



Consumer need for mobile app atmospherics and its relationships to shopper responses

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ABSTRACT

This study developed and tested a conceptual model delineating the interrelationships among hedonic shopping orientation, consumer need for mobile app atmospherics, entertainment gratification, mobile irritation, and intention to reuse mobile apps for apparel shopping. A total of 216 U.S. mobile shoppers in the age range of 18–34 participated in the study. Consumers with a higher need for mobile app atmospherics tended to experience increased entertainment gratification and reduced irritation in using mobile apps. Hedonic shopping orientation was found to be an antecedent of consumer need for mobile app atmospherics. However, hedonic shoppers' mixed emotions toward mobile apps were confirmed through the positive influences of hedonic shopping orientation on both entertainment gratification and irritation. Consumer need for mobile app atmospherics played a significant role in predicting the intention to reuse mobile apps for apparel shopping, along with entertainment gratification and mobile irritation. This study extended the research scope of mobile shopping behavior and provided implications for mobile app retailing.

1. Introduction

With the rapid increase in the number of smartphone owners, mobile apps have become a game changer in the retail world (Smith, 2016). A mobile app, or mobile application, is a software program installed on a smartphone that presents formatted information to users, based on a self-contained user interface (Charland and Leroux, 2011; Kim et al., 2014). According to Emarketer (2016), the adoption and usage of mobile apps for shopping by smartphone users has grown continuously in recent years. Specifically, in the past few years, the volume of mobile apps that allow users to shop has increased by 174% year-over-year (Khalaf, 2015).

However, it is reported that consumers use mobile apps for shopping less than what retailers have expected. Although U.S. smartphone users download multiple mobile shopping apps, only 25% of them make a purchase through the apps stored in their phones (Emarketer, 2014, 2016). Despite that the ability to make purchases directly in apps has been around for several years, a large number of mobile shopping apps fail to convert a user's exploratory visit into an actual transaction. This low conversion rate has raised an important research question regarding why smartphone users are reluctant to shop via mobile apps.

Some researchers have suggested that those failures could result from a service provider's disregard for what consumers actually expect from mobile app shopping (Hausman and Siekpe, 2009; Lim, 2013).

Indeed, current mobile app marketing largely overlooks a duality of motivations in consumer behavior, such as the distinction between performing an act to “get something” versus doing so because “you love it” (Babin et al., 1994, p.644; Batra et al., 2012, p.11; Chang et al., 2004). While using mobile apps, users may be motivated to shop not only due to instrumental needs such as competitive pricing or product assortment but also because of the environmental quality of a shopping encounter. As consumers can use mobile apps to actually make purchases, not just supplement their in-store shopping experiences (Smith, 2016), it is critical for retailers to create standalone mobile app atmospherics.

Adopting the perspective of mobile app users, this study builds on the contentions that fulfilling consumer need for retail atmospherics is important in mobile retailing, and that mobile app atmospherics should be strategically designed in order to generate desirable shopper responses. Although prior research confirms the significant effects of retail atmospherics on consumer shopping behavior (e.g., Dailey, 2002; Mehrabian and Russell, 1974), empirical investigations on mobile app atmospherics are few and remain largely unexamined. Therefore, this study attempts to expand our current understanding of mobile shoppers by providing novel insight relevant to consumer need for mobile app atmospherics. This study aims to contribute to the literature on the effectiveness of mobile app retailing.

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3.2. Entertainment gratification and mobile irritation

The uses and gratification theory (U & G) explains the important role of consumers in the use of communication media (Katz, 1959; Katz et al., 1973; Klapper, 1960). According to the U & G theory, users heavily participate in media usage and communicate highly with it (Luo, 2002). They make choices based on their previous experience with the media (Katz et al., 1973). In sum, the U & G theory makes it possible to understand users' needs, which motivates them to use the media for gratification of those needs (Lim and Ting, 2012; Rubin, 1994). For instance, it provides an effective theoretical basis for studying users of online shopping websites (Ko, 2000; Ruggiero, 2000). Regarding online shopping, the most crucial dimensions of the U & G theory are entertainment gratification, informativeness gratification, and web irritation (e.g., Chen and Wells, 1999; Ko et al., 2005; Korgaonkar and Wolin, 1999; Lim and Ting, 2012; Luo, 2002). Entertainment gratification is defined as the extent to which the web is entertaining and joyful to users (Eighmey and McCord, 1998, p. 190); informativeness gratification refers to the extent to which the web provides users with helpful and sufficient information; and web irritation means the extent to which the web is annoying and irritating to users (Eighmey and McCord, 1998, p. 190).

