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## **Determinants of mobile consumers' perceived value of location-based advertising and user responses**

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**Abstract:** This study examines factors affecting mobile consumers' perceived advertising value of latest location-based mobile advertising (LBA) and its relationship with user responses. Data was collected from a nationally representative web survey of 605 respondents who fit the demographic quotas of mobile consumers in Singapore. Partial least squares results show that privacy concerns have a stronger negative effect on perceived LBA value than perceived sacrifice, while perceived utility, utilisation of contextual information and trust positively predict perceived LBA value. Moreover, perceived LBA value increases consumers' responses to purchase advertised brands, followed by searching for brand information and passing LBA to others. Implications for mobile advertising theories and practices are discussed.

**Keywords:** location-based mobile advertising; perceived control; perceived sacrifice; perceived utility; privacy concern; trust; use intention; utilisation of contextual information.

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## 1 Introduction

With the global mobile cellular penetration rate exceeding 96% (ITU, 2014), personalised mobile devices become more ubiquitous than other communication artefacts and raise interest in the development of mobile advertisements. After the development of mobile app-based advertising, the mobile marketing association (MMA) (2011) defines the location-based advertising (LBA) as any application, service, or campaign that uses geographic locations to deliver or enhance a marketing message/service. Due to the advancements in location-based technologies, app-based LBAs which allow advertisers to disseminate pull-type mobile advertising to the targeted consumers in specific locations are likely to improve the consumers' negative attitudes towards push-type SMS and MMS advertising (Peterson and Groot, 2009; Richard and Meuli, 2013; Unni and Harmon, 2007).

Several prior studies primarily investigated determinants affecting the consumers' attitudes (Al Khasawneh and Shuhaiber, 2013; Brunner and Kumar 2007; Noor, Sreenivasan and Ismail, 2013; Park and Ohm, 2014), acceptance/adoption (Merisavo et al., 2007; Parreño et al., 2013; Zhou, 2013), and the intention to use (Hsiao and Chang, 2014; Lohan et al., 2011; Richard and Meuli, 2013) in mobile advertising, especially SMS advertisements. Market analyses show that the location-targeted

advertising will lead the rapid market growth since it generates higher returns than the conventional mobile advertising (Rathore, 2014). However, uncertain LBA effectiveness causes a hesitation in adoption (Lin et al., forthcoming). Thus it is essential to understand the determinants of the consumers' perceived advertising value. After the emergence of the app-based LBAs in a few scholarly studies (Chen, Su and Yen, 2014; Reichhart, 2014; Xu and Li, 2014), till date no one of them has examined the predictors of the consumers' for the perceived LBA value and responses.

To fill the research gaps, this study aims to advance consumer insights about the latest LBA and develop a research model to examine motivating factors (perceived utility, utilisation of contextual information, perceived control, and trust) and inhibiting factors (perceived sacrifice and privacy concerns) towards LBA's perceived value which influences consumer responses (i.e., purchasing advertised products/services, passing LBAs along, or searching for information). Theoretically, this research develops a LBA perceived-value model informed by the uses and gratifications theory (U&G) and Ducoffe's web advertising model (1996), which contributes to the study of the predictors and consumer responses in latest LBA. Practically, the findings can provide useful insights for LBA stakeholders to make effective strategies to optimise the LBA value so as to stimulate the desirable consumers' reactions to the latest mobile advertising.

## **2 Theoretical background and hypotheses**

In this study, LBA refers to the advertisements containing geo-specific information sent to mobile users near the advertised vendors or products in forms of SMS, MMS, mobile display advertising, and mobile app advertising. The key concept of investigation is the advertising value, a crucial determinant to measure advertisement effectiveness in terms of consumer responses (Ducoffe, 1995). Liu et al. (2012) regarded the investigation of consumers' perceived value of mobile advertising as an extension of U&G theory. Since the 1940s, U&G theory has been utilised to explain psychological motives and consumers' value associated with mass media. It has been recently been applied to internet and mobile consumer behaviours. Ducoffe's web advertising model was the first to examine advertising value rather than attitude towards advertisements (Kim and Han, 2014; Liu et al., 2012). It conceptualises advertising value as "a subjective evaluation of the relative worth or utility of advertising to consumers" (Ducoffe, 1995, p.1). This line of research can better investigate determinants affecting how consumers perceive the worth of advertising (Ducoffe, 1996).

