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Modeling Mobile Website Usability

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by

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Abstract

Smartphones have become a prevalent part of today's society. Smartphone users have begun using their phones to make purchases on the mobile web. This study focused on usability characteristics of mobile websites of large retail companies. The aim of this study was to conduct quantitative analyses building upon previous usability research both in the e-commerce and m-commerce realm. A sample population was obtained from a convenience sample recruited from a social media and email campaign. Respondents were asked to visit an assigned website and find three products for a friend, family member, or significant other. The data were analyzed quantitatively according to the constructs and proposed characteristics of m-commerce usability. As a result, this study contributed to the fields of marketing and information systems by revealing that website identity and website emotion are related to usability. Further, it attempted to provide insight toward differences in the study results and past research on usability.

Key Words: m-commerce, usability, e-commerce, Microsoft Usability Guidelines

Dedication

Dad, Mom, and Drew:

Thank you for being there for me since day one. You guys are the best.

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m-commerce	mobile commerce
e-commerce	electronic commerce
MUG	Microsoft Usability Guidelines
TAM	Technology Acceptance Model
VIF	variance inflation factor

INTRODUCTION

E-commerce has been on the rise in recent years. In 2007, the U.S. Department of Commerce reported that U.S. retail e-commerce sales topped $93 billion in 2005—a 22.2 percent growth from the previous year. Traditionally, most e-commerce transactions have taken place on a desktop (Agarwal and Venkatesh 2002).

Mobile devices, however, have increased in popularity in recent years and are beginning to play a significant role in the e-commerce realm (Lobo, Kaskaloglu, Kim, Herbert 2011). Coda Research Consultancy forecasted that total smartphone units sold between 2010 and 2015 would total 2.5 billion (2010). According to Gartner (2015), smartphone sales surpassed one billion units in 2014 alone. Coda Research Consultancy also expected that mobile Internet use via smartphones would increase 50 fold by the end of 2015 (2010). Cellphone carriers and service providers have continually made improvements in data services to help consumers access the mobile web and m-commerce websites (Venkatesh et al. 2006).

M-commerce, as defined by Norman Sadeh (2002), is an emerging set of applications and services people can access from their web-enabled mobile devices. Wu and Wang (2005) refer to m-commerce as any transactions with a monetary value implemented via a mobile device. Due to the surge in the amount of smartphone users, businesses have a huge opportunity available with the increase of mobile web usage (Venkatesh, Ramesh, & Massey 2003). However, website usability in the m-commerce realm is an area that has not been researched thoroughly (Venkatesh, Ramesh, Massey 2003). Thus, this research seeks to study factors that contribute to mobile website usability.

BACKGROUND

Usability as defined by ISO 9241 is *"the extent to which a product or a service can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use."* Pedley (2007) defined usability in an e-commerce context as a measure of how easy it is for a website visitor to complete a task. Usability is a prominent measure of accessibility and acceptability, and a correlation exists between website usability and website usage (Downing and Liu 2009). Increased website usage often leads to an increase in customers (Nielsen 2000). Usability research aims to understand the common factors and principles that lead to an increase of usability, and subsequently, an increase in web traffic (Downing and Liu 2009; Nielsen 2000; Cappel and Huang 2007). Usability is also a valid metric for determining overall success of an organization's web presence (Agarwal and Venkatesh 2002).

Prior research on website usability has evaluated different dimensions that affect overall usability. Eighmey and McCord (1998) looked into nine factors that affect usability including dimensions such as personal involvement, useful information, and simplicity of organization. In 2002, Agarwal and Venkatesh (2002) conducted website usability research by assessing the Microsoft Usability Guidelines (MUG) by measuring the dimensions of content, ease of use, promotion, made-for-the-medium, and emotion. Venkatesh and Ramesh (2006) found that the MUG model outperformed the widely accepted Technology Acceptance Model (TAM) both in terms of richness and variance explained (about 70 percent compared to 50 percent).

Downing and Liu (2014) found that previous website usability research using the MUG model lacked consideration of important dimensions such as identity of a website

(Nielsen 2000), trust assurance (Everard and Galletta 2006), download delay, and responsiveness (Palmer 2002). In Downing and Liu's (2014) retail website usability research using an altered MUG model, they found that identity, download delay, trust assurance, made-for-the-medium, responsiveness, and emotion were all significant dimensions of website usability. They found that the elements content and ease of use of the original MUG-based model were not significant contributors to retail website usability.