There are certain differences between a web-based environment and a mobile-based environment, given differences in access devices (e.g., desktop/laptop vs. smartphone/tablet). Also, the concept of mobile atmospherics should be also considered separately from web atmospherics, as an important component of mobile app shopping. In order to better capture the role of consumer need for retail atmospherics in mobile app shopping, this study applies the U & G theory. Since this study focuses on consumer need for mobile app atmospherics derived from hedonic shopping orientation, the proposed model focuses on entertainment gratification and irritation, without informativeness gratification. According to the U & G theory, it is likely that those shoppers with a higher level of need for mobile app atmospherics are easily immersed into the mobile app shopping environment. Further, they are expected to display more enthusiastic, affective responses to app design cues while showing less sensitivity to technological glitches and malfunctions. Therefore,

H4: A high level of consumer need for mobile app atmospherics will lead to a high level of entertainment gratification.

H5: A high level of hedonic shopping orientation will lead to a low level of mobile irritation.

3.3. Intention to reuse mobile apps for apparel shopping

In online shopping contexts, the reuse intention of websites is defined as a user's intention to reuse the websites in the future (Yoo and Donthu, 2001). According to Belk et al. (2003), individuals' needs in consumption contexts can be described as a motivational domain that can be controlled, planned for, addressed, prioritized, and gratified through logical instrumental processes. Extending this notion, it is likely that mobile shoppers with a high (versus low) level of need for mobile app atmospherics engage in repeat usage of mobile apps to fulfill their inherent need. Another related concept in this relationship is consumer seduction by marketers (Deighton and Grayson, 1995). We argue that consumer need for mobile app atmospherics can be experienced as being seduced and that seducing agents (i.e., apparel retailers providing mobile shopping apps) play a critical role in shaping and activating consumer need for mobile app atmospherics. For instance, although clothing generally falls into the high-touch product category (Levin et al., 2003), apparel retailers have found creative ways to fulfill consumer need for online atmospherics including image-interactivity technology (IIT) (Kim et al., 2007) and design aesthetics (Wang et al., 2010), enabling shoppers to be immersed in the online shopping

environment. Likewise, responding to the trend that consumers use mobile apps to actually make purchases, not just supplement their in-store shopping experiences, many apparel retailers have turned their attention to mobile app atmospherics to ensure high quality in-app experiences (e.g., Nordstrom, Kohl's) (Smith, 2016). Therefore,

H6: A high level of consumer need for mobile app atmospherics will lead to a high level of intention to reuse mobile apps for apparel shopping.

According to previous studies, entertainment value provided by the website is positively related to a user's online purchase intention (Ducoffe, 1996; Shavitt et al., 1998). Also, a user's enjoyment and entertainment are important reasons for revisiting the website (Raney et al., 2003; Stafford and Stafford, 2001; Wolfinbarger and Gilly, 2001). On the other hand, web irritation causes a significant but negative influence on the website user's behavior, such as purchase or reuse intention (Ducoffe, 1996; Gao et al., 2004; Haq, 2009; Luo, 2002). We propose that these observations will be validated in the mobile environment. Therefore,

H7: A high level of entertainment gratification will lead to a high level of intention to reuse mobile apps for apparel shopping.

H8: A high level of mobile irritation will lead to a low level of intention to reuse mobile apps for apparel shopping.

4. Methods

An online questionnaire was created which contained multi-item scales to measure the following constructs included in the proposed model (see Fig. 1): hedonic shopping orientation, consumer need for mobile app atmospherics, entertainment gratification, mobile irritation, and intention to reuse mobile apps for apparel shopping. Data were collected using Amazon's Mechanical Turk (MTurk) service. U.S. mobile shoppers in the age range of 18–34 were recruited to participate in the study. In the United States, over 97% of 18- to 34-year-olds own smartphones, while 77% of total adults have smartphones (Nielsen, 2016; Pew Research Center, 2017). In this study, the term “mobile shoppers” refers to those who have experienced mobile shopping before.

