-tested with a small, convenient sample of 30 people to ensure a logical arrangement of questions and to confirm that all of the constructs were statistically free of problems in terms of the reliability and validity of items.

Data Analysis

Data were analyzed quantitatively using the Statistical Package for Social Science (SPSS) version 20.0. A principal component analysis was used to measure the validity of the constructs, and Cronbach's alpha was used to measure the reliability of the constructs. The hypotheses were tested using multiple linear regression.

RESULT

Demographic Characteristics

All 189 of the respondents who participated in the survey were from Malaysia, and all had shopping experiences via SNS. From the descriptive statistics, 61 (32.3%) respondents had only one SNS account, 58 (30.8%) respondents had two SNS accounts, 47 (24.7%) respondents had three SNS accounts, and 23 (12.2%) respondents had more than three SNS accounts. Facebook was the most popular SNS used by the respondents: 135 respondents had used Facebook, 35 respondents had used Instagram, and 5 respondents had used Twitter for SNS shopping activities. Most of the respondents reported spending two to four hours a day on SNS. Other detailed characteristics, including sex, age, education, employment, and income, are presented in Table 2.

Construct Validity and Reliability

This study employed a total of seven constructs. Five constructs represented the IQ as independent variables, completeness, ease of understanding, accuracy, timeliness, and personalization. Two constructs served as dependent variables: perceived usefulness and customer satisfaction. Three items were set for each of the IQ characteristic constructs, and four items were set for both the perceived usefulness and the customer satisfaction constructs. A principal component factor analysis was conducted to validate the constructs. Five items were eliminated from the main analysis owing to factor loading values of less than 0.50 (<0.50): one item from ease of understanding, one from timeliness, one item from perceived usefulness, and two items from the customer satisfaction construct (Field, 2013). A construct with a Cronbach's alpha value of 0.70 or higher was considered to be reliable. All

Table 2. List of demographic characteristics

Demographic variable	Sample composition (<i>n</i> = 189)	
	<i>n</i>	Percent (%)
Sex		
Male	83	43.9
Female	106	56.1
Age		
20– 29 years	152	80.4
30– 39 years	33	17.5
40– 49 years	4	2.1
Education		
Some high school	17	9.0
High school diploma	14	7.4
Bachelor’s Degree	141	74.6
Master’s Degree	14	7.4
PhD	3	1.6
Employment		
Private sector	65	34.4
Public sector	32	17.0
Self-employed	21	11.1
Student	60	31.7
Unemployed	11	5.8
Income (monthly) in (MYR) Malaysian ringgit		
Less than MYR 1500	90	47.6
MYR 1500 – MYR 2999	53	28.0
MYR 3000 – MYR 4900	24	12.7
MYR 5000 – MYR 6999	9	4.8
MYR 7000 – MYR 8900	4	2.1
More than MYR 9000	9	4.8

of the constructs met the reliability criteria, with a Cronbach’s alpha value higher than 0.70 (Field, 2013). Table 3 shows the detail validity and reliability analysis results.

Constructs Correlation

According to Table 4, the correlation matrix showed that most of the constructs had a moderate to strong correlation (0.500–0.800). Although most of the correlation points were between 0.500–0.699, some correlation points exceeded 0.700. Our concern was that this correlation might cause a potential multicollinearity problem. To identify a multicollinearity problem, we formally examined the data using the variance inflation factor (VIF), a common measure of multicollinearity in regression analysis, which indicates the degree to which each predictor variable is explained by other predictor variables (Field, 2013). A VIF value less than 5 (<5) and a threshold VIF value less than or equal to 10 (i.e., tolerance >0.1) indicated that the constructs were free from a multicollinearity problem (Field, 2013). The VIF results showed that the values of all constructs were less than 5 (i.e., 2.100–3.002), and the tolerance variation value was greater than 0.1 (i.e., 0.333–0.476). These results illustrated the lack of a multicollinearity problem in this study.