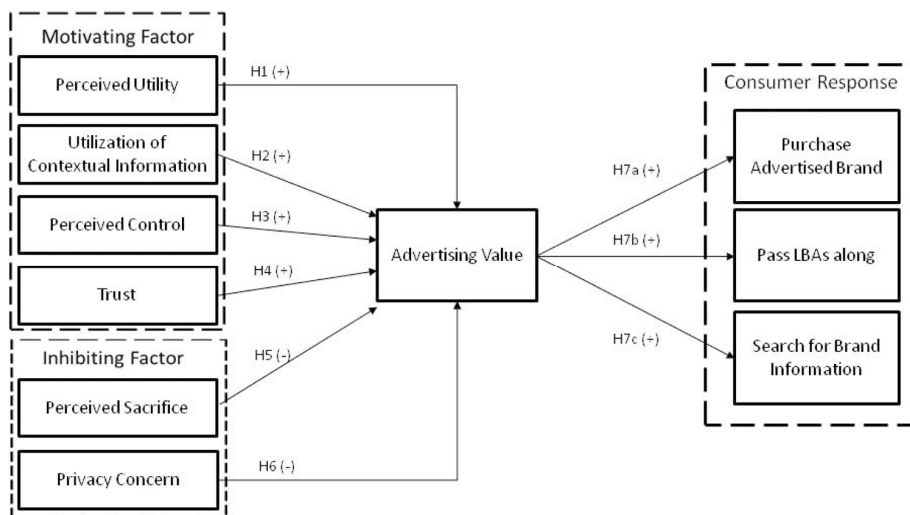
The experts identify value as the most important success factor for the impact of m-marketing (Huang, 2012). According to Ström, Vendel and Bredican (2014), although perceived value affects consumer acceptance and use of mobile marketing, this concept was not explicitly measured when most studies focused on examining components of benefits and sacrifices of mobile push advertising. To operationalise advertising value, prior studies described mobile advertising as being useful, valuable, and important (Kim and Han, 2014; Liu et al., 2012). When advertising value meets or exceeds customers' expectations, they tend to take favourable actions such as purchasing products (Ducoffe and Curlo, 2000). In contrast, advertisements that lack perceived value result in negative responses like ignoring advertising messages. Even though mobile advertising value is positively associated with consumer attitude (Liu et al., 2012; Tsang, Ho and Liang, 2004) and purchase intention (Kim and Han, 2014), the relationship between advertising

value and user responses is not yet established. Therefore, this study attempts to identify determinants of mobile consumers' perceived advertising value of the latest LBA and its relation with various user responses.

Merisavo et al. (2007) developed one of the most comprehensive models to study mobile advertising consumer acceptance (Yang, Liu and Zhou, 2010a). They identified five predictors: *perceived utility*, *utilisation of contextual information*, *perceived control*, *perceived sacrifice*, and *trust*. Prior mobile advertising studies show that privacy concerns negatively affect consumer attitude and responses to LBA (Dhar and Varshney, 2011; Wei, Hao and Pan, 2010). It also reduces consumers' perceived values of LBA (Lin et al., forthcoming). This study adapts Merisavo et al.'s mobile advertising acceptance determinants, but adds *privacy concern* as a separate variable differentiating from *perceived sacrifice*. Most importantly, this study investigates how these predictors influence perceived value of latest LBA which is closely related to consumer responses and advertising effectiveness.

Advertising value is a key determinant in predicting mobile advertising acceptance which was used in many past studies (Ström, Vendel and Bredican, 2014). The perceived value is associated with the consumers' perceived benefits (motivators) and sacrifices (inhibitors) of mobile advertising which affect consumer responses. This study proposes the LBA advertising value model to examine how motivating factors (perceived utility, utilisation of contextual information, perceived control and trust) and inhibiting factors (perceived sacrifice and privacy concerns) affect mobile consumers' perceived advertising value of the latest LBA. Instead of simplifying consumer behaviours as user acceptance or use intention to adopt mobile advertising, this study further examines the effect of the perceived LBA advertising value on the consumers responses, including purchasing the advertised brand, passing the LBAs along and searching for brand information. Figure 1 shows the LBA advertising value model.

**Figure 1** LBA advertising value model



### *2.1. Perceived utility*

The perceived utility is a motivating factor for consumer acceptance of push-based mobile advertising (Al Khasawneh and Shuhaiber, 2013; Choi, Hwang and McMillan, 2008; Yang, Liu and Zhou, 2010a). Merisavo et al. (2007) which define perceived utility as the consumers' reflections on a mobile advertisement's usefulness, relevance, monetary incentives, and infotainment content. Derived from the U&G theory, informativeness is considered as a valuable factor for m-advertising and consumers tend to react positively to it (Liu et al., 2012). Entertainment is a key driver of the consumers' attitude towards mobile advertising (Parreño et al., 2013). When consumers perceive SMS advertising messages to be entertaining and relevant, they are likely to increase consumers' intention to purchase the advertised products (Scharl, Dickinger and Murphy, 2005). Informativeness, entertainment, and incentives of m-advertising messages are also found to be positively associated with consumer acceptance (Al Khasawneh and Shuhaiber, 2013) and perceived advertising value (Liu et al., 2012). Incentives such as vouchers and discounts also increase people's intention to use LBAs (Richard and Meuli, 2013). Additionally, the timely delivery of useful information via mobile devices positively affects target groups' responses to mobile advertising (Nasco and Bruner, 2008). Hence, this study hypothesises that:

*H1: Perceived utility has a positive effect on advertising value.*

### *2.2 Utilisation of contextual information*

According to Okazaki, Molina and Hirose (2012), the ubiquity of mobile devices serves as an advantage for time and spatial flexibility. Perceived usefulness of mobile services varies depending on situational value (Ström, Vendel and Bredican, 2014). Mobile advertising can reach targeted consumers in specific locations and time as they carry mobile devices anytime and anywhere (Okazaki, Li and Hirose, 2009). When advertisers arrange m-advertising messages to meet consumers' time, location, and preferences, it positively affects consumer attitudes (Al Khasawneh and Shuhaiber, 2013; Nasco and Bruner, 2008) and advertising acceptance (Merisavo et al., 2007). Yang, Zhou and Liu (2010b) find similar results in different cultures when examining young Chinese and US consumers' responses to contextualised mobile advertising. As the latest LBAs provide more targeted contextual information than conventional mobile advertising, they are likely to enhance consumers' perceived value (Liu et al., 2012). Hence, this study proposes that:

*H2: Utilisation of contextual information has a positive effect on the advertising value.*

### *2.3 Perceived control*

Perceived control, a key element of the theory of planned behaviour, is defined as an individual perception of internal and external constraints on behaviour, which affects the behaviour intention (Ajzen, 1991). Experts regard permission as the most important success factor in developing and using m-marketing (Huang, 2012). As mobile phones are considered to be personal devices (Okazaki, Li and Hirose, 2009), intrusion from unwanted mobile advertising or spams tend to cause frustration to the consumers

(Okazaki and Taylor, 2008). The perceived control of the permission to receive and filter mobile advertising avoids physical and media disturbances (Carroll et al., 2007), which positively affects consumers' acceptance (Leppäniemi and Karjaluoto, 2005), consumer attitudes towards m-advertising (Tsang, Ho and Liang, 2004) and their purchase intention (Noor, Sreenivasan and Ismail, 2013). In the USA and the European Union, it is a legal requirement for advertisers to ask for a consent (opt-in) before sending mobile marketing information (Cleff, 2010). The MMA (2011) regards permission-based LBAs as the best practice for mobile advertising. Wei, Hao and Pan (2010) find that obtaining prior consent, a means of consumer control, is positively related to the acceptance of SMS advertising. Hence, this study proposes that:

*H3: Perceived control has a positive effect on advertising value.*

## 2.4 Trust

Hsiao and Chang (2014, p.733) define trust in the context of mobile advertising as "consumer beliefs that advertisers are honest, responsible, and professional and understand and care for the consumers." Prior studies show that consumers tend to accept push-based mobile advertising when they trust advertisers, mobile service providers, and regulators to protect personal data and privacy (Merisavo et al., 2007; Okazaki, Li and Hirose, 2009; Yang, Zhou and Liu, 2010b). Making the latest LBA services relevant to targeted groups requires a great amount of locational and contextual consumer data (Dhar and Varshney, 2011; Peterson and Groot, 2009). Consumer trust not only increases the willingness to share personal data (Schoenbachler and Gordon, 2002), but also reduces m-advertising avoidance (Okazaki, Molina and Hirose, 2012). Trust is a concept similar to credibility in the advertising field. According to Choi, Hwang and McMillan (2008), consumers in Korea and the USA believe that credibility positively affects the perceived value of mobile advertising. Liu et al. (2012) further points out that consumers' perceived credibility of m-advertising's sources of information and content is positively associated with perceived advertising value. Hsiao and Chang (2014) also find that perceived trust in advertisers increase the perceived value of mobile advertising. Hence, this study postulates that:

*H4: Consumer trust has a positive effect on advertising value.*

## 2.5 Perceived sacrifice

This study adapts Merisavo et al.'s (2007) perceived sacrifices and defines this inhibitor as annoyance when receiving unsolicited content and risks in wasting time reading unsuitable messages. Irritation is the main sacrifice of mobile advertising use (Ström, Vendel and Bredican, 2014), especially for mobile push advertising without prior user consent. Irritated information in m-advertisement which distracts or overwhelms consumers can be regarded as an intrusion to reduce advertising effectiveness (Liu et al., 2012). Receiving irrelevant m-advertising in inappropriate contexts (e.g., working and home) which causes distraction and intrusion is also regarded as perceived sacrifice in the LBA use (Lin et al., forthcoming). These LBA sacrifices tend to cause consumers' negative attitudes and affect intention to use (Choi, Hwang and McMillan, 2008). When consumers make great efforts to learn how to use the app-based LBA, the level of

perceived sacrifices is likely to be higher (Ström, Vendel and Bredican, 2014). Thus this study proposes that:

*H5: Perceived sacrifice has a negative effect on advertising value.*

## *2.6 Privacy concern*

Privacy issues have raised lots of academic and market inquiries as they threaten the diffusion of m-advertising (Leppäniemi and Karjaluoto, 2005; Okazaki, Molina and Hirose, 2012). Although Merisavo et al. (2007) include one privacy item to measure perceived sacrifice, this influential factor deserves be examined as an independent variable. Experts think that privacy management of m-marketing system and services is a significant success factor for development (Huang, 2012). Consumers' privacy concerns include receiving unsolicited advertising messages, unauthorised personal data collection for marketing purposes, and deliberate theft of personal information (Cleff, 2010). Although advertisers and advertising agencies use individual location and social information to create highly contextualised The LBAs, consumers worry that their privacy may be compromised, thus resulting in potential losses, uncertainty, and risks (Zhou, 2013). Privacy concern affects consumer acceptance and use of LBA (Dhar and Varshney, 2011; Lin et al., forthcoming). When permission-based LBAs provide consumers greater involvement (Li and Du, 2012) and user control, privacy concerns tend to be reduced (Xu, Oh and Teo, 2009). These findings suggest a potential link between privacy concerns and advertising value. Thus, this study adds privacy concern as a predictor of the LBA's perceived value and proposes that:

*H6: Privacy concerns have a negative effect on advertising value.*

## *2.7 LBA responses*

Instead of consumer acceptance or intention to use, this study examines the relation between LBA value and consumer responses. According to JiWire (2011), 75% of North American respondents take action after receiving LBA messages by clicking on ads, searching for nearest shops, and conducting brand research. Wei, Hao and Pan (2010) find that those who perceive more value in SMS advertising tend to pass them to others, but those who accept SMS advertising are more likely to purchase the advertised brands. These findings suggest perceived LBA value trigger different consumer responses. Sanakulov and Karjaluoto (2015) also emphasise mobile advertising studies must examine actual consumer behaviours. Based on prior studies, this study classifies consumer responses to the LBA into purchasing the advertised brand, passing the LBA to others (e.g. friends and family members) and searching for brand information. This study hypothesises that:

*H7A: Advertising value increases consumers' responses to purchase the advertised brand.*

*H7B: Advertising value increases consumers' responses to pass LBAs along.*

*H7C: Advertising value increases consumers' responses to search for information.*

### 3 Method

#### 3.1 Research context

Singapore is a suitable research context to investigate factors affecting consumers' perceived value of LBAs and user responses. As of June 2014, the Infocomm Development Authority (IDA) reports that Singapore has a 153.9% mobile penetration rate with 96% of mobile subscription to 3G/4G networks (IDA, 2014). The Location Based Marketing Association (LBMA) regards Singapore as its Asian hub due to its high mobile penetration and smartphone ownership (Lee, 2012). Singapore also has a well-developed and regulated mobile market (Wei, Hao and Pan, 2010). In 2010, the LBA app developers brought competition to the Singapore's mobile advertising businesses. Now that the LBS apps have gained popularity, some advertisers see LBA's potential and use it as a part of the marketing mix (Lin et al., forthcoming). However, majority of the vendors hesitate to adopt LBA due to technical complexity and uncertain ad effectiveness. Mobile consumers tend to hold negative attitudes towards LBAs and when they worry about the misuse of personal data and privacy invasion (Lin and Ho, 2013). Hence, this city-state, in which LBA is at the early adopter stage, can serve as a test bed (Lin et al., forthcoming).

#### 3.2 Data collection

This study employed a national web survey of the LBA (potential) users by collecting data from Singapore's mobile consumers aged 18 years and older. In March 2013, email invitations to the web survey were sent to randomly selected respondents from Nielsen's media panel. Later, 605 valid respondents were recruited to purposefully fit key demographic quotas (i.e., age, gender, ethnicity, education, and monthly income) of Singaporean mobile phone users. The data was comparable to 2012 Singaporean mobile consumers' statistics, except it was slightly skewed towards well-educated and high-income samples. Table 1 summarises the respondents' demographics to ensure common understanding of the latest LBA development, the respondents were asked to watch a two-minute video clip about the LBA mobile apps before answering the survey questions.

**Table 1** Respondents' demographic profile ( $n = 605$ )

<i>Category</i>		<i>Frequency</i>	<i>Percentage</i>
Gender	Male	310	51.24
	Female	295	48.76
Age	18–29	137	22.64
	30–39	140	23.14
	40–49	188	31.07
	> 50	140	23.14
	Ethnicity	Chinese	460
	Malay	61	10.08
	Indian	57	9.42
	Eurasian	8	1.32
	Others	19	3.14



**Table 1** Respondents' demographic profile ( $n = 605$ ) (continued)

Category		Frequency	Percentage
Educational attainment	Primary level/PSLE and below	9	1.49
	Secondary level/'O' levels or equivalent	150	24.79
	Junior college/'A' levels of equivalent	28	4.63
	Polytechnic/Diploma	166	27.44
	College/University undergraduate	192	31.74
	Master's degree	53	8.76
	Doctoral degree	7	1.16
Monthly income	Dependent/no income	74	12.23
	\$1,000 and below	46	7.60
	\$1,001–\$3,000	188	31.07
	\$3,001–\$5,000	162	26.78
	\$5,001–\$7,000	59	9.75
	\$7,001–\$9,000	33	5.45
	\$9,001–\$10,000	12	1.98
	\$10,001 and above	31	5.12

### 3.3 Measurement

Most measurements were adapted from prior mobile advertising studies (Appendix 1). *Advertising value* was measured by items from Liu et al. (2012). Items for *perceived utility* were based on Liu et al. (2012) and Merisavo et al. (2007). Items for *utilisation of contextual information*, *perceived control*, and *trust* were adopted from Merisavo et al. (2007). This study adopted Wei, Hao and Pan's (2010) three-item measurements for *privacy concern* which is suggested be independent of perceived sacrifice (Ström, Vendel and Bredican, 2014). Three self-generated items (i.e., purchase advertised brand, search for product information, and pass LBA along) examine *consumer responses to LBA*. All items were measured with a 7-point Likert scale ranging from 1 for 'strongly disagree' to 7 for 'strongly agree.'

