A PROPOSED EXPERT SYSTEM FOR EVALUATING THE PARTNERSHIP IN BANKS

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ABSTRACT

Expert systems are no longer just a technology, but they have entered many fields of decision-making from these medical fields, for example, as they help in diagnosing the disease and giving treatment, and also in the field of administration, where they give the manager a rational decision to solve a problem and other fields, DSS is an interactive information system that provides information, models, and data processing tools to assist decision-making. Islamic banks such as commercial banks offer products and services to customers, but these banks face many problems and the most important ones are the problems financing where Islamic banks seek to participate in money rather than lending and interest the participatory financing system is one of the most important sources of financing within Islamic banks This system is based on the agreement between the Bank and the customer to participate in a new project or project already in place in the proportions that agree to by the bank and the client but this funding takes a long time and many actions so the researcher has built an expert system to reduce the time it takes to award Funding and also to reduce procedures as the expert systems have the ability to help the human element in making decisions. This paper presents expert systems in Islamic banks in the system of co-financing in order to save time and effort and maximize profit.

KEYWORDS

Expert systems, Decision support systems, Banks, Islamic banks.

1. INTRODUCTION

Expert systems are an emerging technology with many areas of potential applications. Expert systems are artificial intelligence (AI) tools that capture the expertise of knowledge workers and provide advice to (usually) non-experts in a given domain. Thus, expert systems constitute a subset of the class of AI systems primarily concerned with transferring knowledge from experts to novices.

Knowledge-based expert systems, or simply expert systems, use human knowledge to solve problems that normally would require human intelligence. These expert systems represent the expertise, knowledge as data or rules within the computer. These rules and data can be called upon when needed to solve problems. There are three main parts to the expert system:

Knowledge base, a set of if-then rules; working memory, a database of facts; inference engine, the reasoning logic to create rules and data. [1].

The expert systems of the most widely used artificial intelligence applications The popular since the first appearance of an expert system in the seventies of the last century, was a great success became so expert systems are used in the fields of medicine, engineering, and then spread to other fields of the administrative sciences and others. [2]

Experience systems are used in various areas, including:

The medical field, where it is used to diagnose medical illnesses and carry out surgical operations, Finance stock trading, the field of technology, as used in automatic control, Robot Control scientific field where he contributes to scientific experiments and inventions, entertainment area where used in video games. The expert systems have also been used in the area of finance in traditional banks to assess customer credit applications. Also used in marketing to make strategic marketing decisions within the enterprise.

The discovery and development of expert systems recorded since in the early 1970s until today. The unique characteristic of the expert system is an explanation capability to review its own reasoning and explain its decisions. It was built by extracting knowledge from human experts as shown in Figure.1 to be applied in a computer program for knowledge processing so that it can deal with quantitative and qualitative data. Compared to other conventional program that require sequences of step prescripted called algorithm, expert system more intelligent as human being that allow inexact reasoning and can deal with incomplete data. [3]

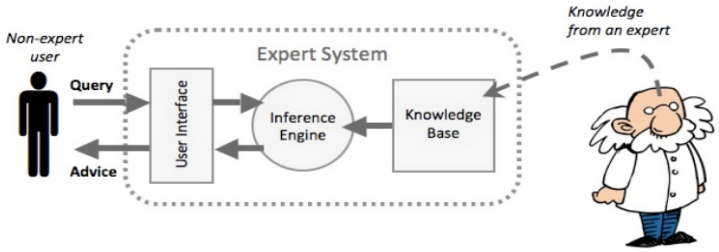

Figure 1: Simple diagram of expert system [3]

2. EXPERT SYSTEM

Expert system refers to the mechanism which has the capability of collecting core data, process on it, analyze, makea synthesis, perform operations, and provide the correct and accurate results which help to any individual or to any organization to take their best decisions. It is the specialized branch of Artificial Intelligence. [4]

