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Do the Means and the Source Matter? A Study on the Actual Usage of Digitally Disseminated Coupons

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Original Research

Do the Means and the Source Matter? A Study on the Actual Usage of Digitally Disseminated Coupons

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Abstract

How to effectively distribute coupons digitally to consumers who may exercise them remains an enduring, yet important, issue to address. In this study, we seek to answer two questions. First, would the dissemination of product discount coupons through mobile technology, such as the mobile phone network via the short-message-service (SMS), yield different effects on consumers, compared to a more traditional communication technology such as e-mail? Second, does the source, that is, the merchant or referral from peers, matter to a consumer? We build on the theoretical lens of cognitive effort (technology) and social capital (source) to theorize and empirically validate the conjectures through a real-world field experiment spanning four weeks. In terms of technology, the results indicate no significant difference in terms of the usage rate of coupons between the two technological means through which the coupons were disseminated. However, in terms of the source, we observed a higher propensity of using coupons received from a peer as compared to coupons received from a merchant. Furthermore, the forwarding rate of the discount coupons was significantly higher via e-mail as compared to SMS. Implications for research and practice are discussed.

Keywords: Mobile commerce, product discount coupons, e-mail, SMS

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INTRODUCTION

Although there has been ample evidence suggesting that the product discount coupon could serve as a promising device for consumer market segmentation purposes (Biyalogorsky et al. 2001; Shaffer and Zhang 1995), much less attention has been devoted to understanding the means through which the coupon is disseminated, and its effectiveness in enticing consumers to eventually procure. Indeed, the bulk of the existing knowledge about the discount coupon has predominantly revolved around the notion of competition for price-sensitive consumers whereby lowering the regular price for a product increases a merchant's revenue (Dass 2005). Such a focus on rationalizing the use of the discount coupon has resulted in a significant number of merchants considering the discount coupon as one of the most important marketing strategies. For instance, one can now easily get hold of a discount coupon just by walking down the street, surfing the Internet, or even collecting postage mail.

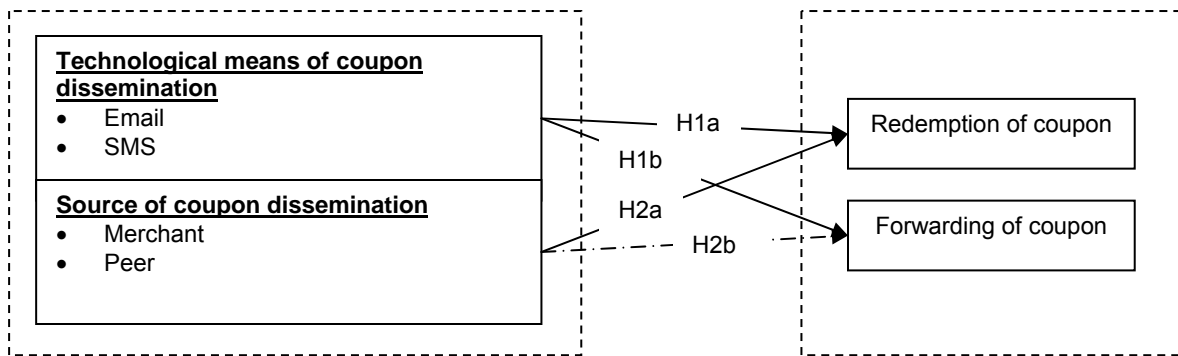
Despite some knowledge that can be gained from the prior studies on discount coupons, these studies are largely conceptual in nature (Cheng and Dogan 2008; Krishna and Zhang 1999; Chiang 1995; Shaffer and Zhang 1995; Inman and McAlister 1994; Lichtenstein et al. 1990; Neslin 1990; Narasimhan 1984). This has resulted in a paucity of studies that afford empirical evidence about the use of coupons (Dickinger et al. 2004; Bawa et al. 1997). Even in the case of studies that did collect empirical data on the discount coupon, a significant number of these studies employed the survey method to collect perceptual data and focused on the individual's intention to use a coupon as the dependent measure (e.g., Dickinger and Kleijnen 2008; Suri et al. 2004; Hung et al. 2003; Chiang 1995). Rather than assessing an individual's intention, a more direct and valuable dependent measure that reflects the effectiveness of the discount coupon could be actual usage. This argument is further grounded on the conjecture that an individual's intention does not always dictate actual usage (Limayem et al. 2001; Szajna 1996). It is thus of particular interest to proponents of the discount coupon whether the target users did actually use their coupons so that their purported commercial benefits can indeed materialize.