Before the national web survey, the questionnaire was pretested by 44 undergraduate students in a comprehensive university in Singapore. Some items were rephrased to improve clarity. The pre-test Cronbach's alpha ( $\alpha$ ) for each multi-item construct was more than 0.70, indicating adequate internal consistency.

### 3.4 Scale evaluation

Reliability and validity of the multi-item scales were examined to ensure model fitness. First, factor loading per item must be above 0.70. Appendix 1 shows that the items were loaded adequately. In Table 2, all scales satisfy the recommended values for Cronbach's alpha ( $\geq 0.70$ ), composite reliability ( $\geq 0.70$ ) and average variance extracted ( $\geq 0.50$ ), suggesting adequate internal consistency and convergent validity. It also shows the Stone-Geisser (Q2) value for each multi-item scale which is positive, indicating the strong predictive power (Okazaki, Li and Hirose, 2009). Advertising value's multiple

predictors were assessed for potential multi-collinearity. The variance inflation factors (VIF) do not reach the critical value of 4 while the tolerance values exceeds 0.200, showing that the predictors of advertising value have no multi-collinearity problem.

**Table 2** Means and quality indicators

Scale	Mean	$\alpha$	CR	AVE	$Q^2$	Collinearity statistics	
						Tolerance	VIF
Perceived utility	4.478	0.956	0.963	0.742	0.675	0.670	1.493
Utilisation of contextual information	4.724	0.882	0.927	0.809	0.580	0.711	1.406
Perceived control	5.416	0.941	0.949	0.823	0.686	0.489	2.043
Trust	4.366	0.905	0.941	0.842	0.646	0.852	1.174
Perceived sacrifice	4.836	0.915	0.939	0.795	0.641	0.653	1.532
Privacy concerns	5.509	0.964	0.976	0.932	0.790	0.533	1.876
Advertising value	4.176	0.887	0.930	0.817	0.441	N.A.	N.A.
Purchase advertised brand*	4.008	N.A.	N.A.	N.A.	0.350	N.A.	N.A.
Pass LBAs along*	4.646	N.A.	N.A.	N.A.	0.222	N.A.	N.A.
Search for brand information*	4.278	N.A.	N.A.	N.A.	0.283	N.A.	N.A.

Note:  $\alpha$  = Cronbach's alpha; CR = composite reliability; AVE = average variance extracted;  $Q^2$  = Stone-Geisser Criterion; VIF = variance inflation factors; N.A. = not applicable; \* = single item.

Table 3 shows that the multi-item scales have adequate discriminant validity as the square root of the AVE for each component is greater than the correlation between components.

**Table 3** Discriminant validity of constructs

Scale	1	2	3	4	5	6	7
1. Perceived utility	<b>0.86</b>						
2. Utilisation of contextual information	0.49	<b>0.90</b>					
3. Perceived control	0.07	0.21	<b>0.91</b>				
4. Trust	0.35	0.27	0.10	<b>0.92</b>			
5. Perceived sacrifice	-0.17	-0.01	0.52	0.06	<b>0.89</b>		
6. Privacy concerns	0.10	0.19	0.66	0.13	0.46	<b>0.97</b>	
7. Advertising value	0.69	0.48	-0.09	0.31	-0.25	-0.09	<b>0.90</b>

Note: Diagonal elements are results of the square root of AVE and should exceed the inter-construct correlations to establish discriminant validity.

### 3.5 Statistical analysis

To test the proposed hypotheses, the study employed partial least squares (PLS) (a variant of structural equation modelling) (SEM) due to its wide applications to marketing and business related studies (Hair, Ringle and Sarstedt, 2013). PLS was appropriate for predicting multiple constructs of a particular phenomenon and testing hypotheses from emerging theories in a complex model (Xu, Oh and Teo, 2009). Smart PLS version 2.0.M3 (Ringle, Wende and Will, 2005) was used to perform PLS.

## 4 Descriptive results

### 4.1 Mobile device usage profile

Out of the lot 92% respondents were smartphone users. On an average, respondents have used non-smartphones for 8.70 years (SD = 5.45), smartphones for 3.36 years (SD = 2.09) and tablet computers for 2.69 years (SD = 3.21). In addition to spending on an average of 37.55 minutes on voice calls daily (SD = 68.95), they sent and received 49.78 mobile instant messages (e.g. iMessage and Whatsapp) ( $M = 49.78$ ,  $SD = 109.19$ ), followed by 23.91 SMSes (SD = 65.20) and 2.53 MMSes ( $M = 2.53$ ,  $SD = 14.10$ ).

