2009

An Exploratory Field Experiment on Actual Usage of Discount Coupons

Anar Gasimov
ETH Zurich, agasimov@ethz.ch

Juliana Sutanto
ETH Zurich, jsutanto@ethz.ch

CheeWei Phang
Fudan University, phangcw@fudan.edu.cn

Chuan-Hoo Tan
City University of Hong Kong, tancho@comp.nus.edu.sg

An Exploratory Field Experiment on Actual Usage of Discount Coupons

Anar Gasimov
ETH Zurich
agasimov@ethz.ch

Juliana Sutanto
ETH Zurich
jsutanto@ethz.ch

CheeWei Phang
Fudan University
phangcw@fudan.edu.cn

Chuan-Hoo Tan
City University of Hong Kong
ch.tan@cityu.edu.hk

ABSTRACT

In this study, we seek to answer the question of whether sending the product discount coupons through the mobile technology as opposed to another more traditional communication technology i.e., e-mail, will yield different effect on consumer behavior? Through a real-world field experiment spanning four weeks, we observed that there is no significant difference in terms of coupons' usage rate between the two technological means through which the coupons were disseminated, i.e., mobile phone in the form of short-message-service (SMS); and e-mail technology as e-mail message. However, we discovered that the discount coupons' forwarding rate is significantly higher via e-mail as compared to SMS. Furthermore, the results provide indication that the propensity of using coupons received from a peer is higher as compared to coupons received from a merchant.

Keywords

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

INTRODUCTION

Bulk of the existing knowledge about 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 focus on rationalizing the use of the discount coupon has led to a significant number of merchants utilizing the coupon as one of the important marketing strategies. While much has been gained from the prior studies on discount coupon, these studies are largely conceptual in nature (Cheng and Dogan 2008; Shaffer and Zhang 1995; Inman and McAlister 1994; Bawa and Shoemaker 1987). This resulted in a lack of studies that provide empirical evidence about the use of coupon (Dickinger et al. 2004; Bawa et al. 1997). Even for studies that did collect empirical data on the discount coupon, a significant amount of these studies employed survey method to collect perceptual data and focused on individual's intention to use coupon as the dependent measure (see e.g., Dickinger and Kleijnen 2008; Suri et al. 2004). Rather than assessing an individual's intention, a more worthy dependent measure could be the actual usage. More recent studies have indicated that individuals' intention does not always dictate their actual usage (Limayem et al. 2001).

With recent advancement of information and communication technologies (ICT), a variety of technological tools have been employed for the dissemination of discount coupon. E-mail represents a widely employed means for this purpose that has received considerable attention of researchers (see Bampo et al. 2008). The exponential growth of mobile phone users in the recent decades has also triggered marketers' interest to tap on this technology with the hope to more effectively reach potential customers, particularly via the popular short-message-service (SMS) (Reyck and Degraeve 2003). However, is there a difference in consumers' response towards coupons sent through different technological means i.e., e-mail and SMS? In particular, will there be a difference in the number of consumers who will respond favorably, i.e., using the coupon to procure a product, when it is received through an e-mail as opposed to a SMS? Along this direction, we could 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 social network contacts (i.e., someone whom he/she knows) as opposed to from the merchant directly. 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.

SMS AND E-MAIL

A primary concern with respect to the dissemination of discount coupons is the low usage rate, which is often associated with a consumer's cognitive effort required to find and to redeem the coupon. Indeed, the occurrence of committing cognitive errors such as misplacing and forgetting to use coupons are often cited as the primary factors affecting the usage of the discount coupons (Swaminathan and Bawa 2005). To address this problem, researchers proposed the use of ICT, such as e-mailing (Chiou and Inman 2008). For instance, in a research endeavor that compares between online and print coupons, Suri and his colleagues (2004) observed that less

motivated consumers, commonly seen in marketing situations such as coupon distribution, are likely to be more careful when processing information on an online coupon than in a print coupon. Leading from this is the inquiry on the effectiveness of the various forms of ICT that could be utilized to disseminate coupons.

In this study, we examine two ICT-facilitated disseminations of discount coupons: e-mail and SMS. The former denotes the conventional tool favored by merchants and the latter signifies the contemporary tool that is fast becoming popular due to the advancements of mobile technology. E-mail can be perceived as the precursor of digital text communication (Bawa and Shoemaker 1987). Several studies were conducted on e-mail coupon, e.g., the use of e-mail as 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 by many consumers (Morimoto and Chang 2006).