Despite the amount of research on e-commerce website usability, mobile web browsing is very different from desktop web browsing. Not enough research exists on the topic of mobile web site usability (Venkatesh, Ramesh, & Massey 2003). The mobile web browsing experience is largely about saving time, varying locations, and convenience (Venkatesh et al. 2003). There are many limitations to mobile web browsing that include small screen sizes, download delays, inaccessible Flash content, and awkward input (Lobo, Kaskaloglu, Kim, Herbert 2011; Tsiaousis and Giaglis 2014). Screen sizes on mobile devices limit the amount of content that a user can be exposed to at one time (Venkatesh et al. 2003). This can cause frustration for users attempting to make purchases on m-commerce websites (Lobo et al. 2011). Download speeds for cellular data might limit the rate at which a mobile webpage is delivered to a user. Nielsen (2000) argues that users are likely to leave a site if the download time takes more than ten seconds. In previous research using the MUG-based model to assess m-commerce website usability, ease of use was significantly more important in wireless contexts (Venkatesh et al. 2003). However, ease of use was not found to be a significant contributor of website usability in Downing and Liu's (2014) research on retail e-

commerce. Venkatesh et al. (2003) also found that emotion ranked as a significantly less important dimension of mobile website usability while Downing and Liu (2014) found that it was a significant contributor to website usability. Therefore, there exists a need for more research to be done on usability in the m-commerce realm.

This study will examine the dimensions of website usability that have been proven to be significant (the MUG model) and measure the usability of m-commerce web sites using them. This study will consider the additional factors that Downing and Liu (2014) proposed to be important in the retail e-commerce realm: identity of a website, trust assurance, download delay, and responsiveness. Motivations for use (economic and entertainment) will also be studied to determine if they are related to usability.

The purpose of this research is to expand on previous usability research by applying it to the m-commerce realm. The dimensions that will be used to evaluate m-commerce website usability will be based off of Downing and Liu's (2014) altered MUG model: identity, download delay, content, ease of use, trust assurance, made-for-the-medium, responsiveness, promotion, and emotion with the addition of motivations for use (economic and entertainment). The study should provide understanding as to what is important to m-commerce users to create a more compelling experience and drive revenue.

RESEARCH FRAMEWORK AND HYPOTHESES

The following are descriptions for each construct in the research framework:

Identity

Many websites have difficulties differentiating from others because of their similar presence (Downing and Liu 2014). A website is often the first point of contact for a consumer, as users will form their impressions based on this initial information (Cotlier 2001). Customers see websites as a representation of a company's resources and capabilities; therefore, it is important for businesses to establish their identity on their websites (Koufaris and Hampton-Sosa 2004). This suggests the following hypothesis:

H_1: Identity will have a significant positive effect on website usability.

Download Delay

Download delay is the initial request for a webpage by a user in a browser. Green and Pearson (2011) define download delay as *the response time for each activity made by the user on the website.* Download delay is one of the most crucial aspects of e-commerce quality (McKinney et al. 2002, Torkzadeh and Dhillon 2002, Pavlou and Fygenson 2006). Mobile users are very sensitive to load times (Hoehle and Venkatesh 2015). An increase in load times can also cause users to make more errors while using a mobile device (Hummel et. al 2008). This suggests the second hypothesis:

H_2: Download delay will have a significant negative effect on mobile website usability.

Content

The MUG defines content as entertainment or knowledge that helps its audience accomplish some important task (Keeker 2008). Content is a measure of the informational capabilities of a website (Agarwal and Venkatesh 2002). A good website shows clarity and purpose in its content (Everard and Galletta 2006). Lynch and Horton (2009) concluded that the first thing a user sees on a webpage is the overall pattern of the content on the page which has a significant impact on the user's experience of the website. It has been found that the completeness of the information is a key part of any successful website (Varian and Shapiro 1999). Consumers browsing a website for products rely on content to discover information that sometimes the brick-and-mortar store cannot provide (Alba et al. 1997; Lynch and Ariely, 2000). This suggests the following hypothesis:

H_3: Content will have a significant positive effect on mobile website usability.

Ease of Use

Ease of use is the user's amount of mental effort required to use a website (Venkatesh and Agarwal 2002). Ease of use can also be described as the ease of effort for a consumer to successfully use a website (Massey et al. 2005). Too much information on a website can lead to problems such as information overload and can make it difficult for a customer to locate desired information (Ranganathan and Ganapathy 2002). Ease of use has been found to be a significant contributor to usability in the past (Al-Masoudi et al. 2010). This suggests the fourth hypothesis:

H_4: Perceived ease of use will have a significant positive effect on mobile website usability.

Trust Assurance

Many consumers who shop online are concerned about personal privacy and the security of transactions online and in the m-commerce realm (Wu and Wang 2005). Customers must be willing to provide personal information (and trust the business with it) in order for the business to advance customer relationships through targeted marketing communications (Everard and Galletta 2006). Successful business relationships require businesses to describe their information collection practices and policies on the website (Downing and Liu 2014). Despite this need for trust, most e-commerce site providers ignore the need to be concerned with various privacy and security practices (Wu and Wang 2005). Some level of trust must develop between the customer and the business for transactions to take place (Kim, Ferrin, & Rao 2008). This suggests the following hypothesis:

H_5: Trust assurance will have a significant positive effect on the mobile website usability.