A total of 216 usable responses were collected. Approximately 69% of the sample was female. Various income groups were represented in the sample with 38% of the sample between \$35,000 and \$49,999. Almost 30% of the sample indicated that they use mobile apps once a week for the purpose of shopping in general. Also, approximately 55% of the sample responded that they bought apparel products at least once a month via mobile apps (see Table 1).

All scales used to test the proposed model can be found in Table 2. In addition, sources used in the creation of each scale are also provided. Each scale was first investigated using exploratory factor analysis and the results supported a single dimension for each scale. In addition, item-total correlations were high (greater than 0.50) for each construct. Descriptive statistics for each scale as well as correlations between all constructs are presented in Table 3. A measurement model using AMOS with maximum likelihood estimation was then conducted, consistent with Anderson and Gerbing's (1988) two-step approach. The results indicated an acceptable measurement model fit ($\chi^2 = 234.43$, $df = 140$; $\chi^2/df = 1.67$; CFI = 0.96; NNFI = 0.95; RMSEA = 0.06; SRMR = 0.06). The results supported the internal consistency of all the constructs as the composite reliability was greater than 0.80 for all constructs (see Table 2). Variance extracted for all constructs were greater than the generally accepted value of 0.50 (see Table 2). The completely standardized item loadings for all measurement items are also included in Table 2.

The results also support the convergent and discriminant validity of all of the constructs. Convergent validity is the extent that multiple

Table 1
Participants characteristics.

		N	%
Gender	Female	150	69.4
	Male	66	30.6
Total Household Income	Under \$25,000	33	15.3
	\$25,000–\$34,999	36	16.7
	\$35,000–\$49,999	82	38.0
	\$50,000–59,999	31	14.4
	Over \$60,000	34	15.7
Frequency of Mobile App Shopping	Once a Month	36	16.7
	2–3 Times a Month	51	23.6
	Once a week	63	29.2
	2–3 Times a week	30	13.9
	Daily	36	16.6
Frequency of Apparel Shopping	Less than Once a Month	59	27.3
	Once a Month	61	28.2
	2–3 Times a Month	58	26.9
	Once a week	20	9.3
via Mobile Apps	2–3 Times a week	12	5.6
	Daily	6	2.8
	Total	216	100.0

measures of the same theoretical constructs are in agreement whereas discriminant validity refers to the extent that one theoretical construct differs from another (Byrne, 1998). The items of each scale loaded highly on its respective construct (t-values range from 7.87 to 17.70), providing evidence of convergent validity (Anderson and Gerbing, 1988). As evidence of discriminant validity, none of the confidence intervals of the phi matrix included 1.00 (Anderson and Gerbing, 1988). Discriminant validity was also tested by comparing variance extracted estimates with the squared phi estimates (Fornell and Larcker, 1981). The variance extracted estimates were greater than the squared correlation estimates for all sets of constructs, supporting the discriminant validity between the constructs.

5. Results

The structural model using AMOS was then estimated to test the

Table 2
Measurement items.

Scales/source	Item ^a	Standardized Loading	Variance Extracted ^b	Composite Reliability ^c
Hedonic Shopping Orientation (Kaltcheva and Weiz, 2006)	When shopping, I often have fun.	0.81	0.55	0.83
	When shopping, I am usually looking for entertainment.	0.64		
	I like to kill time by shopping.	0.70		
	When shopping, I like to browse around.	0.81		
Consumer Need for Mobile App Atmospherics (Koo and Ju, 2010)	It is desirable for mobile apps to have dynamic graphics.	0.53	0.50	0.80
	It is desirable for mobile apps to have interactive features.	0.61		
	It is desirable for mobile apps to be neatly designed.	0.79		
	It is desirable for mobile apps to look appealing.	0.86		
Entertainment Gratification (Chen et al., 2002; Ducoffe, 1996)	I find it entertaining to use mobile apps.	0.78	0.66	0.89
	I find that mobile apps are fun to use.	0.79		
	I feel excited when using mobile apps.	0.88		
	Using mobile apps provide me with lots of enjoyment.	0.80		
Mobile Irritation (Ducoffe, 1996; Korgaonkar and Wolin, 1999)	I often feel irritated when using mobile apps.	0.91	0.73	0.92
	I feel that most mobile apps are confusing.	0.87		
	I feel that most mobile apps are messy.	0.81		
	I often feel frustrated when using mobile apps.	0.84		
Intention to Reuse Mobile Apps for Apparel Shopping (Dodds et al., 1991; Yoo and Donthu, 2001)	I plan to reuse mobile apps for apparel shopping.	0.83	0.73	0.97
	I intend to reuse mobile apps in the near future for apparel shopping.	0.94		
	The probability that I would consider reuse mobile apps for apparel shopping is high.	0.87		