The use of SMS as a digital text communication for marketing purposes has exponentially increased in the recent years (Reyck and Degraeve 2003). For instance, marketing services such as text2store.com or ping-mobile.com send discount coupons in text messages to their registered members' mobile phone. In a recent study, Dickinger and Kleijnen (2008) observed that a consumer's perceived control of the coupon influences his/her intention to redeem the coupons. It is further added that the perceived effort required to redeem the coupon would affect one's attitude towards the coupon. While these studies add to the wealth of knowledge on SMS coupon, they often employ perceptual measures, e.g., purchase intention, due to the challenges in administering real-world experimentation based on actual systems used by the consumers. Hence, there is little knowledge on the impact of SMS (versus e-mail) on the actual usage of coupon.

HYPOTHESES DEVELOPMENT

In this research, we anchored on the cognitive effort paradigm as the theoretical lens to postulate the comparative impact of SMS over e-mail on usage, i.e., redemption, and the forwarding of received discount coupon. This theoretical lens is relevant as suggested by scholars (e.g., Swaminathan and Bawa 2005) that 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 a human cognitive capacity is limited (Payne et al. 1993). He/she may expend only the effort necessary to make a satisfactory (rather than the optimal) decision (Gregor and Benbasat 1999). When facing with 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, it is conjectured that an ICT that reduces the cognitive effort associated with accomplishing a task could substantially increase a consumer's propensity to exercise the task (Montgomery et al. 2004). Applying the cognitive effort paradigm to our study, we posit that the ICT that facilitates the processing of the discount coupon could lead to a higher usage of the coupon in 1) redeeming the coupon and/or 2) sharing the coupon with others through forwarding.

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 very easy to have quick access to all the stored coupons, the probability to find the right coupon at the right time is very high. Although modern mobile phones also have e-mail functionality that allows e-mail coupons to be read from the mobile phone, the effort needed to launch the specific application and then to sort, select, and redeem the e-mail coupons are not as simple as SMS coupons. More typically, one needs to print the e-mail coupon in order to redeem it, which makes the redemption process tedious. Previous study has shown that consumers' interest towards an advertisement depends on the message's processing costs (Krishnamurthy 2001). Based on the cognitive effort theory, this means that individuals are likely to prefer to redeem SMS coupons over e-mail coupons.

H1: *The 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 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 possible with SMS coupon. The technical limitations of SMS make the discount coupons forwarding process more difficult. E-mail coupons can be shared / forwarded with a simple click on a website link in the e-mail message or by filling up the input field on a web interface with the e-mail address of a friend. In contrast, to forward a coupon via SMS, a slightly more complicated process is necessary. This process requires the sender to know a) the central number of the SMS coupon system; and b) the phone number(s) of the coupon recipient(s), which often requires some amount of manual typing. Based on the cognitive effort theory, we expect that e-mail technology will be preferred for coupon sharing/forwarding over SMS.

H2: *The forwarding rate will be higher for coupons received through e-mail than those received through SMS.*

RESEARCH METHODOLOGY

This study employed a between-subject field experiment method to test the hypotheses. The experiment was conducted in a European country in a two-period manner. In the treatment group, the participants first received SMS

coupons during the first period and then e-mail coupons in the second period. In the control group, the participants only received e-mail digital coupons during the second period. This design was made in consideration of the natural setting constraints in conducting field experiment and followed the principles of quasi-experiment (Shadish et al. 2002). Specifically, to evaluate the impact of the different communication channels, i.e., e-mail and SMS, we first need to rule out the plausible sequential effect. The way to address this is to demonstrate that the usage of e-mail coupons in the second period in the treatment group is not affected by the use of SMS coupons in the first period. Subsequently, we can assess the relative impact of the channels.

To enhance external validity, we 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 an SMS coupon received to his friend(s) by sending an SMS message that contains the coupon number and the friend's phone number to a short number. To share an e-mail coupon received, the individual can click on a "share this coupon" link in the coupon message. When a user wants to redeem a coupon, the merchant can validate the coupon in real-time by entering the coupon number on the application web interface. E-mail coupon has to be printed and taken to the shop in order to be redeemed, while SMS coupon can be shown via the user's mobile phone. We engaged in collaboration with a restaurant that was willing to offer sandwich discount in the forms of the SMS and e-mail coupons.

