A Qualitative Study in Consumer Behavior of Skype Internet Phone

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Abstract - **Various Internet applications have mushroomed for years in many different fields, but only few of them survive in the market. One of them is the Internet phone service which has been available since 1995. Recently, this market has shown fast development in terms of many new value-added services offered and an impressive increase in the number of users all over the world. This paper aims to investigate why certain products subsist while varied substitutes exist in the same field. A qualitative approach was used to explore the consumer behaviors of Skype Internet phone and compare the schema changes of Skype users and non-skype users in the same periods. Concluding from the result of qualitative study, the findings indicate the social influences are the most important factors that affect customer behaviors of Skype Internet phone. The model of this paper is not only suitable for Internet applications but also can be extended to survey diverse products in different areas.**

Keywords - **Qualitative study, Consumer behavior, Skype**

I. INTRODUCTION

The study in this paper is an attempt to investigate why certain products subsist while varied substitutes exist in the same field. A qualitative approach is used to explore the consumer behaviors of Skype Internet phone and compare the schema changes between Skype users and non-skype users in the same periods. These two groups, the Skype users and the non-skype users, are both interviewed in three different periods, week 5, week 10, and week 15. Not only the differences between these two groups are compared, but the shift in patterns of consumer behaviors and cognitions of individual users are also under investigation.

VoIP (Voice over IP) technology is gaining popularity and deployed both in home and enterprises [14], and there are over 200 million Skype downloads and approximately 85 million users worldwide [3]. Skype, created by KaZaa in 2003, becomes so popular that users are willing to accept a good service for free, even though service continuity and quality is not guaranteed [1]. The user satisfaction of VoIP has increasingly been the object of study in recent years, but the qualitative research in VoIP products is still rarely reported until now.

Our contribution of this paper is to reveal the in-depth consumer behavior of Skype behind the quantified user satisfaction. We conduct the study by the grounded theory [5][11][12][13] using three sets of coding procedures, open coding, axial coding, and selective coding, which help the analyst break down the original data, conceptualize it and re-arrange it [17].

II. VOIP TECHNOLOGY AND USER SATISFACTION

Chen states the major challenges lies in the lack of an easily accessible and objective index to quantifying the degree of user satisfaction [3], and claims that there is no formal study that quantifies the level of user satisfaction of Skype voice phone service before the date of his paper published. The user satisfaction index is used in [3] to determine the degree of user satisfaction from the conversation patterns with the following three voice interactivity measures to capture the interactivity and smoothness of a given conversation: responsiveness, response delay, talk burst length. Besides, voice encoding technology is also an important factor to determine the VoIP quality, and Markopoulou uses mean opinion score (MOS) to indicate user satisfaction of voice communication over Internet [10].

Sripanidkulchai asserts the key motivation for this transition from traditional phone services to VoIP services is not just the reduced cost, but the ease of integration of voice services with other network-based applications and across multiple sites, particularly in the enterprise environment [14]. The integration issues and the learning gap are also important in our research. No matter how the performance of VoIP is, Hartpence asserts in [8] that for the near future, we must retain some portion of traditional telecommunications while whole heartily adopting IP based networking and the protocols that will carry us through next generation connectivity. Jiang also believes VoIP will eventually replace the old telephone equipments from our offices, due to the cost benefit and new services it offers [9]. Although, Varshney believes there are still many users are certainly unlikely to accept lower quality until VoIP provides the new service's tangible benefits, including reduced cost or more features [16].

For the security issues, Skype uses AES and RSA algorithm to cipher messages [1], and a watermark technique that could be used for effectively identifying and correlating encrypted, peer-to-peer VoIP calls even if they are anonymized by low latency anonymizing networks [17]. The encryption can secure voice and text

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message, but the anonymous identification technology is a dark-side of user privacy.

Cadiz proposes the enhanced telephony prototype to survey the user experience using PC-phone, and finds that most PC-phone features make people easy to deal with incoming calls but do not seems to make it easier to call people, and claims that a great PC-phone user interface does not necessarily look like a phone [2]. Moreover, the EasyVoice in [4] allows a person with voice disabilities to use VoIP.

