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What determines online consumers to migrate from PC to Mobile Terminals? - An empirical research on consumers' online channel-migration behaviors

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Abstract: With the improvement of telecommunication and wireless Internet-access technologies, smart mobile terminals have been extensively applied for mobile shopping. In this paper, PPM Model is taken as a theoretical framework and an empirical research method is employed to determine the antecedents influencing consumers' decisions on migrating from PC-based shopping to mobile shopping. We found that inconvenience, security, perceived usefulness, and perceived ease of use are the significant antecedents influencing consumers' channel migration intention of choosing mobile shopping.

Key words: Channel migration, mobile shopping, online shopping, Push-Pull-Mooring model

1. INTRODUCTION

The development of wireless networks and intelligent mobile terminals give birth to a new shopping channel, namely mobile channel. It allows online shoppers to eliminate the limits of personal computers so that they can use their fragmentation of time to go shopping anytime, anywhere ^[1]. According to Taobao's latest research, the proportion of customers who took over physical commodities and completed their payment through the mobile terminal has exceeded 60%. Customers mainly purchase goods, check shopping records, and browse on the mobile terminals. The number of mobile shoppers has rapidly increased. Why do consumers migrate from PC-based shopping to mobile shopping? Apart from inconvenience above, what other factors can influence consumers into mobile shopping migration is a significant problem drawing wide attention from both researchers and retailers. Consumers' migration from PC-based channel to mobile channel is a channel migration behavior ^[2]. PC terminal and mobile terminal are two different channels. PC-based online shopping and mobile shopping are two different shopping ways bringing consumers different shopping experiences. And the different location of human residence can produce various impacts upon people's daily lives. Cross-channel shopping migration behavior can be analogized to people's migration activities among different residential locations ^[3].

PPM model is used to analyze human migration behavior. It is also used by scholars to explain channel migration behavior ^[4]. This paradigm suggests that there are negative factors at the origin that push people away, while positive factors at the destination act to pull people toward them. There are also "mooring variables"--personal and social factors that can either hold potential migrants to their place of origin or facilitate migration to the new destination. In this paper, PPM theory is regarded as a framework to study the consumers' migration from traditional network channels to mobile channel. Based upon the PPM theory and its literature review in the marketing field, theoretical model and assumptions are described, then we talk about the methods used in data analysis, next the result of data is discussed. Finally, the conclusion consists of practical implication and the future research directions.

2. THEORETICAL BACKGROUND

2.1 Channel migration

Migration is referred as the movement of a person between two places for a certain period of time. In the

multi-channel consumer environment, consumers often transfer from one channel to another, the channel repeatedly changing behavior is known as consumer channel migration behavior^[5]. Broadly speaking, the "migration" is the process of changing current state in permanent or temporary (Lee, 1966), but also the movement of the body between two locations for a period of time (Boyle et, 1998), initially used by sociologists to study the phenomenon of human migration. Later, Steinfield firstly introduced the concept of "migrate" to consumer behavior research. However, they did not conduct a complete definition for the consumer channel migration. And existing studies show that there are only two literatures on channel migration behavior give a clear definition. Thomas and Sullivan defined consumers migration as the dynamic selection process among different retailer channels (such as grocery stores, catalogs, Internet, etc.) and they believed that this process occurs throughout the decision-making stage. Since then, Kauffman et al further noted that consumer channel migration behavior should refer to consumer behavior migrating from one channel to another^[6].

Channel migration involves two different channels, previous studies focused on the migration of online and offline channels. Now many scholars study consumer's willingness to accept mobile channel, but fewer research factors influenced online shoppers migrate to the mobile channel from the perspective of channel migration. In this paper, the traditional internet channel and mobile channel is defined as the two ends of the migration process.