Made-for-the-Medium

Made-for-the-medium refers to tailoring a website to support the type of community the business wants to foster (Keeker 2008). One-to-one marketing research has shown that websites should be tailored to each customers' specific needs (Peppers et al. 1999). The Internet provides an opportunity to marketers to personalize and customize websites to consumers online (Day 2000). By remembering knowledge about the consumer like credit card information, websites can streamline user actions and reduce the overall amount of time needed to complete a transaction (Massey et al. 2005). Marketers should tailor targeted communications using means that are deemed as

appropriate using this medium. Online chat options and consumer polls provide opportunities for businesses to create a sense of community online (Massey et al. 2005). This suggests the sixth hypothesis:

H_6: Made-for-the-medium will have a significant positive effect on mobile website usability.

Responsiveness

Responsiveness is a key component of system quality (DeLone and McLean 2004). Green et al. (2011) defined responsiveness as *the presence of feedback to users and the availability of response from the site managers.* Poor responsiveness can motivate consumers to stop using an e-commerce platform (DeLone and McLean 2004). DeLone and McLean (2004) also found that responsiveness was related to service quality. Prior research suggests that feedback options and access to previous asked questions (FAQ) are important for the customer when engaging in online activities on the Web (Evans and Wurster 2000; Downing and Liu 2014). This suggests the following hypothesis:

H_7: Responsiveness will have a significant positive effect on mobile website usability.

Promotion

Promotion captures the advertising of a website on the Internet and other media (Agarwal and Venkatesh 2002). Promotion should communicate the primary features, goals, or themes of the site. It has to convey an appealing attitude toward its target audience (Keeker 2008). Wang (2008) concluded that consumers use advertisements on websites as a source for credible information if they come from a third party. Jiang and

Liu (2012) found that promotional campaigns can lead to an increase in sales if the campaigns are tailored to a consumer's browsing habits online. Wu, Cook, and Strong (2005) also found that various types of promotions on websites lead to an increased amount of time spent on a webpage, which is related to an increase in sales. This suggests the following hypothesis:

H_8: A well designed promotion will have a significant positive effect on mobile website usability.

Emotion

Information systems literature suggests that the likelihood of a repeat visit to a website is enhanced when the visitors find the visit enjoyable (Downing and Liu 2014). Emotion, as defined by Agarwal and Venkatesh (2002), deals with the affective reactions by consumers while visiting a website. Although online retailers may find it difficult to replicate the in-store emotional and sensory effects on a consumer (Rohm and Swaminathan 2004), Keeker (2008) says that it is important for a website to have information organized in such a manner that leads the user toward an emotional climax that maximizes the consumer's emotional reactions. This leads to the hypothesis:

H_9: Emotion will have a significant positive effect on the mobile website usability.

Motivation for Use (Economic & Entertainment)

Chen (2012) defined motivation as *the basic driving force behind all actions of the consumer.* Shoppers can generally be divided into two groups: value-based, task-oriented, and economically concerned shoppers and entertainment-seeking consumers (Büttner et al. 2013). A consumer's classification is dependent upon his or her mindset

while shopping. Büttner et al. (2013) concluded that online retailers can tailor specific parts of their website to deliver a shopping experience that fits with a consumer's mindset. Some online shoppers shop online for the cost-savings that they may encounter (Lester et al. 2005). Previous consumer behavior research has shown that consumers sometimes shop purely for entertainment reasons and to relieve stress (Jamal et al. 2006). The amount of entertainment a shopper is experiencing is important because it can steer a consumer's journey on a website (Kim et al. 2005). This suggests the hypotheses:

H_{10}: Motivation for Use (Economic) will have a significant positive effect on mobile website usability.

H_{11}: Motivation for Use (Entertainment) will have a significant positive effect on mobile web site usability.

RESEARCH METHODOLOGY AND DATA COLLECTION

This study was based on prior retail website usability research conducted by Downing and Liu (2014) who used the Fortune 500 list to select websites for respondents to browse. This study consisted of the use and review of mobile versions of retail websites by respondents. This research used three different mobile retail websites: *www.sears.com*, *www.dollargeneral.com*, and *www.target.com*. These websites were selected from a pilot study that asked respondents to choose three Fortune 500 company websites that were high quality, acceptable quality, and low quality (Target, Sears, and Dollar General, respectively). Table 1 lists the three websites used in this study and the number of survey respondents who visited each website.

Respondents were taken from a convenience sample recruited by a social media campaign and mailing lists at a university. Respondents were randomly assigned one of the three websites listed in Table 1. Each respondent had to browse the website on an internet connected mobile device. Respondents were asked to imagine that he or she was shopping for a friend, family member, or significant other. Each respondent was given the task to find three products from different product categories on the website and add them to the online shopping cart. Respondents were also asked to locate and read the mobile website's privacy policy or Frequently Asked Questions (FAQ) page. Respondents were incentivized to successfully complete the survey with a chance to win an online gift card to a large online web retailer. All measures in the questionnaire were done on a seven-point Likert scale ranging from "strongly disagree" to "strongly agree." The questionnaire was created using the online survey software *Qualtrics* and distributed electronically through social media and email.

