EVIDENCE ON E-BANKING QUALITY IN THE CHINA COMMERCIAL BANK SECTOR

Zhengwei Ma, Northwestern Polytechnic University, USA
Luying Ma, Heilongjiang Province Agricultural Bank of China
Jinkun Zhao, Harbin University, China

ABSTRACT

In the global bank sector, cost savings potential and speed of information transmission are reason to rapidly develop E-banking. In China, there are 130 commercial banks, most of which supply E-banking service to their customers. This paper analyzes factors that influence E-banking quality in the commercial bank sector in China. The results will help financial organizations formulate appropriate marketing strategies for E-banking, and commercial banks to increase customer satisfaction. Based on the literature review, a research model was developed. Eleven factors were selected from nine areas to gain a better understanding of E-banking service quality. Multiple regression was used to analyze the data. This result shows that Security, Reputation and Customer Service are the major factors affecting the adoption of E-banking services in China. Furthermore, the results show that 20% of sample respondents have already adopted E-banking services is encouraging and suggests a bright future for virtual-banking in China.

JEL: G2

KEY WORDS: Commercial bank, E-banking quality, China, Dimensions

INTRODUCTION

In the last 20 years, the internet has been rapid developing. Global internet access exceeded 1,094 million people in December 2006 (IWS, 2006). This implies that 1,094 million people all over the world used the internet to connect with each other. The number of internet users has increased by 157% in the last five years (www.internetworldstats.com). Internet is a technology that spreads fast. Internet use is estimated to double every hundred days. Since 2000, internet banking has experienced explosive growth in many countries and has transformed traditional banking practices. By offering internet banking services, traditional financial institutions seek to lower operational costs, improve consumer banking services, retain consumers and expand market share (Saadullah, 2007).

The financial service industry was one of the first to recognize the potential of the internet as a means of interacting with customers. However, current data compiled by the Web Marketing Association shows that banks are falling behind other industries with respect to innovation within their Internet channels (Bruno-Britz, 2006). Since Pakistan's banks made a debut on Internet banking in March 2005, surveys have shown that the average user is gaining experience and confidence online and is increasingly getting on the Internet to perform tasks important to their daily lives including conducting financial transactions and seeking information about finances (Yun, 2007).

The bank sector is one of the most important service sectors for a nation's economy. Modern, highly industrialized and technology-driven economies are threatened by higher risks than ever; thus, individuals need to protect themselves against private risks. From the banks' viewpoint, the use of Internet banking is expected to lead to cost reductions and improved competitiveness. This service-delivery channel is seen as powerful because it can retain current Web-based customers who continue using banking services from any location. Moreover, Internet banking provides opportunities for a bank to develop its market by building a new customer base from existing Internet users (Suganthi et al., 2001; Dannenberg & Keller, 1998; Zineldin, 1995). However, online banking service quality has been evaluated as inferior by numerous customer (Rubino, 2000). Since the Internet is a relatively new transactional channel, online banking may not clearly understand what specific services are desired. Many customers have not yet

formed clear expectations for online retailers (Zeithaml et al. 2001). The importance of service quality and the challenges facing Internet-based services necessitate insight on the part of managers about what attributes customers use in their evaluation of online service quality. However, a rigorous measurement instrument of online service has not been available (Cox and Dale, 2001; O'Neil et al., 2001; Yoo and Donthu, 2001). In order to improve that condition, this study intends to: 1) Identify the more salient service quality dimensions for online banking; 2) Confirm the identified major service quality dimensions for online banking ; and 3) Determine the relative importance of each identified service quality dimensions in producing overall online banking service quality.

The authors employed a two-stage approach in developing a reliable and valid measurement of online banking service quality. A broad conceptual framework which integrates theory and related concepts in the customer service quality is established. The authors applied an ethnographic content analysis of 317 customer reviews of online banking. Next a confirmatory factor analysis was used to outline eleven major online banking service quality dimensions: Reliability, Convenience, Efficiency, Comfort, Serviceability, Security, Privacy, Assurance, Reputation, Customer Service, Product Differentiation and Customization. The remainder of this paper is organized as follows. In the next section we discuss the relevant literature. Following the literature review, sections discussing the data and methodology and test results are presented. The paper closes with some concluding comments.

LITERATURE REVIEW

Prior research has empirically found that reliability is a leading dimension of E-banking quality; and refers to consistency of delivery and dependability in relation to E-banking websites (Kettinger and Lee, 1997; Pitt et al., 1999). An online banking provider is considered reliable if it performs the service as promised (Tan et al., 2003), the web site is available 24/7 and is in working condition (Zeithaml et al., 2001). Apart from that, E-banking provides higher degree of convenience that enables customers to access banking at all times and places. The convenience is perceived as a measure of relative advantage (Joseph et al. 1999). Therefore, it is hypothesized that convenience has positive effect on consumer perceived of e-banking quality.

Zeithaml et al. (2002) find that there is a significant correlation between efficiency and e-banking quality. Speeds of download and response time are two of important facts of e-banking efficiency in consumer perceived satisfaction. Speed of download depends on the nature downloaded content, the computing hardware and method of connection used to download information (Jayawardhena and Foley, 2000). Most site demonstration downloads are small snapshots, and some users have to download the program in order to view the demonstration. Most consumers perceive downloading involves risk of importing unwanted viruses, and consume hard disk space. Very often, slow response time after any e-interaction leads to a delay of service delivery and makes consumers unsure about whether or not the transaction is completed (Jun and Cai, 2001). In addition, Kwon & Chidambaram (2000), studying consumer perceptions of e-banking service quality concluded that comfort is one of five dimensions sufficiently representative of perceived e-banking quality. Thus, it is hypothesized that efficiency and comfort have positive effect on e-banking quality.

Madu and Madu (2002) identify other factors of paramount importance in ensuring the quality of e-banking, i.e. the ability of an innovation to meet users' needs using different feature availability on the web site. For instance, the provision of interactive loan calculators, exchange rate converters, and mortgage calculators on web sites draw the attention of both users and non-users into the bank's web site. These calculators are very useful for some bank customers. Therefore, it is hypothesized that serviceability has positive effect on consumer acceptance of e-banking quality.

Security and privacy are two important dimensions that may affect consumer perceptions of e-banking quality. Encryption technology is the critical feature at bank sites to secure information privacy, supplemented by a combination of different unique identifiers, for instance, a password, mother's maiden name, a memorable date, or inactivity automatically logs users off the account. The Secure Socket Layer,

a widely-used protocol for online credit card payment, is designed to provide a private and reliable channel between two communicating entities. The use of Java Applet that runs within the user's browser; the use of a Personal Identification Number, as well as an integrated digital signature and digital certificate associated with a smart card system all enhance security (Hutchinson and Warren, 2003). Thus, a combination of smart card and biometric recognition using fingerprints offers a more secure and easier access control for computers than the password method. Hence, it is hypothesized that security and privacy have a positive effect on consumer acceptance of e-banking quality.

Assurance refers to one important dimension that may affect e-banking quality. Madu and Madu (2002) have proposed assurance as a dimension of online service quality based on their literature review. Schneider and Perry (2000) suggested some web features that help promote assurance to consumers. For instances, providing detailed information, stating regulations or rules of the transaction, and including the third party trust assurances (e.g. SSL certificate). Cheung and Lee (2003) also recommended several guidelines for building trust/assurance, including affiliation with an objective third party, stating the guarantee policy and statement on the website, and maintaining a professional appearance of the website. Thus, it is hypothesized that assurance has positive effect on e-banking quality.

The concept of reputation has been looked at from many different perspectives including applied economics (Shapiro, 1983) and strategic management (Fombrun and Shanley, 1990). From a marketing perspective, the concept of reputation has often been associated with the idea of brand equity (Aaker, 1996) or the organization's credibility to its customers (e.g. Hyde and Gosschalk, 2005). In general, reputation may be considered the result of the organization's relational history with the context in which it functions. In this respect, the set of interactions produced between the company and its customers will be a source of information for them to appreciate the quality of the products in comparison with the available alternatives (Yoon and Kim, 2000). That is, reputation may influence how consumers perceived e-banking quality compared to those of competing banks (Fombrun and Shanley, 1990) and therefore, it is hypothesized that reputation has a positive effect on e-banking quality.

Product differentiation and customization involves adapting web sites to better suit customer individual requirements, and is achieved through the tracking and data mining of customers past transactions (Surjadjaja et al., 2003). Product differentiation and customization are important factors when customers choose e-banking providers. Internet providers, who provide individualized service, "rather than auto replies" to customer queries or requests, show greater empathy towards their clientele (Madu and Madu, 2002, p. 253). Based upon a comprehensive review of the literature, the proposed e-dimensions will be explored empirically in the context of e-banking.

Micah (2010) made the point that "Online customers are literally invisible to you (and you to them), so it's easy to shortchange them emotionally. But this lack of visual and tactile presence makes it even more crucial to create a sense of personal, human-to-human connection in the online arena." Wolfinbarger and Gilly (2003), through focus group interviews, a content analysis, and an online survey, uncovered one dimension of online retailing experience: customer service. In this study, the authors hypothesize that customer service has a positive effect on e-banking quality.

The authors of the present study reviewed a mass of publications about online banking quality. These publications come from European, North American, and Asian countries. Some advanced online banking in China and developed countries was coordinated and compared. As a result, a suitable research model was build to guide data collection (See figure 1). The purpose of this model is to build an appropriate conceptual framework for identifying and verifying the factors that may affect the quality of commercial online banking in China. These issues are inter-connected and may affect each other.

Based on the literature review and the theorization made in the present study, the dependent variables were developed. This is online banking quality. All of variable adapted from some famous scholars. The variables used in the analysis are presented in Table 1.

DATA AND METHODOLOGY

The survey was conducted in cooperation with the four state-owned commercial banks online banking in China, which mailed a questionnaire to 5,500 randomly selected customers. Only one mail was sent to each consumer. In order to increase study participation, an incentive lottery was offered. Those who completed the survey would have their names entered into the raffle; and there are two cash prizes. Data were collected during the spring of 2009.

The questionnaire consisted of five sections, two relevant for this paper. The first gathered background information on e-banking providers, frequency of use, service and demographics (e.g., gender, age, etc.). The second section consisted of 34 statements that represent the e-quality factors. The statements were randomly ordered on the questionnaire. Respondents were asked to rate how much they agreed with each factor related to e-banking service, and the quality of e-banking using a seven-point scale (1= totally disagree to 7= totally agree).
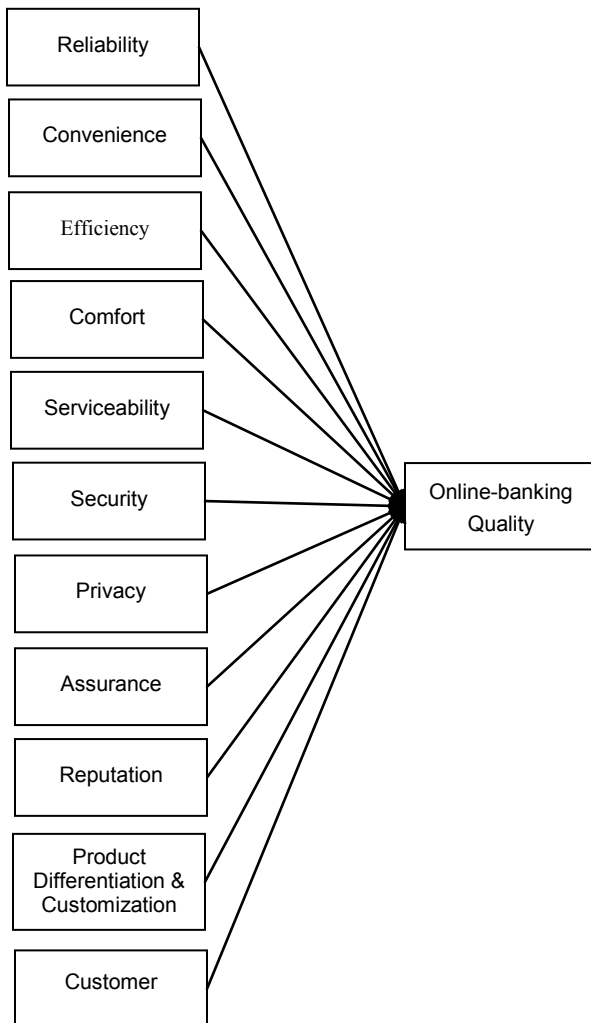
Figure 1: Research Framework

Figure 1 presents the research model used to the guide data collection process

Table 1:   Variable Summary

Independent Variables	Literature review Independent Variables
1. Reliability	1. Kettinger and Lee (1997), Pitt et al. (1999), Zeithaml et al. (2001), Zhilin et al. (2004)
2. Convenience	2. Joseph et al. (1999), Zhilin et al. (2004), Pedro Pinheiro Cruz, (2005), Sasdullah Khan (2007)
3. Efficiency	3. Zeithaml et al. (2002), Joseph et al. (1999), Zhilin et al. (2004), Pedro Pinheiro Cruz, (2005)
4. Comfort	4. Pablo and Pedro (2005)
5. Serviceability	5. Madu and Madu (2002), Pedro Pinheiro Cruz (2005)
6. Security	6. Parasuraman et al.(1985), Madu and Madu (2002), Wolfmbarger and Gilly (2003)
7. Privacy	7. Zeithaml et al. (2002), Zhilin et al. (2004), Sasdullah Khan (2007)
8. Assurance	8. Madu and Madu (2002), Pedro Pinheiro Cruz, (2005)
9. Reputation	9. Madu and Madu (2002), Pedro Pinheiro Cruz (2005)
10. Product Differentiation	10. Joseph (1999), Pedro Pinheiro Cruz (2005)
11. Customer Service	11. Wolfinbarger and Gilly (2003), Pedro Pinheiro Cruz (2005)
Dependent Variables	**Literature review Dependent Variables s**
1.Online banking Quality	1. Pitt et al. (1999), Pablo and Pedro (2005)

This table summarizes the independent and dependent variables used in the analysis.

Principal components factor analysis was used to determine whether the observed correlations among the 34 items representing the e-banking quality factors could be explained by the existence of a smaller number of underlying e-quality dimensions. Only factors that accounted for a variance greater than one (that is eigenvalues > 1) were extracted. Varimax rotation, an algorithm that minimizes the number of variables that have high loadings on the orthogonal factors, was used to improve interpretability. Factor scores from the factor solution were analyzed to prove the groups of the independent variables. All of the independent variables belonged in the first group. Multiple regressions are used to demonstrate the independent variables have a positive relationship with online banking quality.

Internet technology has the potential of enabling the banks to enhance their internet offerings with features that improve customer-service interactions and supply them with options for increasing control of their internet banking experience. However, as with any new technology, online banking presents certain risks for banks. A host of liabilities, such as inadequate planning, faulty deployment, insufficient internal controls, legal and regulatory ambiguities and weak outsourcing standards, may pose significant risks to an online banking system. Data integrity, confidentiality, authentication and authorization issues also place stress on an immature online banking system (Stakelbeck, 2005). It is a fact that online banking of commercial banks in China has some flaws when compared with that of some developed countries. In an attempt to identify these issues, the following research question was formulated for the present study: What factors will affect the quality of commercial online banking in China? Based on the research question and an extensive literature review, a number of hypotheses would are tested to clearly exhibit the inter-relationships between the independent variables and dependent variables. These hypotheses are listed below: Each of the variables is hypothesized to have a positive relationship with online banking quality.

RESULTS

The survey was conducted in cooperation with the four state-owned commercial banks online banking in China, which mailed a questionnaire to 5,500 randomly selected customers. The scope of the study was explained in a cover letter and an enclosed return envelope guaranteed the anonymity of the results. After three weeks a total of 1,611 respondents (29.29 %) had replied, of which 171 questionnaires had more than 10% missing values and were excluded from further analyses. Missing EM-Algorithm was used for data imputation for the remaining 1,440 data records, leading to a final response rate of 26.18%. Demographic characteristics of the respondents are listed in the appendix. The characteristics of our sample were compared to those of the universe of Chinese Internet users published by the China Internet Network information Center (2009).   No statistically significant differences were found. Furthermore, T-tests showed no significant difference between early and late respondents.   The presence of a difference could indicate a non-response bias in quantitative surveys (Armstrong and Overton 1977). As

non-normality of data occurred in the data file, the authors used bootstrapping for testing the effects of non-normal distributed variables on our structural equation model (Efron and Tibishiran, 1993). The analyses produced no significant changes in parameter estimation.

Empirically validated scales were adapted to the context of the study and used to measure the respective constructs. Additionally, a confirmatory factor analysis was used to assess construct measurement. Four items were removed based on inadequate factor loadings and theoretical arguments. A 7-point Likert scale was used to measure all items. In the case of Web site quality, item parceling was used to reduce the total of 11 items.

Table 2: Multiple Regression Results: Enter Methodology

Model		Standardized Coefficients Beta	t	Sig.
	(Constant)		2.436*	.016
1.	Reliability	.074	1.199	.232
2.	Convenience	.092	1.390	.166
3.	Efficiency	.050	.816	.416
4.	Comfort	-.024	-.355	.723
5.	Serviceability	.049	.690	.491
6.	Security	.179	2.636*	.009
7.	Privacy	.065	1.027	.306
8.	Assurance	-.046	-.736	.462
9.	Reputation	.214	3.064*	.003
10.	Product Differentiation	-.023	-.436	.664
11.	Customer Service	.393	7.634*	.000

*Note: *Coefficients significant to a level of 0.01.*

Table 3:   Regression Coefficients: Stepwise Methodology

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.677	0.227		7.385	0
	Customer Service	0.743	0.041	0.789	17.913	0
2	(Constant)	0.905	0.214		4.223	0
	Customer Service	0.487	0.047	0.517	10.471	0
	Reputation	0.386	0.045	0.421	8.528	0
3	(Constant)	0.709	0.201		3.517	0.001
	Customer Service	0.38	0.047	0.403	8.086	0
	Reputation	0.275	0.046	0.3	5.952	0
	Security	0.256	0.045	0.292	5.741	0
4	(Constant)	0.601	0.203		2.955	0.004
	Customer Service	0.368	0.047	0.39	7.893	0
	Reputation	0.226	0.05	0.246	4.542	0
	Security	0.211	0.048	0.241	4.443	0
	Convenience	0.123	0.049	0.136	2.503	0.013

The authors use the multiple regressions to test the model. From the ANOVA[b] table, the result shows significance in the overall model (sig. = .000[a]). It was also notable that this model has allowed us to

explain at a very high amount of the variance of online service quality (R^2=0.778) in Table 2. Based on the standardized estimates online banking quality is clearly and positively influenced by customer service in handling personal data (β= 0.393) and reputation (β= 0.214), and to a lesser extent by security (β=0.179). At the same time, the authors find the indirect affect of online banking quality is convenience (β= 0.092) in Table 2. It validated in Table 3.

Next, The following regression equation was estimated to identify the determinants of E-banking Quality:
E-banking Quality = 0.074（Reliability）+ 0.092（Convenience）+ 0.05（Efficiency）+ -0.024（Comfort）+ 0.049（Serviceability）+ 0.179（Security）+ 0.065（Privacy）+ -0.046（Assurance）+ 0.214（Reputation）+ -0.023（Product Differentiation and Customization + 0.393（Customer Service.

CONCLUDING COMMENTS

A properly configured online banking infrastructure will ensure orderly growth and sustainable economic progress for China. Consumers will evaluate online banking products and services based upon trust, confidence, user privacy, transaction legitimacy, security, system dependability and merchant acceptance and conveyance. To ensure success, a blueprint must be provided for all banks, customers and third-party vendors. Without such guidance, China may find itself with several conflicting e-banking standards which will ultimately inhibit the development and growth of the country's financial system. The result of the present study indicate that certain factors can affect the quality of China's commercial banks. One factor in particular-- online banking quality—was found in the present study to have influenced consumers' intent to use the internet banking. Research results such as this one will help China's commercial banks establish a blueprint which directs the internet bank's development and help the commercial banks to consummate online banking services. This, along with other goals, is what the present study is intended to achieve.

A 7-point Likert scale was used to measure all items. A confirmatory factor analysis was used to assess construct measurement. Four items were removed after the analysis showed inadequate factor loadings and theoretical arguments. The authors used the multiple regression enter and stepwise techniques to analyze the data.

In brief, the eleven hypotheses are real: Reliability, Convenience, Efficiency, Comfort, Serviceability, Security, Privacy, Assurance, Reputation, Customer Service, Product Differentiation and Customization are significantly and positively related to online banking quality. The result shows that customer service is the most important element of online banking quality for the commercial bank and online banking customer. Commercial bank's convenience, security and reputation are also important elements for commercial bank. These are important reasons for online banking customers to choose the service (CFCA report). Reliability, efficiency, comfort, serviceability, privacy, assurance, product differentiation and customization show positive relationship with online banking quality of Chinese commercial banks.

There are several limitations to the current study. First, the sample is China-focused with all of the respondents residing in China. The participants in this study may process attributes and behaviors that differ from those in other parts of the world. Next, as mentioned earlier in the data collection section, it was impossible to send follow-up surveys and thus no attempt was made to ascertain the existence of non-response bias by comparing responses from the first-wave surveys with those of a second wave.

Future research could provide several extensions of the current study. First, the measurement instrument constructed in this study can be used to investigate how consumer perceived online service quality affect customer satisfaction and in turn purchasing behaviors such as customer repurchase intentions and loyalty. Similarly, the antecedents of customer perceived online service quality may also be examined using the measurement instrument. Second, the current research focuses on service quality factors perceived by consumers who have conducted online transactions. However, a mass of individuals primarily utilize the Internet as information sources and have not conducted commercial transactions. These consumers may have some unique perceptions of service quality. Thus, further research can develop a more generalized

service quality scale by include the perceptions from both groups. Finally, as the e-commerce field becomes increasingly mature, consumers will shape clear expectations for online service quality attributes. More and more industry-wide service standards will be set up and be accepted. Thus, future studies may utilize the expectation-disconfirmation paradigm to measure online service quality and customer satisfaction.

APPENDIX

Questionnaire about factors that influence colleges' students on adopting online banking service in China

The questionnaire has two (2) parts. All questions are about fundamental services and functions of online banking which you use. Please answer all questions carefully. Note that all responses are handled anonymously!

Part 1 Personal Data

Gender: Female □   Male □
Education: High School or below□   Undergraduate □   Graduate □

Do you use online banking service in China?   Yes   NO   □

Which bank's online banking service do you use?
Bank of China □   Industrial and Commercial Bank of China □   China Construction Bank □
Agricultural Bank of China□   Others _____

How long time do you use online banking service in USA?
Less than 6 months □   6-12 months □   12-18 months □   more than 18months □

How often do you use online banking service in USA?
Less than 1 time/week □   1-2 times/week □   3-4 times/week □   5 or more times/week □
_____

Part 2: Please answer choosing a number that most describes you think. The smaller number you choose is the more you disagree, and the bigger number is the more you agree with the statement. (1=totally disagree, 7=totally agree)

Example	Totally disagree					Totally agree	
	1	2	3	4	5	6	7
Please circle the number closest to you answer	1	2	3	4	5	6	7
1. My online banking provides accurate e-banking information and continuous improvement of financial records me.	1	2	3	4	5	6	7
2. I think I can access anytime and anywhere, and save time as compared to conventional banking.	1	2	3	4	5	6	7
3. I think to use e-banking to deal with my daily bank's events is very efficiency	1	2	3	4	5	6	7
4. I think my e-banking website is comfortable for me.	1	2	3	4	5	6	7
5. I think my e-banking website is Serviceability	1	2	3	4	5	6	7
6. I feel safe my in online transactions and secure in providing sensitive information							
7. for my online transactions.	1	2	3	4	5	6	7
8. I think my e-banking companies keep customers information private and confidential	1	2	3	4	5	6	7
9. I think my e-banking provider is assurance	1	2	3	4	5	6	7
10. I think that reputation for e-bank provider is very important issue when I choose my							
11. online banking service	1	2	3	4	5	6	7
12. I think e-banking's product differentiation and customization is very important issue							
13. when I choose my online banking service.	1	2	3	4	5	6	7
14. I think customer service quality of e-banking is very important issue when I choose my online banking service.	1	2	3	4	5	6	7

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15. I believe my online banking services provide good quality	1	2	3	4	5	6	7

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BIOGRAPHY

Mr. Zhengwei Ma is Doctor Candidate at Northwestern Polytechnic University USA. Mr. Ma is the president of the Student Association. Contact information is E-mail: zhengwei1980@hotmail.com Phone Number: 510-396-2997.

Ms. Luying Ma is security department manager of Heilongjiang Province Agricultural Bank of China. Ms. Ma is MBA student in Harbin Engineering University. Contact information: mly88888@126.com Phone Number: 86-13845115790.

Mr. Jinkun Zhao is a staff of intendance and instructor of Harbin University. Contact information: zjk1998@126.com Phone Number: 86-13313660246.