With the recent advancement of Information and Communication Technologies (ICTs), a variety of technological tools have been employed for digitally disseminating discount coupons. At one end is e-mail, which represents a more conventional technological means that has been widely employed for this purpose, and has received considerable attention from researchers (Bampo et al. 2008). At the other end, representing a more innovative technological means, is mobile technology, especially the short-message-service (SMS) via the mobile phone, which has also triggered marketers' interest with the hope of more effectively reaching potential customers (Reyck and Degraeve 2003). While there have been some studies in the area of human-computer interaction (HCI) that examine e-mail or SMS as a technological means for information dissemination and communication (e.g., Mano and Mesch 2010; Peevers et al. 2008), to the best of our knowledge, there has been no relevant research that compares the use of these different technological means for disseminating the digital discount coupon in terms of consumers' response. To fill this research gap, this study will address the question: *is there a difference in consumers' response towards coupons sent through different technological means, namely, e-mail and SMS?* In particular, will there be a difference in the number of consumers who will respond favorably by using the coupon to procure a product when it is received through an e-mail, as opposed to an SMS? Furthermore, it is plausible that the dissemination of commercial messages, such as those which contain product information, occurs more often from consumers themselves, rather than directly from merchants (Brown and Reingen 1987). Extending this observation to the digital dissemination of the product discount coupon and use, another question that we seek to investigate is: *does the source of dissemination, such as the merchant or referral from peers (such as friends), matter to a consumer?* In other words, will an individual respond favorably to a digital coupon, be it in the form of e-mail or SMS, which is received from someone whom he/she knows, as opposed to one coming directly from the merchant?

To investigate the issues above, we conducted a between-subject field experiment which involved real-users who purchased real products over a period of four weeks using discount coupons received via e-mail and SMS. This study contributes to our current understanding in two ways. First, through conducting a field experiment that involved real purchases, we were able to assess the actual impact of different ICTs on the usage and dissemination of discount coupons. These findings add knowledge about discount coupons that is currently dominated by conceptual studies offering little empirical evidence about consumers' actual coupon usage. Second, through the meticulous calibration of the field experiment, we echo the call for more field-based realistic experiments that serve to test technologies in a real-world context. The design, implementation, and field evaluation of the e-mail and SMS-based digital discount coupons thus may serve as valuable additions to the HCI literature.

THEORETICAL BACKGROUND AND RESEARCH MODEL

Figure 1 depicts a research model that assesses the impacts of technological means of disseminating discount coupons, e-mail and SMS, and the sources of coupon dissemination, from the merchant or the peer, on consumers' actual redemption and forwarding of the coupon.



Note: H2b denoted by dotted arrow, refers to null hypothesis.

Figure 1: Research Model

SMS and E-mail as the Means for Discount Coupon Dissemination: The Cognitive Effort Perspective

Discount coupons are documents which allow the holder to procure a designated product at a special price, usually lower than the regular price, within a permitted period of time (Monroe 2003). An enduring issue pertaining to the dissemination of discount coupons is the low usage rate, which is often associated with the cognitive effort a consumer requires to find and redeem the coupon. Indeed, the occurrence of committing cognitive errors, such as misplacing and forgetting to use coupons, is often cited as the primary factor affecting usage of discount coupons (Swaminathan and Bawa 2005). To address this problem, researchers have proposed using an ICT, such as e-mail (Chiou and Inman 2008). For instance, in a research endeavor that compares online and print coupons, Suri et al. (2004) observed that consumers are likely to be more careful when processing information about an online coupon than a print coupon. Based on this observation, it is necessary to inquire into the effectiveness of various technological means which can be used to disseminate coupons.

In this study, we examine email and SMS as two technological means of disseminating discount coupons. The former denotes a conventional technological means that has been widely adopted by merchants; while the latter signifies a contemporary technological means that is fast becoming popular due to the advancements in mobile technology. E-mail may be perceived as the precursor of digital text communication (Bawa and Shoemaker 1987). Several studies have been conducted on e-mail coupons, such as the use of the e-mail as a marketing instrument to induce customer retention (Lewis 2004), and to clear excess product capacity (Hartmann 2006). However, it has been noted that the use of e-mail coupons could be perceived as irritating or cognitively burdensome by many consumers (Morimoto and Chang 2006). For instance, one would typically need to print out the coupon in order to redeem it.