^a Anchored with 7-point Likert-type scale descriptors, from 1 = “Strongly disagree” to 5 = “Strongly agree.”

^b Variance Extracted = $\sum (\text{standardized loading})^2 / \sum (\text{standardized loading})^2 + \sum \text{measurement error}$.

^c Composite Reliability = $(\sum \text{standardized loading})^2 / (\sum \text{standardized loading})^2 + \sum \text{measurement error}$.

Table 3
Summary statistics.

Construct	1	2	3	4	5
1. Hedonic shopping orientation	1.00				
2. Consumer need for mobile app atmospherics	0.41	1.00			
3. Entertainment gratification	0.46	0.61	1.00		
4. Mobile irritation	0.06	– 0.21	– 0.28	1.00	
5. Intention to reuse mobile apps for apparel shopping	0.30	0.37	0.39	– 0.19	1.00
Mean	4.50	5.61	5.53	3.17	4.95
SD	1.46	1.22	1.18	1.61	1.48

proposed relationships. The fit statistics indicated an acceptable model fit ($\chi^2 = 247.23$, $df = 142$; $\chi^2/df = 1.74$; CFI = 0.96; NNFI = 0.95; RMSEA = 0.06; SRMR = 0.07) and the results can be found in Table 4. All the hypotheses were supported except H8. Hedonic shopping orientation positively influenced: consumer need for mobile atmospherics ($\beta = 0.42$, $p < 0.001$); entertainment gratification ($\beta = 0.24$, $p < 0.01$); and mobile irritation ($\beta = 0.17$, $p < 0.05$). In turn, consumer need for mobile atmospherics positively influenced entertainment gratification ($\beta = 0.53$, $p < 0.001$). Also, the results supported the negative influence of consumer need for mobile atmospherics on mobile irritation ($\beta = -0.31$, $p < 0.01$). As expected, the intention to reuse mobile apps for apparel shopping was predicted by consumer need for mobile atmospherics ($\beta = 0.21$, $p < 0.05$) and entertainment gratification ($\beta = 0.24$, $p < 0.05$). However, the results did not support the predicted influence of mobile irritation on the intention to reuse mobile apps for apparel shopping ($\beta = -0.08$, $p = 0.25$).

6. Discussion and implications

While retail mobile apps present a huge potential to increase customer loyalty, Lifetime Value (LTV), satisfaction, and revenue (Smith, 2016), it clearly presents some challenges due to its limited capacity to allow the consumer to experience full “tactile input” (Citrin et al., 2003). This problem has been extensively discussed in the literature

Table 4
Structural model results.

Endogenous constructs	Standardized estimate	Standard error	t-value ^a
Consumer Need for Mobile App Atmospherics (R ² = 0.17)			
H1 Hedonic Shopping Orientation	0.42	0.06	4.44***
Entertainment Gratification (R ² = 0.42)			
H2 Hedonic Shopping Orientation	0.24	0.07	3.21**
H4 Consumer Need for Mobile App Atmospherics	0.53	0.16	5.16***
Mobile Irritation (R ² = 0.08)			
H3 Hedonic Shopping Orientation	0.17	0.12	2.02*
H5 Consumer Need for Mobile App Atmospherics	– 0.31	0.21	– 3.26**
Intention to Reuse Mobile Apps for Apparel Shopping (R ² = 0.18)			
H6 Consumer Need for Mobile App Atmospherics	0.21	0.21	2.03*
H7 Entertainment Gratification	0.24	0.12	2.41*
H8 Mobile Irritation	– 0.08	0.06	– 1.15

