

Expert System Design For Computer Based Banking Management	العنوان:
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ملخص البحث

تقدم الرسالة دراسة تفصيلية لكيفية تطوير معدلات الأداء للساده مديري المواقع المختلفه بينك التتميه والائتمان الزراعى (بنك محافظة كفر الشيخ) وذلك من خلال تصميم نظام خبير لإدارة الأعمال البنكيه باستخدام أجهزة الحاسب الآلى التى تم تركيبها وتشغيلها بفروع البنك وبنوك القرى التابعه له وتدعيم هذا النظام بنموذج المنطق الملتبس لمساعدة المدير المسئول فى اتخاذ القرار الرشيد. ومن أهم الدوافع التى دفعت الباحث للقيام بهذا البحث ما يلى:

- ◆ البنك لا يوجد به نظام تكاليف متكامل ليضمن تحميل كل نشاط من الأنشطة التى يعمل فيها بالمبالغ المدرجه فى الخطه من خلال مجموعه من الضوابط والمعايير التى تضمن تحقيق الربحيه وبالتالي تكون عمليات تقييم معدلات الاداء معتمده على خبرة مدير الموقع وتختلف من موقع الى اخر.
- ◆ الصعوبه فى امداد مدير الموقع بالبيانات التحليليه اللازمه لاتخاذ القرار المناسب لأى مشكله فى التوقيت المناسب. الامر الذى قد يودى الى عدم مسايرة ادارة البنك للتطور التكنولوجى فى الفكر الادارى فى ظل الحاسب الآلى والذى تنتهجه المنشآت المنافسه التى تعمل فى نفس مجال العمل البنكى.

تتكون الرساله من أربعة أبواب:

الباب الأول :

يحتوى على مقدمه عن الأنشطة الرئيسيه التى يعمل فيها البنك (الأنشطة محل الدراسه) وهى (الائتمان الزراعى - الائتمان الأستثمارى القصير - الائتمان التجارى - الائتمان الأستثمارى المتوسط و الطويل - النشاط السلى و النشاط المصرفى).

الباب الثانى:

يعرض النظام الادارى بالبنك شاملا الأهداف والخطط التى يجب أن تنفذ خلال العام. كما يستعرض الأدوات والعدد التى سوف يقوم الباحث باستخدامها لتصميم النظام المتكامل من نظم الخبره ونموذج المنطق الملتبس وتوضيح كيفية التعامل معها. ولكن نظرا لصعوبه المشكله وتعقدها وتداخلها لكثرة عدد الفروع وبنوك القرى بالإضافة الى خضوعها الى حالات عدم التأكد عند تنفيذ وتسويق الأنشطة الأمر الذى جعلنا نفكر فى الأستعانه بخبرة الساده مديري المواقع والمسئولين لتصميم هذا النظام.

الباب الثالث:

فى هذا الباب نعرض التجارب العمليه التى تم تنفيذها وهى:

(١) -تصميم برنامج بلغة (Visual Basic) تم تسميته إدارة البنك بالأهداف (MBO) يعرض لنا نسب التحقيق الفعلية لجميع العمليات المتعلقة بكل نشاط وهى (المنح - التحصيل - الأيرادات والتكاليف).

(٢) - تصميم نظام خبير لتطوير مستوى أداء العمليات البنكية بالاستعانة بأفكار وخبرات السادة العاملين المشهود لهم بالكفاءة فى مجال العمل البنكى من الأداره الوسطى والأشرفيه ومديرى الإدارات المختلفه (أى من لهم سلطة اتخاذ القرار بالبنك).

(٣) - تم تجميع هذه الافكار والمعلومات وتكويدها فى صورة نتائج مبوبه لتقابل معظم الاحتمالات التى قد يتعرض لها أى نشاط من نسب (المنح أو التحصيل أو الايرادات أو التكاليف) لكى تعرض أمام مدير الموقع فى صورة رسائل توضح نسب التحقيق الفعلية وتعرض نقاط الضعف فى تنفيذ الخطه كل فترة تقييم (نصف شهريه - شهريه - نصف سنويه أو سنويه) , فيقوم مدير الموقع بتلافى هذه الاخطاء فى التنفيذ للوصول الى الأمثليه فى تحقيق الأهداف فى صورة اتخاذ قرارات تحقق الأمثليه المرجوه.

(٤)- تم تحسين أدوات اتخاذ القرار الأمثل من خلال ادخال الانحرافات فى تحقيق خطة الايرادات والتكاليف الى نموذج المنطق الملتبس لتعديل مسار الخرج بالكم والكيف الذى يضمن تحقيق الربحيه الرشيده.