### 4.2 Use of location-based advertising

Results show that the majority of respondents received SMS ads (59.83%), followed by mobile app ads (38.68%) and MMS ads (32.40%). They received the LBAs mostly on smartphones (60.50%) followed by the tablet computers (29.42%) and the non-smartphones (21.65%). The top three reasons why they received the LBAs include 'downloading free mobile content' (55.64%), 'ordering the delivery of products/services' (49.74%) and 'giving consent to the retailers during promotions' (47.69%). Although 52% of respondents preferred to receive 1–3 LBAs per week, slightly more than half of them (52.23%) would only respond to one weekly.

Context matters to users' actual responses to the LBAs. 28.57% of respondents selected 'respond and purchase' as their most possible actions after receiving the LBAs in 'shopping places.' Those who chose to 'pass the LBAs to others' were most likely to do so in 'places for social gathering' (21.50%). The respondents would 'read' the LBAs while they are waiting (20.33%), at home (17.75%), in public transports (17.70%), and at shopping places (14.60%). Around 75.04% of respondents only read partial LBA messages (25–75% of the content).

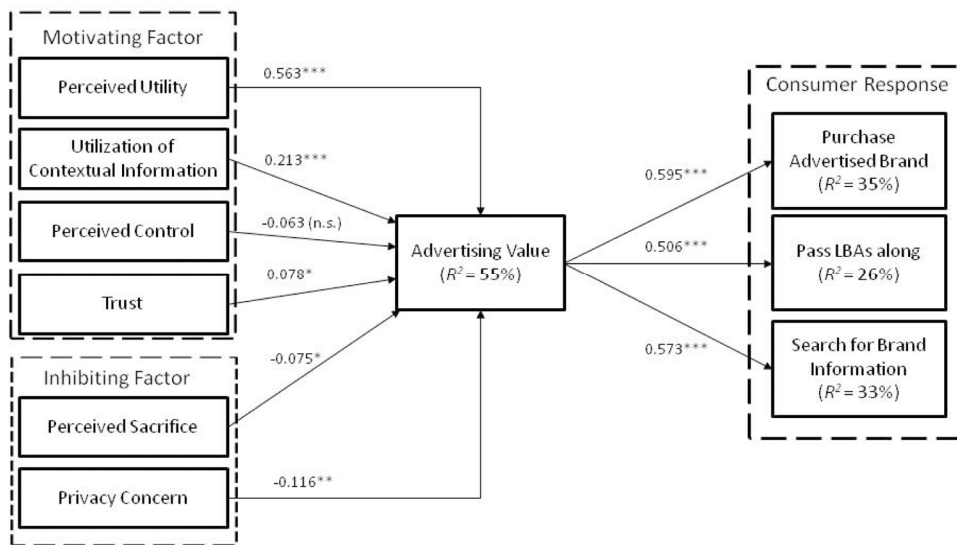
## 5 PLS results

### 5.1 Model evaluation

Figure 2 shows the PLS results of the research model with squared multiple correlations ( $R^2$ ) for endogenous constructs and statistical significance for path coefficients. The required  $t$ -values to determine statistical significance was computed by performing 5,000 bootstrapping subsamples as recommended by Hair, Ringle and Sarstedt (2013). The  $R^2$

of each endogenous construct reflects adequate explanatory power since it satisfies Falk and Miller's (1992) suggested value of more than 10%. Specifically, *perceived utility*, *utilisation of contextual information*, *perceived control*, *perceived sacrifice*, *privacy concern* and *trust* can explain 55% of the total variance for perceived advertising value. Lastly, *perceived advertising value* can explain the variance of three LBA responses: *purchasing advertised brand* (35%), followed by *searching for brand information* (33%) and *passing the LBAs along* (26%). Based on endogenous constructs'  $R^2$  values, the model is reliable for drawing valid results from the proposed hypotheses.

**Figure 2** PLS results



Note: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ , n.s. = not significant.

## 5.2 Hypothesis testing

PLS results show that the paths from *perceived utility* ( $\beta = 0.563$ ,  $p < 0.001$ ), *utilisation of contextual information* ( $\beta = 0.213$ ,  $p < 0.001$ ) and *trust* ( $\beta = 0.078$ ,  $p < 0.05$ ) have positive effects on *perceived advertising value*, thus supporting H1, H2 and H4. However, *perceived sacrifice* ( $\beta = -0.075$ ,  $p < 0.05$ ) and *privacy concern* ( $\beta = -0.116$ ,  $p < 0.01$ ) have negative effects on *perceived advertising value*, thus supporting H5 and H6. Since there is no significant effect for the path from *perceived control* to *perceived advertising value*, H3 is rejected. Among those with positive significant paths, *perceived utility* ( $\beta = 0.563$ ) has the greatest impact on *perceived advertising value*.