2.2 PPM theory

PPM theory concerning migration is a very famous paradigm^[4]. Essentially, PPM paradigm indicates that individuals decision of migrating from one geographic area to another is mainly affected by push, pull, and mooring factors. Push factors are defined as the negative factors that drive people away from the original location, such as the decline of natural resources, unemployment, lack of opportunities for personal development. Pull factors are the positive factors that attract people to the destination, such as better jobs and development opportunities, higher incomes and a more comfortable climate. Finally, since migration is a complex decision, some of the intervening variables are individual factors and social factors, which can either hamper or facilitate the migration to the new destination. Mooring variables should be taken into account PP model, the mooring factors consist of the individual's own, social and cultural factors^[7], such as personnel relations and work skills.

PPM theory has been applied to the management disciplines. Bansal et al. (2005) stressed the analogy between migration and customers' migration behavior in marketing literature. From the previous study on service provider switching, researchers identified a number of constructs, and these constructs match to push, pull and mooring factors^[4]. Although some scholars have borrowed sociology PPM theory to explain the process of consumer channel migration behavior, but they ignore the role of individual factors in the channel migration^[8].

Jung-Yu Lai * et al. suggested that the original channel's inconvenience pushes consumer to migrate to mobile shopping. When people use the PC-based online shopping, they must sit in front of the computers^[2], while the users of mobile shopping can freely lean against the chair or lie in bed to finish shopping, and mobile terminal make people act more freely and comfortably. Using PC-based shopping must have a computer and Internet access, and people generally finish shopping at a fixed location (home, office or cafe), while mobile shopping allows consumers to complete the shopping activities in any area wireless network coverage. People use PC-based shopping generally during surfing on the Internet, but mobile devices is carried anywhere, so people can shop directly whenever they want^[9]. The mobile shopping channel is different from typical online shopping because it provides services regardless of temporal and spatial constraints, enabling consumers to shop when they are on the move^[10].

Harvir S. Bansal e al. suggested that switching cost is a mooring factor that affects consumer migration intention. Using mobile channels requires a certain cost, including equipment costs, transaction costs and access

costs ^[11]. The cost of mobile devices is the cost you should pay for the special device which support mobile commerce capabilities if you want to use the mobile channel; transaction costs represent the costs pay for useful information; access costs represent access charges we need to use for mobile shopping. Using mobile channels also require consumers to spend time and effort to learn to use the new equipment ^[12].

August 14, 2013, according to the investigation in the mobile online shoppers on "what are the factors affect your adoption of mobile shopping?", CNIT-Research found the most important factor to affect the user mobile shopping was "worried about the payment account unsafe". The proportion of this option is up to 62.6%, while the second factor is "possible disclosure of personal privacy and transaction information," the users who select this option are more than 45.5%. This shows that mobile users are most concerned about the issue of security, such as risks of accessing websites, downloading malware, and accessing dangerous networks. And because the mobile terminal's characteristic is one person with one special device, it is easy for retailers to clear consumer identify, and to track their daily search data, then personal information safety could be threatened.

2.3 TAM

Joaquin et al. showed that perceived usefulness and perceived ease of use has played an important role in accepting mobile shopping ^[13]. Davis et al. proposed the TAM (Technology Acceptance Model) to explain and predict the acceptance and use of information technology ^[14]. Perceived usefulness is "the degree to which a person believes that using a particular system would enhance his or her job performance". Perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort" ^[15]. Perceived usefulness and perceived ease of use can be used to assess channel by the consumers. Hsi-Peng Lu et al. also believe that perceived usefulness and perceived ease of use has a significant impact on the mobile shopping willingness.

3. RESEARCH MODEL AND HYPOTHESIS

As a channel migration behavior, online shopping customers migrate to mobile shopping. We will use PPM framework to analyze reasons for migration.

3.1 Push factor

Some negative factors will push migrants to leave their place of origin, to find another place to live. Now people have been sitting in front of computer to work, study during their daily life, therefore, when people are at rest or shopping, they want to change this sedentary lifestyle. Then, people keep busy and fast-paced life, so they want to take advantage of fragmentary time together for shopping. Not only do they finish shopping, but also save the entire time. PC terminal can't meet these needs of consumers, so consumers began to seek other channels for shopping.

