Consumer Choices Based on Signals: the Case of Mobile Phone Services in Vietnam

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ABSTRACT
Although it is well known that firms can use signals to inform consumers about the unsobservable of their products or services in a market where asymmetric information exists, research on the role of signal characteristics in consumer choices of service brands is largely ignored. Using a choice experiment with best-worst scaling, the authors found that signal credibility, consistency, and clarity have positive impacts on consumer choices. Further, the interaction between signal clarity and credibility also affects the choice of consumers. These findings suggest that service providers should send clear, consistent, and credible signals to assist consumers in making purchase decisions.

INTRODUCTION
The mobile phone service market has just appeared in Vietnam recently. In the last few years, there were only two players in the market—Vinaphone and Mobifone. Recently, the entry of S-phone and Viettel has made the market more competitive (Ngo 2005). Accordingly, several sales promotion tools have been launched by service providers to attract consumers. However, the quality of mobile phone services is still in question. Several complaints about quality have been lodged by consumers because they have not known about the quality of the service before consuming it (VietnamNet 2005).

Service providers know more about the quality of their services than do consumers, that is, consumers are not fully informed about the quality of the services. This is characterised by the asymmetry of information (Boulding and Kirmani 1993). In addition, most services comprise experience quality, that is, consumers are generally unable to evaluate the quality of a service prior to consumption (Zeithaml and Bitter 2000). This requires service providers to use signals to inform the quality of their services to consumers, and signaling theory is useful (Kirmani and Rao 2000).

Signaling theory, which is derived from the information economics literature under the condition of asymmetric information (Spence 1973), has been widely employed by researchers in marketing such as in studies of brand equity (Erdem and Swait 1998; Erdem, Swait, and Louviere 2002), warranties, product quality (Boulding and Kirmani 1993; Rao, Qu, and Ruekert 1999; Soberman 2003), price (Simester 1995; Srivastava and Lurie 2004), and advertising (Caves and Greene 1996; Kirmani and Wright 1989). However, little research has been devoted to explore the usefulness of signaling theory in services, especially, in transition markets like Vietnam. To bridge this gap, this study aims to apply signaling theory to investigate consumer choices of services. Specifically, it explores the impacts of signal characteristics—clarity, consistency, and credibility—on the choice of mobile services by consumers. The article is organised around the following key points: We first review the literature and propose the hypotheses. We then present the method and data analysis. We conclude the article by discussing the results, implications and directions for future research.

LITERATURE REVIEW AND HYPOTHESES
When information asymmetry exists and service providers know more about their service quality than do buyers, several marketing signals can serve as signals of quality of service brands (see Kirmani and Rao 2000 for an extensive review). Herbig and Milewicz (1996, 35) define “a marketing signal is a marketing activity which provides information beyond the activity itself and which reveals insights into the unobservable.” Marketing signals convey information about service brands to consumers such as service attributes, prices, and warranties (Boulding and Kirmani 1993; Herbig and Milewicz 1994).

Under the condition of asymmetric information, a service consumer is generally confronted with a problem of distinguishing between high- and low-quality service providers. Also, a service provider may face difficulties in positioning itself against low-quality service providers in the mind of the consumer (Mishra, Heide, and Cort 1998). The inability of consumers to assess the quality of the service provider can create two problems—adverse selection and moral hazard. The adverse selection problem involves certain fixed characteristics of the service provider that have the potential to influence the level of quality delivered, however, they are unobservable to the consumer. The moral hazard problem relates to the ability and motivation of the service provider to cheat the consumer, such as to change the levels of quality provided for each transaction (Mishra et al. 1998). Under such conditions, the service provider can use a number of marketing signals such as service quality, price, warranties, advertising, and brand names to show its ability to meet the need of the consumer and to differentiate it from other service providers (i.e., to influence the consumer’s choice and to help the consumer to distinguish it from less-qualified service providers; Boulding and Kirmani 1993; Rao and Ruekert 1994). Hence, it is important that the service provider’s signaling scenarios should not be easily imitated by less qualified service providers (Koku 1995).

A signal is not part of a product or service itself. It is a piece of information about the product or service that assists consumers in making inferences about the quality and value of the product or service (Herbig and Milewicz 1994). As signaling is a learning process in which consumers receive the signal, read and interpret it in the light of experience, and react accordingly (Heil and Robertson 1991; Herbig and Milewicz 1994), the characteristics of a signal plays a crucial role in facilitating this learning process. Three important characteristics of a signal have been found in the literature: signal clarity; credibility; and, consistency (Erdem and Swait 1998; Heil and Robertson 1991). Signal clarity refers to “the absence of ambiguity in the information conveyed by the brand’s past and present marketing mix strategies and associated activities”. Signal consistency is “the degree to which each marketing mix component or decision reflects the intended whole”, and signal credibility “underlies consumer confidence in a firm’s product claims” (Erdem and Swait 1998, 137).