The sample ranges in age from 18 to 59 with 18 male and 44 female respondents. The average respondent age was 25. Of the 85 responses to the survey, 23 responses were deemed unusable leaving 62 survey responses as valid. The unusable responses either failed quality check questions or did not complete the task given to respondents.

The questions from the survey instrument used are included in the Appendix. Table 2 shows the mapping of the research model's constructs to the questions in the survey.

RESULTS

The standard version of SPSS for Windows, Release 23.0 was used to perform all analyses. Reliability for each construct was assessed using Cronbach's Alpha for scales

with two or more items. The following constructs had two or more scale measurements and had reliability evaluated using Cronbach's alpha: download delay, content, ease of use, trust assurance, made-for-the-medium, responsiveness, promotion, emotion, website usability, motivation for use (economic), and motivation for use (entertainment). The identity construct only used a single-item indicator in the survey. For the purpose of this research, a Cronbach's Alpha of 0.7 or above was considered reliable. Table 3 shows the results for each construct's reliability.

The multi-item scales for each construct were averaged into one variable that represented the summated construct in a multiple regression analysis. Due to the low Cronbach's Alpha reliabilities for the constructs responsiveness, promotion, and emotion, single-item indicators for each of these items were used in the multiple regression analysis. Tables 4, 5 and 6 show the results of the multiple regression model.

DISCUSSION AND CONCLUSIONS

A multiple regression model was analyzed with usability as the dependent variable and identity, content, download delay, content, ease of use, trust assurance, made-for-the-medium, responsiveness, promotion, emotion, motivation for use (economic), and motivation for use (entertainment) as the independent variables. First, issues with multicollinearity were assessed by examining the variance inflation factors (Table 6). The variance inflation factor (VIF) value of five was the cut-off point used to determine if an issue with multicollinearity existed. None of the independent variables had an issue with multicollinearity (Table 6). Second, the F-value from the ANOVA was 10.255 (Table 5). The p-value of the ANOVA test of .000 shows that our research model

is significant. The .706 R-square in Table 4 indicates 70.6% of the variance in website usability is explained by the eleven factors in the research model. The significance levels of the coefficients of the research model in Table 6 indicate that two of the eleven hypotheses were significant contributors to mobile website usability: identity (p = .025) and emotion (p = .004). The other variables download delay (p = .611), content (p = .060), ease of use (p = .778), trust assurance (p = .057), made-for-the-medium (p = .192), responsiveness (p = .499), emotion (.210), motivation for use (Economic) (p = .456), and motivation for use (Entertainment) (p = .272) were determined to not be significant contributors to usability. Using the absolute values of each of the variables' standardized coefficients (Table 6), emotion (standardized beta coefficient .389) was determined to be the key driver of usability.

Identity

Identity was found to be a significant contributor to mobile website usability (p = .025). The t-value for identity was 2.310 (Table 6). Identity was also found to be significant contributors of usability in previous research (Downing and Liu 2014). Hypothesis 1 is supported. This concludes that website managers should pay particular attention to their business's identity as part of their mobile website.

Download Delay

Download delay was found to not be a contributing factor to mobile website usability (p = .611). The t-value for download delay was -.512 (Table 6). Conversely, other studies have shown that download delay has implications for website usability (Straub et al. 2002, Fui-Hoon Nah 2004) and is a significant contributor to website quality (Kim and Stoel 2004). In other research where download delay has not been

found to be a significant contributor to usability, download delay was measured as a perception (Green and Pearson 2011). This was also the case in this research. Individuals may have different perceptions of what is a delay in download speeds or page access times. Other individuals may be experienced with faster load times. It has also been shown that factors in the user's external environment can contribute to delayed load times and increase the amount of errors a user makes on a mobile device (Hummel, Hess, & Grill 2008). These factors affecting download delay were not controlled for in this study. Hypothesis 2 is not supported.

Content

Mobile website content was not found to be a contributing factor of usability ($p = 0.060$); however, it could be considered marginally significant. The t-value for content was 1.931 (Table 6). In past research, content has been found to be a significant predictor of perceived website usefulness (Green and Pearson 2011). Other studies have shown that content increases customer satisfaction (Kim and Stoel 2004). Past research has shown that there is a positive and direct relationship between customer satisfaction and perceived usability (Flavián et al. 2006). In m-commerce research, Maity (2010) found that content on m-commerce websites sometimes forced users to scroll excessively, creating a stressful shopping experience. Agarwal and Venkatesh (2002) found that content was the most important contributor to website usability; however, content's significance is highly dependent upon the task that the user is trying to accomplish. Given that this research gave each respondent a clear and defined task (i.e. find three products for a friend, family member, or significant other), users probably did not have to rely heavily on the mobile website's content to complete the task. Hypothesis 3 is not

supported. As mentioned in the upcoming limitations section, the small sample size also may have prevented this hypothesis from being supported.