From the related literatures of VoIP technology and user satisfaction, we can retrieve the important factors that may affect customer behaviors of VoIP products, and these issues will be implemented in our in-depth reviews to find the correlations of user cognitions.

III. METHODOLOGY

According to Myers, "grounded theory is a research method that seeks to develop theory that is grounded in data systematically gathered and analyzed", and Myers thinks grounded theory is an inductive, theory discovery methodology [11]. Richardson has the opposite views that researchers of grounded theory use an inductive strategy is the most famous misunderstanding, and he believes that abductive reasoning lies at the heart of grounded theorizing. From Richardson's opinion, abduction, induction and deduction refer to different stages of inquiry [13]. Myers cites from the article of Yin [18] that "a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident, and case study research can be positivist, interpretive, or critical, depending upon the underlying philosophical assumptions of the researcher" [11].

We use abduction as the first stage, and the induction as the second stage. The research methodology is shown in Fig.1. The result of abduction is what we describe in the introduction section of VoIP popularity, and we can infer rules that anyone will use Skype if he or she is an intensive communication tool user and the cost factor is very important for him or her to select communication services. The results of abduction phase can be crosschecked with the results of induction phase. The data of this study are collected through unstructured in-depth interviews as described in [15]. We interview two different groups, the Skype user group and the non-Skype user group, in the fifth week, the tenth week and the fifteenth week. There are three persons in the Skype user group, and there are four persons in non-Skype user group. Due to the limitation of in-depth interview in qualitative research, it is very difficult to interview too many persons in our study. As we review the qualitative research papers, there are only ten persons in the research paper of Hale [7]. Moreover, the results of this paper can be validated by our future quantitative research. After the data collection, we code the interview context in open coding. The purpose of this process is to identify discrete concepts, and similarities. The axial coding and selective coding are used after retrieving concepts of interview contexts, then the schema tables for each interviewee is organized to interpret the results; besides, we can compare the differences between these two groups, and the shift in patterns of consumer behaviors and cognitions of individual users can also be investigated.

In order to judge the soundness of this qualitative research, we use the four criteria from Guba and Lincoln [6] for qualitative validation. These criteria are confirmability, dependability, credibility, and transferability. For confirmability, each researcher can conduct a data audit that examines the data collection and analysis procedures and make judgments and corrections. The data audition will also be cross-examined by different researchers. For dependability, the research is responsible for describing the changes that occur in the setting and how these changes affected the way the research approached the study. The credibility can be judged by the participants. At last, the qualitative transferability is primarily the responsibility of the one doing the generalizing. The confirmability, dependability, and credibility can be verified in our research, and we leave the transferability in the future work, because we don't generalize the case in this paper.

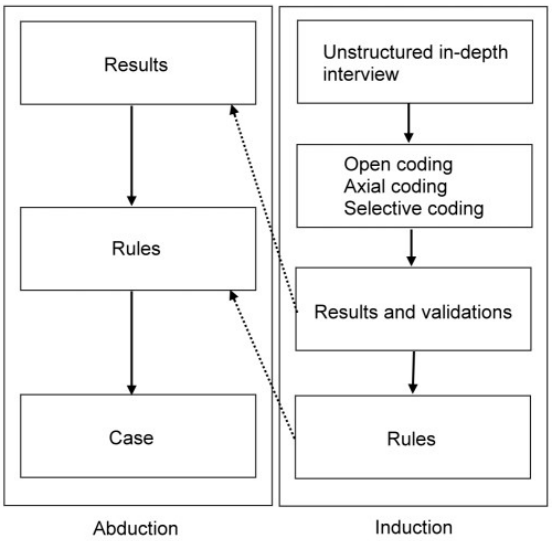

Fig. 1: The research methodology

IV. INTERVIEW AND CODING

We interview two groups of users, the Skype users as shown in Table II (G1-01, G1-02, and G1-03), and non-Skype users as shown in Table III (G2-01, G2-02, G2-03, and G2-04). The persons in the group of Skype users have already used Skype as an important communication tool, and the persons in the group of non-Skype users didn't or rarely use Skype to communicate with their friends. The number of interviewees is limited for the in-depth interview. People may question the generalization of

small data set, but the research methodology is also useful to approach another conclusion using bigger data set; besides, we try to increase the coverage of wide range of interviewees as shown in Table I. The reason why only one interviewee from private company is selected is because there might be a policy to force employees to use free services in a private company, and this policy will bring other factors in our study.