Signal clarity assists consumers in identifying what a service provider would like to communicate with them,
such as service attributes and position (Heil and Robertson 1991). To make a signal clear, every marketing-mix element should be consistent (i.e., reflecting the same attributes, objectives, and position), and stable over time (Erdem and Swait 1998). A clear signal enables consumers to quickly understand and interpret it, preventing any reaction delays. Together with signal clarity, signal credibility is another key characteristic of the signal because it determines the effectiveness of information conveyed (Erdem and Swait 1998; Tirole 1988). Any effects of the signal will happen only if its credibility has been perceived (Sternthal, Dholakia, and Leavitt 1978). As discussed previously, signaling is a learning process and consumers interpret the signal and adjust their interpretation based on the history of the sender and previous transactions (Herbig and Milewicz 1994). To assess the meaning as well as the credibility of the signal, consumers may carry out consistency checks. Therefore, signal consistency will make the interpretation process faster and more precise (Heil and Robertson 1991). In addition, signaling theory suggests that most rational firms are unlikely to send false signals if the signals increase costs in terms of immediate profits, future profits, and reputation (Tirole 1988). Accordingly, consumers may believe that only high quality service providers would send clear, consistent, and credible signals to their consumers. As a result, these signal characteristics are vital to the evaluation of the quality and choice of a service by consumers. Hence,

H1: Higher signal clarity of a service brand will increase the probability of consumer choices of that brand.

H2: Higher signal credibility of a service brand will increase the probability of consumer choices of that brand.

H3: Higher signal consistency of a service brand will increase the probability of consumer choices of that brand.

The effectiveness of information received by consumers depends heavily on whether signals sent are credible or not (Erdem and Swait 1998; Tirole 1988). Therefore, the credibility of brand signals is perhaps the most important characteristic. For that reason, it is important for a service provider to send credible signals to consumers. In so doing, signals will create greater consumers’ confidence in the firm’s product or service claims (Erdem and Swait 1998). However, the confidence of consumers depends on what they receive and make inferences over time, that is, signal credibility is sensitive to time (Herbig and Milewicz 1993). Clear and consistent signals facilitate consumers to interpret the content signaled by the firm, reinforcing consumers’ belief that the firm’s willingness and ability to offer the promised service (Erdem and Swait 1998). Consequently, the clarity and consistency of signals will increase consumers’ confidence in the claims. In other words, the interaction effects between signal credibility and clarity, between signal credibility and consistency, and between signal consistency and signal clarity are likely to exist. Thus,

H4: The impact of signal credibility on the probability of consumer choices will be stronger with high signal clarity than with low signal clarity.

H5: The impact of signal credibility on the probability of consumer choices will be stronger with high signal consistency than with low signal consistency.

METHODOLOGY
Experimental Design
A choice experiment with a best-worst scaling method was employed in this study. There were three attributes, that is, clarity, consistency, and credibility. Each attribute had two levels: low and high. Three options, coded as A, B, and C, were used for each choice set. Consequently, the total profiles for the full factorial design were 512 ($2^{3} \times 3$). Several strategies to construct such a design can be found in the literature (Street, Burgess, and Louviere 2005). For example, we can utilise a software package such as SAS to generate an OMEP (Orthogonal Main Effects Plan) and then, using a search algorithm to construct choice sets (Kuhfeld 2004). Another way is to use a LMA approach (Louviere, Hensher, and Swait 2000). The first strategy gives us an efficient design, however, we do not know if a better design is available. The second approach requires the number of choice sets much larger than needed to estimate the effects of interest (Street et al. 2005).

In order to minimise the number of choice sets and to estimate all main and two-way interaction effects, we utilised a method of optimal designs developed by Street et al. (2005). The construction of the choice sets in this study is as follows: For the first option (option A), a full factorial design was used ($2^{3} \times 8$ profiles). The profiles in option B were obtained by leaving the levels of the second attribute unchanged and systematically changing the levels of the first and third attributes by adding 1 (mod 2) to the respective attributes of the profiles in option A. For example, the levels of signal clarity for choice sets 1 and 4 (option B) were obtained by adding 1 to those of in option A: $0 + 1 = 1$ and $1 + 1 = 0$ (see column 5, table 1). Similarly, the profiles in option C were obtained by leaving the levels of the third attribute unchanged and systematically changing the levels of the first and second attributes by adding 1 (mod 2) to the respective attributes of the profiles in option A. This design is 100% efficient and is shown table 1 (see Street et al. (2005) for detailed explanation).

