Exploring factors that hinder the adoption of Mobile Services in China A qualitative user analysis with special focus on mobile financial services

Abstract

The object of this thesis is twofold: 1) to find out the adoption status of advanced mobile service with a special interest for mobile financial service in China and 2)to investigate enablers and inhibitors for Chinese users in accepting mobile financial service. A qualitative user study was conducted to investigate Chinese users' attitude towards a set of attributes that may have impact on their decision making to adopt mobile financial service.

The result indicates that the overall adoption rate for advanced mobile service is not as satisfactory as industry predicted, but users have a strong will to adopt such service in the future. They value queue avoidance, being an alternative payment method as comparative advantage of mobile financial service and security assurance and lack of awareness and need as primary hinder factors when they consider adopting mobile financial service.

The result should provide implication on how service providers could improve their product and service to shape strategy in alliance with users' preference. It also points out possible future research area.

Key words: mobile service, mobile financial service, qualitative user analysis, diffusion of innovation.

Table of Contents

Table of Figures:

Terms and Concepts used in the thesis:

Mobile internet: used to refer to websites that are customized to fit for mobile phone users to browse on their mobile phone. Nowadays most of the websites can be accessed by a mobile phone that is on internet, thus this term refers to any websites that can be accessed by a mobile phone.

Mobile service: in this thesis refers to services used and practiced on a mobile phone. It ranges from basic functions such as text messages to value added services, as internet browsing, content downloading, which usually require installing additional software.

Mobile financial service: in this thesis consists mainly mobile banking and mobile payment. It refers to any monetary transaction that is initiated, authorized and implemented on a mobile phone device.

WAP (Wireless Application Protocol): is an open international standard. A WAP bowser is a commonly used web browser for small mobile devices such as cell phones.

GPRS (General packet Radio Service): is a packet oriented mobile data service on the 2G and 3G cellular communication systems global system for mobile communications (GSM).

3G: is a generation of standards for mobile phones and mobile telecommunications services fulfilling the International Mobile Telecommunications-2000 (IMT — 2000) specifications by the International Telecommunication Union.

1. Introduction

1.1 Objectives:

The aim of this thesis is **to explore what are considered to be important factors that influence the adoption of Mobile (Financial) Services in China from a user point of view**. It is designed to find out what are the enablers and inhibitors in the decision making process for Chinese mobile phone users to adopt mobile services. It should note that this thesis has a special interest in the field of mobile financial service but is not restricted to that.

The outcome of the thesis is expected to discover target sample, in this case Chinese mobile phone users', mobile service usage pattern and further reveal their preference towards mobile (financial) service.

This thesis should also give an insight on the status of adoption rate of mobile (financial) services in China and also give implications for service providers on what and how to improve service or product so that such services will be better accepted.

After reading this thesis, viewers should be able to find answers to the following questions:

1. How well is the concept of mobile service, especially mobile financial service adopted by Chinese users?

2. What are the enablers and inhibitors that impact the adoption of mobile financial service?

1.2 Structure

The thesis first introduces fundamental background of mobile service including mobile financial service on a general level. It is then followed by an introduction of current mobile (financial) service market in China.

A literature review section which constitutes the theory foundation of this thesis is then presented. It first reviews what existing literature and studies have presented relevant contents, including summaries and results that have already been achieved from other similar researches. A second part in the section will explain how existing theories are applied to design research methods and questions for this thesis. The theories that are applied in this thesis are mainly adapted from theory of Diffusion of Innovation (DOI) and a few mobile service acceptance models.

An empirical part consisting a qualitative analysis of Chinese users' mobile service usage with a special focus on mobile financial service usage is presented next. Data analysis, study result and research limitations will be discussed at the end of this section. Finally, the author gives conclusion for the study and recommendations for further research based on the result.

1.3 Introduction to mobile service

The concept of mobile service or in many cases referred as M-commerce, mobile data service or mobile value added service have been rather familiar to public around the world. It is due to the fact that mobile service providers are facing price competition in the voice market, mobile service has been considered as a future revenue source by major participants in telecommunication industry as well as merchants and service providers offline who are eager to expand market shares, increase customer satisfaction and ultimately increase profit margin (Funk, 2007;). Mobile service seems to be a new lifestyle to public and media. It means new possibility to do business to service providers.

Though supply side of mobile service has been pushing and trying to develop the depth and width of service provided, little progress have been gained in terms of penetration rate and market shares. In Asia which is considered to be ahead of North America and Europe in terms of the adoption of mobile service, its revenue accounts for between 5% and 20% of the total revenue made by telecommunication service providers in 2005 (Minges, 2005).

It has been a boom for SMS (short message service which is considered as one of the mobile data services), but public cannot name another killer service which is as widely spread as SMS. The mobile service phenomenon has also attracted academic attention, there are numerous articles and reports that were intended to find out answers to the following questions: What are the reasons that majority users do not use mobile services as much as industry and academic critics expected? Is there anything services providers haven't offered yet or have done wrong?

My interest in doing this thesis is inspired by the fact that on one hand mobile service has taken the role of being a new and seemingly promising business where a great

level of competition can be expected: mobile operators and application developers are vying for their market shares in this coming battle; on the other hand by comparing different regions, Asian countries like Japan and Korea seem to be one step forward in developing the idea, spreading and commercializing mobile services. Users in those countries have experienced more pulling power to engage mobile data services. But few researches have studied such adoption status in China.

While comparing Chinese market with that of Japan and Korea, China experienced both a boom of mobile service offered, yet a low acceptance rate. For the reason China is the fastest growing and potentially the biggest mobile phone related business market, the author is interested in finding out what is undergoing in this promising market.

1.4 Rationales

This thesis will be a collaboration result from the thesis writer and Mobile Financial Service (MOFS) project team which is formed mainly by Aalto University School of Science and Technology (Based in Helsinki, Finland) faculties and researchers. All the data used in the thesis are gathered and provided by Chinese students who took the course *qualitative user research for mobile services and payments.* The course was held in China in March 2010 in Dalian University of technology, based in Dalian and South West School of Economics and Finance, based in Chengdu.

The author worked as a course assistant to further categorize and analyze data gathered and conducted this thesis as a summary report of a research aiming to study current Chinese mobile phone user's usage pattern and attitude toward mobile service offered in China.

The aim of the course is to **introduce to students fundamental theory, tools and methods for qualitative user analysis in order to better assist their study and research in future in mobile service related field**.

MOFS project team is also interested in finding out the adoption status of mobile financial services in china. Within this area, this study is designed to shed a light on how context of use in technology acceptance theory affects user's behavior. In another words, how dose use environment elements affect the use of mobile service?

The project team believes that the answers to those questions will help to better understand the elements that are important in Chinese user' decision making process thus to give suggestions to improve mobile service design. It may reveal valuable research areas that were originally overseen.

1.5 Background

In the recent years, the wireless telecommunication infrastructure has been fast developed and now is even more affordable than its fixed-line service. Wireless Mobile Data Service (WMDS or in this thesis collectively referred as mobile service) in this background has also been developing to take advantage of the existing well developed infrastructure. Mobile service refers to all types of digital data services via wireless networks accessible through any type of mobile devices. (Xu, 2003)

From secondary sources, meaning from public available information especially from news, industrial magazines and academic critics, the author found a trend that Chinese telecommunication operators have a significant incentive to explore new revenue source and new business model which set beyond traditional ones. They are also actively seeking for collaboration with potential partners. Mobile value added service is expected to be the platform where operators can gain new market shares thus to increase profit margins.

The same holds to many Chinese third parties including merchants, commercial websites and financial agencies that are now eager to both expand market shares and increase customer satisfaction. A number of Chinese internet giants, such as sohu.com (one of major Chinese portal sites), baidu.com (biggest Chinese internet search engine), taobao.com (biggest Chinese online C2C and B2C market in terms of turnover) etc., have released their mobile phone application in order to increase volume of visits and further increase sales.

After a few years of fast growth in volume and size, those participants are facing fierce competition in the original business distribution channel and they have to actively integrate resource to reshape strategy. It is fair to say that most of the existing major internet content providers and a great number of off-line merchants in China

have released their mobile phone application. They expect consumers to access their service on their mobile phone easily after installing the application in the mobile phone.

The reason behind it is apparent. According to a report from Chinese Ministry of Industry and Information Technology (MIIT, 2010), by the end of 2010 there are 859 million active mobile phone users, almost 10 million users more than 2009. There are 34.73 million more 3G users, totaled 47.05 million. Mobile phone adoption rate reached 64.4/100, which is 8.1% more than last year. With such a huge user base, no business providers can afford to oversee this market. All above suggests that supply side of mobile data service is ready to shift their business to a higher level. What is the market's reaction to the pulling power from suppliers?

Previous research done on Chinese market pointed out that for Chinese mobile operators, a subscriber is not necessarily a user; despite a 37.7% increase in mobile phone users from 2004 to 2006, there was a 3.87% decline in average revenue per user (ARPU) per month after promotion of simple mobile data services. (Lu et. al, 2007) This figure suggests that there is not an apparent success of spreading the use of WMDS in China; this is, of course, important and has strategic implications for business practitioners. Past studies have indicated that having mobile data capability and actually using it are two different things.

There are three telecommunication operators in China: China Mobile Communications Corporation (referred as China Mobile, CM), China United Telecommunications Corporation (referred as China Unicom or CU) and China Telecommunications Corporation (referred as China Telecom or CT). All of the three operators are licensed to provide mobile and data service. In another word, those three operators are authorized to provide full mobile related service.

1.6 Scope of Thesis

The study scope of this thesis only focuses in the field of mobile phone data service. This refers to any service, financial transaction and interactive process that is initiated, authorized and executed on a mobile (smart) phone device. The service can be supported, realized by mobile phone internet, GPRS or 3G network.

This thesis does not include process that is done on computer internet or on other portable devices, i.e. a PDA or an IPAD. In addition, this study excludes voice services and SMS (short message service) since those services have been well accepted and do not provide much additional value for the research topic.

The description of functions and difference between services, business and revenue models are not the focus in this thesis either. This thesis aims to find out in Chinese market, which have barely been studied, what factors are playing important roles to affect the spread of mobile (financial) service, from a qualitative user analysis point of view.

Applications that are designed to fulfill certain business and work purpose is not included in this study, in other words, mobile (financial) service in this thesis means applications that are designed for majority consumers and users have a right to freely choose mobile service.

1.7 Mobile Financial Service

In this thesis, mobile financial service (MFS) covers a broad range of financial activities that users may encounter when using their mobile phones. Roughly speaking, MFS can be divided into two distinct categories: mobile banking (m-banking) and mobile payments (m-payments) (Boyd & Jacob, 2007).

Mobile banking is defined as 'a channel whereby the customer interacts with a bank via a mobile device, such as a mobile phone or personal digital assistant (PDA)' (Barnes & Corbitt, 2003). Mobile payments on the other hand are defined as 'the use of a mobile device to conduct a payment transaction in which money or funds are transferred from a payer to a receiver via an intermediary, or directly without an intermediary. ' A full mobile payment procedure contains initiation, authorization, clearing /settlement, confirmation and money transfer, and delivery of the service or good.

However, categorizing mobile banking and mobile payments could be difficult. They are distinct but in many cases overlapping. Some m-banking platforms provide payment services, such as money transfers, while some m-payments service is required to be linked to bank accounts to get the source of fund and personal information, which should be accounted as m-banking, to realize functions (Boyd & Jacob, 2007). So MFS can be interpreted collectively to a set of applications that enable people to use their mobile phones to manipulate their bank account, store value in an account linked to their handsets, transfer funds, or even access credit or insurance products (Donner & Tellez, 2008).

It should be noted that there is a distinction between mobile payments and mobile banking services though in many cases mobile payment transactions conducted via mobile banking systems. Mobile banking services are realized on banks' own

technical systems and offered for the banks' own customers. While mobile payments are offered as a new payment service to a retail market.

This market has the following features: 1) this service could be provided not only by banks but also mobile operators and third parties, 2) both consumers and merchants would have to adopt it instead of consumers alone in the M-banking, and 3) it is very difficult to release regulations on standardization and realize compatibility of different payment systems and procedures. All mentioned factors increase the complexity of mobile payment adoption environment.

1.8 The global m-payment market and dynamics

M-payment procedure – example

| Monthly mobile bill | Prepaid mobile account | Bank account | Credit-/debit card | Stored value account |

Clearing / settlement

Mobile payment provider

Initiation 1

Authorisation 2

Confirmation, transfer of money 4

Customer

Delivery of service or good 5

Merchant
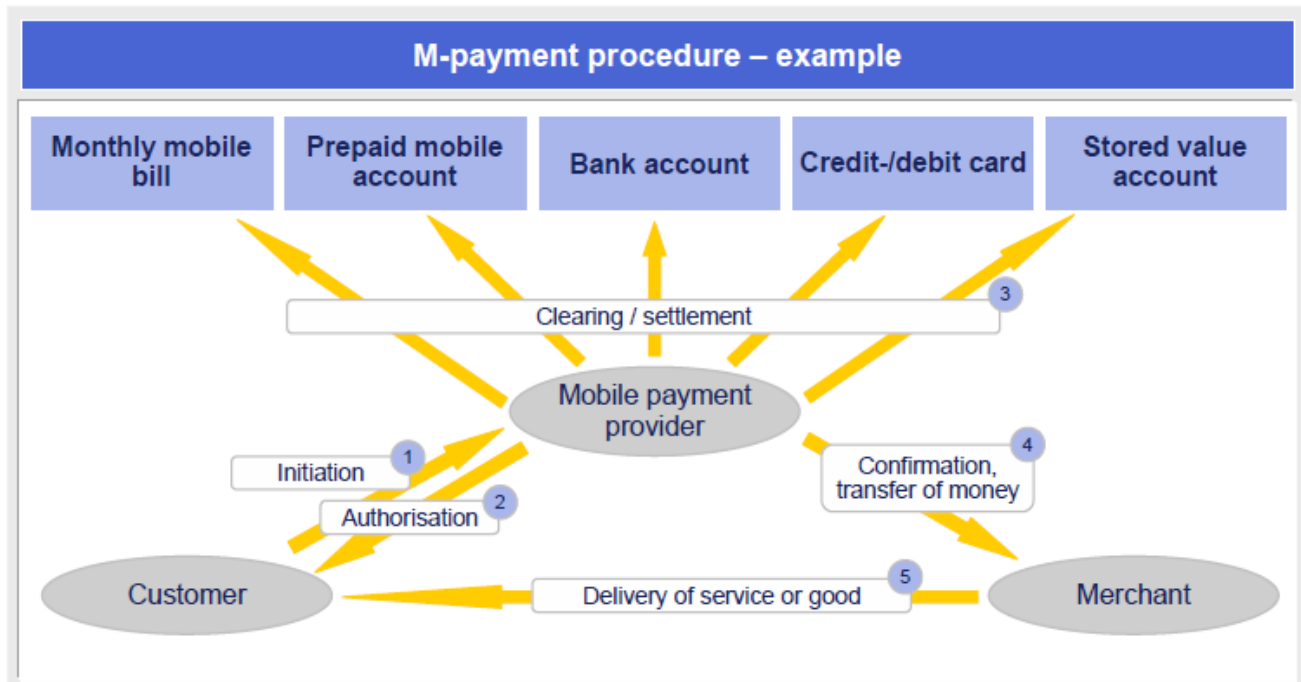
Figure 1: Mobile payment procedure
Resource: Arthur D. Little, http://adlittle.es/

Mobile financial service is regarded a key service type in all of the existing mobile services. According to a report from Arthur D. Little, there are six main players in the mobile payment value chain: mobile operators, financial institutions (e.g. banks and credit card companies), independent service providers, merchants, equipment suppliers and industry associations. Within this value chain, power and market drivers may be distributed differently in different region and different markets. Those players take part in various stages from authorization to facilitation and access provision to service promotion.

In the case of Chinese market, banks, merchants, third party payment providers and industry association seem to be more active in developing applications through which users can easily login the service. It can be seen that hardware or equipment suppliers are also seeking their position in the competition. Localized system developer and

device manufacture have released pilot project where mobile payment application has been already embodied before purchasing the device.

The Arthur D. Little report expects total m-payment transaction volume to reach almost USD 250 billion in 2012 and dramatic transaction volume growth of 68% p.a. from 2008 to 2012. They also believe those figures to materialize in the future as telecommunication companies have an incentive to launch m-payment services in order to take advantage of the current opportunity. In the report also points out it is believed that transaction volume will keep rising as m-payments will take over market share from banking transactions due to lower service prices and from online-payment services due to increased mobility.

The developments of mobile financial services are influenced by factors of economic, technological, social and cultural regardless the region. It is worth mentioning that the report pointed that banking infrastructure is indicated as a key factor influencing the potential for m-payments in any market because they found out m-payments have more opportunities in markets with relatively less developed the banking network. M payment acts as a competitive service channel.

1.9 Mobile payment market in China:

The boost and spread of mobile phone and smart phone in China gives a good precondition for the adoption of mobile (financial) services. The number of mobile phone user is extremely high and it's still rising. According to MIIT (2010), there were more than 28million 3G users in China by the end of July 2010, has an increase of 11.4% than June 2010, an increase of 544.6% comparing with July 2009. There were an increase of users of around 15 million since January 2010, and July alone has a 2.8 million increase. China telecom, China mobile and China Unicom have 3G users of 7.75million, 11.83 million and 8.5 million respectively. The same holds to the number of financial related card users. The total number of bank and financial related card holder reached around 1 billion.

According to the MIIT report the mobile payment market reached 1.97 billion Yuan and number of users was 82.5 million. But in China there is no industry standard that regulates and guides all the interest holders to further invest and develop their mobile payment infrastructure and strategy. It is widely believed that once a national wide industry standard and regulation are legalized it will help the further spread of mobile payment.

China issued long-awaited licenses for third-generation (3G) mobile phones on 7.1.2009. This makes faster data transmission and services such as mobile financial services, video calling, and better experience in internet browsing possible. The significant change in the technology and regulation environment has been for the growing demand for mobility. It can be predicted that mobile financial service is the key factor of mobile commerce in the future. While heavy-weight participants in the industry such as financial agencies, service providers, telecommunication operators, merchants and commercial portal website are ready to compete in this new domain, several academic papers have found out that the decision power is in user's hand.

They will freely choose whatever option that is best fit their preference. (Kreyer et al., 2003; Kreyer et al., 2002).

Three approaches for mobile payment in china

On computer internet, PayPal has already gathered the largest user base, and in China the winner is Alipay. But in mobile payment industry, all the third party mobile payment providers are in the phase of preparing and staging.

Payment is a concept which is as wide as mobile, this complexes the concept of mobile payment. Now in china, not only third party payment service providers are vying for this market, but also financial agencies such as banks and mobile operators. They have categorized mobile payment mainly into the following three approaches:

1) Mobile phone works as credit card, in this case near field communication (NFC) technology is embodied, and some may refer this approach as mobile wallet. For example in Japan, this concept has been widely spread and accepted that mobile phone can be used as a wallet. Users put the mobile phone near a reader to complete the registration and payment. And that kind of readers have been installed on public transportation, supermarket and cinemas et al. User account can be either prepaid or postpaid, resembling a credit card. In this means, users have to sign contracts with a mobile operator to get a special SIM card which can be used at the point where a POS machine is installed. This method works easiest but has most difficulties when it is implemented in China. Preinstalled NFC may cause interest conflict between financial agencies (bank association, credit card association et al), mobile operators and mobile phone manufactures. While bigger difficulty lies in the fact that much more modification and reconstruction will be required in infrastructure, in some case users need to buy a new handset. This could be a frustrating project in China that requires much

effort. For example who should be responsible for setting up POS machines is an issued yet to be solved, let alone which party should get more profit. In China, lack of POS device is one of the main reasons that hinder the spread of such payment system.

2) A second payment method is to turn a mobile phone into a POS machine. A successful case is *Square* in America. A *Square* reader is installed in merchant's and connect to user's mobile phone when a payment about to be made. The next procedure works like make payment with a credit card.

3) As a third approach, which is considered by industry the most applicable and promising, is to copy computer third party payment procedure. This approach is well developed in terms of user acceptance. A great number of users have installed applications in their mobile phone from various service providers. This makes conducting payment on their handset easier than ever. Almost all the applications have been designed to be compatible with most popular Chinese third parity payment agencies. Thus users can easily login service with personal account and complete a transaction on their mobile phone. This approach doesn't require physical presence of participants which best fits the feature of a remote payment. And more importantly, many Chinese third party payment providers have accumulated great experience from operation, customer relationship, bank cooperation and risk control on computer internet. If they can copy those advantages from computer internet payment, they are more likely to be successful.

Financial agency, mobile operator, and third party payment providers have already begun to fight for more controlling power in the mentioned procedures. But more effort should be made offline. In the first mentioned approaches, financial agencies collaborates with mobile services providers. Financial agency plays a more important

role taking more responsibilities, and mobile operators offer a channel. When using the service, users tie their mobile phone number with payment account number. In order to pay with their account they can send out messages or pay through WAP.

But opportunity exists with threat. A Chinese third party payment provider is facing a dilemma: C2C payment market share has been firmly taken by Alipay. Owned by Alibaba group and developed along the prosperity of Taobao.com (the largest Chinese C2C and B2C online market), Alipay did not leave much space for its competitors in Chinese computer internet payment market. While for bigger B2C transactions, more and more merchants are offering on-delivery payment. In America, top 10 e-business providers consists only two internet service providers: Amazon.com and ebay.com, the rest are traditional retailing giants such as Wal-Mart and BestBuy. This is happening in China as well. Some major merchants have released pay-on delivery service.

As for the second approach, mobile service provider offers an account so that users can deposit money prior to paying, or they would charge from user's normal account so after using mobile service the charge will appear in the mobile phone bill. But for this option, mobile operators in China are not authorized to offer or implement any financial activities other than their telecommunication business; they can only execute financial transactions that are related to core business, such as offering ring tone downloading and charge that.

Though mentioned payment systems have been functioning but no common agreement has been achieved on creating a standard mobile payment business model and regulations. And for MSPs, mobile payment and mobile service are new business area. No successful experience can be learnt.

And for distant mobile payment on internet, MSPs even have bigger difficulties developing services in the field. As distant mobile payment is not restricted by space

or time, and it covers various expenditure types including transfers, payments and normal shopping, it is not likely to gain permission from financial regulating agencies in Chinese government. None of the Chinese mobile service providers has been granted rights to develop distant mobile phone payment on mobile internet in big monetary terms. So far the only option for user to conduct such payments on mobile phone is to login their paying account, which can be their bank account or a third party platform account, and pay with the same procedure as they do on computer internet. One thing has been proved by several interviews is that mobile service providers have been trying to get into this area and offer their own platform so users would have an easier short cut to pay and operators would get the revenue as well.

The structure of the study is as follows. The second section includes a literature review of the theory of innovation diffusion and discusses some measurement tools. In the third section, the mobile phone financial service is defined and described in detail. Methodology is discussed in section four. In the fifth section, existing literature on mobile financial service, factors that affect the adoption of mobile financial service is reviewed first. Finally, based on the literature review and interviews a catch-all evaluation tool is developed. In the final section, I draw conclusions and propos for further research.

2. Literature review

2.1 Previous studies

There have been a great number of studies and researches conducted on mobile service related field ranging from discussing product design (Andersson & Hedman, 2007), analyzing business models (Lyytinen & Damsgaard, 2001), user analysis (Constantiou et al., 2008), technical analysis (Li& Tao, 2009) and etc. Articles cover both supply side and demand side.

Most of the studies have been done with a focus on European and American market. A few had shed light on the success in Japanese or Korea market, and made a comparison of the adoption status of mobile service between several Asian markets. (Kim et al., 2007)

It is acknowledged and proved by market and academic researches that the actual adoption rate and influence of mobile service is far below what researchers and professionals in the industry predicted. Influence in this thesis can be interpreted as to what extent the mass public is aware of certain mobile service, willing to use it and to what extent the service will change consumer behavior pattern and habits. The exact reason why the idea of mobile service did not fly in Chinese market has not been really concluded and analyzed.

There have been discussions on what really hinders the pace of spreading mobile services. Kumar et al. (2006) claim that it is because of the low data transfer speed. Some researchers claim that it lacks of quality services (McMahon& Steketee, 2006)

and some state business models are antiquated (Coursaris et al, 2006; Saugstrup & Henten, 2006).

Yet the author would argue with some of the reasons mentioned above. By the year 2010, some of those difficulties and situations have been dramatically changed. The mobile industry was reshaped and moved much forward thanks to hardware development in mobile device and telecommunication infrastructure. And the emerge of high speed smart phone with revolutionary processing power, such as ox and android embodied mobile phone, as well as the development and maturity of 3G network, make mobile service ready to give user a much smoother use experience.

Previous researches have put a main weight on how potential businesses can be conducted in this newly emerged yet promising field or how to design the technical details for such businesses, but little attention have been paid on how users feel about the current mobile services and how to improve those, especially in Chinese market.

A number of studies suggest that the consumer side has also shown great interest in the services provided (Dewan & Chen, 2005; Kreyer et al., 2003). among all the most popular mobile services: peer-to-peer payments, instant message, electronic receipts, purchases on web site, and e-tickets, routine bank service and etc., have been typical applications.

Among all of the applications, mobile financial service takes up a majority of the existing ones. Mobile financial service can be roughly defined as transactions that involve payments conducted on a mobile phone. However, though studies show that there is a potential popularity and need, the progress of its adoption has been slower than expected. Such state is argued to be resulted from the complexity of its transactions, lack of user-friendly mobile portals, and slow connectivity (Frolick & Chen 2004).

Aarnio et al. (2002) did a survey of 1553 respondents between 9-34 years in Finland and concluded that categories of users differ significantly in their use of mobile services. Instead of the general idea that mobile services are adapted by individuals, they found out mobile services are better adapted in groups whose charges are paid by employers or someone else. This indicates that price is one of most determining factors when adopting mobile services in their research sample group.

Different interest holders have different stand point in mobile services business. Service providers focus on developing quality value-added services in order to increase revenue (Funk 2007) while researchers intend to study initial adoption process to find out user adoption criteria and then suggest market strategy and development (Lu et al., 2005; Hong & Tam, 2006).

2.2 Theory review

The theory foundation of this thesis consist literature review for the research topic. References are extracted from academic paper, newspaper, professional's blogs, industry magazines and Master/Doctoral thesis as well as official statistics. This section is then followed by empirical studies.

The most well-known theory and models in technology adoption have been Theory of Diffusion of Innovation (DOI) (Rogers 1995), Technology Acceptance Model (TAM) (Davis 1989), and Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003).

Those theories are all widely tested and used by numerous researches and studies concerning the adoption of mobile service and technology. TAM is one of the most widely used in studying end user behavior and system usage (Chen et al, 2002). In this thesis, several theories related to information system and new technology acceptance are being reviewed in order to give an academic view of explaining the adoption of mobile (financial) services in our case. Theories stated in the following are: diffusion of innovation, technology acceptance model, context of use and some advanced mobile service acceptance model.

2.2.1 Diffusion of Innovations

Rogers (1995) defined Diffusion of Innovations as 'the process by which an innovation is communicated through certain channels over time among the members of a social system'. It can be regarded as a multidisciplinary theory that has been widely used to explain information system adoption research.

There are five primary factors that have impact on the rate of adoption according to the theory: 1) relative advantage, 2) complexity, 3) compatibility, 4) trialability, and 5) observability.

Relative advantage is the degree to which an innovation is perceived as better than the idea it replaces (Rogers, 1995). It should be noted that the relative advantage of an innovation is closely associated with an individual perceptions of it. Whether a user believes the innovation as advantageous is more important than whether an innovation has objective advantage over the precedent idea. The theory suggests that the better the perceived relative advantage of an innovation, the more rapid its rate of adoption will be.

Compatibility is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters (Rogers, 1995). Technical compatibility refers to the level of compatibility between the task being conducted and the technology being used (Cooper & Zmud, 1990; Tornatzky & Klein, 1982). In the case of mobile service, this implies that mobile service implementation success will be more likely to occur when the nature of the service is compatible with the technology characteristics.

Complexity is the degree to which an innovation is perceived as difficult to understand and use (Rogers, 1995). Technical complexity refers to the level of task complexity

related to the innovation. Prior research has shown that there is a negative relationship between the complexity of a technology and its successful implementation (Cooper & Zmud, 1990). In the case of mobile service, a higher level of task complexity in service application would be inhibitors in success of the implementation process.

Trialability is the degree to which an innovation may be experimented with on a limited basis (Rogers, 1995). The theory suggests that innovations that can be experimented will, in general, be adopted more quickly than innovations that are not trialable. This is due to the decreased uncertainty gained by experimenting.

Observability is the degree to which the results of an innovation are visible to others (Rogers, 1995). This observability stimulates discussion surrounding the innovation as the peer group requests evaluation information about the innovation. The theory suggests that the easier it is for individuals to see the results of an innovation, the more likely they are to adopt it.

It is widely established that the diffusion of innovations theory (Rogers, 1995) is a powerful tool and gives solid theoretical background for explaining the adoption of mobile technologies including electronic payments (Szmigin & Bourne, 1999) mobile commerce (Teo & Pok, 2003), and mobile banking (Lee et al., 2003). It was pointed out by Tornatzky & Klein (1982) that three of the factors mentioned above have greater importance in adoption of IS system: comparative advantage, complexity and compatibility. It was argued that the rest two: trialabiliity and observability are focusing on the learning mechanisms.

It is also worth mentioning that a number of researchers (Kim et al., 2007) pointed out that user adoption of mobile service is not well supported and explained by the theory of reasoned action (TRA) (Ajzen and Fishbein, 1980), the innovation diffusion theory (Rogers, 1995) or the technology acceptance model (TAM) (Davis, 1989).

These theories are very much used to explain mobile service adoption process as they were part of information system (IS).

An information system is usually regarded as a tool that is applied at a work place in order to facilitate people with their task related work and improve their performance (Jeyaraj et al., 2006). This background setting is not appropriate in a way that most systems in organizational settings are free of charge or in some cases users pay a fee at once and are given certain use package for example unlimited daily usage (Choudrie & Dwivedi, 2006; Dwivedi et al., 2007). While for majority of individual users they are charged as pay-per-use, so users have more power to choose and feel more important to make a right choice whether to use certain mobile service.

2.2.2 Technology acceptance model TAM (Davis, 1989)

There are a great number of researches exploring TAM can be a framework to exam how end users accept information system. And some researchers have claimed TAM is more suitable for studying the diffusion and acceptance of certain technology within an origination instead of studying such diffusion to individual users.

Nevertheless, the two constructs: perceived usefulness and perceived ease of use have been proved to be two important factors that determinate users' intention to apply certain technology. Those two factors were proved to be important for the spread of mobile commerce in Wu and Wang's (2005) paper. Davis defined perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989). He identified 14 items clustered in three groups: job effectiveness, productivity and time savings, and importance of the system to one's job. The other component, perceived ease of use refers to "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989). Similar to the perceived value, also the ease of use was clustered into three groups. The identified clusters distinguish the ease of use in terms of physical effort, mental effort, and the personal expectation experience of the system's ease of use.

Introduced by Davis (1989), the Technology Acceptance Model (TAM) has been widely used to explain what factors users would consider to accept a new technology. It introduced the influence of the perceived ease of use and the perceived usefulness of a technology on the users' attitudes towards using the technology and subsequently on the actual usage.
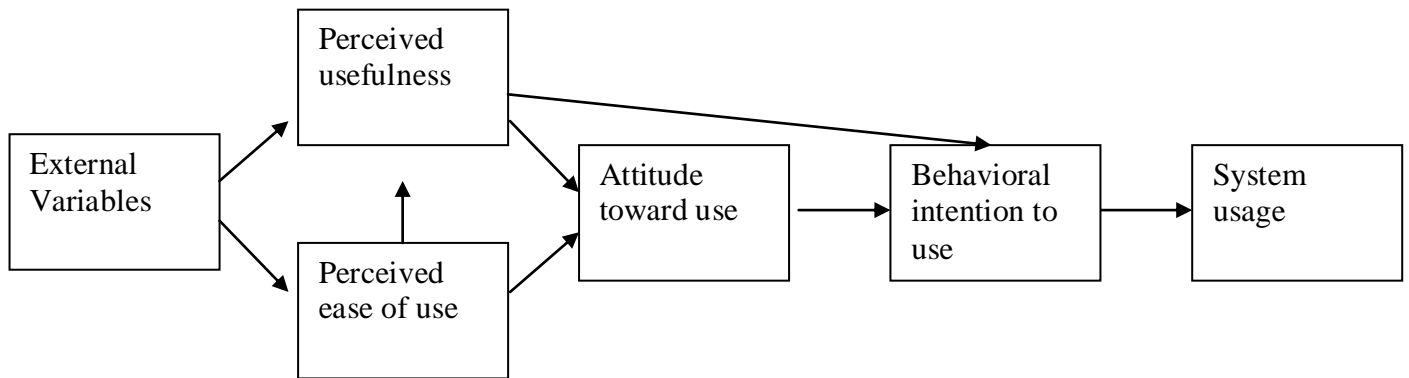
Figure 2: Technology acceptance model TAM (Davis 1989)

The TAM is derivate from the Theory of Reasoned Action (TRA) introduced by Fishbein & Ajzen (1980) and the Theory of Planned Behavior (TPB) described by Ajzen, (1991).The proposed TAM model was widely accepted by the information system research community and was further verified and extended by other researchers.

Most of the research in technology acceptance was done on technologies that were introduced into organizations and could therefore only partially describe the completely voluntary usage of technologies such as the mobile service by independent end users. Only recently the technology acceptance theory was applied to mobile services. TAM has been used as research framework for many studies in the field of mobile telecommunication.

2.2.3 Unified Theory of Acceptance and Use of Technology UTAUT (Venkatesh et al 2003)

UTAUT combines constructs of eight models from earlier research (theory of reasoned action, technology acceptance model, and motivational model, theory of planned behavior, a combined theory of planned behavior/technology acceptance model, model of PC utilization, innovation diffusion theory, and social cognitive theory).
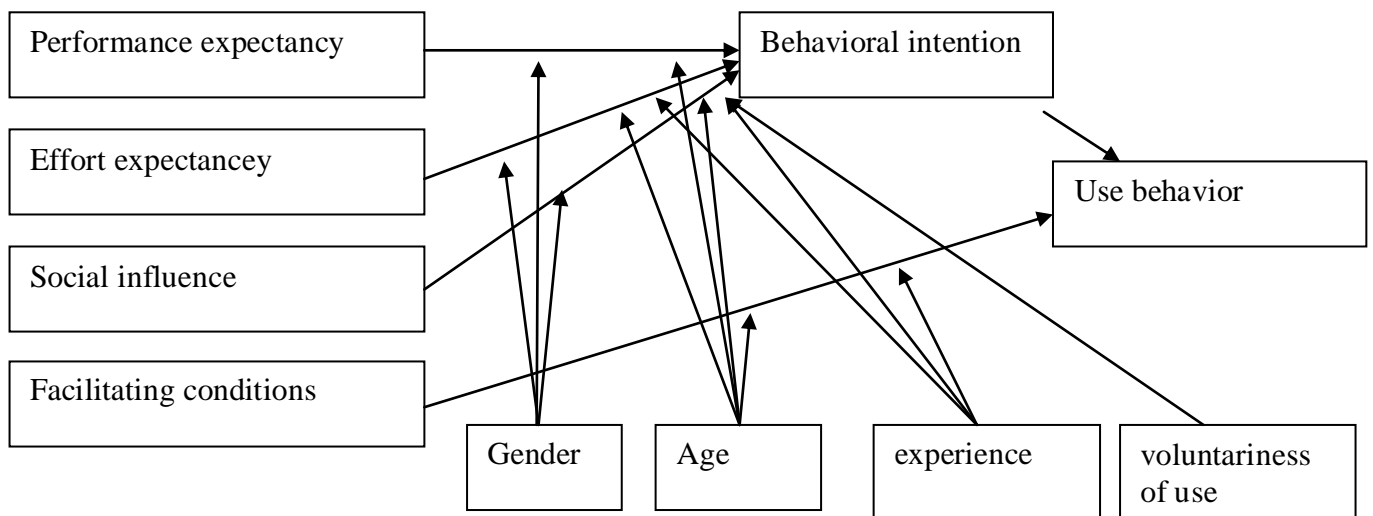
Figure 3: Unified theory of acceptance and use of technology (Venkatesh et al. 2003)

There are three direct determinants of intention to use (performance expectancy, effort expectancy, and social influence) and two direct determinants of usage behavior (intention and facilitating conditions). The model also includes moderating influences of experience, voluntariness of use, gender and age.

2.2.4 Technology Acceptance Model for Mobile Service (Kaasinen, 2005)

According to Kaasinen (2005) another specific and important factor influencing the acceptance of mobile services is trust. Also, Keat & Mohan (2004) suggested adding a component describing the trust to the TAM. Trust is a combination of level of familiarity, the company reputation, factual signals, and the quality of experience. Kaasinen (2005) furthermore combined the specific components of TAM for mobile services in a new version of TAM dedicated to mobile services. Kaasinen modified the value component (from perceived usefulness) and added the components trust and perceived ease of adoption. Furthermore, she added the additional step of "taking into use" before the actual usage behavior is being observed. This specific version of the TAM is shown in the following figure.
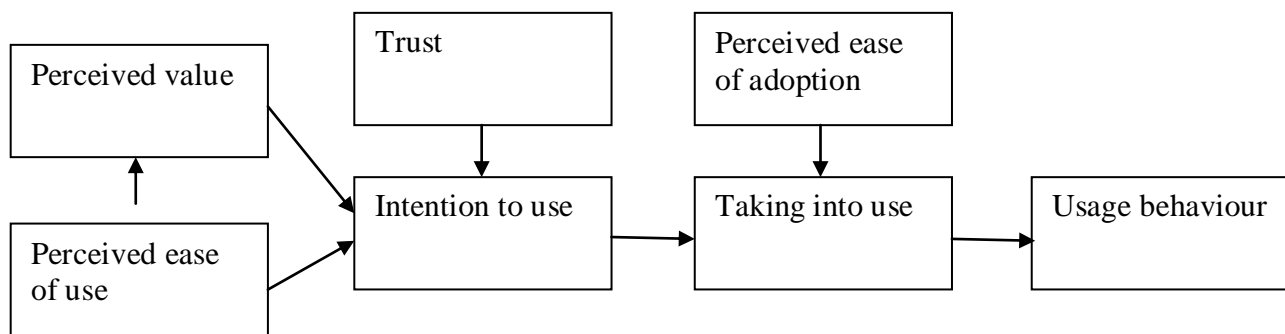
Figure 4: Technology Acceptance model for mobile services (Kaasinen 2005)

2.2.4 Integrated model for predicting consumer intention to use mobile service (Wang et al. 2006)

Wang et al. added three new constructs: perceived credibility, self-efficacy and perceived financial resource to Luarn& Lin's (2005) model for adoption of mobile banking. The new model is designed to predict consumer intention to use mobile service.
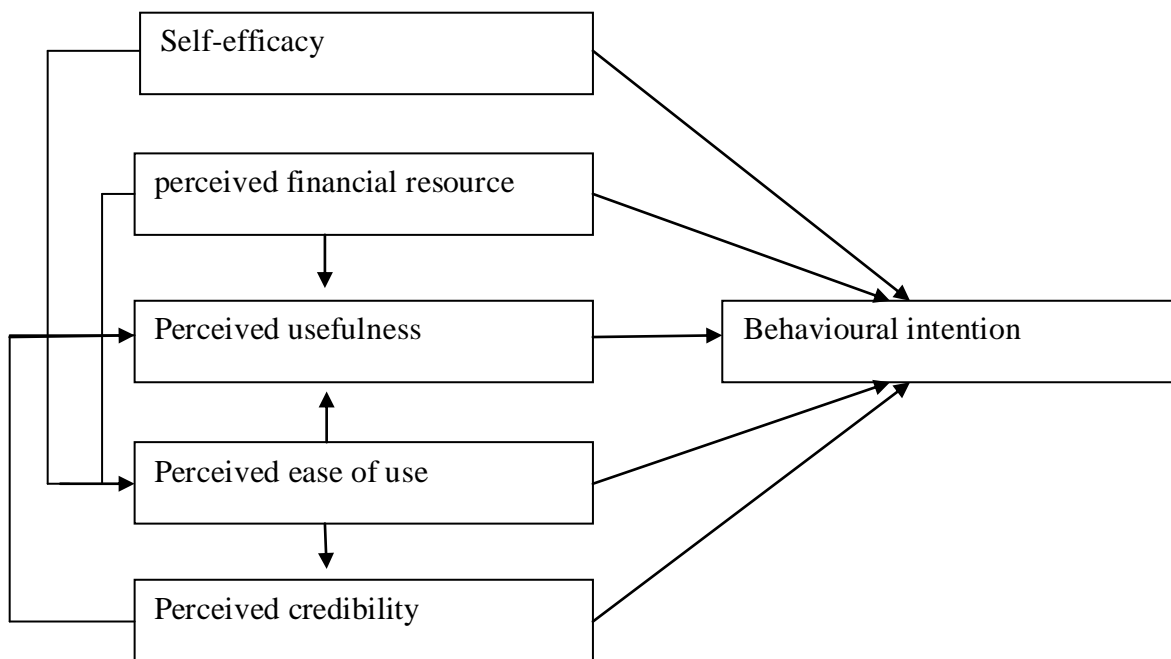
Figure 5: Integrated model for predicting consumer intention to use mobile service (Wang et al. 2006)

Perceived financial resource, perceived credibility and perceived ease of use influence the behavioral intention through their effect on perceived usefulness. Self-efficacy influences behavioral intention indirectly via its effect on perceived ease of use.

Even though the different versions of the TAM might look very diverse, they have a common underlying concept. They all examine a person's individual reaction towards using information technology and mention an additional step called the "intention to using information technology" before turning to the actual use of information technology.

All models have in common that the intention to use a technology is depending on the person's individual perception of the technology and its value and ease of use. Therefore, it is important to consider not only the technology but also the value perception of the potential customers. The potential user attitude towards the technology determines the intention to use the technology. Therefore, research into people who never used a service is necessary and can provide valuable insights into the success of a service. The above described studies all referred to existing services. Dependent on the study, non-users or users were interviewed.

2.3 Theoretical frame work for this thesis

According to literature and previous studies review from last section, the author developed research framework for the thesis as the following;

Comparative advantage	⟶
Complexity	⟶
Compatibility	⟶	Willingness of adoption of mobile financial service
Contextual factors	⟶
Trust	⟶
Perceived usefulness	⟶
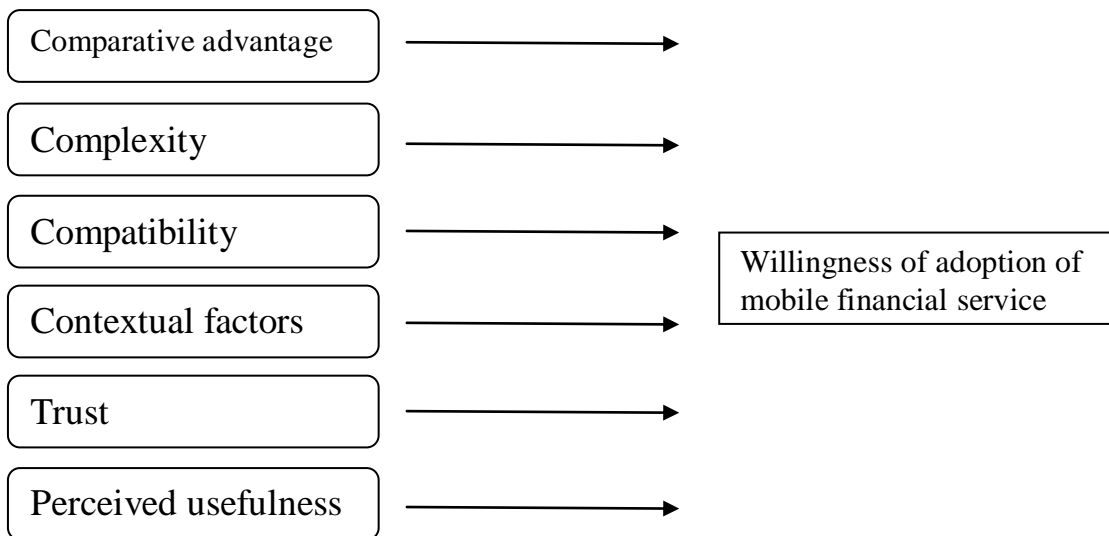
Figure 6: Conceptual framework for the thesis

Research method and question design will be centered on this framework to explore user's perception towards those factors.

Relative advantages of mobile services: it has been discussed by many studies that mobile services offer users additional value in terms of ubiquitous access (Laukkanen & Lauronen, 2005). And the same holds to mobile payments. Timely access to financial assets, purchase possibilities without restraints of time and location, and an alternative to cash payments is evaluated as main advantages comparing with traditional means. There are already real life examples such as pay for transportation tickets or car parking remotely without the need to visit an ATM, a ticketing machine or a parking meter (Begonha et al., 2002).

Compatibility: measures the consistency between an innovation and the values, experiences, and needs of potential adopters (Rogers, 1995). Many researches have discussed that the compatibility of mobile payments with consumers' purchase transactions, habits, and preferences correspondingly influences the diffusion progress. (Lee et al., 2003; Shon & Swatman, 1998). For payment systems, consumer ability to integrate them into their daily life is an important aspect of compatibility. It also includes what type of service will be better

Complexity: The example of adoption of smart cards and mobile banking (Laukkanen & Lauronen, 2005) showed that complexity with usability have negative impact on the adoption of payment system (Szmigin & Bourne, 1999). Shon (1998) in his paper also argued that ease of use and convenience affect consumer adoption of Internet payments. Mobile financial service is expected to increase consumer convenience by providing alternative payment method to decrease use for coins and cash in small transactions, offering timely access to financial asset and increasing the availability of purchase possibilities (Coursaris & Hassanein, 2002). However, typical Limitations, including small displays and keypads, slow processing and transmission speed and memory, and short battery life, in mobile device features diminish the usability and user-friendliness of mobile technologies (Siau et al., 2004).

This construct is similar to perceived ease of use construct in TAM, which involves an individual's assessment of the effort involved in using a system. Improvement in perceived ease of use contributes to improved performance. Taking into account that mobile service is in a relatively immature stage in China, this will be an important factor for most mobile users. China Commercial Network did a Phone survey to 1000 users in 2004 and found out that ease of use was listed to be one of the most important factors when implementing mobile phone functions.

Security and trust for mobile financial service: Lack of consumer perceived security and trust in vendors and payment systems is one of the main barriers to electronic and mobile commerce transactions in a mobile environment, (Siau et al., 2004). The key requirements for secure financial transactions in electronic environment include confidentiality, data integrity, authentication, and non-repudiation (Shon & Swatman, 1998). Other security factors important for consumer adoption are anonymity and privacy, which relate to use policies of customers' personal information and purchase records (Jayawardhena & Foley, 1998; Shon & Swatman, 1998).

Perceived usefulness (PU): is considered to be one of the most important factors that a user will consider to use a technology. It measures an individual's subjective assessment of the utility provided by the technology. What utility will it bring to user? Lu et al. (2003) presented a theoretically-based research model for the Wireless Internet. They suggested that PU had a direct effect on intention to use.

According to a MIIT (2010) report, despite the high penetration rate of wireless mobile phones in China, most mobile phone users reported that they did not use any data service other than SMS and MMS in 2006, but that 77% of the Chinese mobile users wanted to buy 3G handsets in 2007 if the phones could provide useful mobile services such as high-speed Internet access, wireless positioning, video calls, mobile TV program watching, and multiple audio file formats for music downloading. (Lu et al., 2008)

Context of Use: When using a mobile device to conduct certain service, the author assumes the situation in which a user use such service has some impact on user's decision whether to use or how and to what extent to use a mobile service. The theory of context of use provides a good frame work to exam what environmental factors can be determinate.

Before context of use can be introduced, one should be familiar with the difference between the concept of mobility and ubiquitous and the concept of ease of use though they may seem to be similar. Mobility in this thesis focus on the time and place and access benefits that mobile technology brings while perceived usefulness explains the benefits of technology in general.

In Perry et al. (2001) paper they have already shed a light on the affect that environmental factors posed on mobile use. They argued that the access and spread of mobile service use are dependent and restricted by the use environment. Environmental factors can be categorized into technological and social: not all places provided the technological infrastructure for ubiquitous computing, and not all situations were socially acceptable or convenient. In order to apply certain mobile use, technology infrastructure is needed, e.g. Wi-Fi or WLAN network should be available. While people's decision to use a new technology will also be affect by the fact that such technology should satisfy user's desire from social level being, social identity, convenient. In the previous studies which mainly conducted by western researchers, use context was proved to be an important factor that affect user's choice of store, products and purchase channel. (Gehrt &Yan, 2004)

3. Empirical study

In this chapter, we will discuss the implementation of qualitative user analysis according to the following structure:

3.1 Introduction to the course

A course 'qualitative user analysis' was conducted as an affiliation project of MOFS (mobile financial service) team initiated and operated by a number of researchers in Helsinki University of Technology (After 2010 referred as Alto university of technology). The course was held in China during March to May 2010, in Dalian University of Technology, Dalian, and Southwest School of Economics and Finance, Chengdu.

The aim of the course is to provide students with necessary and basic knowledge, analysis tools to conduct qualitative user analysis thus they can further conduct such studies for mobile services related field.

The students were in undergraduate and postgraduate level of studies, majored in information system, business or mobile technology related subjects. They were given

an introduction to the main schools of theory in this research field and instructed to give out questionnaires and conduct interviews to practice what they learned on the course. The data collected from filled questionnaires and interview transcripts are used to generate this summary.

The outcome of the course along with student studies are presented in the following sessions, and this result should give an insight on current mobile (financial) services adoption state in China and implications to services providers.

After this course the students are expected to be equipped with basic knowledge of doing similar user qualitative research in future. The final summary and analysis of questionnaires and interviews which were sent out by students in the course should give viewers a brief feedback on the following research questions:

1. **How popular is mobile (financial) services in China?**
2. **What are the most accepted mobile services?**
3. **What type of mobile service is better accepted?**
4. **What factors in context of use theory is affecting the use of mobile services?**
5. **If those services are not well accepted, what is the reason behind it from user point of view?**

This course focuses on finding out what factors influence users' willingness when they consider using certain mobile service and how the contextual factors affect their decision making. It gives implications to service providers on what and how to improve their mobile service from a user center design point of view.

3.2 Introduction to Mobile Financial Service Project

The aim of the MOFS project is to conduct researches in all the related areas in mobile financial services.

> *The primary focus of MOFS is to develop safe and flexible trust enablers and cost-efficient banking and payment tools for existing, new and innovative mobile services and to put these in practice by creating the critical technical and business enablers. (http://mofs.soberit.hut.fi/)*

The content being studies covers every knowledge area that mobile financial services may encounter when implemented. It varies from technology proposition discussion to business implementation and product design etc. Those researches are expected to help participants better understand what is required in spreading mobile financial services and help the implementation of it. MOFS offers a platform that gathers all interest holders to exchange opinions and achievements.

3.3 Research Design

The research in this thesis is based on the following structure:

3.3.1. Explore previous researches and studies to find theoretical framework to support this study.

As presented in the previous literature and study review session, the author intends to apply innovation of diffusion theory as the backbone of this research. It is expected to explore how interviewees and respondents react to our research questions and what is their assessment of mobile (financial) service relative advantage, complexity, compatibility, perceived usefulness and how do contextual factors affect their decision making.

3.3.2. Question design

In order to give answers to the research questions, a questionnaire (Appendix 1) and a list of discussion and interview questions (Appendix 2 and3) were designed and given out to a number of mobile phone users in Dalian, Chengdu and Jinan, China. Respondents were found and contacted by the students who participated the course.

Questionnaires are designed with a purpose to find out respondents' demographic background and their mobile phone and internet usage patterns. They will be further categorized according to their level of involvement in mobile (financial) service. Those who have used or are familiar with it will be invited to group discussion and interviewed later on.

In the questionnaire, background information includes age, gender, occupation and time of using mobile phone and internet as well as level of involvement with mobile

service. It should give a first impression on what mobile service, application or internet service are accepted by those users. The first questionnaire is also designed to acquire information of their use experience and satisfaction towards those services.

The purpose of the group discussion and interview, which will be carried after analyzing filled questionnaires, is to ask in details how do respondents evaluate mobile financial (financial) service from the point of relative advantage, complexity, compatibility, trust, perceived usefulness and contextual factors. The interview will be combined with group discussion.

According to the information acquired from the questionnaire users can then be categorized into frequent internet user, frequent mobile phone user and other. We expect those who use internet service frequently (more than 3 times a week) will have more intention to access internet service through a mobile phone, thus they are more likely to have knowledge of or to engage mobile services.

Those who claimed to be more familiar with internet and mobile services and had used such service were then interviewed in details. For those who are not familiar or never used mobile services, another questionnaire titled **Reasons why not using mobile service** (Appendix 3) will be given to further study factors that hinder the adoption of mobile data service.

It is expected that the majority of the respondents are students aged from 17 to 25. The reason for giving out questionnaires only to students in this age range is that in mobile service use, young and educated people are usually regarded as technology pioneers, innovation early adopters. According to previous researches and it is also well known that, this group of users constitutes a majority part of mobile phone users and these are the people who tend to adopt new technology, in this case mobile (financial) services.

As studied by previous researchers, in the mass population order people usually engage difficulties of accepting new technology and they are less willing to dramatically change their habit of life, including their attitude and ability to adapt to new innovation. In general people may encounter various reasons why they do not want to adopt new technology. A few main reasons are learning difficulty, lack of information, unsatisfactory use experience and etc.

In this case, by asking young and educated sample group we wish to get contemporary information on mobile services adoption status in China. Due to the small sample size this study result cannot be generalized to evaluate the adoption rate of a wider range, i.e. the overall adoption rate in China, but if results show mobile services are not well accepted by those students then we can roughly conclude and assume that the overall acceptance rate in China is below satisfactory. We can also get information from their answers such as what are the more popular applications or what kind of attitude do young people hold towards certain service ideas.

The level of study status and knowledge towards mobile services study differs from students who were in Dalian course and those in Chengdu course. In Dalian course students were from their Master and Doctor phases of study and from department of information technology whereas in Chengdu students were from several business related departments, they were mostly new to the concept of the course. Thus course contents are deeper in Dalian course since students already had some background knowledge.

The set of questionnaires consists one list of questions asking interviewees background information (appendix1) including their habit of using internet and computer, another list of interview questions asking about detailed mobile service usage, and one more supplement question list to study if interviewees use mobile

financial service. There are altogether 50 basic questionnaires sent out and 20 further interviews were conducted within those sample interviewees.

After filtering the questionnaires, we can category users to mobile service users (frequent and non-frequent) and non-mobile service users (never used or rarely used). Those who are familiar with mobile (financial) service will be invited to a focus group discussion to further discuss about the research topic. Those who have never used mobile financial service will be asked to briefly talk about their impression of MFS though they never used.

The Focus Group method is fundamentally a way of listening to people and learning from them (Morgan 1998). Focus groups create lines of communication within the group. There is continual communication between the moderator and the participants, as well as among the participants themselves. This brings: (1) exploration and discovery, (2) context and depth, and (3) interpretation.

3.4 Process of qualitative user analysis

To help understand how the result is conducted viewers should be familiar with the process of qualitative analysis. It is the base to understand the result presented in this thesis.

In the course, students were first given articles on how to conduct qualitative data analysis. Qualitative user analysis may refer to analyzing narrative data (text) or recordings or videos. Since in this research there were no recordings or videos presented, we should process text data accordingly. A normal qualitative user analysis can be conducted in following steps.

The article **analyzing qualitative data** by Taylor -Powell and Renner (2003) was used as a guideline to give students introduction to qualitative user analysis. The brief of the article can be summarized as following.

1. Get to know your data

Good analysis can only be generated from quality and unbiased data. Read again what respondents answered. Invest time to filter the data before analyzing them. One should also write down the first impression from reading the data, this may be helpful for further analysis. Some of the data might be invalided because they are biased or did not answer the question properly. After rereading the data, you should get a rough memory of the data, it would help you to create a frame or structure for further analysis, and you know where to find corresponding data in the future.

2. Focus the analysis

One should identify the key question and what is expected to be answered before diving into data. Write this down though the key points might change as the analysis goes on. Two common approaches are 1) focus by topic or question, time or event. This is usually applied to open-ended questions. It means putting all the answers to one question or topic together in order to find consistencies and differences. In this way you may find relationships between topics or questions. 2) Focus by case, individual or group. This means one could analyze data from a single person e.g. one interviewee, or a group e. g. a group of interviewees that are aged over 20, to see what patterns or connections within that sample.

3. Categorizing information

Categorizing data is one crucial step in qualitative analysis, one should read and reread the text to find out key words to 1) identify the patterns and themes, those key words may be ideas, concepts, terminology, behaviors, interactions, phrases etc. And once identify those key words they one can 2) find the logic connecting them and organize them into coherent categories.

4. Identify patterns and themes within and between categories.

After putting those data into different categories, you need to give description to each category to see the theme and variation of each category. There are three ways that can help to do that: 1. within category description, 2 larger category, and 3.relative importance.

Within category description means you may be interested in finding what people say about one theme so you gather all the responds related to that theme within that category and analyze what are the similarity and difference between responses. It is advised to write a summary for each category.

You can also put related categories together to form a larger category. From a macro view one can see how each and every sub category is portraying one theme and how they are connected.

Sometimes you will find that whenever one theme appears the other will do as well, they are consistently occurring in the data. It is always encouraging to find out such a connection but one should be careful that simple connections are barely powerful or logical enough to explain human behaviors. There are some questions one needs to ask: how do things related? What data support this interpretation? What other factors are affecting?

5. Bring it all together

The final goal should be to find out what the whole data really means and what is the most important. To do this, you may start with listing all the key points that you have found out in the previous steps.

Write an outline on how to present all the findings to viewers. The length and format of report depend on audience. Quotes and descriptive examples are suggested to better illustrate the findings. A diagram with boxes and arrows is also good in a way that it vividly points out the relations in between and it shows gaps in the whole picture which could be further research areas.

The above mentioned are the essential knowledge of qualitative data analysis one should command in order to understand how this thesis reached its result. In the following section the author will explain how the data is gathered and the final analysis of the data.

3.5 Data analysis and findings

Question set 1 (Appendix 1) were sent out to 50 respondents in Chengdu and Dalian, and all of them were filled and returned. Respondents were contacted and gathered by students in the course. And most of the respondents were the students in the same university or even in the same department. After filtering there were 46 out 50 that are valid, the 4 faulty sets are disqualified because they were not fully filled or some answers did not answer the questions.

3.5.1 Basic information of respondents

After analyzing the questionnaires of background information of the respondents, the following is summarized：

Total questionnaire sent	50
Total questionnaire answered	50
Valid	46
Used mobile data service	34
Used financial related services	8
Never used any data service	12
Male	25
Female	21
Age	18-25
Occupation	31graduates and 15 post graduates

Major functions that user typical use with their mobile phone:

- Photographing and filming (38 out 46, **82.6%**)

- Bowering internet (24 out 46, **52.1%**)

- Email (11 out 46, **23.9%**)

- Instant message application (15 out 46, **32.6**)

3.5.2 Computer and internet usage data analysis
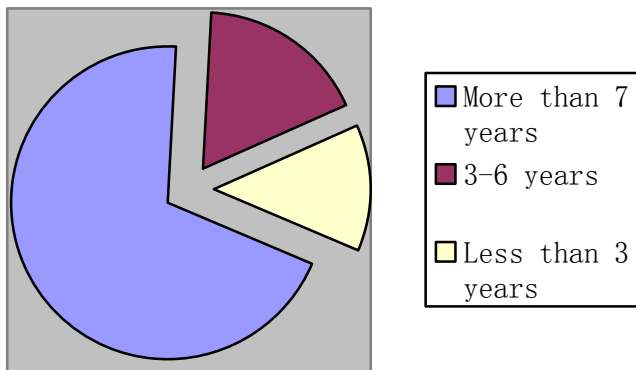
Figure 7: Time of computer usage
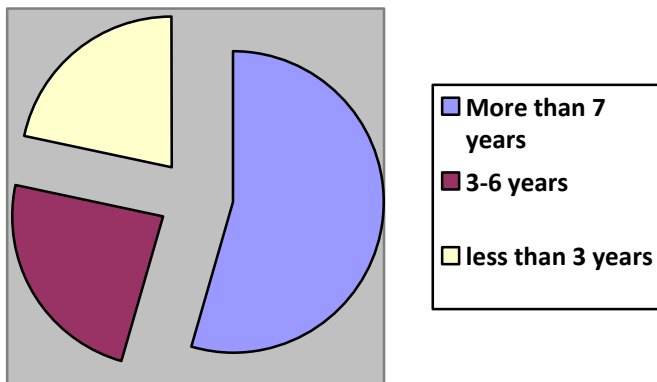
Figure 8: Time of internet usage

Computer usage

more than 7 years	32	69.5%
3-6 years	8	17.3%
less than 3 years	6	13.0%

Computer use frequency

Daily	30	65.2%
More than 3 times a week	15	32.6%
less than 3 times a week	1	2.1%

Internet usage

More than 7 years	25	54.3%
3- 6 years	11	23.9%
less than 3 years	10	21.7%

Internet usage frequency

Daily	36	78.2%
More than 3 times a week	8	17.3%
Less than 3 times a week	2	4.3%

Those who have operated computer and internet for more than 7 years and frequent users are the candidates that we intent to invite to focus group discussion for the reason that they are more familiar with internet usage and most likely to be engaged with mobile service.

3.5.3 Most visited websites and service
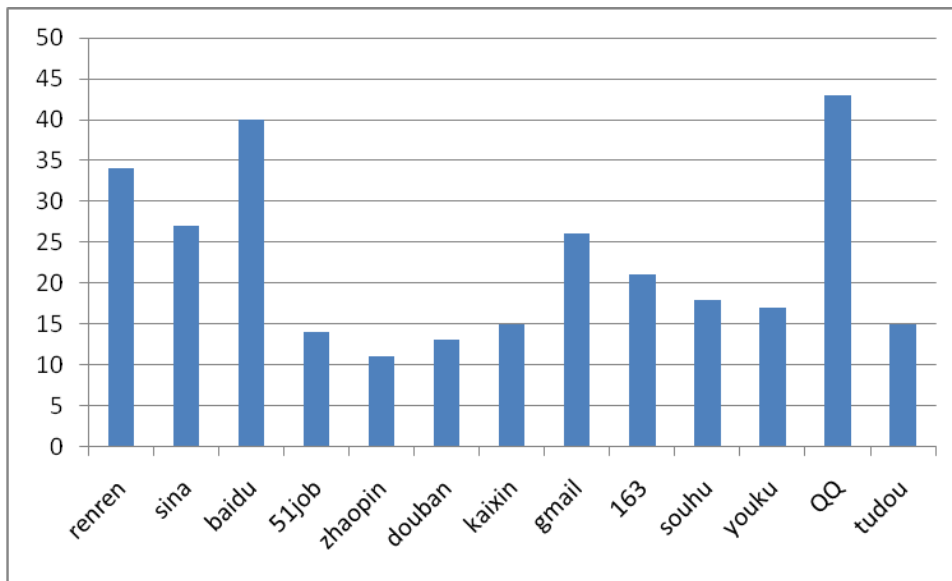
Figure 9: Most visited websites or services by mobile phone. Multiple options are allowed.

Among the 46 users 40 users visit the website of www.baidu.com (biggest Chinese search engine) frequently, 34 users visit www.renren.com (one of the most popular Chinese social network website), 17 visit www.youku.com (Chinese video sharing website), another 27 users visit www.sina.com.cn (Chinese portal site), 26 use Gmail and 21 use www.163.com for email and other service. And they also visit www.Zhaopin.com and www.51job.com to browser job information or job hunting. The most used application is QQ which is the most accepted Chinese online chatting software (Instant Massage application).

From above we can conclude that the most visited websites are search engines, social network websites and portal sites. Thus, we assume that the most desired websites by our target group are those that help to acquire information, stay connected, and communicate with people.

3.5.4 Mobile phone usage data analysis

Mobile phone brands
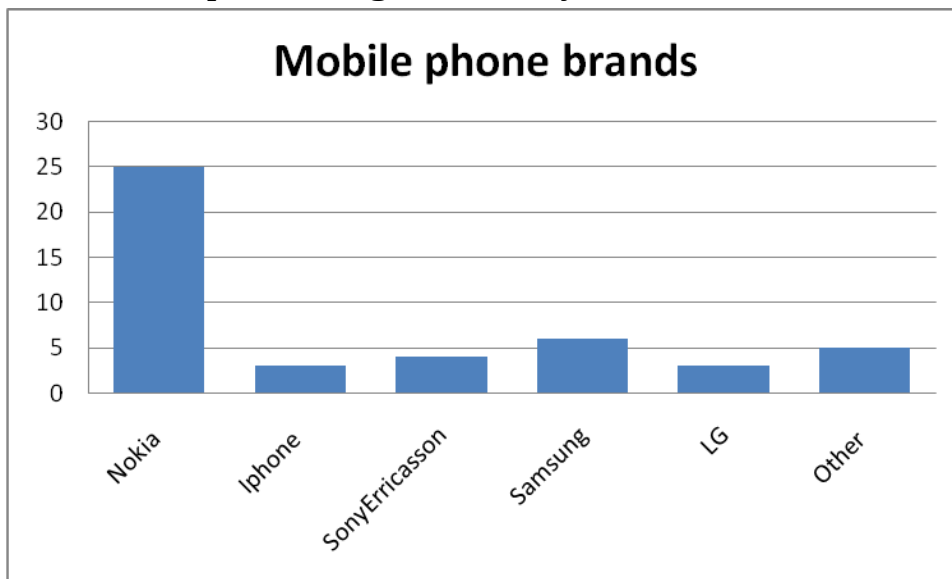
Figure 10: Mobile brands that respondents carry

Among the 46 users, 25 users use Nokia mobile phones; 3 users have iphone; 6 use Samsung mobile phone; 4 users use SonyEricsson, 3 with LG and 5 use other brands. And 22 out of 46 mobile phones that those users carry are 3G mobile phone. The procession of a 3G supported mobile phone or a smart phone is regarded a precondition for acceptance of mobile service since a great amount of mobile service contains image, video, music or much data processing, a non-smart phone may encounter difficulties of realizing those functions.

40 out of 46 users choose China mobile as their operator because of, they explained, good connection and reasonably priced data package. 38 users have been using mobile phone for 3-6 years; the rest 8 users have been using mobile phone for 1-3 years. 16 of them had monthly data package by the time of inquire.

Frequent internet user（daily）	30
Use mobile phone for more than 3 years	38

Frequent mobile phone user (daily)	38
Data package processed	16
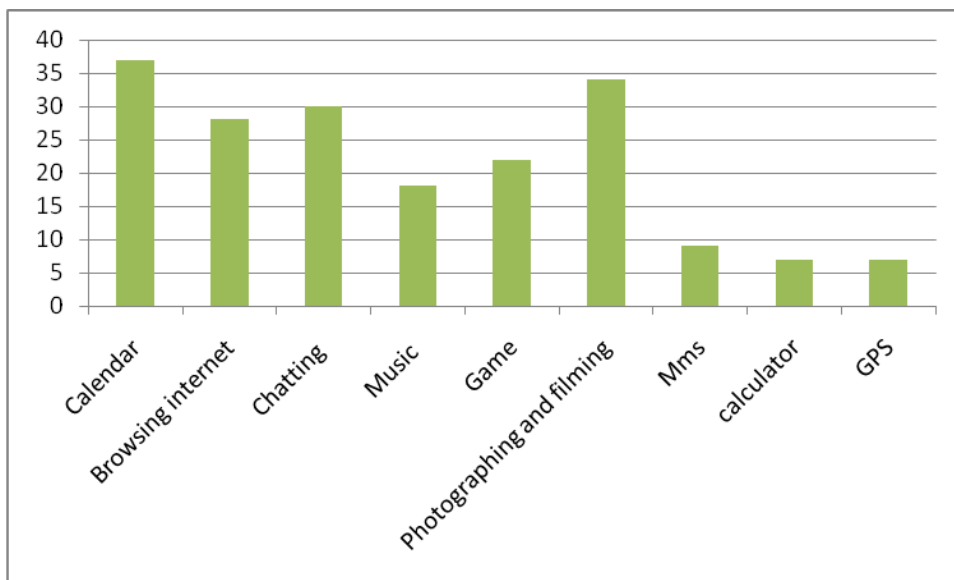
Figure 11: Functions respondents use with a mobile phone excluding calling and SMS, multiple items allowed.

Among all the basic functions in a mobile phone, calendar (this does include synthesizing and updating calendar with other devices. i.e. synthesizing mobile calendar with user's personal account on a computer), browsing internet, chatting and photographing are listed to be mostly used functions. It can be interpreted as consistent with our previous assumption that users tend to use services that help to access information, communicate with others and entertain people.

3.5.5 Satisfaction toward certain mobile service

Respondent is also asked to give feedback on satisfaction on one of most used mobile services. They are free to choose one mobile service that he or she is familiar with and give comments on the use experience.

This evaluation is mainly designed to find out how people evaluate complexity, cost (contextual factor) and usefulness of the service when using that service.

Number of students gave feedback	20
Feel satisfied of the service mentioned	8
Feel it is easy to use	7
Feel it is useful	11
Sensitive about cost	9

In 46 respondents there are 20 that have used certain data service frequently and gave feedback. There are different internet services or applications mentioned, which are realized by accessing internet on a mobile phone. And through analyzing their feedbacks, we can conclude that the overall satisfaction rate is not good. Reasons can be concluded as following:

First, not many respondents have engaged such data service in their daily life or seldom have they used such service. Thus only less than 50% of the respondents gave feedback to the satisfaction inquiry in the questionnaire. 70% of the respondents have expressed that they don't use such service often.

Only half of the 20 users feel it was easy to use that service they indicate. 12 users said they need to try a few times before they feel trouble-free to use the service and they don't think other users would consider the service easy to use. Most of the users

associated poor use experience and complexity with hardware incapability of mobile device. And they are price sensitive, considering it would be very pleasing if the service does not charge or charge only a small amount of data fee.

There are 6 users evaluating the service of **browsing the internet.** We get the average and results are as Figure 5.
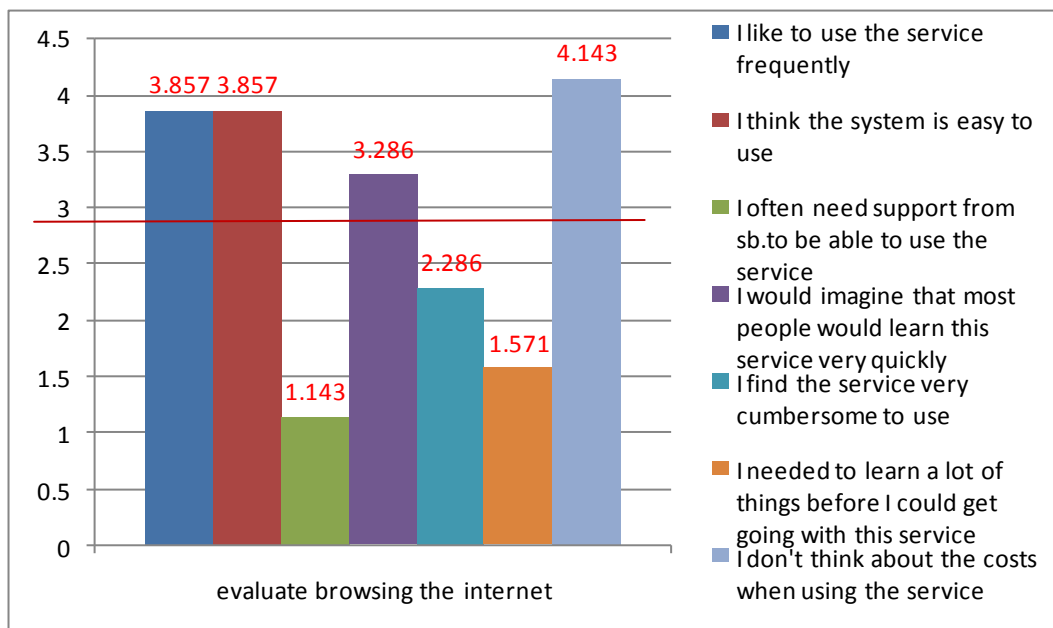
Figure 12: Satisfaction toward internet browsing

3.6 Focus group discussion Interview

After filling questionnaire 1, frequent internet and mobile phone users who have engaged mobile service are invited to focus group discussion. The purpose of the focus group discussion and interview is to find out:

1. Which kind of mobile data service is better accepted?
2. Why do people use those services?
3. How well is mobile financial service adopted?
4. What are the enablers and inhibitors for adopting mobile financial service?
5. In what kind of situation do people use mobile (financial) service?

Group discussion and interview method was applied in this session. Interviewees were those respondents who identified themselves as frequent internet and mobile phone users and who have used mobile services. They were instructed to form a discussion group which sized between 3 to 6 target interviewees by random order. Each discussion group is led by a group of our students, which usually consists 3 of them. Discussions and interviews were recorded in form of transcripts. They took place inside the campus in teaching facilities.

Group 1	5 Students
Group 2	4 Students
Group 3	5 Students
Group 4	6 Students

The interviewer was instructed to first ask what mobile services interviewees use. Mobile service in this case refers to any data service or operations that is done via mobile internet or realized with telecommunication network meaning 3G or 2G

network. It involves mobile financial service but does not restrict to it. The purpose of this inquire is to explore, from a wider view, Chinese users' mobile data service usage pattern. This leads to an open discussion, which is expected to inspire interviewees to better recall their use experience.

The interviewers will also hint interviewees, if interviewees couldn't recall any mobile service at once, with some of the most common and well-known mobile services. In that case mobile financial service is firstly hinted and the interviewers would briefly ask the interviewee's reaction and impression towards those mobile financial services even if they have not adopted.

The interviewee is expected to name all the mobile services that can be recalled and have been used. The interviewer will then ask several questions in details concerning one of the mobile services that the interviewee mentioned. In case interviewee has used any mobile financial service then the question would be focusing on that service.

3.6.1 Theoretical constructs for question design

The interview questions are designed based on constructs in proposed study framework. It is expected to find out what attributes are affecting the adoption process and how important are certain attributes to users.

The literature review gives a theoretic frame for this research. Existing papers give affluent tools and examples. Among the factors and constructs that have been discussed and proven to be influential for the diffusion of certain new technology, the author has special interests on the following factors:

Comparative advantage: what is the perceived advantage of using mobile financial service over traditional means?

Complexity: is it easy to learn and to use a particular system? If it is not, what are the difficulties? To what extent is it free from effort?

Compatibility: it measures to what extend is an innovation consistent with potential user's needs, experience, value and habits. In this case how is mobile financial service going to be integrated into user's daily life? How is mobile financial service compatible with infrastructure, technology, payment transactions, and business models, nature of the service and user preference?

Trust and security in payment procedures: would users trust this new approach of payment method? What are the user perceived risk and obstacles?

Perceived usefulness: How much utility will the service bring to users? Would it help to better assist user daily life or work? Dose it bring value and what value is it? What is the main reason a user decide to adopt mobile financial service?

Contextual factors: Is it any external factors that are affecting the decision process? How are price and technological use environment affecting user's decision?

The research questions will be designed to explore what is the users' attitude towards those evaluation criteria to find out enablers and inhibitors.

Result analysis

From those 20 interview transcripts collected, the following can be concluded:

Comparative advantage	Alternative payment method
	Ubiquitous access
	Queue avoidance
Compatibility	Information retrieval
	Downloading digital content (ringtone)
	Staying connected with people (Social network application)
Complexity	Perceived high level of complexity
Trust	Perceived risk for exposure of personal information
Perceived usefulness	Entertaining
	Replacement for computer internet service
Contextual factor	Price sensitive
	'only use when there is WIFI'

The summary of the lead discussion for following question is presented in the following:

1. What kind of mobile services are more popular?

By asking respondents which mobile service they consider themselves are familiar with, we get various answers. But those services can be categorized mainly into:

- Email
- Download music or content provided by mobile operator or other providers
- Web browsing
- Purchase or order new mobile service through text message
- GPS service
- Instant Message (IM) applications

Most of the interviewees have used their mobile phone to browse internet. Among those services, checking email and web browsing do not involve any monetary transactions other than data fee. Other services such as downloading content and ordering new service from mobile operator involve monetary transactions and additional fee for the goods will be charged by either mobile operators, a third party or in a few cases the merchant itself. Any purchasing of goods through online store or any website on a mobile device will be referred as mobile shopping.

All interviewees have used their mobile phones to browse internet to either look for information, visit websites or check emails. They claimed that they would do this a few times a week whenever there is no computer internet available or a need to do so. And those are the users who have data packages. So we can conclude that getting on internet has been a common use in their mobile usage.

Another well accepted data usage is purchase content from internet. The contents mentioned by interviewees are music, ringtone, ebooks, and applications including games. Most of the mobile operators have provided their own sources where mobile users can download those contents.

A most common process works as: Users login in the website and click the link then system will ask if users confirm to purchase. Once confirmed the content will be download to that mobile phone automatically. In this manner the charge will be deducted from users' mobile deposit if it is prepaid account, and for postpaid account the charge will appear in the coming bill. Downloading from operator source will not ask user to enter personal information such as financial account or credit card information. For an easier manner, sometimes users can send out the instructed message to a service number and the content will be pushed to user's mobile phone.

It is worth mentioning that only one of the three iphone users has tried to login iTunes or app store to download contents directly from there though it is widely acknowledged that they offers a very convenient means for purchasing content for iphone, a short cut to access the content source. But interviewees said that they would usually look for free contents and they rarely downloaded charged items. The same holds to Android embodied mobile phone users. They can access android official application market easily.

It is due to the fact that only a small portion of respondent has iphone or android embodied mobile phone, in another words, not many respondents had high speed smart mobile phone at the time we conducted the interview, so they may feel the use experience is not as trouble-free as industry expected.

Even though there have been mobile ticketing service in China but there was almost no respondent tried that service. No one has tried any monetary transaction on their mobile phone other than downloading contents from internet, though they do login to website such as www.Taobao.com which is the biggest Chinese online B2C and C2C website. It can be roughly explained that they would look for items on their mobile phone, but they do not initiate the actual payment transaction on it.

It should be noted that downloading contents charges as well as purchasing actual goods on internet. But in most cases downloading contents charge users in their mobile phone bills or deduct their prepaid deposit instead of asking users to access their bank account online and to make the transaction on line. Respondents said they would accept small monetary transactions because they 'don't feel comfortable making large payments on a mobile device'.

2. Why do people use those services?

When being asked why you choose to use such mobile service, most interviewees said that the service will bring them convenience, i.e. browsing internet to find information timely, or accessing real time weather report.

'When I am outside and want to dine with friends, I would usually get on internet with my mobile phone to check if there is any recommended restaurant nearby.'

'I would use GPS when I need to find my destination sometimes.'

Some other acclaimed certain mobile service is entertaining that they would enjoy using them when they are bored, waiting and queuing or when they feel like trying something new. Games, music and electronic books are listed as most popular content interviewees would like to download.

It's worth mentioning that some interviewees claimed that they used certain services because they were notified by mobile operators or merchants that when using the service there will be additional discount or promotions as incentives. Operators have tried to encourage users to use certain service by sending notification and give bonus when using it. Those interviewees indeed acclaim that price is one of the factors they have to consider.

3. How well is MFS adopted?

Most of the interviewees have explained that they are aware of the concept of mobile banking, and their knowledge is acquired from promotions from the bank, other people and news, but they rarely login or use mobile banking themselves. And they also said their knowledge towards mobile banking is limited to basic bank account check and transactions. Most of interviewees claimed they had never tried

sophisticated mobile banking functions which have been already available at that time, such as using mobile bank account to pay property management fees and to manage personal assets to investment.

General discussion about mobile financial service

Heard of mobile financial service	*20*
Used on a regular base	*1*
Used	*11*
Never used any	*9*
Interested in using in the future	*17*

When being asked what is the impression toward mobile financial services, their answers were mainly in the following categories.

1. Interviewee 1(Female 21):

I have heard from my bank that I can also access my bank account via my mobile phone but I never did. I don't know the web address of my bank and I never bother to find it... I think the main reason is that I don't feel the need of accessing my bank account with my mobile phone. I always withdraw money from a bank branch or an ATM machine, and I always pay with cash or in some conditions with cards... not every merchant accepts bank cards or credit cards.

Exploring the need for using mobile financial service is the root of the question. If user can do exactly the same with a computer even faster, safer, easier and more comfortable then it is unlikely for users to adopt mobile financial service. The comparative advantage of mobile financial service remains to be seen.

The spread of mobile financial service is also restricted to development of infrastructure for many Chinese merchants or receivers are not ready to accept payment methods other than cash yet. It is particularly common in rural areas. Even some of the area is not adapted to bank cards yet. It is immature to adopt financial payment in terms infrastructure development and lack of user perceived usefulness.

2. Interviewee 2 (Female 22):

I saw the news that you can send out messages to your bank account and give instructions to certain actions, but I was not interested. I guess I don't trust it completely. And I don't know if they charge additional fee?

Interviewer: Do you mean you have doubts with the security issue, with the bank or with you mobile phone?

…I don't feel comfortable sending out my personal information, especially when it involves money through my mobile phone. Because I heard there are hidden mobile phone applications that steal your information or contents that you send or receive…I am not an expert in such technology but as a normal user that kind of information upsets me…

…I don't check my bank account too often, every time when I do I did online with my computer which I have more confident with the security issues. And it's much easier to see and to operate on a computer than on a mobile phone.

Supply side of mobile financial service have been developing and enhancing security assurance. Though technology has made it possible to manipulate bank account via either a computer or a mobile phone safely, the message has yet to be delivered to end users. In the discussion, most Chinese users said that they still have doubts against the concept of transferring money wirelessly or without talking to a bank clerk. They

mostly worried about exposure and leak of personal information, especially key information for accessing personal account.

3. Interviewee 3 (male 21):

I was told by a bank staff in a promotion that if I transfer money from my mobile banking system I would get additional bonus with which I can eventually exchange for gifts but I haven't done it yet. I thought it kind of complicated.

Banks do have the incentive to encourage their customers to access service with mobile phone for that will stimulate bank infrastructure build up and eventually get one step forward in reaching more mobile banking users. But there seems to be several inhibitors end users mentioned that keep them from using the service. Concerning difficulty to use is one of the mostly mentioned. It closely relates to the concept of complexity which has been discussed in the previous session. Would the service provider be able to design and implement a simple and user friendly application or a solution is the key to success. And one more point to note is, service providers need to spread the idea that a service has been improved or neatly designed for most of the users have a strong impression that manipulating such service on a mobile phone requires a high level of technical acquaintance, which is not.

4. Interviewee 4 (male 23):
I don't have a large data package and it will be charging a lot if my monthly data usage exceeds the limit. I access internet only there is no alternative or I have to. For example if I am looking for a place outside and I may access GPS otherwise I won't use any data service.

A typical use condition that we found out in the discussion is when there is no alternative access to the service. Ubiquitous access to service is regarded the most

comparative advantage by interviewees. Also several users mentioned they are price sensitive, they would be reluctant to use any mobile service if additional data fee is charged. We found out when an use environment is 1) supported by free internet access or 2) urgent for the service and there is no other alternative means that a user most likely to engage mobile service.

5. Interviewee 6 (Male 24)

I don't think my mobile phone will give me good use experience if I access my bank account with this phone...the screen is too small and it process slowly. I never bother to try it.

5 interviewees mentioned they thought their mobile device wouldn't provide a comfortable use experience in terms of slow processing speed, limited RAM, small and low resolution screen, uncomfortable keypad. But they also explained that once the service is well supported by hardware they would like to try to use such services in future.

From the answers above we can generally conclude the awareness of mobile financial service is good, though most of the interviewees have heard about mobile banking but not necessarily mobile ticketing and shopping.

But the perceived usefulness of mobile banking service is low. 9 of interviewees said they don't feel a need to access their bank account on a mobile phone. They explained because they periodically withdraw money from ATM machines or banks. They had not engaged any situation that they need to transfer money or access bank account on their mobile phone. They explained they are not use to it.

There were 15 out of 46 respondents who acknowledged have adopted mobile financial service or showing strong interest of adopting it in future. They were then interviewed in details. The demographic of respondents is as follows:

Number of respondents:	15 (Male:7 Female:8)
Smart phone owners:	14
Number of users that have monthly data package	14
Age	18-25
Number of users that are financially dependent on parents	14
Have heard about mobile financial service	15
Have used mobile ticketing service	0
Have used mobile shopping	3
Have used financial services including mobile banking.	11

3.6.2 Comparative advantage:

From previous literature review we have learned that ubiquitous access to service is considered to be an advantage over traditional financial service. Those Chinese interviewees have also responded as so:

Interviewee 7 (Male 24)
I now tend to buy game credits on my mobile phone…sometimes when I am running out of credits and there is no kiosks around I would simply login my account using my mobile phone and buy game credits. And even there is a physical shop around I feel no

need to go there anymore since it's much easier to do it on my mobile phone and they charge no premium.

Interviewee 2 (Female 22)

I usually buy movie tickets in the cinema but I am getting tired of being in a long queue and waiting. I would love to try getting tickets by a mobile phone in advance though I haven't tried to do so nor have I heard of such a service. (By the time of the interview there were only a limited number of cinemas in China that offer mobile movie ticketing service.)

Interviewee 5 (Female 20):

I would like to try to do some basic bank operations on my mobile phone if it's not too difficult to learn. I am getting tired of standing in a long line in a bank.

Queue avoiding is mostly mentioned by interviewees. A few other interviewees said they would consider using mobile banking if it charges lower transaction or service fee.

3.6.3 Complexity

Rogers pointed out in diffusion of innovation theory that if an innovation is hard to learn or complex to use its adoption rate will be negatively affected dramatically. Users will refuse to use if that innovation requires much effort. This element is influenced by users' mobile device itself as well as the service design. Potential problems include device is not well supporting service features: small display and keypad, slow processing speed, low battery life; the faulty service design: unfriendly user interface, complicated process, functions that are not well designed for a mobile device.

Interviewee 7

… I connect my account to the merchant's account thus it's very convenient to repeat two or three steps…I put those accounts that I often conduct payment to in favorite.

Interviewee 10

I like the idea that now a lot of service providers released their mobile version or in another word you can pretty much do many things on your mobile phone…for example I know my parents can pay property management fee via their mobile phone and they would get discount if they do though they never use their mobile phone other than calling or text messages… but it bothers me it is so complicated to find out which channel offers a best deal…if I want to buy a movie ticket, I know I can buy from mobile operator source and bank partner source or even some third party

It is worth mentioning that several months after the interviews were done, major Chinese banks began to launch their mobile end user application with which user can easily access their mobile bank account with a click on the icon on their mobile phone. The development of the application should thanks to the development and spread of smart mobile phone especially Apple iPhone and android embodied mobile phone. Those applications can be easily installed on a mobile phone of such kind and it saves much effort comparing with traditional means by which users usually login via WAP address. With the help of such application users no longer need to manually login bank website which is more laborious, instead they have a short cut to the service. And service providers are improving process design and user interface so functions can be more smoothly realized. This would dramatically decrease complexity of using such service.

3.6.4 Compatibility

Compatibility in this thesis is defined as what kind of financial service is regarded suitable to be realized on a mobile device. The findings suggest that small value payments and routine financial service which does not involve revealing personal information are regarded as best fit. Purchasing of digital goods which does not require physical exam is also accepted by users.

'I think it would be nice if we can easily buy train tickets on a mobile phone, or travel tickets.'

'Movie tickets, lottery or even some coupons which merchants can scan at the POS…'

'I know the concept of mobile wallet, I'd like to try someday. So I don't need to pay with coins anymore, but not with large payments.'

'I've get used to paying and downloading ringtone but I don't think I would buy anything more than 10rmb on my mobile phone.'

Based on the transcripts, the following four categories of service were identified as particularly suitable for mobile financial service:

1. Purchasing electronic ticketing such as movies, public transportation and coupons.
2. Purchasing digital content and services such as games, music, pictures, news and eBooks, which is usually realized within the mobile phone.
3. Routine personal financial account checking, mobile banking mainly.
4. Small value payments at POS such as at a supermarket or at a convenient store where instead of paying with coins consumer can put the mobile phone on the reader and make the payment.

Interviewees regard mobile financial service especially transactions with a large monetary value as 'uncomfortable, cannot be trusted'. And some argued that it does not provide additional value, they would rather pay at the point of sale with bankcards or cash. The reasons for that can be concluded as lack of need and lack of security assurance. Most of interviewees said they would accept payment or transaction value that is under 10 Yuan. Though it is listed to be a limitation that our interview samples are students who are considered to be price- sensitive, the author still hypothesis that users have doubts in security assurance issues when using mobile financial service.

3.6.5 Contextual factors

Interviewees said they usually accessing data service when:

1) There is a need, i.e. when trying to find certain location outdoor and it is not convenient to inquiry people or look up on a map, they would use GPS service. When travelling and there is no access to internet on a computer, they would be willing to access internet on their mobile phone to check news, email, weather, personal social networking website. A few interviewees said they would also visit online shops when they shop in reality to, for example, compare prices. 12 out 15 interviewees have downloaded and read eBooks on their mobile phones, and they said they would access eBooks whenever they are bored. And eBooks was listed as the more downloaded content than games and music.

2) There is free WIFI environment. In that situation users can access internet for free and they tend to explore more data services than they do when there is no free WIFI network. In China free WIFI and WLAN coverage is less common than those in developed countries.

3) Users are waiting or need mobility from mobile services. Some interviewees mentioned they would play games or search for applications and contents to download

when they have nothing to do and need something to spend time with. That situations involve being on transportation, waiting in a queue. Some interviewees said they would prefer to access the same service on a mobile phone in favor of its mobility. The service they could recall was QQ, some of the users would use a mobile phone to login QQ to chat when they are lying on bed.

3.7 Answer summary and analysis on why not use mobile services.

The questionnaire titled *why not mobile financial services* were sent to a different group of students other than those have answered previous questionnaire and interview. 24 questionnaires were sent out to 24 individuals by the author and all were answered and sent back. Respondents are aged between 21 to 24, 11 of them are male and 13 are female. They were undergraduates and graduates by the time they filled in the questionnaire.

The reason for choosing a different group of students is:

Those students are from another city in China, Jinan, which is the capital of Shandong province. This city is regarded, in this case, as a representative of an average economic level in East costal region of China.

The mobile services provided in this region are not significantly different from those in Dalian and Chengdu. Local mobile operators do provide localized services, but those services are regarded insignificant because of its relatively small number comparing with the total amount of nationwide standard services. And also due to its geographical limitation those localized services cannot be used and generalized to test an overall nationwide user behavior.

Jinan is located roughly in half way between Dalian and Chengdu. Those three cities are important Chinese cities geographically, economically and politically. They are representative in terms of life style from north to south thus can be regarded as valuable representatives to test normal young Chinese user's attitude towards mobile services.

In this survey respondents were firstly asked if they have ever 1) used 2) heard about but never used or 3) never heard of any of those most well-known mobile services. If an interviewee says never used or never heard of such a service then interviewer would ask if in the future the interviewee wants to adopt or is interested in such a service. Those most used mobile services are:

Online chatting: QQ mobile version, the most adopted Chinese online chatting application

Mobile operator services: download ringtone, music or other downloadable content

Online shopping: Taobao (www.taobao.com), one of the biggest Chinese online B2C and C2C shopping website, it covers almost every payment option that is involved in daily life including purchasing any physical products, residence electricity and water payment, lottery or mobile credits payment and etc.

Internet browsing: Baidu (www.baidu.com) and Google (www.google.com), both are well accepted searching engines in China. Sohu (www.sohu.com) and Sina (www.sina.com.cn), both are most visited Chinese portal web sites.

 Financial service:
1. umpay (www.umpay.com.cn), which is the official mobile payment portal offered by the union of Chinese banks and China mobile. Both organizations have the most user base in their industry. Services have been on line in many Chinese provinces including our target regions.
2. Alipay (www.alipay.com). The most popular on line third party financial service provider. Owned by Alibaba group and designed originally to be a trust enabler for Taobao which Alipay can withhold buyers payment until they receive ordered

goods. With the help of Alipay, Taobao overcame may be one of the biggest barriers to on line shopping in China, trust.

3. Any mobile bank version of whichever bank account that a respondent is holding.

By first asking those services interviewer should get basic information on how much a respondent is involved in using mobile services.

A summary of 24 correspondence answers can be seen as bellow:
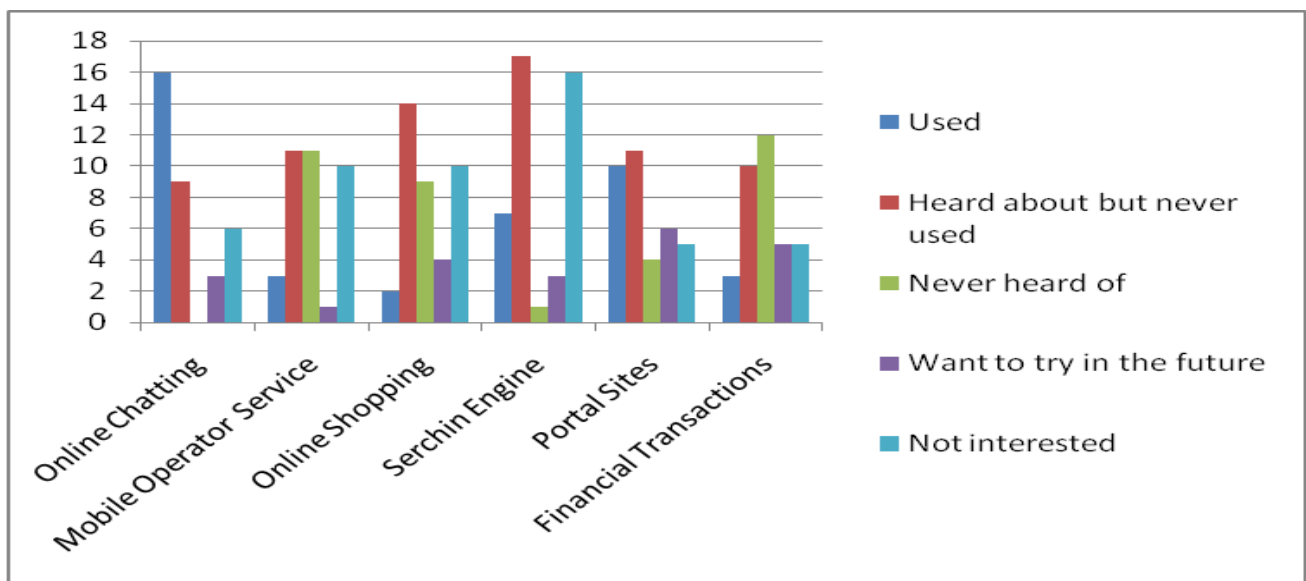
Next, respondents were asked:

If you haven't or you rarely used any mobile financial service, what do you think is the reason for you as a user not using such services?

The question is an open question. First, interviewees were given time to think why they do not or rarely use mobile services. Multiple reasons are allowed. A summary of their answers is as following:

Figure: summary of reasons user do not use mobile financial service

Do not have a need to use	19

Concerns on security	13
Unpleasant use experience	8
Do not have data package	7
Do not know any mobile (financial) service	5

Then, after their answering, they were provided a list of reasons for not adopting mobile service from which they can choose all that apply:

I do not have a need to browse internet or use other service with my mobile phone. I only use my mobile with basic functions.	18
I never knew any mobile financial services	11
I found it very complicated or troublesome to (learn how to) use my mobile to realize any services.	7
Because of my mobile phone, I don't get a pleasant use experience when engaging any of the services. It is for reasons such as phone has a small screen, it is hard to type or it does not have a good process speed and so on.	10
I don't trust the security issues when using such services with my mobile.	17
I don't find any application or services that are fit for mobile usage. The use experience or user interface of such service need to be improved.	6
Mobile phone internet connection is not as fast as it is with a cable thus I feel reluctant to try.	8

From above we can see that the top three reasons users indicate that they don't use mobile financial service is

1. Do not have a need or an incentive to use
2. Have doubts on security issues
3. Poor use experience which could be caused either by product design or limitation of handset.

We can also see a difference between the numbers that are aware of MFS in both target groups. The former target users were mainly from mobile technology and business related majors while the latter ones were randomly chosen student. Their

knowledge towards mobile service varies. The former group has better awareness of MFS.

3.8 Conclusions and recommendations

From the above study we can conclude that the overall acceptance rate for mobile data services especially financial related mobile services are not as high as we might expect. 15 out 46 (32.6%) respondents can be considered as active users, though there was already a multitude of mobile data service available. It can be roughly said that Mobile ticketing, mobile banking, and mobile purchasing or shopping are not widely accepted by Chinese users yet.

According to the study, queue avoiding, ubiquitous access to service, being an alternative to additional payment channel and price discount are listed to be most acknowledged comparative advantage of mobile financial service. This finding is not much of diffidence to those of similar researches in other regions, such as Europe and America.

And so far with the spread of high speed, wide screen smart phone (especially apple iPhone and Android embodied mobile phone which will allow various application easily installed), it is believed that there will be more better designed application with smoother use experience releasing which will dramatically decrease use difficulty. Users acknowledge that they would like to use such service as long as service is easy to use and they have already commented that applications developed from service providers is a good approach. Those respondents do not think their mobile device will be an inhibitor for adopting mobile financial service if the use experience can be improved.

Study also found out that most users think they would consider purchasing digital goods via a mobile phone more logical and acceptable than buying physical products. Digital goods in this sense include, as they mentioned: movie ticket which will no

longer need to be in paper format, ringtones or digital books as well as applications. And paying small fees on a mobile phone is said to be acceptable by majority users. They tend to be very cautious when they were asked to explore personal information especially their bank account information, either on mobile website or in a text message.

According to the survey of 'Why not use mobile financial service', lack of need and security assurance topped first two main reasons that users do not use mobile financial service. Also lack of awareness is accounted for another main reason. They are not fully aware what financial service can be done on a mobile phone or which service provider offers such service. Though many respondents said poor user experience kept them from using such service, the spread of faster, better hardware configured mobile phone will significantly change the situation. Thus this may not worry users as much as security issues do.

From the discussion and interviews we can conclude that users tend to use mobile services when they consider the services can bring them convenience and satisfied user's need. The contexts of use or the environment in which users intend to use also play an important role affecting users' decision. Users acknowledged that they are more willing to use mobile service when they have leisure time, when they are in a Wi-Fi environment thus they don't need to pay for data fee and in situation that there is an urgent need for service yet no other alternative means can be applied.

To summarize, the result answered research question. Not only did we explore the adoption status of MFS within sample group but also concluded that the primary inhibitors for adopting MFS in China are: Lack of awareness and need, Lack trust in service provided. While respondents agreed that as the development of telecommunication infrastructure (i.e. WI-FI coverage) and hardware device, it will be less a concern that complexity will be an inhibitor for adopting MFS.

Recommendations

The mobile financial service and even normal mobile service has yet to be accepted by majority of mobile phone users. The situation for mobile financial service now is somehow similar to that of credit card and online shopping when they were first introduced. It needs time to gain popularity and with the change of consumer behavior, for example young and educated people would demand service that is fast, efficient and ubiquitous. They hold positive attitude towards trying something new and technology related. Possible recommendations given by the author are:

1. Choose the right domain to implement mobile financial service. According to our study, interviewees felt they would feel comfortable to choose mobile payment for small amount of transactions. To be exact, Chinese users would like to use mobile payment for transportation tickets, mobile credit deposit, and property management fees. Such mobile service for small transactions have been launched in a few selected, developed Chinese cities, and it is now only at early stage of implementation. But this is the most suitable domain for mobile financial service.

2. Combined with proper technology, the use of mobile service can be realized in different form and format in order to achieve various goals. In some Chinese cities, for example GuangZhou, mobile operators have tried to release mobile service that are supported and realized by NFC (near field communication) technology, thus it creates various ways to use a mobile phone. By carrying a customized mobile phone users can purchase transportation tickets, movie tickets and even shopping by just putting the mobile phone to the reading device. And in some work place, employees need to carry their mobile phone in order to access to the facility, parking lot and register to the shift. Like being discussed in this thesis, participants including mobile operators, financial agencies, merchants and customers need to

agree on regulations, industry standard, and business model and infrastructure development.

3. Lack of awareness is one of the hinder factors according to this study thus more marketing effort should be made in order to increase awareness of mobile service. Most of the respondents said they do not have much knowledge on certain mobile service even in some case they are aware of it.

4. Among all the existing payment approaches, conduct mobile payment through application developed by service providers seems to be the most accepted means. It does not require physical presence of payer and receiver and applications could be easily installed on smart phone. In this means users no longer need to access internet browser and type address, instead by accessing the application they are directly in the service page. This is much easier for users than engaging service in WAP address. Service providers could enhance their strategy in developing killer applications.

3.9 Limitations of this study

There are a few limitations in this study that may affect the final result.

Though it's designed to investigate a group of students, a sample group that may be the best representative to find out primary information of their opinion on Chinese mobile services adoption issues, we cannot say with certainty that the overall Chinese mobile services status is as such.

For one reason, all the respondents are located in limited geographical regions, in this case they were all located in three Chinese cities: Dalian, Chengdu and Jinan; respondents' habit of use of mobile services could be influenced by local service offerings, regulations or even local consumer behavior patterns or local cultures. It may occur that certain mobile services are not operated in some region or there are charged differently from those in other regions. A variation in services offering would affect user's decision making. But the differences between services in different locations are not a research question in this thesis.

As discussed above, students are one category of users that forms majority of innovation pioneers and proven to tend to adopt mobile services. But there is considerably big amount of population that may use mobile data services. By analyzing questionnaires and interviews, price issue was regarded as one hinder factor that most respondents would consider in their decision making, even though this factor is not weighted much. There could be other users who do not regard price as a hinder factor or overweight other utilities than price and choose to adopt mobile service.

Also there should be a certain number of users other than students that consider some mobile services necessary as a part of their daily life, i.e. business people accessing

data service for information or other purpose. Our study did not include these users, which may underestimate the utility and adoption status of mobile services.

This thesis contains a qualitative study on users' opinion on their adoption issues through the overall sample questionnaires and interviews. But those interviews and questionnaires are not guaranteed to be sufficient and are not surly covering every aspect that may affect the adoption of mobile service. It is worth mentioning that the result of this thesis is not solid enough to be generalized or to be used to predicted similar research questions in other regions in China.

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Appendix

Appendix 1: Questionnaire: Mobile Services

Background information

1. **How old are you?**
2. **Gender (Circle correct choice)** Man Woman
3. **What is your home location? (City, Country)**
4. **What is your occupation?**

Computer Usage

1. **How long have you been using a computer? (Circle correct choice)**

Less than a year ,-1-3 years, 3-6 years, More than 7 years

2. **How often do you use a computer? (Circle correct choice)**

Daily – Couple of times a week – Once a week – A few times a month – More seldom – I do not use a computer

3. **How long have you been using internet? (Circle correct choice)**

Less than a year – 1-3 years – 3-6 years – More than 7 years

4. **Name three most visited websites or most used internet services.**

Mobile Phone Usage

1. How long have you been using a mobile phone?

Less than a year – 1-3 years – 3-6 years – More than 7 years

2. What is the brand/ model of your mobile phone? Is it a 3G or a smart phone?

3. What is the mobile operator that you have?

4. What is the mobile account that you have?

5. What function do you often use with your mobile phone? (Tick all that apply)

- Calling

- Text messages (SMS)

- Multimedia messages (MMS)

- On line Chatting

- Browsing internet

- Calendar

- Email

- Banking

- Photographing

- Music

- Shopping or make payments

- Other, please describe briefly:

Next, select a mobile service that you have used.

What is the name of the service?

Please answer to the following questions regarding the service:

Strongly disagree =1,   Strongly agree= 5

1. I use this service frequently

2. I think the system is easy to use

3. I often need support from somebody to be able to use this service

4. I would imagine that most people would learn to use this service very quickly

5. I find the service very cumbersome to use

6. I needed to learn a lot of things before I could get going with this service

7. If the service charges extra I will not consider using it

8. I think the service is useful

9. Overall I'm satisfied with the service

Appendix 2: Questions for mobile services discussion and interview

Part 1: Ask the interviewee to fill the mobile service questionnaire

Part 2: General questions about the usage of mobile services for discussion

- What services do you use with your mobile device?

(Instructions for the interviewer: Discuss with the user about the topic: first, ask user to name the ones he/she remembers, then suggest popular service names: qq, kong, 3g, sina, baidu, sohu, taobao, monternet,… and different service types: internet browsing, banking, ticketing, payment/purchasing, chat)

- How often do you use your mobile phone to access the services?
- Where do you typically use mobile services?
- When do you typically use mobile services?
- Have you heard about any mobile financial service? What is your impression towards it? If you haven't used any, are you willing to adopt it in the future?
- If you haven't adopted any mobile financial service, what do you think is the reason for it?

Part 3: Questions related to a selected a service for detailed interview

(*Instructions for the interviewer: select one that the interviewee has mentioned earlier, preferably from banking, ticketing, payment/purchasing*).

- Why do you use this service? (What utility does it bring? Why do you think this service is useful?)
- Why is the service important to you?
- What are the main advantages in using the service?
- Is it easy to use? What are the main problems? What enhancement do you

suggest?

- How do you use the service? *(Instructions for the interviewer: ask the interviewee to show with her/his mobile is possible)*

- In what kind of situation or surroundings do you use the service? When and where? (i.e. WI-fi support environment. In class to assist learning.)

- How long have you been using the service?

- How often do you use the service?

- Do you use the service with a computer, too?

- How much do you trust mobile financial service?

Appendix 3: Questionnaire: Why not mobile services?

Have you used any mobile data services that are provided by tele-operators or third-parties? It refers to services other than calling or SMS, but such as sending out a message to download a ring tone, game or mobile news, chatting on your mobile phone with chatting software, shopping via your mobile phone, buying ticket, mobile banking and etc. If you have, what are they?

If you haven't or you rarely used any, what do you think is the reason for you as a user not using such services? Choose all applied

- I don't have a data package with my mobile phone, I found it expensive.
- I never get used to browsing internet with my mobile phone. I only use my mobile with basic functions.
- I never knew that many services that can be carried out on a mobile phone.
- I never knew any mobile financial services
- I found it very complicated or troublesome to (learn how to) use my mobile to realize any services.
- Because of my mobile phone, I don't get a pleasant use experience when engaging any of the services. It is for reasons such as my phone has a small screen, it is hard to type or it does not have a good process speed and so on.
- I don't trust the security issues when using such services with my mobile.
- I don't find any application or services that are fit for mobile usage. Or the user experience or user interface of such need to be improved.

- Mobile phone internet connection is not as fast as it is with a cable thus I feel reluctant to try.

- Other reasons, please articulate:

If those external reasons (other than reasons that are due to user's personal feelings) can be improved to a level that is satisfactory, would you be willing to use mobile data services? What are the mobile services that you expect most that you can use easily on your mobile phone? You can state multiple services, such as buy train tickets, ordering food delivery, online shopping, campus card update and etc.