The use of the second technological means, SMS, as a digital text communication for marketing purposes, has exponentially increased in recent years (Kavassalis et al. 2003; Reyck and Degraeve 2003). For instance, marketing services such as text2store.com and ping-mobile.com send discount coupons in text messages to their registered members' mobile phones. In a recent study on the use of SMS to disseminate discount coupons, Dickinger and Kleijnen (2008) observed that a consumer's perceived control of the coupon influences his/her intention to redeem it. Additionally, the perceived cognitive effort required to redeem the coupon affects one's attitude towards it. In a related work by Zhang and Mao (2008), the authors suggested that the perceived ease of using SMS coupons affects intention to use it. While these studies add to the wealth of knowledge on SMS coupons, they often employ perceptual measures such as purchase intention, due to the challenges of administering real-world experimentation based on actual systems used by the consumers. Hence, there is little empirical knowledge about the impact of SMS (versus e-mail) on the actual usage of coupons.

Our review of these two ICTs subtly, yet consistently, directs us toward cognitive effort as a core means of understanding the influence of technologies on discount coupon usage. More explicitly, as advocated by Swaminathan and Bawa (2005), cognitive exertion needed to redeem a coupon is a non-trivial factor affecting the actual usage of the coupon. The cognitive effort paradigm builds on the principle that human cognitive capacity is limited (Payne et al. 1993). Hence, a consumer may only expend the effort necessary to make a satisfactory (rather than an optimal) decision (Gregor and Benbasat 1999). When facing a task that requires an individual to expend more cognitive effort, one may give up, defer, or adopt heuristic strategies (Payne et al. 1993). To this end, a technological means that reduces the cognitive effort associated with accomplishing a task could substantially increase a consumer's propensity to accomplish the task (Montgomery et al. 2004).

Applying the cognitive effort paradigm to our study, we posit that the technological means which facilitates processing of the discount coupon could lead to a higher usage in redeeming the coupon, and/or disseminating the coupon by sharing (forwarding) it with others. As compared to e-mail coupons, SMS coupons are stored in a mobile phone that is always being carried by the recipient (Rettie et al. 2005; Reyck and Degraeve 2003). Since it is easy to have quick access to all the stored coupons, the probability of finding the right coupon at the right time is very high. Although modern mobile phones also have functionality that allows e-mail coupons to be read, the effort needed to launch the specific application, to sort out and locate the coupons among other e-mails within the small screen, and then to eventually redeem the coupons, is not as simple as retrieving SMS coupons. More typically, one needs to print the e-mail coupon in order to redeem it, which makes the redemption process tedious. Previous research has shown that generally, consumers' interest towards a commercial message depends on the message's processing costs (Krishnamurthy 2001). Based on the cognitive effort theory, this means that individuals are likely to prefer redeeming SMS coupons over e-mail coupons. Hence, we hypothesize:

H1a: Discount coupon usage will be higher for coupons received through SMS than those received through e-mail.

Despite the ease of redeeming SMS coupons, mobile technologies (and especially SMS) have some limitations as compared to the e-mail system. First of all, SMS messages are limited by the maximum number of characters (~160), whereas e-mail messages have no such limitation. In an e-mail coupon, we can put an entire HTML page with links, buttons, input fields, etc. This is not feasible with an SMS coupon. The technical limitations of SMS make the discount coupons forwarding process more challenging to accomplish. E-mail coupons can be shared or forwarded with a simple click on a pre-programmed website link included in the e-mail message, or by entering the e-mail address of a friend into the corresponding input field on a web interface. In contrast, to forward a coupon via SMS, a slightly more complicated process is necessary. This often requires the sender to know the central number of the SMS coupon system (so that the new coupon to be forwarded can be produced and authenticated by the system before it is sent to the next recipient), and the phone number(s) of the coupon recipient(s), which requires some amount of manual typing. Therefore, based on the cognitive effort theory, we expect that e-mail technology will be preferred for coupon sharing/forwarding over SMS. Thus, we hypothesize:

H1b: The forwarding rate will be higher for coupons received through e-mail than those received through SMS.

Besides the technological means, we also explore the extent to which an individual will respond favorably to a digital coupon, be it in the form of e-mail or SMS, that is received from his/her peer, as opposed to that received from the merchant directly.