A total of 368 individuals participated in the experiment. The participants voluntarily registered for the experiment through our online registration system. They were not aware of the product that they would receive and in what mode (i.e., e-mail and SMS). We began by randomly selecting half of them (i.e., 184) and then sending these participants an SMS coupon. This first round of discount coupons expired two weeks after they were sent to the participants. Soon after, we sent e-mail coupon with the same sandwich discount to those who previously received SMS coupon as well as to the remaining half of the participants who had yet received a coupon.

DATA ANALYSIS

Before we can conduct the hypotheses testing, we need to first rule out the sequential effect of the experiment. To do so, as described earlier, we conducted a chi-square test between the usage of coupons received through e-mails in the two experiment groups, i.e., treatment group and control group (see Table 1). We observed that there was no significant difference between the usage of coupons (Pearson chi-square = 3.269, $p > .05$). With this result, we proceed with the testing for H1.

	Usage of coupon		Forwarding of coupon	
	No	Yes	No	Yes
Treatment Group				
E-mail	167	17	169	15
SMS	168	16	178	6

Table 1. Frequency Counts

The results from the experiment suggest that there was no significant difference in coupon usage across the two communication channels (Pearson chi-square = .001, $p > .10$). Specifically, the number of people using the SMS coupon was almost the same as the number of individuals using the e-mail coupons (i.e., 16 and 17 respectively). Hence, H1 is not supported. We observed that there were more occurrences of subjects forwarding the coupon received through e-mail (i.e., 15) than those received through SMS (i.e., 6). The Pearson Chi-Square test result further provides statistical support (i.e., chi-square = 4.717, $p < .05$). Hence, H2 was supported.

DISCUSSIONS

While we did not find significant difference between the usage rate of e-mail and SMS coupons, we discovered that the forwarding rate of e-mail coupon was significantly higher than SMS coupon. It seems that the relatively common activity of e-mail forwarding (e.g., one tends to forward an e-mail containing interesting information to his/her friends) did increase the tendency to forward the e-mail coupons as well. This finding however should be viewed with respect to the e-mail and SMS forwarding systems that we created for the field experiment purpose. To share an e-mail coupon received, the participant needed to: 1) click on a "share this coupon" link in the coupon message, 2) input the e-mail addresses of their friends in the pop-up webpage, 3) click "submit". In contrast, to share an SMS coupon received, the participant needed to: 1) press the forward button, 2) input a specified short number as the recipient number, 3) delete the discount message except the coupon number, 4) type the mobile phone numbers of their friends, and finally 5) press the send button. The extra steps in forwarding the SMS coupons could have resulted in the number of SMS coupon forwarding being lower than that of the e-mail coupon forwarding, as we have previously argued. While our systems involve the typical steps required to forward e-mail and SMS in practice, future research may nonetheless try to think innovatively to create system that simplifies SMS forwarding such as it becomes similar to e-mail forwarding, and assess if the differences between the two technologies persist.

To further explore the impact of the communication channels on consumer behavior, we plot the network diagram of the e-mail and SMS coupons forwarding instances (see Figures 1 and 2). Table 2 depicts the frequency counts of the usage of coupons sent by merchant and peers. It seems to suggest that regardless of

the mode of transfer, discount coupons received from peers will have higher usage rate than discount coupons received from the merchant. Further analysis is needed to confirm this descriptive result. This observation seems to be in line with the social network paradigm. The tenet of the social network paradigm is that individuals in a social network tend to influence each other's behavior. A social network is a set of actors connected by a set of ties e.g., ties of family members, friends, or acquaintances (Wasserman and Faust 1994). The influence among individuals in a social network may operate via a number of mechanisms. For instance, individuals may be more receptive towards the information received from their social network contacts compared to merchants due to a higher level of trust towards the social network contacts (Coleman 1988). It is also believed that norms and sanctions work within a social network to deter deceiving behavior among its members (Coleman 1988).