Consumers want the convenience that a PC terminal couldn't provide, but the mobile terminal could, so consumers' channel migration intention will be stronger. Thus, we assume a hypothesis.

H1: The more inconvenient traditional online shopping is, the stronger consumer migration intention to mobile shopping channels is.

3.2 Pull factor

According to PPM theory, when migrants choose destination, they will examine the positive factors in the region. If these positive factors meet the demand that people could not get in origin place, they will accept this new location. Similarly, in the channel migration process, consumers first found some negative factors in existing channel, so that they will actively look for other better channels. And when people decide to use the new channels, they should give full consideration to the overall capacity of the new channels, and see whether their needs could be met. The numerous advantages of mobile internet technology (i.e. ubiquity, mobility, internet access convenience, personalization, flexibility, and dissemination of information) enable new shopping

services that can fulfill previously unmet needs in the retail industry. Unlike the traditional Internet, the mobile Internet enables retailers to send customized information and pinpoint user location services in real-time interactions with the customer via a handset ^[16]. On the basis of these advantages on the mobile channel, we use TAM to propose two main factors that determine the consumers migration intention: perceived usefulness (PU) and perceived ease of use (PEOU).

H2: The higher perceived usefulness consumer has in mobile shopping, the stronger channel migration intention will be.

H3: The higher perceived ease of use consumer has in mobile shopping, the stronger channel migration intention will be.

3.3 Mooring factor

Because the complexity of migration decisions, it is not sufficient to consider push and pull factors merely independently. Intervening obstacles or mooring effects were suggested to be considered in migration. Here are some factors on other aspects of personal and social would have an impact on migration intention. The higher consumer switching cost in migration is, the more reluctant to channel migration is. Thus, we propose security will affect consumers' intention to migrate.

H4: Consumers believe that the lower the cost is, the greater migration intention to mobile channel is.

H5: Lower the security caused by the mobile channels is, the stronger migration intention to the mobile channel is.

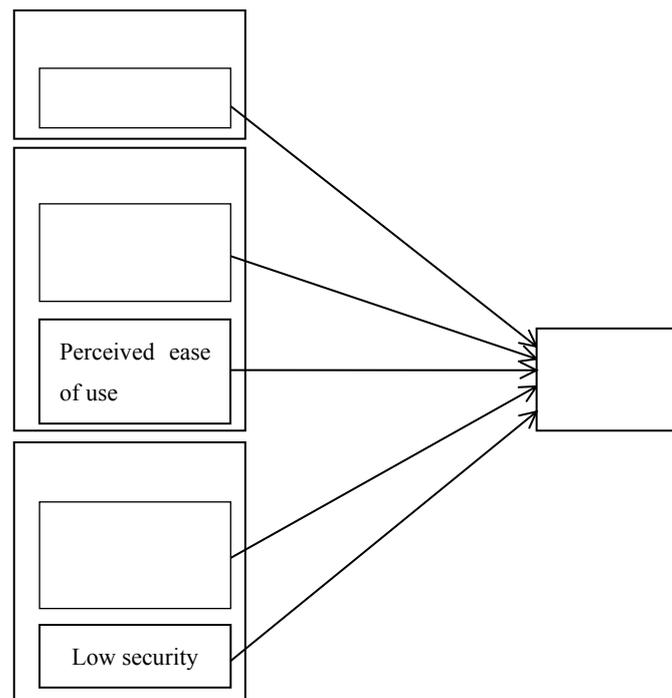


Figure 1. Research model

According to PPM, we can clarify the factors in investigating customer migration intention to three parts: push, pull and mooring factors. Push factors refers to inconvenience. Pull factors consists of the perceived usefulness and perceived ease of use. Mooring factors are high switching cost and low security.