Since we use unstructured in-depth interview, we design the questionnaires to make the participants to express themselves as possible. The whole process lasts for fifteen weeks, and each interview is hold in week 5, week 10, and week 15. Due to the large size of the coding books, we just show the partial axial coding in Table IV. There are seven tables of axial coding for each interviewee individually. The contents of each code column in Table IV are the results of interview contexts, and the contents of each axial column are the concepts retrieved from the code columns.

Table I.
The category of interviewees

Category	Interviewee
Male	G1-01, G1-02, G1-03, G2-02
Female	G2-01, G2-03, G2-04
Academic staff	G1-01, G2-01, G2-04
Student	G1-03, G2-02, G2-03
Staff of private company	G1-02
Age under 30	G1-03, G2-02, G2-03
Age over 30	G1-01, G1-02, G2-01, G2-04

Table II.
The profile of Group-1, the Skype user group

Interviewee ID	G1-01	G1-02	G1-03
Occupation	Associate Professor in Electronic Engineering dept. of university	Manager of cargo company	Graduate student in Information Management dept. of university
Gender	Male	Male	Male
Age	41	41	23
Background	Ph.D.	Bachelor	Graduate student

Table III.
The profile of Group-2, the non-Skype user group

Interviewee ID	G2-01	G2-02	G2-03	G2-04
Occupation	Vice-curator of university library	Graduate student in Information Management dept. of university	Undergraduate student in Information Management dept. of university	Art teacher
Gender	Female	Male	Female	Female
Age	45	24	20	34
Background	Master	Bachelor	Undergraduate student	College diploma

Table IV
The partial axial coding of G1-01.

Axial	Code	Code Description	Week 5	Week 10	Week 15
Free of charge	It's free	Important features of Skype	*	*	
Saving of communication fee	decrease of phone bill	Motivation of using Skype	*	*	*
Easy to use	It's very easy to use	Experience of using Skype			*
Quality expectation	If the quality can be improved, it might replace home phone	User requirement of Skype			**

Table V
The schema change of G1-01 in three periods; the number 1~7 indicate the area in Fig.2 individually

1	● Save more in international calls ● Use Skype in any time ● 70% in certain location ● Skype phone cannot replace home phone	4	● No idea about the Skype phone ● Office user ● Use ADSL in home ● Skype is free ● Prefer to use Skype than other tools ● Regular Skype user
2	● Good experience using Skype ● Skype requires network connection	5	● No video in Skype ● Skype is set to auto login when power on the computer
3	● It's a good alternative of phones ● It's very easy to use ● It might replace phones if the quality can be improved ● Recommend couple friends to use it ● No relatives nor friends using MSN ● More relatives and friends using Skype ● Recommend to use it when going abroad ● Phone fee is too expensive	6	● Poor quality when the bandwidth is low
7	● Decrease the phone bill ● It's convenient ● To talk with many friends at the same time ● Business purpose or just chatting ● 60% in certain location		

	● intensive communication requirement ● Use Skypeout to call home phone ● It's cheap for Skypeout

Table VI
The comparison of Skype and non-Skype user group in three periods
(1) Psychological influences, (2) social influences, (3) marketing mix, and (4) situational influences