The Sample and Measures
A sample of 279 in-service training students, both undergraduate and post-graduate, in the University of Economics, Ho Chi Minh City and Vietnam’s Fulbright Economics Teaching Program was in the experiment. The sample was comprised of 103 female and 176 male participants. In terms of age, 217 participants were less than or equal to 30 years of age and 62 were more than 30 years of age. A best-worst scaling method (Finn and Louviere 1992; Marley and Louviere 2005) was used to obtain the data. Best-worst scaling has been found to have several advantages over traditional scaling methods such as containing less respondent error, more discriminating way to measure attribute importance than either rating scales or the method of pair comparisons (Charzran 2005). The format of the best-worst scaling employed in this study is shown in table 2. The questionnaire included eight choice sets. Subjects were presented 8 choice sets. In each choice set, there were three options: A; B; and, C. For each choice
TABLE 1

<table>
<thead>
<tr>
<th>Choice set</th>
<th>Option (brand) A</th>
<th>Option (brand) B</th>
<th>Option (brand) C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clarity</td>
<td>Consistency</td>
<td>Credibility</td>
<td>Clarity</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

TABLE 2

<table>
<thead>
<tr>
<th>Signal characteristics</th>
<th>Option (brand) A</th>
<th>Option (brand) B</th>
<th>Option (brand) C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clarity</td>
<td>low</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>Consistency</td>
<td>low</td>
<td>low</td>
<td>high</td>
</tr>
<tr>
<td>Credibility</td>
<td>low</td>
<td>high</td>
<td>low</td>
</tr>
<tr>
<td>Which option do you prefer best</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Which option do you prefer least</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

Data Coding and Entry

The data were coded and inputted using the following procedure. There were three options for each choice set: A; B; and, C. Therefore, three pair comparisons were made for each choice set option, that is, AB, AC, and BC. For example, if the best option chosen was A and the least option chosen was C, the data for this respondent for choice set 1 would be coded as follows: AB: 10; AC: 10; and, BC: 10 (1: if a respondent chose the option and 0: if he or she did not choose the option). As a result, each respondent had six rows for each choice set in the data matrix. There were eight choice sets, resulting in 48 rows for each respondent. With a sample size of 279, the data matrix had a total of 13392 (279x48) cases.

DATA ANALYSIS AND RESULTS

Binary logistic regression was utilised to analyse the data. We also aimed to investigate the effects of two respondent characteristics, that is, gender (female respondents, coded as 0, and male respondents, coded as 1) and age (equal or less than 30 years of age, coded as 0, and more than 30 years of age, coded as 1). The results indicate that the model fitted the data well: $\chi^2(7) = 6323.13$ (p < .001); -2Loglikelihood = 12242.13; Cox & Snell $R^2 = .376$; Nagelkerke $R^2 = .502$; and, overall correct choice predicted = 78.9%.

The results indicate that all main effects were significant (p < .001), supporting hypotheses 1, 2, and 3. Among these characteristics of a brand signal, that is, clarity, consistency, and credibility, signal credibility had the greatest impact on consumer choices ($\beta_{\text{credibility}} = 2.819$, compared to $\beta_{\text{clarity}} = 1.236$ and $\beta_{\text{consistency}} = 1.024$). Further, the interaction effect between signal clarity and credibility on the brand choice was also significant ($\beta_{\text{clarity x credibility}} = .479$, p < .001), supporting hypothesis 4. However, the interaction effect between signal consistency and credibility on brand choice was not significant ($\beta_{\text{consistency x credibility}} = .084$, p > .14). Consequently, hypothesis 5 was not supported (see table 3). In addition, the effects of signal clarity, consistency, and credibility on consumer choices were the same for young and older, as well as for male and female respondents.
TABLE 3
BINARY LOGISTIC REGRESSION RESULTS