Merchant and Peer as the Sources of Discount Coupon Dissemination: The Social Capital Perspective

In an early study, Whyte (1954) investigated the diffusion of air conditioners in a Philadelphia suburb and concluded, on the basis of anecdotal evidence, that the pattern of ownership could be explained by the presence of a network consisting of neighbors exchanging product information. Subsequent investigations of peer-generated marketing communication produced more formal statistical confirmation of its importance. For instance, Katz and Lazarsfeld (1955) found that peers are the most influential source in purchasing household goods and food products. They were seven times more effective than newspapers and magazines, four times more effective than personal selling, and twice as effective as radio advertising in influencing consumers to switch brands. Recent studies lend further support to the importance of peer-generated marketing communication (e.g., Brown and Reingen 1987; Donaton 2003; Duhan et al. 1997; Katz and Lazarsfeld 1955; Kotler 2000; Park and Lee 2008; Rosen 2002; Sweeney et al. 2008; Valente and Davis 1999).

Extending the above findings to the digital dissemination and use of discount coupons, we are encouraged to compare the merchant and peer as the sources of coupon dissemination, via e-mail and SMS, and how they influence consumers' actual redemption and forwarding. We anchor such comparisons on the social capital perspective. Social capital broadly refers to resources residing in the fabric of relationships among individuals (Coleman 1988; Putnam 1995, 2000). The theory posits that interactions among individuals can lead to the formation of norms and trust, which in turn reduces social frictions in everyday life (Putnam 1995, 2000).

Over the years, consumers have developed a general tendency of disbelief or skepticism towards advertising and promotional messages (Escalas 2007; Obermiller and Spangenberg 1998). This is further complicated by the fact that spam messages have become increasingly rampant (Burke 2008; Medlin and Romaniello 2008). In the case of discount coupon delivery, the recipients have to rely on the source of the discount coupon (merchant or peer) to perceive with confidence whether the coupon is authentic and can indeed bring about the claimed benefit (i.e.,

discount) to them. Consistent with the social capital perspective, if the source is their peer (rather than a merchant), there will likely be more trust due to previous interactions (Coleman 1988; Putnam 1995, 2000), which should in turn increase the tendency of the recipients to use the coupon. Thus, we hypothesize:

H2a: Discount coupon usage will be higher for coupons received from peers than those received from a merchant.

In the case of whether there will be more forwarding when the coupon is received from a peer or a merchant, the situation becomes somewhat different. Specifically, the consumer now becomes a potential source of the coupon to others. Due to the change in roles, the social capital effect may not apply here. Indeed, the literature on consumers' purchase decision and intention to be a referrer has highlighted that while consumers' higher confidence towards a discount coupon forwarded by a peer may encourage their use of the coupon (Donaton 2003; Kotler 2000; Park and Lee 2008; Rosen 2002; Sweeney et al. 2008), it is the level of satisfaction after they have used the coupon (i.e., consumption-related fulfillment) that determines their likelihood of being a referrer (Sudaraman et al. 1998; Swan and Oliver 1989; Wangenheim and Bayón 2007; Westbrook 1987). Leading from this, we could argue that while the redemption rate of the discount coupon could be higher when the source of the coupon dissemination is a peer rather than a merchant, the forwarding rate of the discount coupon may not be different regardless of whether the source is a peer or a merchant. Accordingly, we hypothesize:

H2b: The forwarding rate will NOT be significantly different for coupons received from a peer or from a merchant.

RESEARCH METHODOLOGY

This study employed a between-subject field quasi-experiment method to test the hypotheses, which is seldom practiced in HCI research. Towards this end, this study also makes a methodological contribution by demonstrating how quasi-experiments can be designed for field testing IT artifacts. A quasi-experiment design provides a set of guidelines and principles for testing causal hypotheses about manipulable causes in the natural setting where random assignment of subjects is impossible or impractical (Shadish et al. 2002). While ensuring a high level of external validity, the approach allows researchers to maintain internal validity through employing a number of measures which we will discuss as follows.

The field experiment was conducted in a European country with a two-period approach. In the treatment group, the participants first received SMS coupons during the first period and then e-mail coupons in the second. In the control group, the participants only received e-mail digital coupons during the first period. This design was made in consideration of the natural-setting constraints of conducting field experiments (Shadish et al. 2002).