3. EXPERT SYSTEM FOR CREDIT ANALYSIS

Expert System accumulates the knowledge of multiple human experts that give system more breadth that single person is likely to achieve, this reduces the risk of doing business, bank credit analysis and authorization depend on many factors and most of the decisions are made in a risky and uncertain environment, Such as, many of the banking structures are operated in macroeconomic instability, political uncertainty, they are working with different kinds of clients. For this reason during development of the system, it is necessary to take into account the factors related to the economic and political condition and the factors related to the clients. In many cases

the values of these factors are characterized by linguistic interpretability, uncertainty, fuzziness. Fuzziness of input information needs to apply fuzzy technology for information processing.[5]

4. CORE ACTIVITIES OF EXPERT SYSTEMS

Expert systems are used to solve different types of problems and do the festival of different activities These activities are Prediction where the expert's conclusion of the positions are given and the relevant to previous positions, Interpretation exposed mainly to describe derived from data collected by various means of monitoring data, Diagnostic these systems are diagnosing faults using evidence and information his work system design and style and described his performance and characteristics in order to infer the causes that lead to prolonged system.

5. COMPONENTS OF EXPERT SYSTEMS

Expert systems consist of a knowledge base, Inference engine, Explanation facilities, and User interface.

- Knowledge base

Contains the human expert in the form of an encrypted concept of the system.

- Inference Engine

It is a complex system that contains inference rules such as "if ... then ..." To reach the solution.

- Explanation facilities

Demonstrates the conclusions of the expert system since the user is very confident in the expert system decisions because the system database contains the experience provided by the human expert correctly.

- User interface

It is the link between the user and the system and contains a set of programs that gives the user the ability to provide system information.

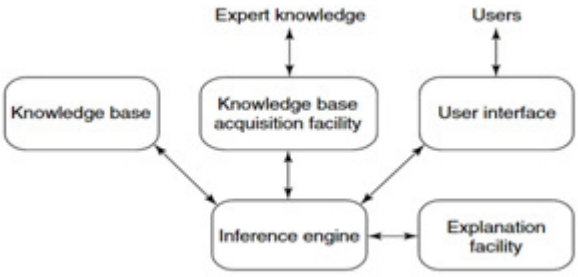

FIGURE 2:Architecture of a simple expert system. [6]

6. BENEFITS OF USING EXPERT SYSTEMS

The Expert Systems provide many advantages to humans, including that the expert systems combine the experience of many human experts to give more precise solutions than one person achieves. Expert systems can be used when human experts are available, the system is characterized by precision and no error because it enjoys with a good representation of knowledge, we can build more than one expert system in a little while, but when we train people, we take a lot of time. Helps solve problems because it looks at all odds, the ability of expert systems to review all transactions while human being able to review Sample only.

7. PROBLEMS OF USING EXPERT SYSTEMS

Human experts make mistakes all the time (people forget things, etc.) so you might imagine that a computer-based expert system would be much better to have around.

However, expert systems can do some problems such:

* Can't easily adapt to new circumstances (e.g. If they are presented with totally unexpected data, they are unable to process it)

* Can be difficult to use (if the non-expert user makes mistakes when using the system, the resulting advice could be very wrong)

* They have no 'common sense' (a human user tends to notice obvious errors, whereas a computer wouldn't).[7]

8. DECISION SUPPORT SYSTEMS

With the appearance and the development of new economic phenomena like diversification and globalization of world markets, the companies move in a more and more challenging environment. The result is that the strategic or political decision-making is increasingly complex (increase in the number of parameters to be taken into account). At the same time, the Enterprise must act quickly in order to maintain the lead position in its field. New information technologies make possible to conceive, particularly powerful and innovative information systems. All the users can reach strategic information by using the Info-centers and their tools. This enables the company to be more reactive; however, this brings new issues like confidentiality or need of skills for analysis.

The Info-centers of the Eighties, which worked directly with operational databases, had reached their limits in volume and quality of data processed, in the reduced capability of information analysis and the difficulty of usage for the decision-makers.

