



## The Role of Expert System in Granting Credit Facilities

*Somaye Hoseini*

*M.Sc, University of Mehr Alborz, Iran*

**Original Article:**

*Received 08 Jan. 2017 Accepted 10 March 2017 Published 09 June. 2017*

### ABSTRACT

In this study, the expert system considered customer financial ratios as input and prediction of credit risk level as output. 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.

**Keyword:**

Risk Management,  
Credit Risk, Expert  
System.

\* Corresponding author: [moabss5562@yahoo.com](mailto:moabss5562@yahoo.com)

Peer review under responsibility of **UCT Journal of Research in Science, Engineering and Technology**

## INTRODUCTION

Along with development of intelligent decision-making systems such as expert systems, artificial intelligence, and decision-making support systems, the banks have also been affected. The intelligent systems have fundamentally changed the expectations of customers in terms of speed, accuracy, price, and service. The availability of services and ease and speed of service delivery with the help of intelligent systems have created competitive advantages for banks. To compete in this complex environment, the banks are forced to provide additional services with higher speed and accuracy to customers. 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. However, the research questions are as follows:

- Whether the use of expert system for granting credit facilities creates a framework to grant facilities?
- Whether the use of expert system for granting facilities increases profitability and reduces banking charges?

Table 1: personality 2

	Frequency	Percentage	Data percentage	Accumulative percentage
Answers				
Average	1	5.3	5.3	5.3
Very important	11	57.9	57.9	63.2
Important	7	36.8	36.8	100
Total	19	100	100	

Table 2: personality 3

	Frequency	Percentage	Data percentage	Accumulative percentage
Answers				
Very important	8	42.1	42.1	42.1
Important	11	57.9	57.9	100
Total	19	100	100	

Table 3: personality 4

	Frequency	Percentage	Data percentage	Accumulative percentage
Answers				
Very important	5	26.3	26.3	26.3
Important	14	73.7	73.7	100
Total	19	100	100	

Table 4: personality 5

	Frequency	Percentage	Data percentage	Accumulative percentage
Answers				
Average	1	5.3	5.3	5.3
Very important	7	36.8	36.8	42.1
Important	11	57.9	57.9	100
Total	19	100	100	

## 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 were 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.

## Findings

The following tables reflect the answers to questions on applicant's character and credit qualification in questionnaire (The items of these sections are shown by character 1, character 2, and etc.).

## Conclusion

Question 1: Whether the use of expert system for granting credit facilities creates a framework to grant facilities?

This model receives input including customer documents such as audited financial statements, balance sheets of customer, and etc. to evaluate all customers using tests

which are different in terms of activity type. These tests evaluate qualitatively or descriptively the activity; it includes three main sections: economic evaluation, human resources evaluation, and technical and operational evaluation of activity. The economic evaluation assesses the economic unit position of facility applicant in region, national, or international levels from the perspective of supply and demand of products or services. The determination of the capital which should be provided by an institution through equity and the capital which should be provided by long-term loans (debt capital) or long-term bank credit facilities is one of the main issues which impacts significantly on success or failure of institutions. Finally, the input data and scores in each stage are used to determine the risk situation in granting customer facilities.

Question 2: Whether the use of expert system for granting facilities increases profitability and reduces banking charges?

The assessment and recognizing difficulties and limitations are very important in granting the facilities. In the case of an active economic unit, the status quo and future trend of activity and its position in market may be predicted by economic analysis. After the analysis of expert system, the situation of granting loan is classified into five categories: excellent, good, average, bad, or very bad.

The granting of facilities to the applicant who has achieved excellent and good scores has the lowest risk.

The granting of facilities to the applicant who has achieved an average score is associated with some degree of risk which may be avoided from banking debts by consolidating securities.

The granting of facilities to the applicant who has achieved bad or very bad scores has the highest risk and it is not proper to granting facilities to him/her.

### Recommendations to implement plan

1. Using archive, a database is created for credit customers' analysis.
2. The relevant regulations and banking system are informed to facilities applicant.
3. The initial facilities application form is completed by customer.
4. The request, records, personality, and originality of applicant is confirmed.
5. The credit limits and powers of system is evaluated. In the case of being qualified, the credit application is conformed and an appropriate message is sent to applicant.
6. The necessary documents are requested from customer and he/she is invited to visit the bank to conclude a contract in scheduled time.
7. All operations of creating records are conducted by representatives of legal, accounting, and credit departments, if necessary. Then, the databases are used to conclude a contract. Considering loans grating regulations, the accounting documents may be issued.
8. The credit reports of client are completed and recorded in expert system.
9. The needed reports are prepared and will be provided to various centers, if needed.