To effectively evaluate the impact of the different technological means for disseminating discount coupons, via e-mail and SMS, we first need to identify and overcome the plausible threats to the internal validity arising from sequential effects (Shadish et al. 2002). Specifically, it is plausible that due to the novelty effect, the subjects receiving the first discount coupon could be more interested in the coupon as opposed to receiving it in the subsequent time period. In other words, we want to rule out the novelty effect due to the sequence in the introduction of the technology. The way to address this concern is to statistically establish that there is no difference in the usage of e-mail coupons between the treatment group and control group. This means that the usage of e-mail coupons in the second period by the treatment group is not affected by the use of SMS coupons in the first period. Subsequently, we are able to assess the relative impact of the different technological channels.

Previous studies on mobile applications have mostly relied on survey methodology to assess individuals' perceptions towards an emulated application (e.g., Venkatesh et al. 2003; Xu et al. 2005). To enhance external validity, we self-developed an actual application that is able to distribute digital coupons via SMS and e-mail. The main functionalities of the application include coupon sending and sharing, as well as real time monitoring of coupon forwarding and usage. An individual can share a received SMS coupon with his friend(s) by sending an SMS message that contains the coupon number and the friend's phone number to the server. To share a received e-mail coupon, the individual can click on a "share this coupon" link in the coupon message. The e-mail coupon has to be printed and taken to the shop in order to be redeemed as is typical of this form of coupon, while the SMS coupon can be shown via the user's mobile phone. When a user wants to redeem a coupon, the merchant can validate the coupon in real-time by digitally taking the photo of the barcode printed on the mobile phone or email, and transmit it to the central server for authentication (see Figure 2 for pictorial illustrations of technologies developed and experiments conducted).



Usage of an Email coupon



Usage of an SMS coupon



Specially designed barcode authentication system based on QRCode



Authentication of the SMS coupon using barcodes



Figure 2: Sample Snapshots of the Technologies & Experiments Conducted

We engaged in collaboration with a restaurant that was willing to offer a sandwich discount in the form of both SMS and e-mail coupons. A total of 368 individuals participated in the experiment. They were recruited openly through posters placed on the notice boards of a university. The participants voluntarily registered for the experiment through

our online registration system. They were not aware of the product coupon that they would receive, or the modes of dissemination. The demographic information of the participants is shown in Table 1.

Table 1: Demographic Information of Participants

Participants' Demographics		Percentage
Age	15 – 24	70.6%
	25 – 34	28.8%
	>= 35	0.6%
Gender	Male	67.8%
	Female	32.2%
Education Degree	Bachelor	53.7%
	Master	36.4%
	Ph.D.	9.9%
Internet Experience	<= 5 years	3.1%
	6 – 10 years	66.1%
	11 – 15 years	29.9%
	> 15 years	0.9%
Mobile Phone Experience	<= 5 years	17.8%
	6 – 10 years	76.1%
	11 – 15 years	5.5%
	> 15 years	0.6%

We began by randomly selecting half of the participants (184), and then sending each participant an SMS coupon. This first round of discount coupons was meant to expire two weeks after they were sent to the participants. Soon after, we sent e-mail coupons with the same sandwich discount to those who previously received SMS coupons, as well as to the remaining half of the participants who had not yet received a coupon. Figure 3 illustrates the experiment design.