Decision support systems (DSS) can be defined as being information systems designed to support decisions- taking in the organization. , the key feature of the decision support systems can be explained as follows: decision support systems increase interaction between the manager and computer systems, and thus there won’t be a need for the manger to deal with decision support systems directly, decision support systems’ characteristics are represented through: supporting the

decision-making process, but not replacing it. It is organized by the middle and senior managements in the organization. It provides private data in all the aspects and areas that are related to the decision-making process. [8]

Moreover, the researcher sees that the decision support systems are can assist decision makers to solve Specific problem and make good decisions about problems that may be rapidly changing and not easily specified in advance.

As defined by the researcher. M. Ruxandra The Decision Support System (DSS) is a class of information systems (including but not limited to computerized systems) that support business and organizational decision-making activities. [9]

And also as defined by the researcher dr. tareq n. hashem information systems designed to support decisions- taking in the organization. [10]

Decision support systems can address human cognitive deficiencies by integrating various sources of information, and quick access to it.

9. COMPONENTS OF THE DECISION SUPPORT SYSTEM

There are three main components of the decision support systems as following:

1. Database Management System (DBMS). Stores large amounts of relevant data as it separates users from the physical aspects of the structure of the database and handles it with its ability to inform the user of the types of data available and how to access them.

2. Model-base Management System (MBMS). Converts data to useful information in decision-making.

3. Dialog Generation and Management System (DGMS). Is an easy-to-use interface for dealing with the form.

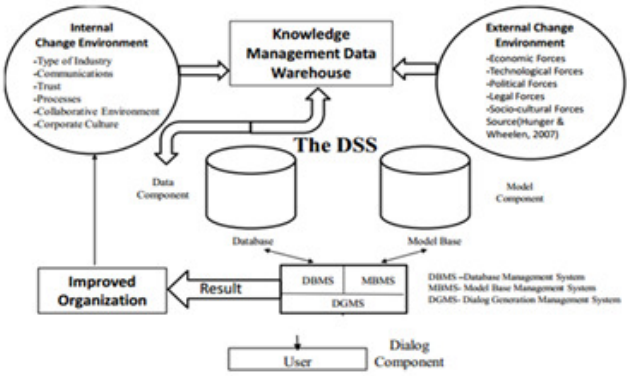

FIGURE 4:DSS Conceptual Framework [11]

10. USING DSS IN BANKS

According to the researcher Jinzi Gao , Ying Zhao where they said that there are four stages of decision making the first stage is the intelligence or the expansion of the problem that needs to be decided and then the design stage and here is the design of the model and ensure its validity and the third stage is to develop solutions and choose the best solution The fourth and final stage is the implementation (implementation of the decision). If successful, the problem is solved. If it is not successful, it will lead to a previous phase of the process. As see in figure 5.

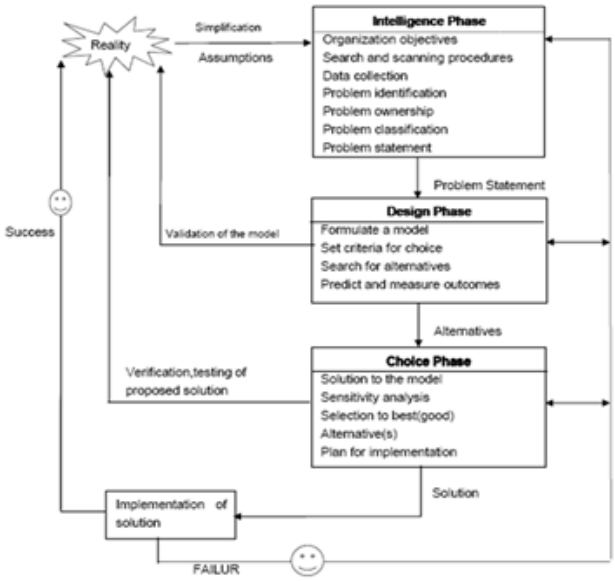

FIGURE 5: The Decision Making/Modeling Process [12]

11. IMPORTANCE OF EXPERT SYSTEM IN THE BANKING SECTOR

Several researches and studies dealt with expert systems in many fields, including the field of banks, which are the subject of interest in this paper.