(٥)- تم عرض نتائج النظام المصمم على بعض الساده مديرى المواقع، حيث توافقت مع توقعاتهم بالإضافة الى زيادة إحساسهم بمدى التطوير الذى حققه النظام بعد تنفيذه.

الباب الرابع:

♦ يشتمل على نتائج البحث ونبذه عن نقاط البحث المطروحه لحلها مستقبليا.

بذلك يكون نظام الخبير المصمم أداءه قويه ومثمره تحت تصرف مدير الموقع لكى يقوم بتقويم مستوى أدائه البنكى ويدير موقعه بالطريقه التى تحقق أهدافه إدارته بما يضمن تحقيق أهداف البنك الأم.

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El- Mansoura University
Faculty of Engineering
Computers & Systems Engineering Dept.

EXPERT SYSTEM DESIGN FOR COMPUTER BASED BANKING MANAGEMENT

A Thesis submitted
In Partial Fulfillment of The Requirement For The Degree of
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In
“ Control Engineering ”

BY
Eng. Adly Rashed Ghallab
Mis. Supervisor in bank of
Development, Agriculture and Credit

Under Supervision Of

Prof.Dr. KAMEL SOLIMAN
Computers & Systems Eng. Dept.
Faculty of Engineering
El- Mansoura University

Ass.Prof.Dr. YEHIA ENAB
Computers & Systems Eng. Dept.
Faculty of Engineering
El- Mansoura University

1998

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

"فأما الزيد فيذهب جفاء
وأما ما ينفع الناس فيمكث في الأرض"
"وأما ما ينفع الناس فيمكث في الأرض"

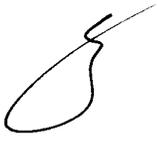
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**THESIS TITLE : EXPERT SYSTEM DESIGN FOR COMPUTER
BASED BANKING MANAGEMENT.**

SEARCHER NAME : Adly Rashed Ghallab.

SUPERVISORS :

NO.	NAME	POSITION	SIGNATURE
1	Prof.Dr. KAMEL SOLIMAN	Prof.Dr. - Computers & Systems Engineering Department. Faculty of Engineering. Mansoura University.	
2	Ass.Prof.Dr. YEHIA ENAB	Ass.Prof.Dr.Computers & Systems Engineering Department. Faculty of Engineering. Mansoura University.	

EXAMINATION COMMITTEE

THESIS TITLE : **EXPERT SYSTEM DESIGN FOR COMPUTER
BASED BANKING MANAGEMENT.**

SEARCHER NAME : **Adly Rashed Ghallab.**

EXAMINATION COMMITTEE :

NO.	NAME	POSITION
1	Prof. Dr. Ebrahim El-Saied Zedan.	Dean of Faculty of Engineering. Zagazig University.
2	Prof. Dr. Fayez Fahmy Gomaa Areed.	Head of Computers & Systems Engineering Department. Faculty of Engineering- Mansoura University.
3	Prof. Dr. Kamel Mohamed Soliman.	Prof. Dr. - Computers & Systems Engineering Department. Faculty of Engineering- Mansoura University.
4	Ass. Prof. Dr. Yehia Mohamed Enab.	Ass. Prof. Dr. - Computers & Systems Engineering Department. Faculty of Engineering- Mansoura University.

EXAMINATION DATE : / / 1998

THESIS GRADE :

SIGNATURES :

NO.	NAME	SIGNATURE
1	Prof. Dr. Ebrahim El-Saied Zedan.	
2	Prof. Dr. Fayez Fahmy Gomaa Areed.	
3	Prof. Dr. Kamel Mohamed Soliman.	
4	Ass. Prof. Dr. Yehia Mohamed Enab.	

Signature
Dean of Faculty of Engineering

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Adly Rashed Ghallab.

SUMMARY

The problem in hand is in Kafr-El-Sheikh bank of development agriculture and credit. This bank consists of ten branches, each branch contains a number of villages, each village organization is interested in six activities. These activities differ primarily in their expected profit depending on the manager experience in decision making against problem manipulation related to achieving the bank aims and objectives.

The bank haven't any integrated cost system to be applied in the different management levels inside it, that system helps to achieve the bank aims by providing the most efficient banking services to clients and improving the manager decision making in critical cases, and the financial work depends only on the classical human-based financial accounting system.

In order to improve the bank manager decision making (optimization of decision) through optimization of profit of the bank activities, i.e. achieve the best possible result considering the restrictions, we must think of the recent management science tools for carrying our constrained optimization.