4. RESEARCH METHODOLOGY AND ANALYSIS

4.1 Measurement and data collection

According to previous literature, we modify the measurement of factors. Items measuring inconvenience

derived from Jung-Yu Lai *, Sutapa and Khire (2012), including PC's bulky, constraints on time and place. Perceived usefulness and perceived ease of use are measured by scales from Archana, Avinandan(2013) [17], Joaqui'n, Carla and Silvia (2008) [13], Hsi-Peng Lu and Philip (2009) Jihyun (2008). Perceived usefulness includes shopping efficiency, easy shopping process and freedom of channel choice. Perceived ease of use includes: easy to learn, easy to use, easy to operate skill, fewer effort, no need of help and easy with some experiences. Switching cost includes time, finance, effort and other cost from Zhang, Christy, Matthew, Huaping (2008) . Security scale comes from Jung-Yu Lai *, Sutapa and Khire (2012), including the payment process safety, the transaction process safety and the personal information security. Items measuring migration intention is the consideration and likelihood from Archana, and Avinandan (2013) .We used a 7-point Likert scale to measure.

4.2 Data analysis

First, the data exploratory factor analysis tested reliability and validity of the questionnaire. We calculated the reliability coefficient for the latent variables, the results showed that Cronbach's α coefficients were higher than 0.70, indicating a good reliability. SPSS reliability test can be carried out, generally require $\alpha > 0.7$, this paper α is 0.816, referring to higher reliability. Processed by SPSS16.0 the overall KMO is 0.814, suitable for factor analysis.

CR (composite reliability) is greater than 0.6, showing the data is better convergent validity; AVE is greater than the square root of each latent variable absolute value of the correlation coefficient, the data showed a high discriminant validity.

Table 1. Factors' reliability and validity

factors	AVE	CR	α	items	loadngs
Inconvenience	0.5379	0.7774	0.730	INCON1	0.73
				INCON2	0.75
				INCON3	0.72
Switching cost	0.8014	0.9413	0.924	SC1	0.89
				SC2	0.94
				SC3	0.96
				SC4	0.78
Low security	0.7122	0.9075	0.894	LSC1	0.92
				LSC2	0.92
				LSC3	0.78
				LSC4	0.74
Perceived usefulness	0.6803	0.8612	0.818	PU1	0.90
				PU2	0.92
				PU3	0.62
Perceived ease of use	0.6979	0.9201	0.890	PEOU1	0.86
				PEOU2	0.87
				PEOU3	0.75
				PEOU4	0.88
				PEOU5	0.81
Migration intention	0.7485	0.8561	0.837	MI1	0.88
				MI2	0.85

According to confirmatory factor analysis results, standardized loadings of the observed variables in the corresponding latent variables are statistically significant (more than 0.5). Structural equation model was used to test model and hypothesis. Run LISREL software, the structural model showed good model fit (RMSEA = 0.074, NFI = 0.92, NNFI = 0.94, PNFI = 0.76, CFI = 0.95, IFI = 0.95, RFI = 0.91, RMR = 0.049, GFI = 0.86, AGFI = 0.82, PGFI = 0.65). Therefore, this model is supported.