	Skype user group	Non-Skype user group
Week 5	● It's cheap and saving of communication fee. (3) ● To use for business purpose or chatting (2) ● Steady working location (4) ● Intensive Skype needs (2) ● Understanding of communication charging rate (3)	● To use Skype in long distant calls (3) ● Email and MSN users (2) ● No friend using Skype (2)
Week 10	● It's cheap and saving of communication fee (3) ● To use for business purpose or chatting (2) ● Steady working location (4) ● Intensive Skype needs (2) ● Understanding of communication charging rate (3) ● Skype will auto login when power-on computer (4)	● Saving of communication fee (3) ● To use Skype in long distant calls (3) ● Not regular Skype user (2)
Week 15	● It's cheap and saving of communication fee (3) ● To use for business purpose or chatting (2) ● Steady working location (4) ● Intensive Skype needs (2) ● Understanding of communication charging rate (3) ● Skype will auto login when power-on computer (4) ● Charge rate of home phone is too high (4) ● Skype is easy to use (1)	● To use Skype in long distant calls (3) ● Not regular Skype user (2)

V. SCHEMA TABLES

Each user is interviewed in three periods, and some interview contexts may change or unchanged as shown in Table V. As Fig.2 shows that area 1 indicates the contexts appear only in week 5, area 2 indicates the contexts appear only in week 10, and area 3 indicates the contexts appear only in week 15. Each coding context is allocated in appropriate areas, from 1 to 7; therefore, it's very obvious to observe the changing. The schema changes of G1-01 of Skype user group in three periods are shown in Table V, and other twelve schema changes are omitted in this paper since they are in the same structures. We retrieve the same or similar concepts from all schema tables into Table VI which shows the comparison of Skype and non-Skype user group in three periods, and every concept in Table VI is categorized into (1) psychological influences, (2) social influences, (3) marketing mix, and (4) situational influences.

Psychological influence is related to satisfaction and personal self-consciousness. Social influence matters when the actions or thoughts of individuals are changed by their friends or colleagues. Marketing mix is the market strategic of products in the marketplace; for example, the free/low cost policy is one of the marketing mix of Skype. Situational influence is the influence from physical surroundings or other external environments.

We can compare the differences between these two groups in Table VI, and the shift in patterns of consumer behaviors and cognitions of individual users can also be investigated. The social influence, the marketing mix, and the situational influence are the main reasons for group-1 to keep using Skype, but the users of group-2 cannot become regular Skype users because of the negative social influence. In this situation, marketing mix factor is not significant for group-2, and the psychological influence and the situational influence are not considered at all.

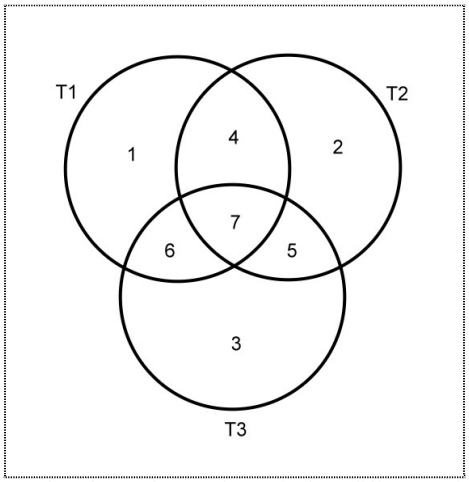

Fig. 2: The schema change of users in three different periods.
T1: week 5, T2: week 10, T3: week 15

VI. CONCLUSIONS

We find that the main reason why persons of Skype user group continue to use Skype is affected by marketing mix since the terms of cost saving show in week 5, week 10, and week 15 in Table VI. Besides, it indicates the users of the Skype user group are more sensitive to prices, functionality, and alternatives than the others. If the users of non-Skype user group become regular Skype users, they are most affected by the social influences, because non-Skype users require friends to use Skype with as shown in Table VI. If the social influences can not turn the non-Skype users to become regular Skype users, the marketing mix issues are not important to them. The

persons who become members of Skype will influence their friends or relatives socially, and the marketing mix will become more influential than before.

We can infer that the feature of free services is not the most important factor to change a non-Skype user to be a Skype user. The psychological influences and the situational influences seem not significant factors in our study. We can also conclude that the marketing mix and the achievement motivation are the main reasons for Skye users to keep using Skype, because they can use Skype in various purposes in cheap price; whereas, the social influences of contractual groups and affiliation motivation are the most important factors for non-Skype users to become regular Skype users. If the social influences do not make great impact on non-Skype users, any other factors can not affect non-Skype users in any degree.

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