Hypothesis Testing

Multiple linear regression analysis results, as shown in Table 5 (5a), indicated that the overall regression model for the relationship between the IQ and the perceived usefulness of SNS-based commerce was significant at the $p < 0.001$ level ($F = 40.246$, with five degrees of freedom, with adjusted $R^2 = 0.511$). Completeness ($\beta = 0.353$, $t = 4.528$, $p < 0.001$), ease of understanding ($\beta = 0.214$, $t = 2.745$, $p < 0.01$), and personalization ($\beta = 0.279$, $t = 3.242$, $p < 0.01$) significantly affected the perceived

Table 3. Construct validity and reliability analysis results

Items	Factor Loading							Cronbach's alpha
	CP	EU	AC	TM	PS	PU	CS	
IQCP1	.748							.869
IQCP2	.770							
IQCP3	.536							
IQEU5		.703						.865
IQEU6		.728						
IQAC7			.751					.875
IQAC8			.746					
IQAC9			.643					
IQTM10				.797				.817
IQTM12				.763				
IQPS13					.573			.851
IQPS14					.641			
IQPS15					.790			
PU1						.710		.892
PU3						.791		
PU4						.781		
CS1							.779	.912
CS4							.849	

*Note: CP: Completeness; EU: Ease of Understanding; AC: Accuracy; TM: Timeliness; PS: Personalization; PU: Perceived Usefulness; CS: Customer Satisfaction

Table 4. Construct correlation

Constructs	Pearson's Correlation Coefficient						
	CP	EU	AC	TM	PS	PU	CS
CP	1						
EU	.676**	1					
AC	.656**	.629**	1				
TM	.580**	.641**	.689**	1			
PS	.664**	.646**	.729**	.703**	1		
PU	.664**	.611**	.548**	.501**	.628**	1	
CS	.626**	.603**	.533**	.526**	.573**	.701**	1

** $p < 0.01$

usefulness of SNS-based commerce. Therefore, hypotheses H1a, H2a, and H5a were supported. The remaining IQ attributes of accuracy ($\beta = 0.010, t = 0.123$) and timeliness ($\beta = 0.044, t = 0.549$) did not significantly contribute to the variance in customer-perceived usefulness of SNS-based commerce. Therefore, at level $p < 0.05$, hypotheses H3a and H4a were rejected.

As for the relationships shown in Table 5 (5b) between the IQ and perceived usefulness and customer satisfaction with SNS-based commerce, the results showed that the overall regression model was significant at the $p < 0.001$ level ($F = 39.172$ with six degrees of freedom), with an adjusted $R^2 = 0.549$. Completeness ($\beta = 0.156, t = 1.978, p < 0.05$) and perceived usefulness ($\beta = 0.439, t = 6186, p < 0.001$) significantly affected the customer satisfaction of SNS-based commerce. Therefore, hypotheses H1b and H6 were supported. Ease of understanding ($\beta = 0.149, t = 1.877$), accuracy ($\beta = 0.019, t = 0.239$), timeliness ($\beta = 0.097, t = 1.258$), and personalization ($\beta = 0.019, t = 0.225$) did not significantly affect the customer satisfaction of SNS-based commerce. Thus, at level $p < 0.05$, hypotheses H2b, H3b, H4b, and H5b were rejected.

DISCUSSION

Our analysis results indicate that completeness was the dominant determinant since it significantly affected both the perceived usefulness and customer satisfaction of SNS-based commerce. This finding is in agreement with previous studies (DeLone & McLean, 2004; Zheng et al., 2013; Chen et al., 2013), implying that, when participating in SNS-based commerce, customers rely on having complete information to assist them in making decisions. These results suggest although there is limited function (Chen et al., 2016) for sellers in a SNS-based commerce environment, other functions such as comments may contribute to the completeness of the information in assisting the buyer. This is consistent with a Chen et al. (2016) finding, which stated that most frequency information found in s-commerce (i.e., a Facebook group) is textual information, and in this kind of information, completeness leads to high impulsiveness on the part of the consumer to buy a product. The completeness of the information it is not mainly about the product information (i.e., price, brand, description, instructions for use) which buyers obtain it from sellers and other buyers through comment function, but is also a complete set of task-related information on what should buyers do when doing purchasing. Thus, completeness contributes to a high perceived usefulness and to customer satisfaction of SNS-based commerce.