Banks play an important and vital role in the development of the economy as they seek to provide the best products and services to their customers and in view of the participatory financing system we found it takes a long time and has many actions which hinder customers in requesting this kind of funding and for that reason the banks need some kind of help Technology that helps bankers to decide on funding to participate quickly and reduce the many actions.

The decision on participatory financing depends on many factors, including the customer's personal data. Financial situation of the client, guarantees provided total assets, liabilities etc. So this decision is in an uncertain environment full of the brain. The human expert who makes such a decision must possess professionalism, and extensive knowledge about the problem area and has the ability to retrieve information in a little time when you need it here comes the importance of expert systems that replaces the human expert, which would make the decision more precise and could store the decision taken until it was retrieved when needed.

The decision is made through the expert systems through the knowledge Base, which consists of "if then", in order to arrive at more precise conclusions and create a user interface and Merge them the knowledge base so that the user can use it so expert systems are a combination of computer technology and expert human experience.

12. BUILDING A PROPOSED ES FOR ISLAMIC BANKS

Through the knowledge of the problems of partnership (The time taken to grant a partnership decision, many actions, lack of highly qualified staff to make a partnership decision and their inability to retrieve many information) we can build an expert system of partnership in banks to reduce the time taken to take the decision of funding and limit the procedures. The system consists of five stages, these stages are the personal data of the client that contains (name, social status, level of education, residence and employment) the financial position of the client and contains (previous income, liabilities, foreclosure index, bank account, life insurance coverage and obligations), guarantees provided (contains the amount of financing, type of collateral, amount of collateral, insurance, credit card, life insurance), Type of funding (Serial number, account number and type of financing), After knowing all this information comes the fifth element is decision making The decision is divided into three decisions and are acceptable if the client is suitable and rejected if the client is inappropriate and consult the president in case in sufficiency, and then the final stage of decision making each of these stages will be explained separately.

12.1 DESIGN PHILOSOPHY

In order to build system you need to know why we're building. In this paper, an expert system is being built to take a decision on participatory financing in a short time; with less procedure and in order to build an expert banking system, we have to do a bunch of tasks, including a bank study, and a review of bank reports. The policies of the central Bank are reviewed and, after the collection of these documents, we analyses and classify them and thus acquire knowledge through field experts and here the Riyadh model is done for the system and then build the database to include all the data collected and then create the user interface and merge it with the base Data so that the end user can use it through the database, all data and information are kept until they are retrieved in similar cases when needed at a later date.

12.2 VARIOUS FLOWS USED IN THE DESIGN STAGE

These flows provide a clear picture of the System. They gave all information needed to understand how the proposed partnership system works. These flowsare used to describe the status and processes of the system.

12.2.1 FLOW CHART OF EXPERT SYSTEM

The flow chart of the form begins with the profile of the customer and then the type of funding and its financial position. Here we have two things. Firstly, either the financial situation is not appropriate in this case, the president should be consulted. The second thing is that the financial situation of the client is appropriate at this stage. The system turns to theguarantees provided. In this case there are two opinions. The first is that the guarantees provided are not sufficient. In this case, the president should be consulted. The second opinion is that the guarantees are sufficient and the decision will be accepted or rejected based on the previous client's data.