Consistent with these conjectures, previous studies have demonstrated the important role of interpersonal contacts within networks of consumers in disseminating a commercial information (Valente and Davis 1999), which has been termed "peer-to-peer" or viral marketing in the marketing literature (Bampo et al. 2008). In this study, the dissemination of coupon via social network contacts was implemented by allowing the users to share the e-mail and SMS coupons with their friend(s) or family member(s). In line with the propositions and previous findings along the social network paradigm, our observation showed that the coupon received from social network contacts were more likely to be used than those received from merchants.

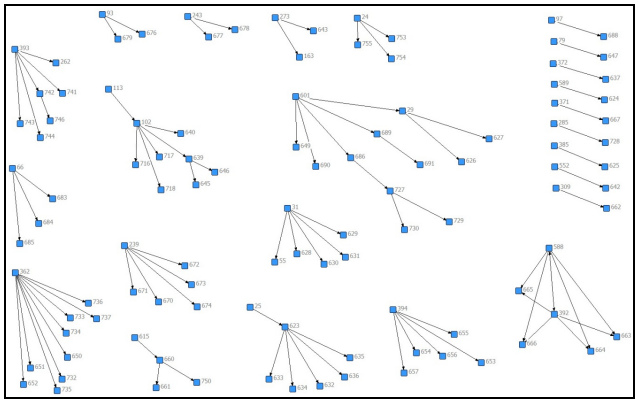

Figure 1. E-mail Forwarding Graphs

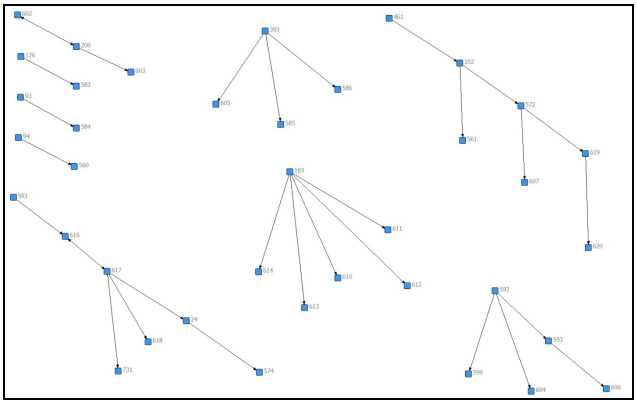

Figure 2. SMS Forwarding Graphs

	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 2. Frequency Counts of the Usage of Coupons

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' response to a single product i.e., sandwich. Prior studies have highlighted that products could also be categorized as being hedonic and utilitarian in nature. To the extent that the nature of the products could affect the willingness and involvement level of the consumers (Swaminathan 2003), further experiments could be conducted to examine the impact of other products on consumer behavior. Second, the field experiment was conducted in a European country. To the extent that culture could affect the findings, future research should replicate our field experiment in other continents to check the generalizability of the findings.

Despite the limitations of the current study, this study offers two 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 of the digital coupons disseminated by two different technologies. To this end, the real and objective data of this study enhance the external validity of the study's findings and contributions. Second, this study creates a stepping stone towards the understanding of the actual

usage behaviors of digital coupons received from peers as compared to digital coupons received from merchants. While most of the previous studies utilized survey instrument to investigate the viral marketing phenomenon, in this study the dissemination of coupon via social network contacts was implemented in both the actual e-mail-based and SMS-based systems, and monitored in real-time. Along the social network paradigm, this study provides indication that the coupons received from social network contacts were more likely to be used than those received from merchants.