<table>
<thead>
<tr>
<th>Factors</th>
<th>Estimate</th>
<th>Standard error</th>
<th>Wald</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clarity</td>
<td>1.236</td>
<td>.067</td>
<td>341.393</td>
<td>1</td>
<td>.000</td>
</tr>
<tr>
<td>Consistency</td>
<td>1.024</td>
<td>.065</td>
<td>244.712</td>
<td>1</td>
<td>.000</td>
</tr>
<tr>
<td>Credibility</td>
<td>2.819</td>
<td>.085</td>
<td>1108.966</td>
<td>1</td>
<td>.000</td>
</tr>
<tr>
<td>Consistency x Credibility</td>
<td>.084</td>
<td>.094</td>
<td>.806</td>
<td>1</td>
<td>.369</td>
</tr>
<tr>
<td>Clarity x Credibility</td>
<td>.479</td>
<td>.099</td>
<td>23.452</td>
<td>1</td>
<td>.000</td>
</tr>
<tr>
<td>Gender</td>
<td>.000</td>
<td>.047</td>
<td>.000</td>
<td>1</td>
<td>1.000</td>
</tr>
<tr>
<td>Age</td>
<td>.000</td>
<td>.055</td>
<td>.000</td>
<td>1</td>
<td>1.000</td>
</tr>
<tr>
<td>Constant</td>
<td>-2.628</td>
<td>.083</td>
<td>1005.885</td>
<td>1</td>
<td>.000</td>
</tr>
</tbody>
</table>

Statistics: -2Loglikelihood = 12242.13; Cox & Snell $R^2 = .376$; Nagelkerke $R^2 = .502$

DISCUSSION AND CONCLUSIONS

The purpose of this study is to explore the role of marketing signals in the choice of mobile phone services by consumers. Based on the assumption that consumers are often uncertain about the quality of services, this study examines whether the clarity, consistency, and credibility of a brand signal have any effects on consumer choices. The results of the experiment show that signal clarity, consistency, and credibility have positive impacts on consumer choice of service brands. Among these characteristics of a signal, signal credibility has the greatest impact on consumer choices. In addition, the interaction between signal clarity and credibility also affects consumer choices. However, this effect is very modest compared to the main effects. Further, our additional analysis indicates that consumers’ gender and age do not moderate consumer choices. These findings are consistent with research in the signaling theory perspective on brands (Erdem and Swait 1998; Rao, Qu, and Ruekert 1999). Thus, other things being equal, signal credibility is the key element in building a strong brand based on signaling theory.

The findings of this study suggest several implications for mobile phone service marketers. When a market is characterised by information asymmetry, signals are an appropriate mechanism to convey the unobservable of services to consumers. Nevertheless, not all signals are efficient. Only clear, consistent, and credible signals perceived by consumers can direct their choices. In order to have such signals, service providers should invest in their brand signals and use marketing-mix strategies to communicate the signal with consumers. This will facilitate the development of consistent brand images, fostering the relationship between brands and their consumers (Farquhar 1989). Previous research has shown that the credibility of a brand signal will be higher when the brand receives higher investments (Erdem and Swait 1998). This will benefit service firms in terms of profits and reputation (brand image) if truthful signals are received by consumers. As signaling theory suggests, consumers evaluate the quality of services based on the signals provided by service firms because they believe that only quality service providers would send clear, consistent, and credible signals to consumers. However, if discrepancies between promised and actual offerings are found to exist, that is, false signals have been sent, costs in terms of immediate profits, future profits, and reputation are likely to occur (Kirmani and Rao 2000; Tirole 1988). Therefore, service providers should invest in brand signals in order to achieve more effective signals and should keep in mind the costs associated with their false signals. In sum, signals are an appropriate and effective mechanism that service providers can employ where asymmetric information exists. The effectiveness of a signal can only be achieved when it is clear, consistent, and credible.

This study has several limitations. Firstly, it is the use of a student sample. Although research has shown that part-time students can be used as a surrogate for consumers (James and Sonners 2001), a more representative sample is of interest in future research. Secondly, this study examines only one service, that is, the mobile phone service. Different types of services should be examined to capture a wider picture of the usefulness of signaling theory. Thirdly, this study examines the choice of consumers based only on signal characteristics. Future research should incorporate other service attributes to the profile in order to make a comparison between their effects on consumer choices. Fourthly, this study employs a simple method of analysis—binary logistic regression—to analyse best-worst data. Other methods of analysis such as multinomial logit models will also be suitable for the analysis of such a data set, which can be employed in future research. Finally, signaling theory offers explanations of consumer choices under the condition of asymmetry of information, that is, how they respond to firms’ actions. Psychological research into consumers helps understand how consumers make inferences, that is, how they process signals (Boulding and Kirmani 1993). Therefore, an integration of these two approaches in future research will enhance our understanding of customers’ beliefs in and reactions to signaling.

REFERENCES


Phenomenon”, *Journal of Consumer Psychology*, 7 (2), 131-57.