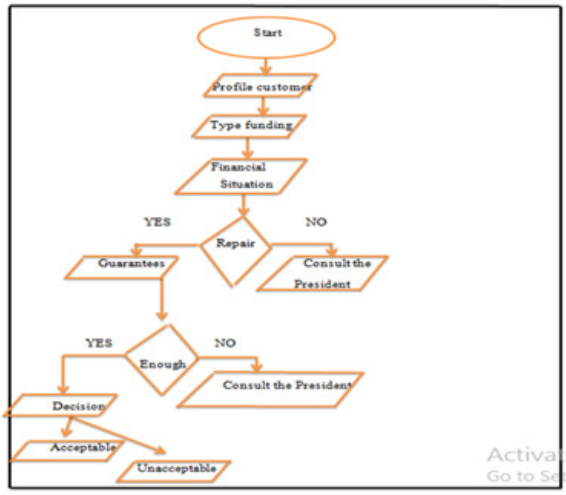

FIGURE 6: Flow chart of ES in Islamic Banks

12.2.2 PROPOSED EXPERT SYSTEM FRAMEWORK

The system consists of five elements, the first element previously the personal identity of the client that contains the name, social status, level of education, residence and employment. The second element is the financial position of the client and contains the previous income, liabilities, foreclosure index, bank account, life insurance coverage and obligations. The third element is collateral and contains the amount of financing, type of collateral, the amount of collateral, insurance, credit card, life insurance. The fourth element is the type of financing, Serial number, account number and type of financing After knowing all this information comes the fifth element is decision making The decision is divided into three decisions and this acceptable if the client is suitable and rejected if the client is inappropriate and consult the president in case of insufficiency.

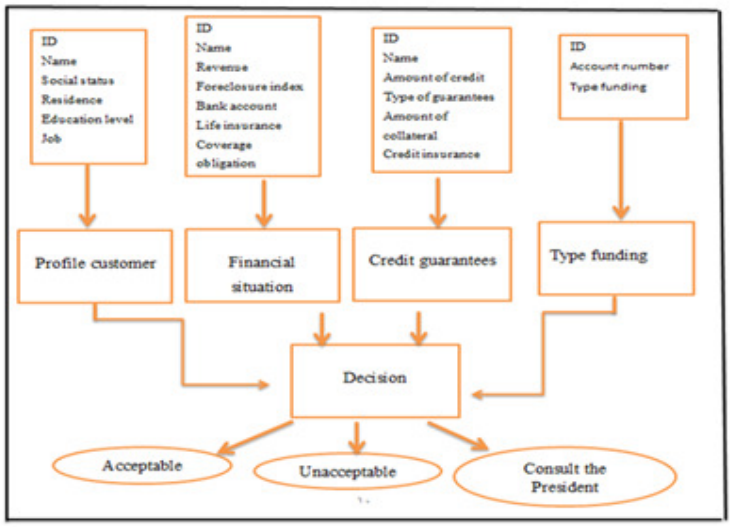

FIGURE 7: Proposed Expert System Framework

13. APPLYING THE PROPOSED ES FOR ISLAMIC BANKS (CASE STUDY)

There is cooperation between information technology and the economy, but the contribution of modern technology is very small, the researcher decided to focus on financing in Islamic banks, specifically the system of co-financing.

The researcher has found that our financial problems within the Islamic banks because there is a weakness in the decision to finance where this decision is based on the profit or loss of the bank. These problems have been occurring according to the large number of funding requests and also the lack of experts in the field of banks to solve these problems. Thus, the construction of an expert system was proposed to keep relevant knowledge to be used in similar cases to support in making the decision as the main objective of building an expert system is to provide expertise to the decision maker.

Where a sample was drawn from an Islamic bank that has been working for a long time. This sample has answered the questionnaire.

13.1 DATA COLLECTION

The main objective of this system is to reduce the time taken to grant the system of partnership and reduce its procedures in Islamic banks. The collection of data serves the proposed system in identifying the problems of co-financing in the service provided to them.

In the survey, there are different sources. The most widely used data collection methods are questionnaires, interviews and direct observations. In this paper, the questionnaire method was selected as a primary method of data collection. Because the questionnaire is the most appropriate method for this paper. In this paper to find out customer feedback on the quality of service provided to them through participatory funding.

13.2 CUSTOMER REQUIREMENTS

By replying to the questionnaires, the need for a participatory financing expert system was identified, due to the following reasons:

- Minimize the time taken to grant a participatory funding decision
- Reduction of participatory financing procedures
- Employees are not eligible to make a participatory funding decision because they cannot retrieve information on different intervals
- To prevent manipulation or mediation

13.3 APPLING PROPOSED ES FOR ISLAMIC BANKS

There are two key elements to building an expert system to evaluate and support the decision to finance banks. The first element is to acquire knowledge to build a database and the second element is to integrate the database with the end user interface.

