

Evaluating Advantages of Expert System in Granting Banking Facilities to Customers

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Abstract

This study was a descriptive-case study research. The population consisted of credit experts of Tejarat bank who were the member of bank's credit Committee and had the right to vote for facilities approval and the individuals whose main task was providing reports for granting facilities and monitoring the use of facilities. After an initial interview and determining the evaluation criteria for facilities and determining the items for each of the criteria, a questionnaire was designed using Likert scale. Data normality test was conducted to ensure the accuracy of the collected data. T-test was performed to realize the selected criteria are important. Then, experts were asked to determine the minimum score for providing the facility to the applicant in each section of the questionnaire. The laws of expert system were provided based on determined minimum scores.

Keywords: Risk Management, Credit Risk, Expert System.

1. Introduction

Today, a growing number of customers tend to perform their banking operations using intelligent electronic systems without participating in banks. Therefore, the banks may use intelligent systems to implement evaluation and selection and simplify loan applications assessment. In this regard, the customers may use expert system to process their bank requests in intended time and space. Due to reduced number of employees and branches, the banks may benefit from reduced operational costs.

This knowledge helps bank expert to determine the relationship between credit risk level of customers and financial position of these rules. In this study, the fuzzy expert system which was designed for financial ratios of customers is considered to be input and prediction of credit risk level is considered to be output. Since all financial ratios are not important enough for decision making of expert system, the financial ratios which are more important to determine the credit risk are filtered and used in decision-making. On the other hand, the credit expert knowledge which is obtained through experience is valuable for success of a financial institution or company. Therefore, special attention should be paid to documentation of these experts' knowledge and expert systems in financial field. However, this knowledge may be used by a large number of people and simplify working in this field.

An important result of an expert system is assimilating knowledge and its development in other times. An expert system helps to determine the investment risk. If a new parameter is important for a financial company or institution, it is added to database and is considered in decision-making process. Therefore, this study aims to perform knowledge engineering and decision-making support expert system modeling for granting credit. In this context, the research questions are as follows:

- Whether the use of expert system for granting credit facilities simplifies loan granting process?
- Whether the use of expert system for granting facilities provides a competitive advantage for the bank?

2. Methodology

The present study is a fundamental research; because it aimed to explain the relationship between consumer credit and credit risk and add to the collective knowledge in this area. The study is a descriptive study; and since the researcher wants to observe special aspects and interpret all aspects from holistic perspective, it is a case study.

The population consisted of credit experts of Tejarat bank who were the member of bank's credit Committee and had the right to vote for facilities approval and the individuals who their main task was providing reports for granting facilities and monitoring the use of facilities (N=25). 25 questionnaires were sent to reflect the opinions of the individuals; 19 cases completed the questionnaires. The demographic characteristic of questionnaires was analyzed using descriptive statistics including frequency tables, percentages and drawing diagrams.

After encoding the questionnaires and computing the descriptive indicators, Shapiro test and the Kolmogorov - Smirnov test (for ensuring the accuracy of the results) and T-test -using SPSS software- was used for statistical hypothesis testing and generalization of results to research population.

The Cronbach's alpha results are as follows:

Table 1: Cronbach's alpha for economy

Reliability	
N of Items	Cronbach's alpha
6	.848

The Cronbach's alpha value is 0.848; this part of questionnaire has good reliability.

Table 2: Cronbach's alpha for business

Reliability	
N of Items	Cronbach's alpha
7	.481

The Cronbach's alpha value is 0.481; therefore, the reliability of this part of questionnaire is not desirable. According to following table, if the first question is removed, the reliability may be increase to 0.565:

Table 3

Item-Total Statistics				
Cronbach's Alpha if Item Deleted	Corrected Item-Total Correlation	Scale Variance if Item Deleted	Scale Mean if Item Deleted	
.565	-.084	4.778	8.00	Business 1
.347	.437	3.544	8.11	Business 2
.345	.502	3.719	7.95	Business 3
.510	.064	4.386	8.05	Business 4
.371	.371	3.538	8.26	Business 5
.555	.016	4.275	9.05	Business 6
.317	.462	3.275	8.05	Business 7

Table 4: Cronbach's alpha for production

Reliability	
N of Items	Cronbach's alpha
10	.760

The Cronbach's alpha value is 0.760; this part of questionnaire has good reliability.

Table 5: Cronbach's alpha for service

Reliability	
N of Items	Cronbach's alpha
10	.799

The Cronbach's alpha value is 0.799; this part of questionnaire has desirable reliability.

3. Findings

The following table shows t-test results.

$$\left\{ \begin{array}{l} H_0 : \mu = 0 \\ H_1 : \mu \neq 0 \end{array} \right.$$

The t-test was used to determine whether the population mean is equal to 0. Since the sig. value was less than 5% (significance level= 5%), the H0 was rejected; this means that the average value is not equal to 0. Since the confidence interval of all variables is positive, this means that the average value is greater than 0.