Ease of Use

This study found that ease of use is not a significant contributor to mobile website usability (p = .778). The t-value was .283 (Table 6). This corresponds with research conducted by Kim and Stoel (2004) that found that ease of use was not a significant contributor that led to online customer satisfaction. In previous m-commerce research, ease of use has been found to be a predictor of attitude toward m-commerce instead of mobile website usability (Maity 2010). Previous research also showed that m-commerce tasks carried out by users are best to be kept simple. Interestingly, Massey et al. (2005) concluded that ease of use's significance toward website usability is contingent upon the user's eagerness to use new technology. The study showed that users that were accepting of newer technology like mobile web browsing contributed to ease of use's significance. The users in this research were not asked about their willingness to accept new forms of technology and web browsing. Hypothesis 4 is not supported.

Trust Assurance

The results of the study did not show that trust assurance was a significant contributor to usability, although results were close to significant (p = 0.057). The t-value for trust assurance was 1.950 (Table 6). Lester et al. (2005) found that lack of security features on a website to be the most important concern of e-commerce shoppers. The results for trust assurance could be explained by research conducted by Massey et al. (2005) that said that usability research should be conducted with segmented users ranging from *not willing to accept new technology* to *accepting new technology*. This coincides

with Wu and Wang's (2005) conclusion that some consumers may decide to make transactions online, but some may want to avoid a higher perceived risk associated with m-commerce. Just as the participants should have been segmented based on levels of perceived risk associated with shopping online, Lester et al. (2005) concluded that security was more important for consumers depending on the products that they were shopping for. Hypothesis 5 is not supported.

Made-for-the-medium

Made-for-the-medium was not found to be a significant contributor to mobile website usability ($p = .192$). The t-value was -1.323 (Table 6). Agarwal and Venkatesh (2002) found that made-for-the-medium was dependent upon the interaction between the product that the user was shopping for and the task he or she was trying to accomplish. Similar to the explanation for the research construct content's insignificance to usability, this research proposed a straightforward task. Based on an assessment of the qualitative responses received in the questionnaire, products selected also were gift-related in nature. Hypothesis 6 is not supported.

Responsiveness

Responsiveness was not found to be a significant contributor to usability ($p = .499$). The t-value was .681 (Table 6). In contrast, Downing and Liu (2014) found that responsiveness was a significant contributor to retail e-commerce usability. Despite responsiveness being important for e-commerce usability, previous research has emphasized the importance to distinguish between the differences of m-commerce and e-commerce in the minds of consumers (Maity 2010). Hypothesis 7 is not supported.

Promotion

Promotion was found not to be a significant contributor to usability ($p = .210$). The t-value for promotion was 1.272 (Table 6). Research by Massey et al. (2005) found that promotion's significance to usability is highly dependent upon the user's acceptance of new technology. Users in this survey were not segmented based upon their acceptance of new ways to browse the internet. Agarwal and Venkatesh (2002) found that promotion was only somewhat important to usability. They also concluded that promotion is only important for companies that are solely existing on the internet. Due to the fact that Dollar General, Sears, and Target all have "brick and mortar" operations, it is likely that these companies did not focus as extensively on promotion on the web. Hypothesis 8 is not supported.

Emotion

Emotion was found to be a significant contributor to usability ($p = .004$). The t-value of emotion was 3.045 (Table 6). The research by Massey et al. (2005) has been used to explain the lack of significance for the constructs ease of use and trust assurance. Their research also showed that emotion can vary in significance if the user base is skeptical about new technology. Although this research shows that emotion is a significant contributor to usability, past research shows that a website with emotional appeal may not lead to an increase in customer satisfaction (Kim & Stoel 2004). In this mobile context, however, it may be important to appeal to customers emotionally to guide them to a purchase. Agarwal and Venkatesh (2002) confirmed that emotion's significance is driven by the user's task and product choices. Interestingly, research has also shown that consumers display greater negative feelings than positive feelings about

decision-making on m-commerce than e-commerce and in-store shopping (Maity 2010). It is also important to note that the task given to respondents in this research was emotionally driven. Hypothesis 9 is supported.

Motivation for Use (Economic & Entertainment)

Both Motivation for Use constructs (Economic and Entertainment) were not found to be significant contributors to usability ($p = .456$; $p = .272$, respectively). The t-values for economic and entertainment motivations for use were 0.752 and -1.112, respectively. This coincides with the findings of Rohm and Swaminathan (2004) that found that commonly thought reasons why consumers shop online, to save time and for enjoyment, were not supported in their research. They concluded that online shopping possibly appeals to shoppers who are driven by functional motives rather than entertainment reasons. Lester et al. (2005) also found that fun and entertainment was not an important part of the online shopping experience. They did find, however, that entertainment was important to consumers when shopping for experience products like shoes and clothing. Ultimately, entertainment as an important part of the shopping experience depended largely on the products that the consumer was shopping for. However, entertainment is still an important aspect of the offline shopping experience for physical retail stores (Cinjarevic et al. 2011). Hypotheses 10 and 11 are not supported.