Our findings support the viewpoint that an ease of understanding affects the perceived usefulness, implying that simple, well-organized information that is easy to read and understand is very helpful for customers when making online shopping decisions (Jeong et al., 2003). However, the viewpoint that the ease of understanding affects customer satisfaction was not supported. Liang et al. (2009) stated that personalization has a significant effect on the perceived usefulness. This is similar to our findings and is in line with a study by DeLone and McLean (2004), which implied that SNS-based commerce must be able to provide tailored information to customers, based on customer knowledge

Table 5. Multiple regression analysis results

5a. Regression analysis between IQ and Perceived Usefulness			
Model Summary			
Adjusted R²: .511, df: 5, F: 40.246, p<0.001			
Coefficients			
Variables	β	t	Sig
Completeness	.353	4.528	.000***
Ease of Understanding	.214	2.745	.007**
Accuracy	.010	.123	.904
Timeliness	.044	.549	.584
Personalization	.279	3.242	.001**
5b. Regression analysis between IQ, Perceived Usefulness, and Customer Satisfaction			
Model Summary			
Adjusted R²: .549, df: 6, F: 39.172, p<0.001			
Coefficients			
Variables	β	t	Sig
Completeness	.156	1.978	.049*
Ease of Understanding	.143	1.877	.062
Accuracy	.019	.239	.811
Timeliness	.097	1.258	.210
Personalization	.019	.225	.822
Perceived Usefulness	.439	6.186	.000***

***p<.001, **p<.01, *p<.05

and preferences, to encourage the perceived usefulness of a system. However, we discovered that personalization did not significantly affect customer satisfaction.

Surprisingly, timeliness and accuracy did not significantly affect either the perceived usefulness or customer satisfaction of SNS-based commerce. This result contradicts a study by Kuo and Lee (2009). One of the possible reasons for this, as suggested by Cheung et al. (2008), is that timeliness is associated with a particular product, service, and event, especially an event that has already taken place. However, in our study, we focused only on general SNS-based commerce, rather than focusing on a particular product, service, or event. This result suggests that SNS-based commerce's consumers incorporate past information when they make decisions (Filiari & McLeay, 2013). Accuracy did not significantly affect the perceived usefulness in our chosen setting. This can be explained by the way that customers perceived accuracy. Usually, accuracy occurs through the confirmation or disconfirmation of user knowledge (Cheung et al., 2008). If a comment or post in SNS-based commerce matches what customers already know, they are likely to believe that the information is accurate. However, if the comment or post does not match what customers already know, they will believe that the information is inaccurate and may perceive it as being risky. This may lead customers to perceive SNS-based commerce as less or not useful, leading to customer dissatisfaction. Another factor that contributes to the insignificant relationship between accuracy and perceived usefulness and customers' satisfaction with SNS-based commerce is the nature of SNS-based commerce and its consumers. Unlike SNS-based commerce, in an e-commerce environment, the owner of an e-commerce website takes most of the control of the website so that—the accuracy of the products in term of picture and textual information (i.e., description of the product and tasks related to the buying process) are easily monitored. However, in SNS-based commerce, sellers have limited control over the information, and sellers from a diverse background will lower the accuracy of information. For example, a spelling mistake will contribute to incorrect information, the low quality of a picture will affect the real state of the picture, and comments from other SNS-based commerce consumers may lead to biased information, as Zaid (2012) and Chen et al. (2016) stated. They defined accuracy in which information is correct and free from bias comments and is able to represent the real-world state. Therefore, in SNS-based commerce, when the accuracy of information is difficult to achieve, consumers search for a completeness of information. This is supported by the findings of Xu et al. (2013) and Chen et al. (2016), who demonstrated that completeness has a high rank compared to accuracy.

Concurrent with previous research, this study showed that customer satisfaction is affected by the perceived usefulness of a system (Rai et al., 2002; Lai et al., 2006; Brown & Jayakody, 2008; Chen et al., 2013). Therefore, perceived usefulness is the most important element in SNS-based commerce since it can affect customer satisfaction.

Overall, our findings revealed (as in the model summary in Table 5) that, as a whole, perceived usefulness and customer satisfaction were significantly affected by the IQ, although not all individual IQ attributes contributed to the results. The result in which IQ significantly affects the perceived usefulness and customer satisfaction is in accordance with the findings of Ghasemaghahi and Hassanein (2016), who stated that most of the previous studies in this area yielded the same results. The results showed that Malaysian SNS-based commerce users are concerned about the availability of information. One possible reason for their concern regarding information quality may be related to the Internet itself. This is in line with Wong (2014a, 2014c), who stated that Malaysian online shoppers are not satisfied owing to Internet security concerns, Internet usage incompetence, and the hassle of Internet shopping.