In terms of the LBA responses, the PLS results support H7A, H7B and H7C as *perceived advertising value* produces positive and significant paths to *purchasing advertised brand* ( $\beta = 0.595$ ,  $p < 0.001$ ), *searching for brand information* ( $\beta = 0.573$ ,  $p < 0.001$ ) and *passing LBAs along* ( $\beta = 0.506$ ,  $p < 0.001$ ). Comparatively, *purchasing advertised brand* shows the highest path value. Table 4 summarises the results of hypothesis testing.

**Table 4** Summary of hypothesis testing

<i>Hypothesis</i>	$\beta$	<i>t-value</i>	<i>Decision</i>
H1 Perceived utility → Advertising value	0.563	13.022***	Accept
H2 Utilisation of contextual information → Advertising value	0.213	5.354***	Accept
H3 Perceived control → Advertising value	-0.063	1.723 (n.s.)	Reject
H4 Trust → Advertising value	0.078	2.354*	Accept
H5 Perceived sacrifice → Advertising value	-0.075	2.060*	Accept
H6 Privacy concern → Advertising value	-0.116	2.874**	Accept
H7A Advertising value → Purchase advertised brand	0.595	17.994***	Accept
H7B Advertising value → Pass LBAs along	0.506	12.603***	Accept
H7C Advertising value → Search for brand information	0.573	17.739***	Accept

Note: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ , n.s. = not significant.

## 6 Discussion

As the LBAs use locational capabilities and contextual information to enhance consumers' perceived advertising value, advertisers and advertising agencies are keen on exploring their potential to reach targeted consumers, strengthen customers' loyalty, and stimulate sales (Lin et al., forthcoming). Unlike prior research examining consumer acceptance and attitude towards SMS ads (e.g., Merisavo et al., 2007; Tsang, Ho and Liang, 2004; Yang, Liu and Zhou, 2010a, 2010b), this study develops a research model which exhibits adequate explanatory power to predict factors affecting mobile phone users' perceived value and responses to latest mobile app-based LBAs. According to PLS results, perceived utility, utilisation of contextual information, and trust have positive effects on mobile users' perceived value of latest LBAs. Among them, perceived utility appears as the strongest predictor, suggesting that the LBA content must convince consumers of potential advantages (e.g., saving time and money, providing incentives and entertainment) to increase perceived value and stimulate consumer responses.

The results also support that when targeted users receive the LBAs with relevant information at suitable time and places, they tend to perceive high LBA value. The relatively low path value of trust ( $\beta = 0.078$ ) reveals that mobile consumers' perceived the LBA value is moderately affected by their trust of mobile operators, marketers and personal data protection laws. According to 2014 Edelman Trust Barometer report (Edelman, 2014), Singaporeans rank third among 27 countries in trusting their government. In addition to high reliance on the government in regulating the LBA businesses, the recent enforcement of the Personal Data Protection Act and consumers' opt-out option in mobile advertising also increase their trust in advertisers and service providers, and thus show less influence on the perceived value of LBA.

The study also shows that perceived control cannot predict the perceived LBA value. This finding contradicts our assumption as prior studies find the positive effects of control and prior consent on mobile advertising adoption (MMA, 2011; Tsang, Ho and

Liang, 2004; Wei et al., 2010). We think context plays a crucial part in determining the significance of perceived control over mobile advertising. For example, perceived control has no impact on mobile advertising acceptance in Merisavo et al.'s (2007) Finland consumers and Yang, Zhou and Liu's (2010b) US consumers. Consumers in the two countries, where current laws and policies protect consumer rights well, may feel less concerned about having full control over receiving mobile advertisements. Similarly, the Singapore government has enforced spam control and personal data protection for mobile advertisements (Lin et al., forthcoming). These protective measures may explain why consumers regard control over the LBAs as insignificant. Furthermore, as control of the LBA means to make effort and spend time on selecting and responding to the LBAs, busy Singaporeans may feel it unnecessary as travelling within this city-state involves little time and expenses. The contradicting role of perceived control of the LBA in our finding suggests that the future studies need to re-examine its impact with considerations of mediating factors such as context and culture.

Prior studies like Ström, Vendel and Bredican (2014) suggest the importance of differentiating the concepts of perceived sacrifice and privacy concern. Instead of treating 'loss of privacy' as part of perceived sacrifice, this model finds that both have negative impact on the perceived LBA value, but privacy concern has a higher significant level ( $\beta = -0.116$ ,  $p < 0.01$ ) than perceived sacrifice ( $\beta = -0.075$ ,  $p < 0.05$ ). Practically, this sends a crucial message to the LBA stakeholders: as long as consumers' privacy concerns are taken care of, they are less concerned about other sacrifices such as losing control, feeling irritated, or blurring distinctions between work, life, or leisure. Moreover, as consumers are inclined to regard irrelevant pushed LBAs as annoying and spam (Lin et al., forthcoming), advertisers and advertising agencies should take a pull approach to send the targeted LBAs with beneficial, trustworthy, and useful information in various contexts.