Since the problem is not only complicated but also suffer of uncertainty, then we must improve the research trends taking into account the bank experts ancient history knowledge for designing the expert system to solve this complicated model, holding the optimal decision making, and reinforcing the results using the fuzzy logic model technique.

All these goals are manipulated by means of :

- ◆ Software design called (**Management By Objective**) to expose the verified ratio per activity.
- ◆ Design the expert system to expose the final results in the form of messages on the computer screens including a directional notes to guide the manager behavior, which are compatible with the bank experts knowledge.
- ◆ Modulate the expert system output through the fuzzy logic model, which helps the manager to take the optimal decision for verifying the optimal profit close to that of nature.

Now, the researcher summarizes the thesis Organization as follows:

This thesis contains four chapters. In chapter one, a general view about the bank of Development, Agriculture and Credit management containing it's building, constructions and activities. Also, contains the statement of the problem in hand and shows briefly how to solve it effectively by means of higher technology of expert systems and fuzzy logic models.

In chapter two, an over view of the fundamentals of the bank management system includes aims and objectives. Also, contains the designed algorithm using higher techniques of expert system merged with fuzzy logic model.

In chapter three, development of the bank current state management by originally design "a Visual Basic-program" to expose the net results essential for taking an effective decisions in the form of ratios.

Another progressive development is achieved by building an expert system program with the help of bank supervisors and managers (experts) which modifies the initial program (VB. program) results so that, broaden a suitable warning messages to illustrate the weakest points with respect to every activity of all bank activities at once. Then reinforcing the last program by linking it by a newer technique of fuzzy logic model, which insures actual modulating of output on condition that, achieve bank year corporate plan with satisfactory profit and gain, and this guidance appears as decisions in the previous messages.

In chapter four, conclusions and suggestions for the future work are introduced.

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LIST OF REPRESENTATIVE ABBREVIATIONS

- BU = Branch usable and planted acreage area.
- BP = Branch year corporate plan.
- B_iA = The Agriculture activity year plan per branch.
- B_iS = The short credit activity year plan per branch.
- B_iC = The commercial credit year plan per branch.
- B_iM = The medium and long credit year plan per branch.
- B_iPC = The product activity credit year plan per branch.
- B_iD = The deposits year plan per branch.
- B.D.A.C. = Bank of Development, Agriculture and Credit.
- MBO = Management By Objectives program.
- FAM = Fuzzy Associative Memory.
- DOF = Degree Of Fulfillment.
- E_g = The percentage error ratio of Gift.
- E_t = The percentage error ratio of Harvest.
- E_i = The percentage error ratio of Income.
- E_c = The percentage error ratio of Cost.
- E_{gain} = The percentage error ratio of Gain.
- Harvest = Gather the payable bank liquidity from clients.

CHAPTER ONE

INTRODUCTION

CHAPTER ONE

INTRODUCTION

This chapter covers some important points. First, description of the field study at the bank showing bank activities, constructions and capabilities of employees. Second, the research motivation and the problem formulation showing how to solve it efficiently.

1.1 THE FIELD STUDY BANK DESCRIPTION

1.1.1 The Bank Activities

The bank must commitment and execute the government policies through the credit services facilities prepared for clients and agents (usually high percentage of them are farmers). From the last statistical report magazine, we find that the bank dealers number are of 200108 clients having an agricultural area of 534804 acres in our state of Kafr-El-Sheikh which are devided as follows :

- (1) The credit areas : 354578 acres.
- (2) The repairation areas : 63922 acres.
- (3) The plantation areas : 116304 acres.

The total areas : 534804 acres.

The bank clients plant the agricultural areas according to the crop composition certified by means of the agriculture ministry as illustrated below in the season of 1996-1997:

105920	cotton acres.
166128	wheat acres.
171785	clover acres.
024815	sugar crops acres.
034902	bean acres.
011976	vegetables acres.
009826	gardens acres.
009452	another crops acres.
<hr/>	
534804	total acres

From this brief introduction we find that every client have only an average agricultural area of 2.6 acres. With the continuous increasing of the population and sharp increase of daily life cost, this requires an increase of this smallest agricultural area productivity, to help the client (the farmer) to live under a social security.

From this view point, the bank role becomes essential for :

- (1) Increasing the credit and deposit facilities for these clients, which is called the overall development aims for production maximization.
- (2) Plenty of production necessity in different forms.
- (3) Plenty of liquidity in order to help them to make a smallest projects.
- (4) Keep their attention to invest their savings , so that serving their needs and specific goals.