^a *p < 0.05, **p < 0.01, ***p < 0.001.

since the inception of Internet retailing. For example, research suggests that consumers perceive a high level of product risk especially when they shop for apparel products online (Goldsmith and Goldsmith, 2002). This is because there is a sensory limitation in physically examining products in an online environment (Forsythe and Shi, 2003; Garbarino and Strahilevitz, 2004).

Although current technological capabilities offer extensive visual cues to consumers, mobile marketers are still limited in their ability to present other design and sensory elements through mobile apps. An important contribution of our research was to further our understanding of mobile retailing by demonstrating the importance of providing mobile app atmospherics for young, hedonic shoppers in an apparel shopping context. By examining consumer need for mobile app atmospherics and its relationships to shopper responses, we proposed and tested a conceptual model extending the uses and gratification theory (U and G).

The results of our study provide evidence that hedonic shopping orientation is positively related to consumer need for mobile app atmospherics. This finding is in line with the work by Kaltcheva and Weitz (2006) who found that motivational orientation plays an important role in the way that consumers process environmental cues in a retail setting. This finding reinforces the importance of manipulating atmospherics, especially if the customer base is hedonic in nature.

Interestingly, our data suggest that young, hedonic shoppers tend to have mixed feelings of gratification and irritation toward mobile apps. As research on consumer mixed emotions suggests (Otnes et al., 1997), hedonic shoppers may have “ambivalence (i.e., mixed emotions)” toward mobile apps in general until they form a substantial need for mobile app atmospherics. For instance, it is likely that hedonic shoppers use mobile apps while shopping in-store and expect a seamless integration of their digital and physical experiences through well designed mobile apps (Smith, 2016). If that happens, their need for mobile app atmospherics can be activated. Those hedonic shoppers seeking mobile app atmospherics may experience a high level of entertainment gratification and do not care much about irritation experienced in a mobile shopping environment. Our findings support this scenario by providing empirical evidence that a high level of consumer need for mobile app atmospherics leads to a high level of “entertainment gratification” and a low level of “mobile irritation.” More specifically, our study demonstrates that the need for a mobile shopping app with dynamic and interactive atmospherics can increase users’ entertainment gratification and decrease users’ irritation while using the mobile app. This finding highlights that mobile shopping apps should be developed not only to stimulate users’ perceptions of enjoyment and fun but also to control users’ perceptions of irritation and confusion (Lim, 2013).

Our findings support the idea that “ambivalent” hedonic shoppers can be converted into enthusiastic mobile shoppers through a neat and intuitively comfortable app environment minimizing mobile irritation, confusion, and frustration experienced while using the app. Mobile shopping apps should offer mobile-friendly technological interfaces with graphics in their proper resolution to avoid messy composition of the mobile screen and overlong page loading time. In other words, mobile shopping apps should avoid merely duplicate web-based atmospherics, which does not adjust for the mobile user interface.

Further, our findings support that entertainment gratification, not mobile irritation, plays a significant role in predicting the intention to reuse mobile apps for apparel shopping. This finding implies that users’ entertainment fostered by well-designed interfaces of mobile shopping apps is a crucial factor in determining the reuse intention. Hence, mobile marketers should make mobile app shopping a pleasurable and exciting experience by providing mobile app visitors, who are potential customers, with interactive and visualized gamification components within the mobile apps.