CONCLUSION

From a theoretical standpoint, this research adapted the IS success model to investigate the effects of IQ attributes on perceived usefulness and customer satisfaction of SNS-based commerce. Many previous studies adapted and validated the IS success model in the e-commerce context and found

that perceived usefulness and customer satisfaction are strongly affected by IQ. Although many studies were conducted to identify the possible IQ characteristics in an e-commerce context, a limited number of studies tested and examined the direct effect of the identified IQ characteristics on perceived usefulness and customer satisfaction, particularly in an s-commerce context (i.e., SNS-based commerce). Therefore, this study attempted to fill this gap by empirically examining the identified IQ attributes' effects on perceived usefulness and customer satisfaction of SNS-based commerce. The research findings that indicate the IQ attributes should be emphasized in SNS-based commerce. Further research is needed to explain why some of the identified IQ characteristics contradicted significant findings from previous research.

From a practical point of view, studying the perceived usefulness and customer satisfaction is essential for practitioners (i.e., online sellers and SNS-based commerce owners). To maintain a competitive advantage, practitioners should focus their efforts on improving their systems (in this case, SNS-based commerce systems) to prevent their customers from switching to competitors. As IQ attributes act as external variables in affecting the perceived usefulness and customer satisfaction, practitioners need to provide the highest quality of information. The research findings suggest that practitioners should improve the completeness, ease of understanding, and personalization of the information they provide. Development of a suitable approach to improve the IQ should be considered. For example, to improve the customers' ease of understanding the information, practitioners should provide simple and clear directions to organize their information (Jeong et al., 2003). This can be accomplished by using simple words and standard language (e.g., avoid using bombastic language or words with unclear meanings) and by organizing the steps and directions in a simple manner (e.g., use numbers and arrows instead of using only pictures). Before suggesting an approach for improvement, practitioners should use this research to evaluate the strengths and weaknesses of their information. In addition, these research findings help practitioners to prioritize information characteristics in SNS-based commerce. We conclude that this study's findings can act as guidelines for practitioners to provide high-quality information to ensure that customers are satisfied with their SNS-based commerce experiences.

We recognize several limitations in this research. First, our research model was validated only with data from Malaysia. Generalizing it to apply to other countries might be limited owing to differences (e.g., culture, society, and situations). Second, this research was conducted within the specific domain of e-commerce (C2C and B2C) related to s-commerce. Therefore, this study might not represent all e-commerce domains that might be applicable for s-commerce. Third, although there are many IQ attributes, this study used only certain attributes that we believed to be suitable and crucial for the context of the study. These were obtained after performing a related literature review. Despite the limitations, we believe this study yields important and reasonable findings. This study can provide directions to other researchers, as well as to IT managers who are interested in the IQ of their system or web topic. Therefore, to provide insightful findings, we recommend that further research be conducted with expanded samples, e-commerce domains, and IQ characteristics.

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APPENDIX A: QUESTIONNAIRE: ITEMS MEASURED FOR EACH CONSTRUCT

Table 6. Questionnaire

Construct	Items
Completeness	IQCP1 This SNS provides a complete set of information related to my shopping activities. IQCP2 This SNS provides information including all necessary value for my shopping activities. IQCP3 This SNS provides information that addresses the needs of my shopping activities.
Ease of understanding	IQEU4 This SNS provides information with a clear meaning.* IQEU5 This SNS is easy to read. IQEU6 This SNS provides information that is understandable.
Accuracy	IQAC7 This SNS produces correct information. IQAC8 This SNS provides accurate information. IQAC9 This SNS provides valid information.
Timeliness	IQTM10 This SNS provides the most recent information. IQTM11 This SNS produces the most current information.* IQTM12 This SNS always updates their information.
Personalization	IQPS13 This SNS provides effective one-on-one information. IQPS14 This SNS produces information customized for me. IQPS15 This SNS addresses my preferences.
Perceived usefulness	PU1 Using this SNS enhances my shopping productivity. PU2 Using this SNS makes it easier to perform my shopping activities.* PU3 Using this SNS improves my performance (e.g., saves money). PU4 Using this SNS enables me to accomplish my shopping activities more quickly.
Customer satisfaction	CS1 I am satisfied using this SNS to do my shopping activities. CS2 I am pleased with this SNS to do my shopping activities.* CS3 I am delighted with this SNS to do my shopping activities.* CS4 I like using this SNS to do my shopping activities. *Dropped from final analysis

*Dropped from final analysis

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