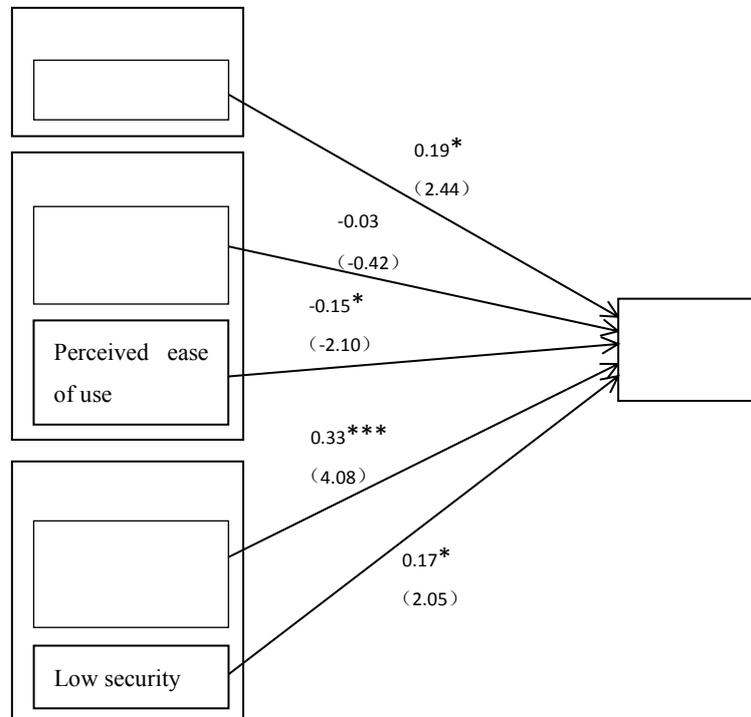


Figure2. Structure equation model standard path

Figure 2 showed t-value and standardized path coefficient. The relationship between inconvenience and migration intention was positive and significant ($t=2.44$), supporting hypothesis 1. The relationship between perceived usefulness and migration intention was also positive and significant ($t=4.08$), supporting hypothesis 2. The effect of perceived ease of use on migration intention was positive and significant ($t=2.05$), supporting hypothesis 3. The effect of switching costs on migration intention was not significant ($t=-0.42$), and hypothesis 4 has not been supported. The relationship between low security and migration intention is negative and significant ($t=-2.10$), supporting the hypothesis 5.

According to Figure 2, the effect of perceived usefulness on migration intention produced a strongest standardized path coefficient, followed by the inconvenience, perceived ease of use, and security.

5. FINDINGS AND DISCUSSIONS

In this paper, the PPM in the field of population migration theory is used to analyze factors influencing consumer channel migration. Pull factors include traditional Internet channel's inconvenience, push factors include the consumer's perceived usefulness, perceived ease of use of the mobile channel, and mooring factor refers to safety.

The original channel's inconvenience plays an important role, because in the mobile channel, consumers can experience what they cannot in the PC-based channel. Our results show that the inconvenience on migration intention is significant ($t=2.44$). Therefore, the inconvenience of traditional online shopping has a positive influence on migration intention to the mobile channel.

Our results also show that pull factors in particular perceived usefulness has a greater impact on the results; perceived usefulness has a significant effect on migration intention ($t=4.08$); and perceived ease of use on the migration intention is also significant ($t=2.05$). The perceived usefulness and perceived ease of use is important factors according to the technology acceptance model. However, only alternative attractiveness is existing variable that conforms to this conceptualization from PPM literature, while Ye, C. and Potter, R. (2007) proposed a pull factor in personal IT transformation named perceived ease of use and pointed out that in previous literature, only alternative attractiveness is a pull factor, which is too broad for this information technology. In order to match the research background, the paper uses perceived ease of use in the Unified Theory of Acceptance and use of Technology (UTAUT). For this article, it's the channel migration environment, but also the performance of a technology, so we use technology acceptance model's two variables: perceived usefulness and perceived ease of use. Joaquin and Silvia Sanz-Blas (2008) showed that perceived usefulness and perceived ease of willingness to accept mobile shopping has played an important role.

Switching costs is one of the important mooring factors. PPM theory literature generally considered switching cost as an important factor. However, the results of this analysis show that switching costs was not significant ($t=-0.42$). The reason might be that people won't buy a mobile device for shopping, although mobile device is a precondition for mobile channel migration. People have mobile devices long before they start their mobile business transaction. Therefore, mobile device is not a necessary cost for consumer's channel migration. Moreover, most of current mobile retailers are traditional e-tailors. The business transaction platform remains unchanged. Consumers won't lose their loyalty points and trust won't be vanished by using different channels. In that case, switching costs is not very significant.