7. Limitations and future research directions

There are some limitations of the present study that should be addressed in the future. First, this study tested consumer need for mobile app atmospherics as a single construct. Hence, future research should test various sensory cues of mobile app atmospherics, such as color, pattern, icons, typeface, menus, background music, and lighting. Second, this study investigated the influences of consumer need for mobile app atmospherics on user gratification and mobile irritation by asking participants to recall their previous mobile app experiences. Since there could be a big variation in individual experiences, future research could provide participants with the same mobile shopping app as a stimulus, and thus, measure the influences of consumer need for mobile app atmospherics more effectively. Conducting an experiment would be also a good way to exclude possible intervening variables that may impact consumer perceptions. Third, this study focused on young mobile shoppers and did not examine generational differences in the proposed relationships. Therefore, future research should explore how demographic differences including gender and age could help mobile marketers better understand their target consumers and eventually convert their app users into actual customers. Lastly, some of the literature in this study was from the late 1990s and early 2000s, when the mobile app landscape was different than the present one. Since there were few previous studies on mobile app shopping, we referred to the literature on online shopping which could best serve our points. However, mobile app shopping may differ significantly from traditional

online shopping. Hence, future research should explore new variables uniquely relevant to mobile app shopping.

References

- Anderson, J.C., Gerbing, D.W., 1988. Structural equation modeling in practice: a review and recommended two-step approach. *Psychol. Bull.* 103 (3), 411–423.
- Babin, B.J., Darden, W.R., Griffin, M., 1994. Work and/or fun: measuring hedonic and utilitarian shopping value. *J. Consum. Res.* 20 (4), 644–656.
- Batra, R., Ahuvia, A., Bagozzi, R.P., 2012. Brand love. *J. Mark.* 76 (2), 1–16.
- Belk, R.W., Ger, G., Askegaard, S., 2003. The fire of desire: a multisited inquiry into consumer passion. *J. Consum. Res.* 30 (3), 326–351.
- Brown, M., Pope, N., Voges, K., 2003. Buying or browsing? An exploration of shopping orientations and online purchase intention. *Eur. J. Mark.* 37 (11/12), 1666–1684.
- Byrne, B.M., 1998. *Structural Equation Modeling with LISREL, PRELIS, and SIMPLIS: Basic Concepts, Applications and Programming*. Lawrence Erlbaum Associates, Mahwah, NJ.
- Chang, E., Burns, L.D., Francis, S.K., 2004. Gender differences in the dimensional structure of apparel shopping satisfaction among Korean consumers: the role of hedonic shopping value. *Cloth. Tex. Res. J.* 22 (4), 185–199.
- Charland, A., Leroux, B., 2011. Mobile application development: web vs. native. *Comm. ACM* 54 (5), 49–53.
- Chen, Q., Wells, W.D., 1999. Attitude toward the site. *J. Advert. Res.* 39 (5), 27–37.
- Chen, L.D., Gillenson, M.L., Sherrell, D.L., 2002. Enticing online consumers: an extended technology acceptance perspective. *Info Manag.* 39 (8), 705–719.
- Citir, A.V., Stem, D.E., Spangenberg, E.R., Clark, M.J., 2003. Consumer need for tactile input: an internet retailing challenge. *J. Bus. Res.* 56 (11), 915–922.
- Dailey, L.C., 2002. Consumers' responses to navigational atmospherics on the web: an empirical test. In: *Proceedings of the American Marketing Association Conference 13*, Chicago, USA, p. 202.
- Deighton, J., Grayson, K., 1995. Marketing and seduction: managing exchange relationships by managing social consensus. *J. Consum. Res.* 21 (4), 660–676.
- Dodds, W.B., Monroe, K.B., Grewal, D., 1991. Effects of price, brand, and store information on buyers' product evaluations. *J. Mark. Res.* 28 (3), 307–319.