MANAGERIAL IMPLICATIONS

Marketing managers may benefit from the results reported here. The findings suggest that it is important for businesses to maintain their identity on their m-commerce websites. The qualitative portions of the questionnaire used in this research showed that a

lot of visitors to Target's website made note of the website's red and white colors, an element of their branding that is prominent in the business's brick-and-mortar retail stores. Emotions of the consumer should also be taken into consideration while creating and maintaining a mobile website. Marketers and website managers should create designs that create positive affective responses for users of m-commerce. Even though our research model has failed to relate download delay, content, ease of use, trust assurance, made-for-the-medium, responsiveness, and promotion, these factors are all important for businesses to keep in mind while maintaining an online presence (Straub et al. 2002; Green and Pearson 2011; Maity 2010; Lester et al. 2005; Agarwal and Venkatesh 2002; Downing and Liu 2014). Content and trust assurance were found to both be close to significant in this study. This suggests that these factors in particular should probably be given attention when considering the usability of a business's mobile website. The Microsoft Usability Guidelines that this and previous usability research were based on provide managers a framework to create a usable website for consumers (Venkatesh and Ramesh 2006). The shopping motivations considered in this study (Economic and Entertainment) were not related to usability; however, businesses should not ignore shopping motives (Rohm and Swaminathan 2004).

FUTURE RESEARCH AND LIMITATIONS

Some limitations of this research could provide a basis for future research. Respondents were not segmented on the basis of m-commerce adoption or new technology adoption. Future research dealing with m-commerce usability should also take user task into consideration. The task given to volunteers in this research was

emotionally driven in nature and could have possibly made an impact on the research results. Users in the study were free to access the Internet on his or her mobile device without any guidelines or Internet connectivity benchmarks that each device must meet. Future studies should control for the variance in Internet connection speeds by having respondents use the same Internet connection. Each respondent also self-reported answers to the questionnaire and the time taken to complete the task varied among respondents. Future research could observe respondents in a fixed environment instead to ensure the quality of data.

Another limitation of this research involved the research methodology. The sample used in this survey was a convenience sample and may not be fully representative of the population of m-commerce users. Only three websites were given to visitors to visit. Further studies should be done with a wider array of mobile websites.

The pilot study that preceded this research rated Dollar General's website as not very usable. The data from users who visited Dollar General in this study were included in the analysis. However, future research should be done to determine if different factors affect usability across websites categorized as not very usable to usable.

The sample size of the study is another limitation. The sample size is small (n = 62) compared to similar usability studies (Downing and Liu 2014). Sample frame errors could also exist within the data collected. The sample also is mostly young adults. A more diverse sample should be taken into consideration with future research.

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Appendices

Appendix A: Tables

Table 1. Websites Visited and Number of Survey Responses per Website

Website Address	**Company**	**Survey Respondents**
www.dollargeneral.com	Dollar General	16
www.sears.com	Sears Holdings	15
www.target.com	Target	31

Table 2: Map of Constructs with Survey Questions

Construct	Questions
Identity	I feel this website could distinguish itself compared to other retail websites I have visited before.
Download Delay	The speed in which the website provided information on the screen was fast enough. The rate at which the information was displayed was fast enough.
Content	I feel this website provided information relevant to the customer. I feel this website offered personalized information and layout. I feel this website provided timely information. I feel the amount of information displayed on the website was adequate.
Ease of Use	I find it is easy to get this website to do what I want it to do. The navigation on this website was clear and easy to follow. The layout of pages made tasks easier. The search functions provided in this website helped me find relevant information.
Trust Assurance	I feel that this website made a reasonable effort to protect my personal information. I feel this website's privacy policy made me feel that the website is trustworthy. The website's security measures made me feel this website is trustworthy. After visiting this website, I would be willing to provide my personal information to the site. This website is trustworthy. This website will keep its promises and commitments.
Made-for-the-Medium	I feel engaged/involved by the interactivity of the site. The extent to which this website can be tailored to fit my specific needs was adequate. I feel that this website provided me the opportunity to be part of an online group or community.
Responsiveness	I feel this website was responsive to the customers' concerns.
Promotion	I feel this website provided a good promotion for the products/service of the company.