In accordance, the bank administration creates and origins the different distributed activities to present suitable services for clients and label them as follows :

- (1) Agriculture credits.
- (2) Short credits for different purposes.
- (3) Commercial credits.
- (4) Medium and long credits.
- (5) Product activity.
- (6) Deposits.

1.1.2 The Bank Buildings And Constructions

The bank consists of branches, villages and deposit units as shown in Table (1.1). In addition, there is a future corporate plan of construction of another ten new villages and nineteen bank offices at the deposit units.

1.1.3 The Bank Employees

i- Employees number :

- * The maximum allowed number of employees = 1965 employee.
- * The actual number of employees = 1589 employee.
- * The (actual / allowed) ratio = 80.87 %

ii- Employees classifications:

- * High education = 285 employee.
- * Technical education = 064 employee.
- * Medium education = 766 employee.
- * Under medium education = 088 employee.
- * Without education = 386 employee.

Total = 1589 employee.

Number	Description
10	Branches : (Kafr-El-Sheikh, Desok, Kaleen, Fowa, Motubs, Sedi-Salm, El-Raid, Balteem, El-Hamool and Beiala).
55	Villages : (every branch having number of villages follow it)
53	Deposit units : (distributed inside the bank geographical area for introducing services to clients in hand)

Table (1.1) The bank structure

From these data, it is cleared that the bank works in a huge number of branches, villages and deposit units, which are distributed inside the geographical area of the state, on contrast, with the low level of education, and lowest rate of the conversion training procedure for officers so that they can become contributed employees in a minimum amount of time and be qualified to execute the bank corporate plan of activities “ the ratio of this kind of employees to the total number of employees is only 48 %”.

In accordance, the bank administration makes some decisions to provide the most efficient and commitment with an innovation professional banking services to customers, clients, government, unions and other groups as follows:

- (1) Generalize the automation system inside all branches of the bank.
- (2) Provide each branch with a staff of training and experienced people so that, they can be familiar with the computer systems.
- (3) Put the management by objective system into consideration to be applied by the branch managers to achieve the bank aims.
- (4) Execute the bank year corporate plan using computer systems ..

a- The year corporate plan designed by the budget administration with respect to the whole bank and with respect to each bank .

b- Each plan contains all activities concerned by the bank as illustrated in (1.1.1).

c- Each activity plan must be divided to a number of subplans concerned with it as follows:

- 1) - Gift plan . 2) - Harvest plan .
- 3) - Income plan. 4) - Cost plan .

(We must illustrate these activities in details in chapter three).

1.2 RESEARCH MOTIVATION

The bank haven't any integrated cost system to be applied in different management and organizational levels inside it beginning from villages to the main bank. The financial work depends only on the financial accounting system. This leads to difficulty of preparing the required analytical data and provide it to the bank management to define the main reasons of profit decreasing of certain activity during a period of time (monthly say). Hence, we find ourselves "under the progressive methodology of bank management" Forced to render obedient the higher technology of automation to overcome this problem, by preparing a complete report about the results of accomplishment of bank activities showing that if the bank aims and objectives are achieved or not every month and at the end of the financial year.

This technology can be easily carried out by designing a program for "management by objectives banking system" and with the helpful of an expert system showing the shortcoming in every activity and reinforcing the designed system by modulating the output in order to verify the bank aims and promote the policy consistent with good customer (client) services using a newer technology called "Fuzzy logic model" as seen in chapter three.

The treatment of the problem by means of this technology must consequently verify the suggested integrated cost system aims and also the bank aims in the form of :

- (1) Control all different cost elements (origins) with respect to all management functions.

- (2) Provide the required data and the suitable information needed for sensitive planning of various credit programs and planning to pull the maximum number of deposits with minimum costs.
- (3) prevention and execution of income bleeding and insufficiency usually occurring during the exhaust of activities or deposit functions through the actual cost ratios.
- (4) Present the most profitability activities, which appear from the difference between truth values of income and cost related to each activity.

1.3 PROBLEM FORMULATION

The research objective of is to improve the bank manger decision making through optimization of profit of the bank activities on subject to the constraints that resource availabilities are not exceeded. This means that we need to achieve the best possible results considering that restrictions, then the constrained optimization has been the most active area of the management- science research which can be solved using the most common management science tools as linear programming to produce the optimal answer to a mathematical problem posed by the model.

The terms constrained optimization and mathematical programming are often used to describe the same general model. Although the explicit meaning of this model can be described in words, the symbolic or mathematical representation is the most unambiguous way to depict all that it says.