REFERENCES

1. Bampo, M., M. T. Ewing, D. R. Mather, D. Stewart and M. Wallace (2008). The effects of the social structure of digital networks on viral marketing performance. *Information Systems Research*, 19, 273-290.
2. Bawa, K. and R. W. Shoemaker (1987). The Coupon-Prone Consumer: Some Findings Based on Purchase Behavior Across Product Classes. *Journal of Marketing*, 51, 99-110.
3. Bawa, K. and R. W. Shoemaker (1987). The Effects of a Direct Mail Coupon on Brand Choice Behavior. *Journal of Marketing Research*, XXIV, 307-376.
4. Bawa, K., S. S. S. Srivastava, and R. K. Srivastava (1997). Coupon Attractiveness and Coupon Proneness: A Framework for Modeling Coupon Redemption. *Journal of Marketing Research*, 34, 517-525.
5. Cheng, H. K. and K. Dogan (2008). Customer-centric marketing with Internet coupons. *Decision Support Systems,* 44, 606-620.
6. Chiou, S. Z. W. and J. J. Inman (2008). Do Shoppers Like Electronic Coupons? A Panel Data Analysis. *Journal of Retailing,* 84(3), 297-307.
7. Coleman, J. (1988). Social Capital in the Creation of Human Capital. *American Journal of Sociology,* 94, 95-120.
8. Dass, R. (2005). Dynamic pricing using e-coupons. *International Journal of Internet Marketing and Advertising*, 2, 78-91.
9. Dickinger, A., P. Haghirian, J. Murphy and A Scharl (2004). An Investigation and Conceptual Model of SMS Marketing. *Proceedings of the 37th Hawaii International Conference on System Sciences*, 31-41.
10. Dickinger, A. and M. Kleijnen (2008). Coupons Going Wireless: Determinants of Consumer Intentions to Redeem Mobile Coupons. *Journal of Interactive Marketing,* 22(3), 23-39.
11. Gregor, S. and I. Benbasat (1999). Explanations from Intelligent Systems: Theoretical Foundations and Implications for Practice. *MIS Quarterly,* 23, 497-530.
12. Hartmann, W. R. (2006). Intertemporal Effects of Consumption and Their Implications for Demand Elasticity Estimates. *Quantitative Marketing and Economics,* 4(4), 325-349.
13. Inman, J. J. and L. McAlister (1994). Do Coupon Expiration Dates Affect Consumer Behavior? *Journal of Marketing Research,* XXXI, 423-428.
14. Krishnamurthy, S. (2001). A Comprehensive Analysis of Permission Marketing. *Journal of Computer Mediated Communication*, 6.
15. Lewis, M. (2004). The Influence of Loyalty Programs and Short-Term Promotions on Customer Retention. *Journal of Marketing Research,* 41(3), 281-292.
16. Limayem, M., S.B. Hirt, W.W. Chin. (2001). Intentional does not Always Matter: The Contingent Role of Habit on IT Usage Behavior. *9th European Conference on Information Systems,* 274-286.
17. Montgomery, A. L., K. Hosanagar, R. Krishnan, and K. B. Clay (2004). Designing a Better Shopbot. *Management Science,* 50(2), 189-206.
18. Morimoto, M. and S. Chang (2006). Consumers' Attitudes Toward Unsolicited Commercial E-mail and Postal Direct Mail Marketing Methods: Intrusiveness, Perceived Loss of Control, and Irritation. *Journal of Interactive Advertising,* 7(1), 8-20.
19. Payne, J.W., J.R. Bettman, E.J. Johnson. (1993). *The Adaptive Decision Maker*. Cambridge University Press, Cambridge, England.
20. Rettie, R., U. Grandcolas, and B. Deakins (2005). Text message advertising: Response rates and branding effects. *Journal of Targeting, Measurement and Analysis for Marketing,* 13, 304-312.
21. Reyck, B. D. and Z. Degraeve (2003). Broadcast Scheduling For Mobile Advertising. *Operations Research,* 51, 509-517.
22. Shadish, W. R., T. D. Cook and D. T. Campbell (2002). *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*. Houghton Mifflin Company, Boston, New York.
23. Shaffer, G. and Z. J. Zhang (1995). Competitive Coupon Targeting. *Marketing Science,* 14, 395-416.
24. Suri, R., S. Swaminathan and K. B. Monroe (2004). Price Communications in Online and Print Coupons: An Empirical Investigation. *Journal of Interactive Marketing,* 18(4), 74-86.
25. Swaminathan, V. (2003). The Impact of Recommendation Agents on Consumer Evaluation and Choice: The Moderating Role of Category Risk, Product Complexity, and Consumer Knowledge. *Journal of Consumer Psychology,* 13(1/2), 93-101.
26. Swaminathan, S. and K. Bawa (2005). Category-Specific Coupon Proneness: The Impact of Individual

Characteristics and Category-Specific Variables. *Journal of Retailing,* 81(3), 205-214.

27. Valente, T. W., and R. Davis (1999). Accelerating the Diffusion of Innovations using Opinion Leaders. *The Annals of the American Academy of the Political and Social Science (ANNALS),* 566, 55-67.
28. Wasserman, S. and K. Faust (1994). *Social Network Analysis: Methods and Applications*. Cambridge University Press, Cambridge.