In cooperation with the human expert who is making the decision to finance and be made a bank study, and a review of bank reports. The policies of the central Bank are reviewed and, after the

collection of these documents, we analyses and classify them and thus acquire knowledge through field experts and here the Riyadh model is done for the system and then build the database to include all the data collected and then create the user interface and merge it with the base Data so that the end user can use it through the database, all data and information are kept until they are retrieved. As in figure (8).

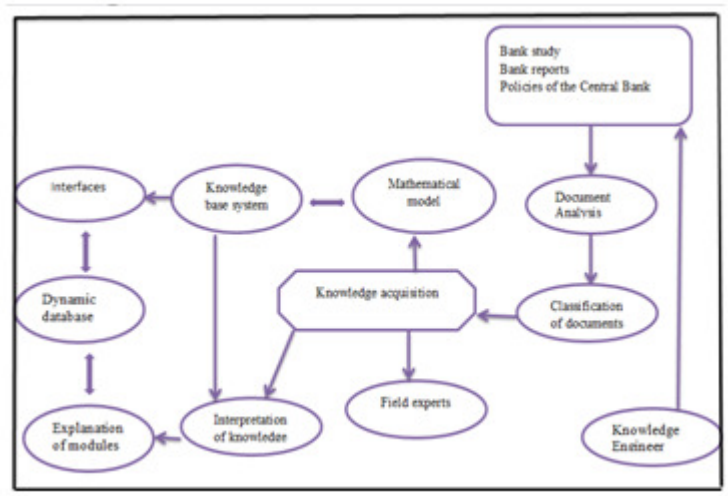

FIGURE 8: Proposed ES for Islamic Banks

The system deals with client-related aspects such as personal data, financial position and collateral provided. These data are then processed and the funding decision taken. The proposed system can be described as follows:

1. Apply for participatory financing and determine whether it is acceptable, rejected or consulted by the President.
2. Evaluate the customer file well.
3. Know and evaluate the customer's financial situation.
4. Knowledge of the guarantees provided and evaluated.
5. Search applying in the database to find solutions.
6. Save the decision after evaluation in the database.

13.4 APPLING EXPERT SYSTEM IN ISLAMIC BANKS

Research Population: The study aims to evaluate the financing of participation in Islamic banks. The researcher will take a random sample of customers who use the system of co-financing. The sample size is as follows: 390 sample.

46 forms not received 344 incoming forms, 38 damaged forms, 306 valid forms for analysis. The questionnaire was designed to evaluate the procedures and the time taken to grant the system to the customers. The questionnaire was divided into two parts: the first section concerned with the personal data of the customers and the second part concerned with a set of evaluation criteria for the system of participation financing. The Likert scale was used to answer these criteria. During (Strongly Agree, Agree, Neutral, Disagree ،Strongly Disagree) Where Strongly Agree gave her

number 5, Where Agree gave her number 4, Where Neutral gave her number 3, Where Disagree gave her number 2, Where Strongly Disagree gave her number 1.

so, the proposed expert system can save the, reduce procedures, an expert system was developed through the questionnaire the system consists of five elements of the first element and is the interface of the system where it contains four buttons of the first button order that opens the Profile customer and the second he opens the element of the Type funding and the third one opens the financial situation element for the fourth Guarantees of financing element opens The fifth button closes the program.

FIGURE 9: The main screen of the program

14. CONCLUSION

The main objective of this paper is to reduce the time spent in evaluating participatory funding requests and limiting procedures using AI techniques.

The expert system is able to replace the role of the human expert in the process of evaluating requests for funding to customers and also able to terminate or limit the procedures of requests for funding. Expert systems can also make optimal decisions as well as human experts because they are able to search within the database and retrieve previous solutions. This is difficult for the human expert. It can be said that expert systems are valuable information about previous solutions in the participatory finance process. The expert finance system will have a significant impact on participatory financing decisions.

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