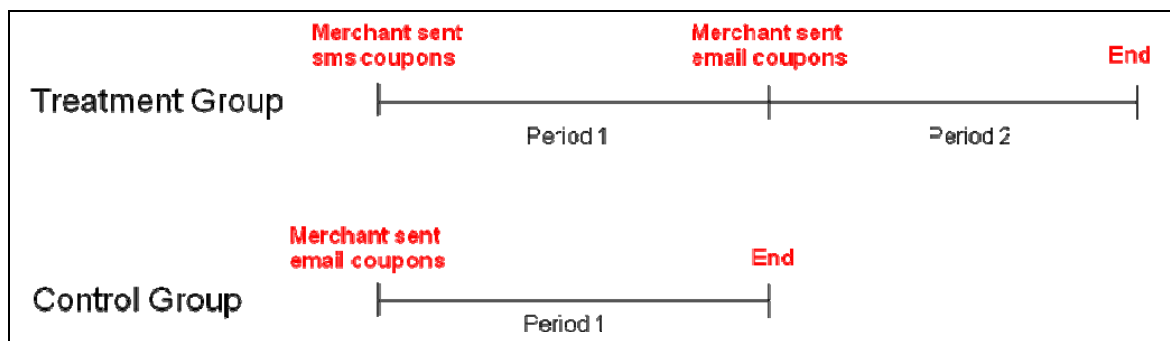


Figure 3: Experiment Design

DATA ANALYSIS

Before conducting the hypotheses testing, we need to first rule out the sequential effects of the experiment. This is because it is plausible that the subjects receiving the first coupon could be more interested in the discount coupon, as opposed to the second period when they received the coupon. This could be regardless of the technological mode of delivery (i.e., the consumers' redemption of the coupon was due to the novelty effect rather than the technology used). To rule out this potential confounding effect, we followed the quasi-experiment principle by introducing a control group where subjects received emails in period 1. Within the same period, we had the subjects in the treatment group receive the coupon via the SMS. However, in the second period, the subjects in the treatment group received the discount coupon via email (see Figure 3). If there were no differences in the redemption of the coupons for subjects (in the control group) who received emails in period 1 and other subjects (in the treatment group) receiving emails in the period 2, we could rule out the potential sequence effects of technology introduction.

We conducted a logistic regression to check whether receiving email in period 2 (treatment group) and in period 1 (control group) would lead to a significant difference in a consumer's propensity to redeem the coupon. The reason

for using logistic regression is because the coupon usage (as well as the coupon forwarding), is binary in nature. The logistic regression revealed no significant difference ($\delta = -.688$, $z = -1.62$, $p = .106$), thus ruling out the possible sequential effects of the experiment.

Table 2 depicts the frequency counts of the usage of coupons sent by merchant and peers. A preliminary, visual inspection of the descriptive statistics suggests that regardless of the technological means of dissemination, discount coupons received from peers will have a higher usage rate than discount coupons received from the merchant. We next proceeded to hypotheses testing. We conducted a logistic regression to test hypotheses 1a and 2a, modeling regressing usage of discount coupons against the technology (email versus SMS) and source (merchant or peer) with control variables including age, Internet experience, mobile phone experience, preference for sandwich as the product, and distance of the user from the sandwich shop. Table 3 depicts the results.

Table 2: Frequency Counts of the Usage of Coupons

	Usage of coupon	
	No (%)	Yes (%)
E-mail Coupon		
From Merchant	343 from 368 coupons (93.2%)	25 from 368 coupons (6.8%)
From Peers	105 from 138 coupons (76.1%)	33 from 138 coupons (23.9%)
SMS Coupon		
From Merchant	167 from 184 coupons (91.3%)	17 from 184 coupons (8.7%)
From Peers	27 from 37 coupons (73%)	10 from 37 coupons (27%)

Table 3: Logistic Regression Modeling Results for H1a and H2a

Variable	Coefficient (δ)	Std. error	z	P > z
Studied variables				
Technology (Email vs. SMS)	-.016	.285	-.06	.954
Source (Merchant vs. Peer)	1.302	.280	4.650	.001
Control variables				
Age	.176	.076	2.31	.021
Internet experience	-.010	.097	-.100	.921
Mobile phone experience	-.103	.102	-1.010	.313
Preference for sandwich as the product	.792	.214	3.690	.001
Distance of the user from the sandwich shop	-.106	.106	-1.000	.317
Pseudo R-square	.100			
Log likelihood	-197.886			
LR Chi2 (7)	43.95			

Hypothesis 1a posits that the usage of the coupons received through SMS will be higher than coupons received via e-mail. The results from the experiment suggest that there was no significant difference in coupon usage across the two technological means used for coupon dissemination ($\delta = -.016$, $z = -.06$, $p = .954$). Hence, H1a is not supported.

In hypothesis 2a, we posit that the usage rate will be higher when the source of the discount coupon dissemination is a peer rather than a merchant. As depicted in Table 2, our results indicate statistical support for H2a ($\delta = 1.302$, $z = 4.650$, $p = .001$). Hence, H2a is supported. To better understand this relationship, we computed the probability of change. We observed that when the source of a coupon is a peer, a consumer's propensity to redeem the coupon increases by a probability of 0.155. Furthermore, the probability to redeem a coupon has a significant impact ($p < 0.05$) when one's preference increases by a standard deviation.

To test for H1b and H2b on impact of forwarding attempts, we used the hurdle regression modeling approach. The hurdle regression model combines a binary model to predict zeros, and a zero-truncated negative binomial regression model to predict nonzero counts, which is suitable for the studied dependent variable (forwarding of discount coupons) due to the mixture of zeros (as some did not forward the coupons) and positive number of coupons forwarded. Table 4 depicts the results. Hypothesis 1b posits that the coupon forwarding rate will be higher for coupons received through email over those received through SMS. Our results indicate that the probability of

forwarding the coupon was greater when email was used, compared to when SMS was used ($\delta = -.856$, $z = -1.960$, $p = .050$). Hence, H1b is supported. However, it should be noted that the technological difference diminished when it was decided to forward the coupon ($\delta = -.279$, $z = -.800$, $p = .425$). Our hypothesis testing for H2b supports the conjecture that the forwarding rate will *not* be significantly different for coupons received from a peer, or from a merchant ($\delta = .023$, $z = .060$, $p = .955$)¹.