Table 6: t-test results

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
LLP	7.869	18	0.000	1.947	1.43	2.47
Private Joint Stock	13.568	18	0.000	2.368	2.00	2.74
Joint	7.143	18	0.000	2.632	1.86	3.41
Limited	22.940	18	0.000	4.316	3.92	4.71

responsibility						
Cooperatives	12.302	18	0.000	3.105	2.57	3.64
Character 2	9.848	18	0.000	1.316	1.04	1.60
Character 3	13.568	18	0.000	1.579	1.33	1.82
Character 4	16.734	18	0.000	1.737	1.52	1.95
Character 5	10.875	18	0.000	1.526	1.23	1.82
Economics 1	7.839	18	0.000	1.368	1.00	1.74
Economics 2	10.500	18	0.000	1.474	1.18	1.77
Economics 3	12.010	18	0.000	1.316	1.09	1.56
Economics 4	6.050	18	0.000	1.158	0.76	1.56
Economics 5	5.339	18	0.000	1.000	0.61	1.39
Economics 6	5.267	18	0.000	1.158	0.70	1.62
Business 1	11.339	18	0.000	1.579	1.29	1.87
Business 2	10.500	18	0.000	1.474	1.18	1.77
Business 3	14.350	18	0.000	1.632	1.39	1.87
Business 4	10.875	18	0.000	1.526	1.23	1.82
Business 5	8.547	18	0.000	1.316	0.99	1.64
Business 6	2.970	18	0.008	0.526	15	0.90
Business 7	9.549	18	0.000	1.526	1.19	1.86
Production 1	13.568	18	0.000	1.579	1.33	1.82
Production 2	9.848	18	0.000	1.316	1.04	1.60

Production 3	7.655	18	0.000	1.316	0.95	1.68
Production 4	6.600	18	0.000	1.158	0.79	1.53
Production 5	7.655	18	0.000	1.316	0.95	1.68
Production 6	4.916	18	0.000	0.737	0.42	1.05
Production 7	5.953	18	0.000	1.105	0.72	1.50
Production 8	6.315	18	0.000	1.263	0.84	1.68
Production 9	14.350	18	0.000	1.632	1.39	1.87
Production 10	10.500	18	0.000	1.474	1.18	1.77
Services 1	6.994	18	0.000	1.316	0.92	1.71
Services 2	6.533	18	0.000	1.105	0.75	1.46
Services 3	9.848	18	0.000	1.316	1.04	1.60
Services 4	12.036	18	0.000	1.368	1.13	1.61
Services 5	6.647	18	0.000	0.947	0.65	1.25
Services 6	6.050	18	0.000	1.158	0.76	1.56
Services 7	10.500	18	0.000	1.474	1.18	1.77
Services 8	6.508	18	0.000	1.053	0.71	1.39
Services 9	7.394	18	0.000	1.421	1.02	1.82
Services 10	7.550	18	0.000	1.000	0.72	1.28

Considering the results of descriptive statistics, the experts were asked to determine minimum score for admission of loans in each section of questionnaire. The results of this evaluation are as follows.

Table 7: Minimum score in each section for accepting facilities

Investigating the character and competence of credit applicant	$7 \leq x < 10$	Excellent
	$5 \leq x < 7$	Good
	$0 \leq x < 5$	Average
	$-5 \leq x < 0$	Bad
	$-10 \leq x < -5$	very bad
Economic Analysis (descriptive or qualitative analysis of activity)	$6 \leq x < 12$	Excellent
	$4 \leq x < 6$	Good
	$0 \leq x < 4$	Average
	$-6 \leq x < 0$	Bad
	$-12 \leq x < -6$	very bad
Technical and operational study of activity (commercial activity)	$10 < x < 14$	Excellent
	$5 < x < 10$	Good
	$0 < x < 5$	Average
	$-7 < x < 0$	Bad
	$-14 < x < -7$	very bad
Technical and operational analysis of activity (production activity)	$12 \leq x < 20$	Excellent
	$7 \leq x < 12$	Good
	$0 \leq x < 7$	Average
	$-10 \leq x < 0$	Bad
	$-20 \leq x < -10$	very bad

Technical and operational analysis of activity (service activity)	$7 \leq x < 14$	Excellent
	$5 \leq x < 7$	Good
	$0 \leq x < 5$	Average
	$-7 \leq x < 0$	Bad
	$-14 \leq x < -7$	very bad

4. Conclusion

First Question: Whether the use of expert system for granting credit facilities simplifies loan granting process?

The banks and financial-credit institutions provide credit facilities. For this purpose, they use the methods which are consistent with their conditions. The granting of facilities and qualitative analysis of credit ratings largely depends on ability and experience of those who are responsible for granting credit or facilities.

The Port Man is a banking consulting system which is designed to help the bank employees to advise individual investors in banks, speed up the consulting process, and standardize the financial advisory experience of banks. The FAME is a consultancy system knowledge base which provides tips for preparing comprehensive financial market for Frame computers business. Therefore, the expert system creates a uniformity in executive affairs, reduces the time of assessing requests, and decreases confusion of clients.

Second Question: Whether the use of expert system for granting facilities provides a competitive advantage for the bank?

The systematic assessment systems such as credit scoring systems reduce human error, risk, and cost of credit granting. Due to shortened process of loans granting and its high speed, the attention of customers will be attracted and the demand for bank credits will increase.

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