Table 2: Map of Constructs with Survey Questions (continued)

Construct	Questions
Emotion	The visit of this website was enjoyable.
Website Usability	I would be willing to visit this website again. I would be willing to recommend this website for others. I would be willing to purchase from this website if needed. I have positive things to say about this website. I feel that this website reflects most current trend(s) and provides nice design for the site visit.
Motivation for Use (Economic)	I enjoy the convenience of shopping on the mobile web. When I want to buy a big-ticket item, I use the mobile web to search for bargain prices.
Motivation for Use (Entertainment)	These days you can use your cell phone to surf the mobile web to get news, information, and entertainment materials or exchange messages with other people who are also online. Please indicate how likely it is for you to use your cell phone to surf the Internet for the following reason: To have fun. To find excitement. To entertain yourself.

Table 3. Cronbach's Alpha for each Construct

Construct	**Cronbach's Alpha**	**Construct Reliable?**
Identity	n/a	n/a
Download Delay	0.936	Yes
Content	0.781	Yes
Ease of Use	0.847	Yes
Trust Assurance	0.810	Yes
Made-for-the-Medium	0.700	Yes
Responsiveness	0.551	No
Promotion	0.362	No
Emotion	0.602	No
Website Usability	0.915	Yes
Motivation for Use (Economic)	0.743	Yes
Motivation for Use (Entertainment)	0.833	Yes

Table 4. Multiple Regression Model Summary[a]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.840[a]	.706	.637	.73811

a. Predictors: (Constant), Identity, Download Delay, Content, Ease of Use, Trust Assurance, Made-for-the-Medium, Responsiveness, Promotion, Emotion, Motivation for Use (Economic), Motivation for Use (Entertainment)

Table 5. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	61.455	11	5.587	10.255	.000[b]
	Residual	25.606	47	.545		
	Total	87.060	58			

a. Dependent Variable: Usability

b. Predictors: (Constant), Identity, Download Delay, Content, Ease of Use, Trust Assurance, Made-for-the-Medium, Responsiveness, Promotion, Emotion, Motivation for Use (Economic), Motivation for Use (Entertainment)

Table 6. Coefficients of Multiple Regression Model[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.043	.778		.055	.956		
	Identity	.163	.071	.201	2.310	.025	.822	1.216
	Download Delay	-.055	.108	-.066	-.512	.611	.379	2.640
	Content	.332	.172	.286	1.931	.060	.286	3.498
	Ease of Use	.048	.168	.048	.283	.778	.217	4.602
	Trust Assurance	.234	.120	.178	1.950	.057	.747	1.339
	Made-for-the-Medium	-.179	.135	-.164	-1.323	.192	.405	2.470
	Responsiveness	.079	.116	.078	.681	.499	.478	2.091
	Promotion	.132	.104	.145	1.272	.210	.480	2.083
	Emotion	.335	.110	.389	3.045	.004	.384	2.602
	Motivation for Use (Economic)	.047	.063	.064	.752	.456	.855	1.169
	Motivation for Use (Entertainment)	-.097	.087	-.094	-1.112	.272	.867	1.153

a. Dependent Variable: Usability

Appendix B: IRB Approval Letter

THE UNIVERSITY OF
SOUTHERN MISSISSIPPI

INSTITUTIONAL REVIEW BOARD
118 College Drive #5147 | Hattiesburg, MS 39406-0001
Phone: 601.266.5997 | Fax: 601.266.4377 | www.usm.edu/research/institutional.review.board

NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.
  Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 16022506
PROJECT TITLE: Modeling Mobile Web Site Usability
PROJECT TYPE: New Project
RESEARCHER(S): James Hamil
COLLEGE/DIVISION: College of Business
DEPARTMENT: Marketing and Merchandising
FUNDING AGENCY/SPONSOR: N/A
IRB COMMITTEE ACTION: Expedited Review Approval
PERIOD OF APPROVAL: 03/02/2016 to 03/01/2017
Lawrence A. Hosman, Ph.D.
Institutional Review Board

Appendix C: Cover Letter

SURVEY OVERVIEW: I am an undergraduate Honors College student in the Department of Marketing and Merchandising at the University of Southern Mississippi. The following research study is designed to better understand mobile web site usability. You must be at least 18 years old to participate, and your participation is purely voluntary. You may choose not to participate or to withdraw from the study at any time without any penalty or prejudice. Your participation in this survey should take approximately five to ten minutes. Your responses will remain confidential and only aggregated results of the research will be published with individual participants unidentified. Your answers will be kept strictly confidential by being combined with others, and used only for research purposes. Upon completion of this survey, you will have the opportunity to be entered into a drawing for a $25 Amazon.com gift certificate. If you have any questions about this survey, please contact Matt Hamil at 601-310-9450 or james.hamil@eagles.usm.edu. This project has been reviewed by the Human Subjects Protection Review Committee, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research subject should be directed to the chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406-0001, (601) 266-6820. Thanks in advance for your participation!