- Donthu, N., Garcia, A., 1999. The internet shopper. *J. Advert. Res.* 39 (3) (52–52).
- Ducoffe, R.H., 1996. Advertising value and advertising on the web. *J. Advert. Res.* 36 (5), 21–35.
- Eighmey, J., McCord, L., 1998. Adding value in the information age: uses and gratifications of sites on the World Wide Web. *J. Bus. Res.* 41, 187–194.
- Emarketer, 2014. Retail purchases via apps? Mobile users will pass. 18, September. <<http://www.emarketer.com/Article/Retail-Purchases-via-Apps-Mobile-Users-Will-Pass/1011203>>.
- Emarketer, 2015. Mobile content and activities roundup. April. <https://www.emarketer.com/public_media/docs/eMarketer_Mobile_Content_Activities_Roundup.pdf>.
- Emarketer, 2016. Shoppers are downloading more mobile retail apps. 3, June. <<https://www.emarketer.com/Article/Shoppers-Downloading-More-Mobile-Retail-Apps/1014041>>.
- Eroglu, S.A., Machleit, K.A., Davis, L.M., 2003. Empirical testing of a model of online store atmospherics and shopper responses. *Psychol. Mark.* 20 (2), 139–150.
- Fornell, C., Larcker, D., 1981. Evaluating structural equation models with unobservable variables and measurement error. *J. Mark. Res.* 18 (1), 39–50.
- Forsythe, S.M., Shi, B., 2003. Consumer patronage and risk perceptions in Internet shopping. *J. Bus. Res.* 56 (11), 867–875.
- Gao, Y., Koufaris, M., Ducoffe, R.H., 2004. An experimental study of the effects of promotional techniques in web-based commerce. *J. Elect. Comm. Org.* 2 (3), 1–20.
- Garbarino, E., Strahilevitz, M., 2004. Gender differences in the perceived risk of buying online and the effects of receiving a site recommendation. *J. Bus. Res.* 57 (7), 768–775.
- Goldsmith, R.E., Goldsmith, E.B., 2002. Buying apparel over the Internet. *J. Proc. Brand Manag.* 11 (2), 89–102.
- Gove, J., Mirza, I., 2016. Mobile retail apps and Sites: Introduction. Think with Google. <<https://www.thinkwithgoogle.com/marketing-resources/experience-design/mobile-retail-apps-sites-introduction/>>.
- Hausman, A.V., Siekpe, J.S., 2009. The effect of web interface features on consumer online purchase intentions. *J. Bus. Res.* 62 (1), 5–13.
- Haq, Z.U., 2009. E-mail advertising: a study of consumer attitude toward e-mail advertising among Indian users. *J. Retail. Leis. Prop.* 8 (3), 207–223.
- Handa, M., Gupta, N., 2014. A study of the relationship between shopping orientation and online shopping behavior among Indian youth. *J. Int. Comm.* 13 (1), 22–44.
- Kaltcheva, V.D., Weitz, B.A., 2006. When should a retailer create an exciting store environment? *J. Mark.* 70 (1), 107–118.
- Katz, E., 1959. Mass communication research and the study of culture. *Stud. Pub. Comm.* 2 (1), 1–6.
- Katz, E., Haas, H., Gurevitch, M., 1973. On the use of the mass media for important things. *Am. Sociol. Rev.* 38 (2), 164–181.
- Khalaf, S., 2015. Shopping, productivity and messaging give mobile another stunning growth year. Flurry Analytics. 6, January. <<http://flurrymobile.tumblr.com/post/115194992530/shopping-productivity-and-messaging-give-mobile>>.
- Kim, J., Fiore, A.M., Lee, H.H., 2007. Influences of online store perception, shopping enjoyment, and shopping involvement on consumer patronage behavior towards an online retailer. *J. Retail. Consum. Serv.* 14 (2), 95–107.
- Kim, J., Park, Y., Kim, C., Lee, H., 2014. Mobile application service networks: apple's app store. *Serv. Bus.* 8 (1), 1–27.
- Klapper, J.T., 1960. *The Effects of Mass Communication*. Free Press, New York, NY.
- Ko, H., 2000. Internet uses and gratifications: understanding motivations for using the internet. In: *Proceedings of the Annual Meeting of the Associate for Education in Journalism and Mass Communication*, Arizona, USA.
- Ko, H., Cho, C.H., Roberts, M.S., 2005. Internet uses and gratifications: a structural equation model of interactive advertising. *J. Advert.* 34 (2), 57–70.