Table 4: Hurdle Regression Modeling for H1b and H2b

<i>Variable</i>	<i>Coefficient (δ)</i>	<i>Std. error</i>	<i>z</i>	<i>P > z </i>
Logistic regression modeling (for not forwarding [0] vs. forwarding [1])				
Studied variables				
Technology (Email vs. SMS)	-.856	.436	-1.960	.050
Source (Merchant vs. Peer)	.023	.406	.060	.955
Control variables				
Age	.268	.094	2.860	.004
Internet experience	.120	.115	1.04	.297
Mobile phone experience	-.270	.114	-2.380	.017
Preference for sandwich as the product	.286	.263	1.09	.277
Distance of the user from the sandwich shop	.050	.132	.380	.706
<i>Pseudo R-square</i>	.091			
<i>Log likelihood</i>	-113.079			
<i>LR Chi2 (7)</i>	22.64			
Zero-truncated negative binomial regression modeling (for number of coupons forwarded)				
Studied variables				
Technology (Email vs SMS)	-.279	.350	-.800	.425
Source (Merchant vs. Peer)	.234	.288	.810	.416
Control variables				
Age	-.230	.110	-2.100	.036
Internet experience	.195	.127	1.540	.124
Mobile phone experience	.006	.088	.070	.946
Preference for sandwich as the product	.229	.149	1.530	.125
Distance of the user from the sandwich shop	.091	.112	.810	.416
<i>Pseudo R-square</i>	.102			
<i>Log likelihood</i>	-51.580			
<i>LR Chi2 (7)</i>	11.760			

DISCUSSION

In this study, we seek to answer two questions. First, does the dissemination of product discount coupons through mobile technology, a mobile phone network via the short-message-service (SMS), yield different effects on consumers' responses towards the coupon, compared to the more conventional communication technology of e-mail? Second, does the source, the merchant or referral from peers, matter to a consumer? In answering these questions, we self-developed and administered a field quasi-experiment involving consumers receiving real discount coupons.

¹ We conducted further analyses to assess whether there is an interaction between the technology employed and the source of coupon in affecting the dependent variables. For the binary dependent variables, the redemption of coupon (0 – not redeem; 1 – redeem) and the decision to forward coupon, we added the interaction effects of technology and peer into the logistic regressions. The results suggest no significant interaction effects observed with dependent variables of the redemption of coupons ($z = .23$, $p = .816$) and decision to forward coupons ($z = .65$, $p = .517$). Likewise, we also introduced the interaction effects of technology and peers on the number of coupons forwarded (i.e., zero-truncated negative binomial regression modeling). The results also failed to show significant interaction effects ($z = .43$, $p = .667$). It appears to show that the impact of technology is independent of the referral source.

While we did not find significant differences between the usage rate of e-mail and SMS coupons, we discovered that the forwarding rate of e-mail coupon was significantly higher than that of SMS coupons. It seems that the relatively common activity of e-mail forwarding (e.g., many people tend to forward an e-mail containing interesting information to their friends) did increase the tendency to forward the e-mail coupons. This finding, however, should be viewed with respect to the e-mail and SMS forwarding systems that we created specifically for the field experiment. To share a received e-mail coupon, the participant needed to click on a "share this coupon" link in the coupon message, input the e-mail addresses of their friends in the pop-up webpage, and then click "submit". In contrast, to share a received SMS coupon, the participant needed to press the forward button, input a specified short recipient number (for sending the message to the server), delete the discount message (except the coupon number), type the mobile phone numbers of friends, and finally press the send button.

The extra steps in forwarding the SMS coupons could have resulted in the number of SMS coupons forwarded being lower than that of the e-mail coupons forwarded, as we have previously argued. To further examine this observation, we constructed the network diagrams of the e-mail and SMS coupon forwarding instances to identify any plausible systematic pattern in the forwarding endeavor. Our observation is that the number of levels of forwarding coupons is often mostly restricted to one level; in other words, most instances of the forwarding for email involves a peer receiving the coupon from the merchant, and forwarding it to his/her peers. However, the forwarding of SMS coupons could involve more than one level of forwarding, which is from person A to person B, and from person B to person C. Given the limited dataset, we could not validate this preliminary observation with confidence. Hence, subsequent research could be conducted to examine this in greater depth.