## **7 Implications and conclusions**

Context plays a critical role in determining consumer acceptance of traditional mobile advertising (Merisavo et al., 2007; Yang, Liu and Zhou, 2010a, 2010b). The survey results show that majority of the respondents were willing to receive a few LBAs and read them partially. When mobile consumers received the LBAs in shopping places, they were most likely to purchase advertised brands or respond to them. The model reveals that perceived advertising values are positively associated with consumer responses in purchasing LBA advertised brands, followed by a search for product information and passing the LBA messages to others. That is why some shopping malls make effective use of the LBA mobile apps to attract foot traffic (Lin et al., forthcoming) and stimulate spontaneous purchase for nearby advertised brands. For products which belong to less impulsive purchasing categories, searching for brand information is a critical consumer response to the LBA as it can enhance brand impression and help with future sales. Moreover, advertisers and advertising agencies should improve their LBA content value so that mobile consumers may pass these messages to others or even share them via social media, which can quickly improve the LBA exposure and brand awareness.

LBA is an emerging form of mobile advertising that is currently facing diffusion resistance among mobile consumers. First, derived from UandG theory and Ducoffe's web advertising model, this study demonstrates the interplay of predictors affecting

consumers' advertising value and its impact on LBA responses. Theoretically, it contributes to the advancement of the LBA knowledge by realising the effects of motivating factors (i.e., perceived utility, utilising of contextual information, perceived control, and trust) as well as inhibiting factors (i.e., perceived sacrifice and privacy concerns) on mobile consumers' advertising value. Second, this study improves the traditional mobile advertising acceptance model by separating privacy concerns from perceived sacrifice. Third, it examined perceived advertising value and its impact on specific consumer responses to the LBA instead of looking at general consumer acceptance or use intention. This new model can be utilised to investigate mobile consumers' perceived value and behavioural responses to mobile marketing technologies. Empirically, the findings provide useful insights of factors affecting consumers' perceived value of latest LBAs which will help stakeholders in the LBA value chain to develop effective LBA content and campaigns in mobile advanced Asian countries. Methodologically, the study which rigorously conducts a web survey of Singaporeans' mobile consumers shows the appropriateness of using PLS to build and test developing models. For future research, in addition to examining new determinants, it will be interesting to investigate the cultural and contextual influences on mobile consumers' perceived advertising value towards LBA.

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## Appendix 1 Scale items

	<i>Factor loadings</i>
<i>Perceived utility – Liu et al., 2012 (1–3); Merisavo et al., 2007 (4–7); Original Items (8–9)</i>	
1 Raise our standard of living	0.809
2 Find products that match my personality and interests	0.883
3 Buy the best brand for a given price	0.875
4 Save money	0.862
5 Save time	0.878
6 Provide entertaining experience	0.827
7 Provide useful product/service/brand information	0.864
8 Increase effectiveness in managing information	0.890
9 Provide incentives for purchasing products or services	0.859
<i>Utilisation of contextual information – Merisavo et al., 2007</i>	
1 When LBAs are related to me being in a specific location (e.g. stores, parking), I consider them useful.	0.915
2 When LBAs are related to me in a specific time or date (e.g. anniversary, changes in stock prices), I consider them useful.	0.899
3 When LBA match my needs, I spend time on providing necessary information (e.g. personal profile).	0.884
<i>Perceived control – Merisavo et al., 2007</i>	
1 I would only agree to receive LBAs if I had given my permission in advance	0.770
2 It is important for me that I can have control over receiving LBAs	0.956
3 It is important for me that I can refuse to receive LBAs	0.972
4 It is important for me that I can filter LBAs to match my needs	0.917
<i>Perceived sacrifice – Merisavo et al., 2007</i>	
1 Loss of control	0.847
2 Time consuming	0.905
3 Feel annoyed or irritated	0.931
4 Blurring distinction between home, work and leisure	0.883

**Appendix 1** (continued)

		<i>Factor loadings</i>
<i>Privacy concerns – Wei et al., 2010 (1–3)</i>		
1	I am concerned that the information I submit on LBAs can be misused	0.951
2	I am concerned about submitting LBA information on mobile devices because it can be used in a way I do not foresee	0.978
3	I am concerned about submitting LBA information on mobile devices because others might use it for marketing or commercial purposes	0.967
<i>Trust – Merisavo et al., 2007</i>		
1	I believe that mobile operator uses my data only for the purpose that I have approved	0.941
2	I believe that marketers would use my data only for the purposes that I have approved	0.943
3	I believe that consumers are protected by laws related to data privacy	0.866
<i>Advertising value – Liu et al., 2012</i>		
1	Useful	0.911
2	Valuable	0.950
3	Important	0.848
<i>Purchase advertised brand (Original item)</i>		
1	I will buy products/services from LBAs sent to my mobile devices	Not applicable
<i>Pass LBAs along (Original Item)</i>		
1	If I find a useful LBA, I will pass it along to my family or friends	Not applicable
<i>Search for brand information (Original item)</i>		
1	I will actively search for LBAs if I happen to know some discounts or promotions which interest me	Not applicable