In symbolic form, the constrained optimization model is

$$\begin{array}{l}
 \text{maximize (or minimize) } f(x_1, x_2, \dots, x_n) \\
 \text{subject to the constraints that} \\
 \qquad \qquad \qquad \leq \\
 g_1(x_1, x_2, \dots, x_n) \{ = \} b_1 \\
 \qquad \qquad \qquad \geq \\
 \qquad \qquad \qquad \leq \\
 g_2(x_1, x_2, \dots, x_n) \{ = \} b_2 \\
 \cdot \quad \cdot \quad \cdot \quad \geq \\
 \cdot \quad \cdot \quad \cdot \quad \leq \\
 g_m(x_1, x_2, \dots, x_n) \{ = \} b_m \\
 \qquad \qquad \qquad \geq
 \end{array}$$

When all the functions in this model are linear, we have the important special case of a linear programming model [1]. The function f is called the objective function Or the payoff function, or simply the return. The model states that the problem is to make the value of this function as large (or as small) as possible, provided that the constraints, or restricting conditions, are also satisfied. The value of the objective function is often measured in quantities like dollars of profit (in a maximization problem) or dollars of cost (in a minimization problem). The variables x_1, x_2, \dots, x_n are called decision variables. The numerical values of the decision variables represent actions or activities to be undertaken at various levels. The decision maker has the values of these variables under his direct control. Any choice of these values indirectly assigns a numerical value to the objective function. The functions g_1, g_2, \dots, g_m are called constraint functions. Any selection of numerical values for the decision variables also, indirectly assigns values to the constraint functions. The model requires that each of these constraint

functions values must satisfy a condition expressed by a mathematical inequality or an equality. The first constraint, for example, is one and only one of the following conditions:

$$g_1(x_1, x_2, \dots, x_n) \leq b_1$$

$$g_1(x_1, x_2, \dots, x_n) = b_1$$

$$g_1(x_1, x_2, \dots, x_n) \geq b_1$$

Where b_1 is a parameter with a specified numerical value. In other words, a constraint is a mathematical equality or inequality which must be satisfied. The numbers b_i , $i = 1, 2, \dots, m$ are called the right-hand sides. The number b_1 is called the right-hand side of the first constraint, and so on.

The set of all m of the constraints taken together, that is, the group of relations

$$g_i(x_1, x_2, \dots, x_n) \begin{cases} \leq \\ = \\ \geq \end{cases} b_i \quad i = 1, 2, \dots, m$$

indirectly restricts the values that can be assigned to the decision variables.

This choice of decision will be forbidden by the model, when it violates one of the constraints. The model will consider only those decisions that satisfy all the constraints.

The bank considered as a case study in this research, consists of ten branches, and each branch contains a number of villages each of them have a certain amount of agricultural area (usable acreage) and a supply of labor to plant and tend the crops through the agricultural and investment credits. The data for the upcoming season of 1996-1997 are as shown in Table(1.2).

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Soliman, Kamel M., Enab, Yehia M.(Super)	مؤلفين آخرين:
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جامعة المنصورة	الجامعة:
كلية الهندسة	الكلية:
مصر	الدولة:
Dissertations	قواعد المعلومات:
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https://search.mandumah.com/Record/536223	رابط:



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تصميم نظام خبير لإدارة الأعمال البنكية باستخدام الحاسب الآلى

البحث مقدم للحصول على درجة الماجستير فى
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إعداد

مهندس / عدلى راشد غلاب
مراقب الحاسب الآلى
بنك التنمية والإئتمان الزراعى

إشراف

أ.م.د. / يحيى محمد إسماعيل عنب
قسم هندسة الحاسبات والنظم
كلية الهندسة - جامعة المنصورة

أ.د. / كامل محمد سليمان
قسم هندسة الحاسبات والنظم
كلية الهندسة - جامعة المنصورة

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El- Mansoura University
Faculty of Engineering
Computers & Systems Engineering Dept.

EXPERT SYSTEM DESIGN FOR COMPUTER BASED BANKING MANAGEMENT

A Thesis submitted
In Partial Fulfillment of The Requirement For The Degree of
MASTER OF SCIENCE
In
“ Control Engineering ”

BY
Eng. Adly Rashed Ghallab
Mis. Supervisor in bank of
Development, Agriculture and Credit

Under Supervision Of

Prof.Dr. KAMEL SOLIMAN
Computers & Systems Eng. Dept.
Faculty of Engineering
El- Mansoura University

Ass.Prof.Dr. YEHIA ENAB
Computers & Systems Eng. Dept.
Faculty of Engineering
El- Mansoura University

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