Security is another noteworthy factor in accepting new technologies. In previous study, this factor is also frequently included in the relevant models. For example, Archana Kumar, Avinandan Mukherjee (2013) believed that the perception of security has a positive impact on mobile shopping intention. And Jung-Yu Lai * and Khire (2012) believed low security and privacy are two factors that need to be considered in mobile shopping. This paper concluded that safety is still important factors ($t= -2.10$), while it is significant in the early adoption stages.

6. MANAGERIAL IMPLICATIONS

This paper analyzes the push, pull and mooring factors to provide enterprises with consumers-attraction suggestions. For traditional Internet retailers, in order to keep the users, it is necessary to improve convenience, so that consumers feel less restricted. Also, the mobile Internet could be used to create a seamless shopping experience.

For enterprises who own a mobile APP, perceived usefulness is the most important factor in the process of migration to mobile shopping. On the one hand, in order to hold the consumer, it is necessary for mobile businesses to improve the technical capacity, which can always access the mobile network, improve load speed, keep real-time updates of user data. On the other hand, company should pay attention to the construction of the offline operational capacity, possess the ability to support mobile services to complete one-stop service, so that consumers experience powerful mobile function. At the same time, all features are designed to help consumers complete the shopping process. Good mobile terminal building improves the perceived usefulness as an important measure to promote the consumer to complete the migration.

Perceived ease of use affected by consumer knowledge, ability, and other aspects of adapt ability has direct influence upon consumers migration. Therefore, companies need to make the mobile interface user-friendly and simplify the transaction process. And it's the only way to make more people accept mobile shopping.

7. LIMITATION AND FUTURE RESEARCH PLAN

Consumers can exercise online transactions for both virtual products (cyber-games, applications, etc.) and physical products (external hard drive, shoes etc). Consumer buying behavior might vary from different product types. This article does not take product type into account. If we considered the mobile terminal specific consumption situation and product type, the results would be more helpful.

We didn't consider variety of personality might have effect on the channel migration. For example, higher innovative consumers are more willing to try new and popular channels, and therefore it would be easier for them to migrate from a PC to a mobile shopping Joaqui'n, Carla and Silvia (2008).

This paper focuses upon online shoppers' migration behaviors from PC-based Internet Channel to Mobile channel. However, those who don't have any previous PC based online shopping experience might have a smart phone. Mobile phones are even closer to e-retailers than PC does. Therefore, how to convert those mobile phone users to mobile shoppers is another issue worthy of research attention.

In the research of online channel migration, more emphases are placed upon PC-Mobile migration. However, PC-based Internet access still retains a strong foothold despite of the fact that mobile Internet access becomes increasingly popular. Many consumers use both channels to conduct their online shopping. What role does PC plays and what role does mobile channel play? Do they play the same role or different? In what situation do consumers use PC based Internet access and in what situation do they use mobile channel? Under what circumstances do consumers even switch back from mobile phone to PC? Those questions are important but remain mostly unsolved. They could be the direction for future online channel migration research ^[18].

In future studies, we should consider the impact of different types of products and particular situation on consumer choice. For example, when consumers do not have a computer around, they may be prepaid recharge through mobile phones, which also belongs to the purchase behavior, but need to purchase in a particular situation. Secondly, we can use the consumer channel migration characteristics in terms of research, especially when it comes to this new and emerging channel, different consumers' attitudes to accept new things and whether habits will affect their willingness to accept a new channel level. Then, the future research may be for non-online shopper to explore their attitudes to mobile shopping, so that enterprises can fully understand the attitude of the entire consumer groups to move the channel. Finally, consumers evaluate these two channels, and they may choose to migrate to the new channel, or stay in their original channel or use two channels at the same time. In order to have a grasp of the overall market, future research should consider all these arenas.

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