Appendix D: Survey Instrument

Using a mobile device (i.e. cell phone) with internet connectivity, you are to use a browser (i.e. Safari, Chrome, Opera, etc.) on your mobile device to access the website listed below. You are to imagine that you are buying a gift for a family member or significant other. You must find at least three products sold on the website that are relevant to a family member or significant other's hobbies. Each of the three products must be of a different product category on the website. Add each item to your online shopping cart. You are also asked to locate and read the Privacy Policy, Terms and Conditions, or FAQ page found on the website. After completing the task, continue the survey.

- ❑ I have read and understand the task at hand.

  (One of the following options below was randomly generated for the respondent.)

- ❑ I have visited www.dollargeneral.com on my mobile device (i.e. cell phone) and completed the task.
- ❑ I have visited www.target.com on my mobile device (i.e. cell phone) and completed the task.
- ❑ I have visited www.sears.com on my mobile device (i.e. cell phone) and completed the task.

Please type the site address you have just visited:

Briefly describe the appearance of the site and your experience locating three different products:

Please rate the following by checking the response that best reflects your opinion of the website you just visited:

1. I feel this website could distinguish itself compared to other retail websites I have visited before.

- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

2. The speed in which the website provided information on the screen was fast enough.

- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

3. The rate at which the information was displayed was fast enough.

- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

4. I feel this website provided information relevant to the customer.

- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

5. I feel this website offered personalized information and layout.

- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

6. I feel this website provided timely information.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

7. I feel the amount of information displayed on the website was adequate.
- ❍ Strongly disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

8. I find it easy to get this website to do what I want it to do.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

9. The navigation on this website was clear and easy to follow.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

10. The layout of pages made tasks easier.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

11. The search functions provided in this website helped me find relevant information.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

12. I feel that this website made a reasonable effort to protect my personal information.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

13. I feel this website's privacy policy made me feel that the website is trustworthy.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

14. The website security measures made me feel the website is trustworthy.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

15. I feel engaged/involved by the interactivity of the site.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

16. Please select "Disagree" as the answer to this question.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

17. The extent to which this website can be tailored to fit my specific needs was adequate.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

18. I feel this website was responsive to the customers' concerns.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

19. The feedback options and FAQ provided in this website were adequate.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

20. I feel this website provided a good promotion for the products/services of the company.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

21. I feel this website I am browsing is promoted well externally on other websites and/or other media.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

22. I feel this website provided features to promote customers' excitement.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

23. The visit of this website was enjoyable.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

24. After visiting this website, I would be willing to provide my personal information to this site.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

25. This website is trustworthy.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

26. This website will keep its promises and commitments.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

27. I would be willing to visit this website again.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

28. I would be willing to recommend this website to others.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

29. I would be willing to purchase from this website if needed.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

30. I have positive things to say about this website.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

31. I feel that this website provided me the opportunity to be part of an online group or community.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

32. I feel this website reflects most current trend(s) and provides nice design for the site visit.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

33. Please select "Somewhat agree" as the answer to this question.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (4)
- ❍ Neither agree nor disagree (5)
- ❍ Somewhat agree (6)
- ❍ Agree (7)
- ❍ Strongly agree (8)

34. I enjoy the convenience of shopping on the mobile web.

- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

35. When I want to buy a big-ticket item, I use the mobile web to search for bargain prices.

- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly agree (7)

These days you can use your cell phone to surf the mobile web to get news, information, and entertainment materials or exchange messages with other people who are also online. Please indicate how likely it is for you to use your cell phone to surf the Internet for the following reasons:

36. To have fun.

- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat Disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly Agree (7)

37. To find excitement.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat Disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly Agree (7)

38. To entertain yourself.
- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Somewhat Disagree (3)
- ❍ Neither agree nor disagree (4)
- ❍ Somewhat agree (5)
- ❍ Agree (6)
- ❍ Strongly Agree (7)

39. Have you ever visited or used this website before to make a purchase on your mobile device (i.e. cell phone)?
- ❍ Yes (1)
- ❍ No (2)

40. Which best describes how often you use your cell phone to shop or browse for products online?
- ❍ None at all (1)
- ❍ Once a year (2)
- ❍ A few times a year (3)
- ❍ Once a month (4)
- ❍ Once a week (5)
- ❍ A few times a week (6)
- ❍ Every day (7)

41. What statement best describes your level of experience using the Web?
- ❍ I have never used the Web before. (1)
- ❍ I have used the Web a few times before this survey. (2)
- ❍ I use the Web a few times a year. (3)
- ❍ I use the Web a few times a month. (4)
- ❍ I use the Web once a week. (5)
- ❍ I use the Web a few times a week. (6)
- ❍ I use the Web almost every day. (7)

42. What was the name of the website you visited earlier in this survey?

43. What products did you find and add to your Shopping Cart on this website?

44. What is your gender?
- ❍ Male (1)
- ❍ Female (2)
- ❍ Other (3)

45. What is your age?

46. Your responses and information will remain confidential and anonymous. However, to be considered for the $25 Amazon Gift card, please enter a valid email address: