An Exploration Research on Roles of Artificial Intelligence in Banking Business Management

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Abstract

The research objectives are to study the roles of AI in business management in commercial banks in Duyun City, Guizhou Province, China. This research is mixed method research design composing of qualitative and quantitative research. The research employs questionnaires to collect data from 400 people being involved in commercial bank business including bank customers using propulsive sampling, and 30 from bank managers. The research method employs One-Way ANOVA analysis and logistic regression analysis to analyze variables and test hypothesis. The research results found that the respondents' perspective stated artificial intelligence function as promoter for bank businesses and acts as a regulator for security of data and transactions of the commercial banks. The future of development of AI should not be limited to logical thinking. It is necessary to consider image thinking and inspiration thinking to promote the breakthrough development of artificial intelligence.

Keywords: AI technology, business management, commercial banks

Introduction

The use of artificial intelligence is revolutionizing our research in science and technology inefficiency. AI increases availability for life science and healthcare information, retailing, banking, travelling and other sectors (Reed, Jaze Z., 2018). AI is also used to search bank data for signs of unusual behavior, including banking fraud and the sale of software. After 2012, thanks to the increase of data volume, the improvement of computing power and the emergence of new algorithm of machine learning, artificial intelligence develops rapidly in industrial application. The development and application of AI in enterprise management play an increasingly important role. AI is poised to transform every industry, just as electricity did 100 years ago. It will create $13 trillion of GDP growth by 2030, according to McKinsey, most of which will be in non-internet sectors including manufacturing, agriculture, energy, logistics, and education. The rise of AI presents an opportunity for executives in every industry to differentiate and defend their businesses.

But implementing a company- wide AI strategy is challenging, especially for legacy enterprises. (Andrew Ng, 2019)

Benefits and Threats Found in Previous Studies Since many studies found various benefits from the emerging of artificial intelligence, fewer studies have done on the negative impacts of the AI. Many studies focused their researches on again, some of these may be obvious, but they underscore how valuable AI is for saving time and money for a financial institution. The benefits to use AI in place of human operators are reliability in regulatory compliance, personalized degree of risk preference in investments, reduced errors, increased efficiency through standardization, enhanced customer service, speed and effectiveness. Especially with the push for banks and financial institutions to monitor compliance and have anti-money laundering measures up to snuff, AI comes to the rescue. AI systems can be programmed to investigate and calculate whether a transaction is committing a crime or not in mere milliseconds as opposed to the hours it takes a human monitor to investigate. The savings on time, and thus money, are in the very least extreme. Not only is time saved with AI, but so is the risk of human error during analysis and determination of risk.

However, some authors recommend in their future research that the further researcher should focus on negative impacts in order to fulfill stereo impacts of AI on banking business. Of the primary threats posed by AI to Finsec is the potential error rate due to its technological infancy. While software does exactly what it is programmed to do, there is still a human responsible for the initial programming. A single programming error can be catastrophic, as in the case of what happened to Knight Capital, who lost $400 million in 30 minutes due to a programming glitch. Another major concern for financial executives is data security and present lack of trustworthy AI regulation. In line with the previous concern, AI is only as good as who has designed it, but also whose hands it is in. Data and intellectual property security is a tremendous threat to any new technology. On one hand, regulation is required, but how trustworthy is the state when they have the AI source codes for regulatory examination? Cases of computer hijackers were constantly reported in financial sectors. Implementing AI in finsec is still treacherous terrain, and poses risks to the industry until kinks are ironed out and it becomes the industry standard.

Problems of AI in Transformation of Management Mode Intelligent and self- help services driven by intellectualization will gradually reduce the demand for labor in the banking sector. For example, the original large number of operable positions will gradually be replaced by intelligent machines, resulting in a decline in the demand for operable positions. At the same time, based on the development of the Internet platform, the proportion of personnel with the professional ability of science and technology and data

will be greatly increased. This fundamental change will change the structure of banking personnel, improve the efficiency of bank management, and promote changes in the internal organization of banks. Fewer people, richer management tools and higher communication efficiency will help banks to move towards a flat organizational form.

New Problems in Human Resource Development and Management According to the Financial Times, Citibank plans to lay off 50% of its technology and business staff in the investment banking sector within five years, ready to replace their jobs with artificial intelligence algorithms. For the investment banking sector, a layoff of 50% means that 10 thousand employees will be disbanded. Jamie Forese, president of Citibank, also said that 40% of the group's workers could be replaced by AI algorithms. Compared with other industries, the financial industry has more jobs that can standardize the process because of the abundant data. So replacing manual labor with AI algorithm can not only improve efficiency and save labor costs, but also they have no mood and will not complain about work or gangs. It is unusual to replace tellers, customer service, analysts and so on with artificial intelligence.

Risk Control from Technical Perspective. The application of AI technology can enhance the bank's ability to prevent and control the risks of customer capital operation. However, with the further application of AI, banks need to deal with new technological risks. Artificial intelligence makes banking more efficient and convenient, but longer data application chains and more complex data relationships may lead to more security vulnerabilities, and security measures against hacker intrusion need to be further strengthened.

Related Researches on Application of AI in Business Management Shianing Wu (2018) explored and found that information security awareness produces a significant positive impact on the performance of information security governance. A research team of Niu, H., Wang, J. (2013) set their angle on volatility clustering and long memory of financial time series and financial price model. Parkes (2015) explored economic reasoning and artificial intelligence. Omoteso, K. (2012) surveyed the application of artificial intelligence in auditing. Haipeng Zhu (2017) used the Shanghai Composite Index as a representative of the financial evaluation to help analyze the financial data more accurately in daily times. Rouhani, S., Ghazanfari, M., Jafari, M. (2012) programmed on evaluation model of business intelligence for enterprise systems using fuzzy TOPSIS. Kisi, O., Shiri, J., Nikoofar, B. (2012) forecasted the daily lake levels using artificial intelligence approaches. Kaastra, I., Boyd, M. (1996) designed a neural network for forecasting financial and economic time series. Abuel-Naga, H. M., Bouazza, A. (2014) found numerical experiment-artificial intelligence approach to develop empirical equations for predicting

leakage rates through GM/GCL composite liners. Wu, D.D. (2014) investigated business intelligence in risk management. Ruan, D. (2012) analyzed soft computing for risk evaluation and management: applications in technology. Kou, G. (2014), made an evaluation of clustering algorithms for financial risk analysis using MCDM methods.

The significance of this research lies in the results from the investigation of banking business management situation of applying AI in customer services in Duyun, Guizhou, China. The data collected will provide information of benefits as well as the management problems brought by using AI. This will help improve the banks investigated to upgrade their banking service system and adopt strong strategic measures to compete and survive in the competition. At the same time, it will provide significant factors for AI industry in achieving operational efficiency and better customer interactions in their business management and will benefit the executive of commercial banks in Duyun City in achieving operational efficiency and better customer interactions in their business management.

Research Objectives

1. To study what benefits artificial intelligence has brought to commercial banks located in Guizhou China.
2. To study what negative impact artificial intelligence has brought to commercial banks in Guizhou China.
3. To study what the major concerns of business management are in commercial banks in Guizhou China.

Scope of Research and Research Samples

This research is designed to study roles of artificial intelligence and impacts of its application on commercial bank business in commercial banks in Guizhou China. The research sample is selected from two sources, of which one is the small sample of 30 people who had contact with the use of artificial intelligence from google website and the other sample is 400 people who are involved in commercial bank business including bank managers and customers. The concerned variables include demographic status of gender, job, work year, major and other elements like skills of automation, reduces of cost, speeding the processing time and improved work efficiency of AI.

Research instrument and its reliability

This research adopted both literature study and empirical study including quantitative analysis to verify and test all the dimensions concerning the application of artificial intelligence in banking business management. Data collecting method consists of two major parts-pilot questionnaires and survey questionnaires. For quantitative research,

a sample of 400 customers is covered in Duyun City, Guizhou Province, China by using survey questionnaires. The questionnaires were delivered through snow-ball method with the help of the staffs in the banks investigated. Data analysis applied One-Way ANOVA analysis and logistic regression analysis.

Research Hypothesis

The research intends to explore the answers for the following suppositions: whether there is significant influence of customer service and business management by gender, by job, by work year, by the staffs' major; whether skills of automation, reduces of cost, speeding processing and improved work efficiency have significant impacts on business management in commercial banks.

Findings in Research Investigation

This research found that the present state of AI in banking business management is at a new searching and testing period in different fields and areas, such as business processing, speeding the transaction, and high efficiency in loans analysis and risks forecasting. Benefits are bountiful in services improvement, reducing work pressure, reducing bank operating costs and risks, helping decision-making for loans and credit.

Findings in Pilot Study

The pilot study was designed on google website by anonymous survey method. Survey questionnaire was sent to 30 people. When asked whether the bank is using AI or not, 30% says Yes while 70% of the response is No. As for the question what section the bank is using AI. 33.3% says customer service; 33.3% is in bank accounting section; 11.1% banking fraud detection; 22.2% is in data collection. For question what customer services AI can offer, the responses varies in the following proportion: 0% chatbots; 55.6% transactions; 44.4% customer 24 hours on-line service; 0% help customers with ROI. For question what profit AI has brought to your bank, the responses are 22.2% increased work efficiency, 22.2% relieved the high pressure of some job, 11.1% increased reputation in business, 22.2% reduced costs and time consuming and 22.2% accuracy of data collected.

As for the method of communicating with AI assistant in the bank, the responses show good distribution of 33.3% by input instruction words, 11.1% by using voice box, 22.2% by clicking the settled system button and 33.3% by pressing "start" button to begin all the procedures. In application, the percentage of human intervention are 44.4% 10% of the mission, 11.1% 20% of the mission, 33.3% 30% of the mission and 11.1% 50% of the mission. AI can learn from the customers and staffs 44.4% decision making by reasoning, 33.3% competitiveness and 22.2% make decision by needs, but out of my expectation there is 0% emotions learned from customers and staffs.

At the open-ended question part, the responses of factors or elements of artificial intelligence influencing on the business management of banks located in the country where you live, answers from my Indian friends by using snow ball say AI is nasant stage, hence awareness of e-banking is less and people are afraid to use because of security issues.

To sum up, the website survey data of AI application in the related bank staffs and customers is reliable and true. The state of using AI is not popular within the sample survey here. However, those who use AI in their banks show good tendency of further enhancing the present AI system in operation and great expectation of exploring more new applications in more bank services.

Findings in Survey Questionnaire in Duyun, Guizhou, China

Analysis of Demographic Descriptive Statistics The research survey questionnaire made an investigation of the participants who are from CEO of the banks, dean, IT professionals, cashiers or economic analysts. Descriptive statistics analysis of demographic state records objectively the distribution of gender, job, working year and major.

Descriptive analysis of frequency of demographic investigation shows that statistics in gender has more female than male with the percentage of 55% to 43.7%; job frequency shows that IT professional and cashier has more percentage than the other job as CEO, Dean and economic analyst, in which IT professional and cashier tops with 31% all, whilst CEO 12%, Dean 17% and economic analyst 8%; working year frequency demonstrates an interesting result, in which, 5-10 years tops with a percentage of 28%, 1-5 years workers the second with a percentage of 24% and 10-15 years staffs takes 24%, whilst 15-20 years staffs with a percentage of 16% and 20 years staffs percentage of 6%; As for major percentage ranks from management with 25%, accounting 24%, IT 19%, finance 16% and marketing 15%.

Analysis of Frequency and Percentage of Section 1 in Survey Questionnaire Statistics show that 24.5% of bank AI was used for customer service; 21.2% used in data collection; 22.8% applied in transaction business; 24.5% improvement has been brought to system instruction given; 22.5% shows speeding the processing time; 20.5% improved work efficiency; 28.8% human intervention in mission of banks; 22.2% was used for bank transaction business; 14.5% is for help customers with ROI(Return on investment).

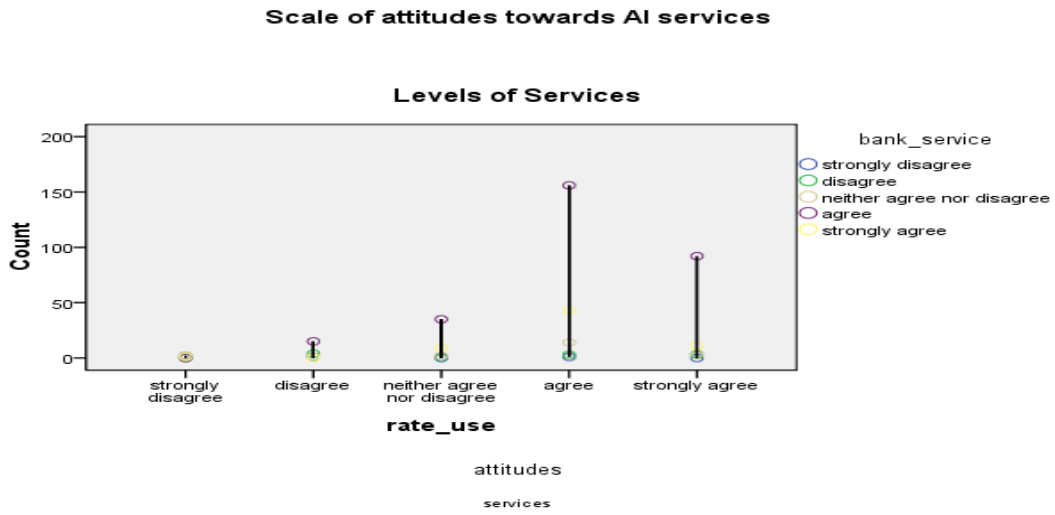
Unfortunately, 29.2% records of mistakes of AI application in banks were found in large scale default mistakes and 32% mistakes in customer account recognition. Way of communicating with AI assistant only starts on the infant stage of 32.0% by pressing “Start” button to begin all the procedures; 26.2% just click the settled system button; yet, 23.5% use Voice Box.

Interestingly, the survey shows 23.5% of learning from human being the ability of competitiveness; 21.5% making decision by needs; 15.2% of decision making by reasoning; 15.8% of emotions learned; 21.5% of way of thinking

As for profits brought by AI to the banks investigated found 31.5% of being relieved the high pressure of some job; 24.0% reduced costs and time consuming; 19.0% of increased work efficiency; 16.2% of increased reputation in business; 9.2% of accuracy of data collected results of AI management for Banks show 36.2% for improved efficiency, 21.2% for enhancing Customer awareness of AI service, 18.0% for reducing staff pressure, 17.5% for reminders of business due time or risks; Also, the survey received 7.0% negative response of AI management reports.

Analysis of Frequency and Percentage of Section 2 in Survey Questionnaires Analysis of survey on attitudes towards AI in banking services shows strong tendency of supporting AI application in banking business from figure 8.2.3, although we have small proportion of disagree and neither agree nor disagree.

Figure 4.1 Scale of Attitudes towards AI Services



Different from the small sample survey results, the above graph is the large sample results analysis, which shows a strong positive attitude towards the using of AI in bank services. Among the 400 samples, around 160 persons agree with the use of AI in their bank services. They believe AI helps to reduce work pressure of employees, the qualified level of knowledge of their bank service staffs, the qualified level of the bank they are working at by the service, the faster speed of your bank transaction service, the safer trustworthiness of regulatory examination of the bank service, the safer security of regulatory data of your bank service, the efficiency of Chatbots service of AI, the reduction

of bank operating costs and risk of AI use in the bank and the improving decision-making for loans and credit. Surprisingly, around 100 responses show strongly agree. Not optimistically, about 70 people maintain an attitude of neither agree nor disagree. They may still be dwelling in the old traditional banks services. Negative and extremely negative answers also shows on the graph, that proportion is around 30 persons disagree and 10 to 15 persons strong disagree.

Hypothesis Testing Results

Table 1 Test of Homogeneity of Variances

Items	Levene Statistics	df1	df2	Sig.
customer_service	3.813	4	395	.005
profits	4.299	4	395	.002
results	7.005	4	395	.000

Note: *p < 0.05

From test of homogeneity of variances, we can see significant differences on test item customer service with sig. value 0.005, profits with sig. value 0.002 and results with sig. value 0.000, among which results of AI brought to banks had the most significant differences shown, profits lists the second and customer service the third because of the sig. value respectively at 0.000≤0.05, 0.002≤0.05, 0.005≤0.05.

Table 2 Significance Test of Variances

Items	Groups	Sum of Squares	df	Mean Square	F	Sig.
customer_service	Between Groups	43.57	4	10.89	7.93	.000
	Within Groups	542.37	395	1.37		
	Total	585.94	399			
profits	Between Groups	28.12	4	7.03	4.50	.001
	Within Groups	616.73	395	1.56		
	Total	644.84	399			
results	Between Groups	13.54	4	3.39	2.35	.053
	Within Groups	568.04	395	1.44		
	Total	581.58	399			

Note: Three variances were applied in the analysis.

One-Way ANOVA significance Test found two variables had significance between groups comparison with customer service sig. value .000 and profits .001 and results .053 not of sig. value respectively at .000≤.05, .001≤.05, .053 > 05.

3 Summary of Hypothesis

Variance	Items	Percent	Sig.
Gender	Male	38.5	.001
	Female	41.4	
Job	CEO	12.2	.000
	Dean	17.0	
	IT professional	31.2	
	cashier	31.0	
	economic analyst	8.5	
Work Year	1-5	24.5	.044
	5-10	28.5	
	10-15	24.8	
	15-20	16.2	
	20 years above	6.0	
Major	finance	16.0	.110
	accounting	24.5	
	IT	19.5	
	management	25.0	
	marketing	15.0	
Skills of Automation		15.0	0.628
Reduces of Cost		17.5	0.002
Speeding Processing Time		22.5	0.000
Improved Work Efficiency		20.5	0.000

Note: Three variances were applied in the analysis.

Table 4 Summary of Hypothesis Testing Results

Hypothesis	Pass	Refused
Hypothesis1-1	+	×
Hypothesis1- 2	+	×
Hypothesis1- 3	+	×
Hypothesis1- 4	+	×
Hypothesis2-1	+	×
Hypothesis2-2	+	×
Hypothesis2-3	+	×
Hypothesis2-4	+	×

To summarize, hypothesis confirmation can be concluded as the followings:

H1-1: There is significant influence of customer service and business management by gender with independent samples test (2-tailed) significant value .001≤.05.

H1-2: There is significant influence of customer service and business management by job with significant value between groups .000≤.05.

H1-3: There is significant influence of customer service and business management by work year of the staff in banks because significant value is .044≤.05..

H1- 4: There is no significant influence of customer service and business management by the staff's major because significant value is .110≥.05.

H2- 1 was rejected at a large proportion only with a small proportion accepted because within customer service, skills of automation compared with reduces of cost shows no significance with sig. value .628≥.05, with .171≥.05 with implementation of system instruction given, with .733≥.05 with speeding the processing time except with improved work efficiency with .000≤.05. So, test of hypothesis of skills of automation was rejected, but variable–improved work efficiency showed significant differences.

H2-2 was half accepted and half rejected because reduces of cost, compared with skills of automation the significant value is .628≥.05, with implementation of system instruction given.048≤.05, with speeding the processing time .858≥.05, but .002≤.05 with improved work efficiency again as in the above analysis in H2-1.

H2- 3 received the same proportion rejection as in H2- 1 within group comparison because compared with skills of automation the significant value is .733≥.05, reduces of

cost .0858≥.05, implementation of system instruction given .055≥.05, but improved work efficiency .000≤.05.

H2-4 was accepted with an absolute significant value .000 when compared within groups because within group comparison the significant value of skills of automation is .000≤.05, reduces of cost .002≤.05, implementation of system instruction given .000≤.05, and speeding the processing time .000≤.05. However, concerning

Summary of Findings and Discussion

The research targets on role of artificial intelligence in business management by taking commercial banks in Duyun, Guizhou, China as a case study to analyze the factors or elements of artificial intelligence in banking business application. At the same time, the research tried to find the problems in banking business management and found skills of automation in Duyun, Guizhou, China is not well developed and largely applied because the test of hypothesis found a large proportion rejected test result. Neither did the research find in the factor of reduces of cost nor the speeding the processing time. Nevertheless, the research found almost absolute positive response on the factor of improved work efficiency. Interestingly, gender in artificial intelligence industry showed relatively significant difference with the tendency of more female favoring on the use of artificial intelligence in banking business management. Surprising finding on those who worked for more than 20 years preferred to choose artificial intelligence both in their banking business management or in customer service comparing with those who just worked for 1-5 years.

Conclusion

There is still a long way to go in combining machine learning, deep learning, neural network, data modeling, algorithm, big data, cloud compute ring with human intelligence and science of mind. The needs of human being is changing with the fast developing of science and technology. When artificial intelligence becomes part of human kinds' life, we have to predict the problem of management of unemployment, intellectual property, structure of work style, freelancers, bitcoin, blockchain and family businesses. However, the more challenge we meet, the more prosperous of the field will be. It is high time to devote our wisdom and ability.

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