While our systems involved the typical steps required to forward the e-mail and SMS in practice, future research may nonetheless attempt to think innovatively about creating a system that simplifies SMS forwarding such that it becomes similar to e-mail forwarding, and assess if the differences between the two technologies persist. While the ease of forwarding seems to be decisive, it may not be the only factor pushing users to forward a coupon. By analyzing the pre-experiment questionnaire data, we found that the influence of dissemination mode on coupon forwarding diminishes when one has decided to do so. In other words, the positive attitude towards coupons is more decisive than the ease of the forwarding method.

Before we discuss the study's implications, readers should be cautioned about some caveats in our research findings. First, our experimental task has focused on individuals' responses to a single product (a sandwich). Prior studies have highlighted that products could also be categorized as being hedonic and utilitarian in nature (Bhattacharjee et al. 2006). While we have included individuals' responses on preferences for the sandwich, along with their willingness and involvement level with regard to this product, to somewhat alleviate this concern (Swaminathan 2003), we would like to encourage more experiments to be conducted which examine the impact of other products on consumer behavior. To this end, future research could also be conducted to compare discount coupon dissemination through different social networks, such as Twitter and Facebook. Second, the field experiment was conducted in a European country. To the extent that consumers may vary geographically and culturally, future research should replicate our field experiment on other continents to check the generalizability of the findings.

Despite the limitations of the current study, it offers three primary theoretical and practical contributions. First, this is a pioneering study that developed an actual application to distribute digital coupons via SMS and e-mail, and employed quasi-experiment principles to examine the actual usage and forwarding behaviors involving real digital coupons disseminated by two different technologies. The administration of the entire experiment met with several challenges, including finding and negotiating with a merchant of the product for our experiment. We hope the objective nature of data grounded on the actual commercial situations could enhance the external validity of the study's findings and contributions. More importantly, we hope that the meticulous design of the field experiment presented in this study could inform HCI researchers on how to employ quasi field experiment methodology to assess the effects of different technological means involving actual consumers/users while maintaining internal and external validity.

Second, this study creates a stepping stone towards understanding the actual usage behaviors involving digital coupons received from peers, as compared to those received from merchants. While most of the previous studies utilized survey instruments to investigate the viral marketing phenomenon, in this study, the dissemination of coupons via peers was implemented in both the actual e-mail-based and SMS-based systems, and monitored in real-time. Along the social capital paradigm, this study provides an indication that the coupons received from peers were more likely to be used than those received from merchants. To increase the redemption rate of digital discount coupons, merchants should thus attempt to strategically engage consumers in disseminating the coupons, regardless of whether they decided to employ SMS or e-mail as the technological means. For instance, merchants might consider providing some forms of incentives, such as reward points, for encouraging consumers to forward the coupons to their friends. The types of effective incentives through which the forwarding behavior can be encouraged present an interesting agenda for future research.

Third, since most of the previous studies have highlighted the relationship between the pleasurable level of

consumption-related fulfillment (i.e., consumers' satisfaction) and the consumers' likelihood of being a referrer (Sudaraman et al. 1998; Swan and Oliver 1989; Wangenheim and Bayón 2007; Westbrook 1987), another interesting agenda for future research is to extend the current study by investigating the interaction effect of consumers' satisfaction and coupon forwarding mode (e-mail and SMS) on the coupon forwarding rate.

CONCLUSION

With rapid advancement in technological sophistication, more innovative approaches in which technologies can be used to better reach out to consumers could be implemented. Towards this end, this study adds to the cumulative knowledge of technology-mediated dissemination of information. Through designing and developing e-mail and SMS-mediated dissemination of discount coupons, as well as conducting a field experiment involving actual consumers and real purchases, we are able to evaluate empirically the actual impact of different forms of technologies on consumer behavior. We hope this study will serve as an enduring call for HCI researchers to consider adopting field experiments involving real systems developed and used by consumers under actual commercial situations in order to enhance the discipline.

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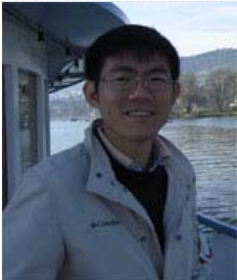
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