10. The operations which are related to receiving payments and follow-ups will be done online.

### Implementation procedure

Given the variety of facilities of in terms of contracts, term and conditions of granting, rate of facilities, customers distribution in different sectors, organizations and agencies, and bank and government macro policies, in general, the facilities applicant may be classified into following categories.

1. Common customers: the customers who apply the loan just for once from bank. They are divided into 4 categories:
  - The applicants who have accounts in bank and request loan to meet their personal or job needs.
  - The applicants who have no account in bank and refer it to request loan.
  - The applicants who refer to bank to request loan with regard to government policies or having an introductory letter from one organization / institution such as facilities to purchase / construction and loans to quick enterprises.
  - The applicants who refer as a group to obtain bank loans (for example, municipalities personnel to obtain loans to buy locally manufactured durable goods).
2. Specific customer: the customers who have one or more accounts in one or more branches of bank, already have used bank's facilities, and have credit unit records in bank's branches.
  - Receiving applicants list from organization / institution and evaluating credit limits of regions and branches
  - Completing the application form by customers in Internet
  - Receiving and evaluating customers' requests and conforming them with the list of organization / institution
  - Helping customers to supply documents through messaging and presence at place for creation of record
  - Examining the documents and securities of customers by a team of evaluators, inspector, accountant, lawyer, and financial experts, if necessary
  - Scanning form of customer contracts, documents, and securities in system
  - Contracting and depositing facilities according to pre-defined standards in system by considering the view of authorities of branch, jurisdictions, and etc. with proper management and scheduling of resources
  - Checking and updating deposit list
  - Preparing and reporting the statistics which are required by managers and users
  - Receiving payments and deferred payments and sending messages to different authorities.

Effects of implementing this plan are as follows:

1. Proper management and allocation of resources and equipment
2. Reduced bank's demands topics
3. Attracting new sources of funding by encouraging the customers of other banks to use banks modern banking services in Tejarat bank

4. Attracting public and private ministries and organizations to grant facilities such as granting loans to students exploring portfolio selection based on CAPM," Expert Systems with Applications, 2011, 38, 16–25.  
28- www. Consumerinfo. com
5. Improved situation of Tejarat Bank and moving toward electronic banking and focused banking through providing modern banking services
6. Decreased work volume and increased efficiency and productivity in branches of bank
7. Reduced human resources and optimum use of them in providing banking services or opening new bank branches
8. Reduced costs of preparing and distributing forms of contract and records
9. Preparing and presenting reports which are required by managers and users at least time possible with high speed and accuracy
10. Increased public and private bank customer satisfaction

### References

- 1-A.B.Emela, M.Oralb, A.Reismanb, R.Yolalan,"A credit scoring approach for the commercial banking sector," Socio-Economic Planning Sciences, 2003, 37, 103–123.
- 4-B.Baesens, T.V.Bestel, S.Viaene, M.Stepanova, J.Suykens, J.Vanthienen," Benchmarking state-of-the-art classification algorithms for credit scoring," Journal of Operational Research, 2003, 54, 627–635.
- 5-B.Chang, C.W.Chang, C.H.Wu,"Fuzzy DEMATEL method for developing supplier selection criteria," Expert Systems with Applications, 2011, 38, 1850–1858.
- 7-Boer, G.B., & Livnat, J. (1990). Using expert systems to teach complex accounting issues. *Issues in Accounting Education*, Spring, 108-119.
- 8- 9-Grljević Olivera, Bošnjak Zita , "Development of Creditworthiness Expert System", September 22-24 2010
- 10-E.Angelini, G.D.Tollo, A.Roli,"A neural network approach for credit risk evaluation," The Quarterly Review of Economics and Finance, 2008, 48(4), 733–755.
- 15-L.C.Thomas, "A survey of credit and behavioral scoring: Forecasting financial risk of lending to consumers," International Journal of Forecasting 2002, 16, 149–172.
- 16-Ljubica Nedović1 and Vladan Devedžić" EXPERT SYSTEMS IN FINANCE – A CROSS-SECTION OF THE FIELD",School of Business Administration, University of Belgrade, Čačanska banka ad Čačak
- 17- L.Yu, SH.Wang, K.K.Lai," An intelligent-agent-based fuzzy group decision making model for financial multicriteria decision support: The case of credit scoring," European Journal of Operational Research,2009, 195, 942–959
- 18-L.Yu, S.Wang, K.K.Lai," Credit risk assessment with a multistage neural network ensemble learning approach," Expert Systems with Applications, 2008, 34(2), 1434–1444.
- 25-Vranes, S., (1992). Expert System Shell Flexibility: BEST Case Study, in S. Tzafestas(Ed.) *Engineering Systems with Intelligence*, Kluwer Academic Publishers, (pp. 33-38).
- 27-W.R.J.Ho, C.L.Tsai, G.H.Tzeng, S.K.Fang,"Combined DEMATEL technique with a novel MCDM model for