- Koo, D.M., Ju, S.H., 2010. The interactional effects of atmospherics and perceptual curiosity on emotions and online shopping intention. *Comp. Human. Behav.* 26 (3), 377–388.
- Korgaonkar, P.K., Wolin, L.D., 1999. A multivariate analysis of web usage. *J. Advert. Res.* 39 (2), 53–68.
- Kotler, P., 1973. Atmospherics as a marketing tool. *J. Retail.* 49 (4), 48–64.
- Levin, A.M., Levin, I.P., Heath, C.E., 2003. Product category dependent consumer preferences for online and offline shopping features and their influence on multi-channel retail alliances. *J. Electr. Comm. Res.* 4 (3), 85–93.
- Lim, W.M., 2013. The effects of web atmospherics on entertainment gratification and web irritation: some empirical evidence from online shopping. *Mod. Appl. Sci.* 7 (12), 15–23.
- Lim, W.M., Ting, D.H., 2012. E-shopping: an analysis of the uses and gratifications theory. *Mod. Appl. Sci.* 6 (5), 48–63.
- Luo, X., 2002. Uses and gratifications theory and e-consumer behaviors: a structural equation modeling study. *J. Interact. Advert.* 2 (2), 34–41.
- Marketing Charts, 2015. How smartphone-owning millennials expect brands to use technology. 5, February. <<http://www.marketingcharts.com/online/how-smartphone-owning-millennials-expect-brands-to-use-technology-51040/>>.
- Mehrabian, A., Russell, J.A., 1974. *An Approach to Environmental Psychology*. The MIT Press, Cambridge, MA.
- Nielsen, 2016. Millennials are top smartphone users. 15, November. <<http://www.nielsen.com/us/en/insights/news/2016/millennials-are-top-smartphone-users.html>>.
- Otnes, C., Lowrey, T.M., Shrum, L.J., 1997. Toward an understanding of consumer ambivalence. *J. Consum. Res.* 24 (1), 80–93.
- Pew Research Center, 2017. Mobile fact sheet. 12, January. <<http://www.pewinternet.org/fact-sheet/mobile/>>.
- Raney, A.A., Arpan, L.M., Pashupati, K., Brill, D.A., 2003. At the movies, on the web: an investigation of the effects of entertaining and interactive web content on site and brand evaluations. *J. Interact. Mark.* 17 (4), 38–53.
- Rubin, A.M., 1994. An examination of television viewing motives. *J. Comm.* 8 (3), 141–165.
- Ruggiero, T.E., 2000. Uses and gratifications theory in the 21st century. *Mass. Comm. Soc.* 3 (1), 3–37.
- Shavitt, S., Lowrey, P., Haefner, J., 1998. Public attitudes towards advertising: more favourable than you might think. *J. Advert. Res.* 38 (4), 7–22.
- Sinha, P.K., 2003. Shopping orientation in the evolving Indian market. *Vikalpa* 28 (2), 13–22.
- Smith, M., 2016. Retail and mobile apps: what works and why. Apptentive. 15, September. <<https://www.apptentive.com/blog/2016/09/15/retail-mobile-apps-works/>>.
- Stafford, T.F., Stafford, M.R., 2001. Identifying motivations for the use of commercial websites. *Info Resour. Manag. J.* 14 (1), 22–30.
- Swaminathan, V., Lepkowska-White, E., Rao, B.P., 1999. Browsers or buyers in cyberspace? An investigation of factors influencing electronic exchange. *J. Comp. Med. Comm.* 5 (2). <<http://onlinelibrary.wiley.com/doi/10.1111/j.1083-6101.1999.tb00335.x/full>>.
- Vrechopoulos, A.P., Manganari, E.E., Siomkos, G.J., 2010. Mobile store environment dynamics: an interdisciplinary approach. In: *Proceedings of the Handbook of Research on Mobile Marketing Management*. IGI Global, Hershey, PA, pp. 346–361.
- Wang, Y.J., Hernandez, M.D., Minor, M.S., 2010. Web aesthetics effects on perceived online service quality and satisfaction in an e-tail environment: the moderating role of purchase task. *J. Bus. Res.* 63 (9), 935–942.
- Wolfenbarger, M., Gilly, M.C., 2001. Shopping online for freedom, control and fun. *Calif. Manag. Rev.* 43 (2), 39–51.
- Wu, C.S., Cheng, F.F., Yen, D.C., 2008. The atmospheric factors of online storefront environment design: an empirical experiment in Taiwan. *Info. Manag.* 45 (7), 493–498.
- Yoo, B., Donthu, N., 2001. Developing a scale to measure the perceived quality of an Internet shopping site (SITEQUAL). *Q. J. Electr. Comm.* 2 (1), 31–47.