أثر تطبيق نماذج بحوث العمليات في تحسين كفاءة نظم المعلومات المحاسبية في المصارف التجارية

م.د محمد زهير مجيد
م.د زينب علاء حميد
جامعة المصطفى/ كلية الإدارة والاقتصاد

ECONOMICS AND ADMINISTRATIVE STUDIES JOURNAL (EASJ)
EISSN: 3005-3625, PISSN: 2790-2560, DOI: http://doi.org/10.58564/EASJ/5.1.2026.7

أثر تطبيق نماذج بحوث العمليات في تحسين كفاءة نظم المعلومات المحاسبية في المصارف التجارية

The impact of applying operations research (OR) models on improving the efficiency of accounting information systems (AIS) in commercial banks

م.د محمد زهير مجيد*
م.د زينب علاء حميد
جامعة المصطفى/كلية الإدارة والاقتصاد

Assistant Teacher Dr. Mohammed Zuhir Majeed*
Assistant Teacher Dr. Zainab Alaa Hameed
Al-Mustafa University /Administration and Economics College

تاريخ الاستلام: 2025/03/23 تاريخ القبول: 2025/04/10 تاريخ النشر: 2026/03/01
Received: 23/03/2025 Accepted: 10/04/2025 Published: 01/03/2026

المستخلص:

يهدف البحث إلى بيان أثر استخدام بحوث العمليات على فعالية نظم المعلومات المحاسبية من وجهة نظر إدارة الوحدات الاقتصادية. وقد تم توزيع 100 استبانة على مجتمع البحث المكون من محاسبي الوحدات الاقتصادية، حيث تم الاعتماد على 70 استبانة منها واستبعاد الباقي. وقد توصل البحث إلى مجموعة من النتائج، أهمها وجود علاقة تأثير ذات دلالة إحصائية عند مستوى دلالة (0.05) لاستخدام بحوث العمليات في نظم المعلومات المحاسبية في توفير البيانات المناسبة لعملية اتخاذ القرار.

الكلمات المفتاحية: بحوث العمليات، فعالية نظم المعلومات المحاسبية.

Abstract:

Abstract: The aim of the research is to show the effect of using operations research (OR) on the effectiveness of accounting information systems (AIS) from the point of view of economic unit management. 100 questionnaires were distributed to the research community consisting of accountants of economic units. 70 questionnaires were relied upon and the rest were excluded. The research reached a set of results, the most important of which is that there is a statistically significant effect relationship at a significance level (0.05) for the use of operations research in AIS in providing appropriate data for the decision-making process.

Keywords: Operations research, accounting information systems.

*Corresponding Author: Mohammed Zuhir

EISSN: 3005-3625, PISSN: 2790-2560, DOI: doi.org/10.58564/EASJ/5.1.2026.7

1. Introduction

Banking services are one of the most prominent concerns of the modern era, as banks play a very important role in the economic field, and the importance of banks and the services they provide is increasing, which helps in preserving the national economy of the country, as well as protecting the money of society, individuals and investors from individuals and companies, but these services and their importance need to be developed, followed up and measured for the accounting systems used in these economic units, to reach a more efficient and effective banking service that helps in facilitating the provision of services to society, and also helps management in making appropriate and more accurate decisions by evaluating the impact of using OR in developing AIS. The survival and continuity of these units also depends on the accuracy and accuracy of the decision and the comparison between alternatives through the use of operations research in the AIS used in them [1][3].

Given the importance of the financial status of the individual, society and economic units, it is necessary to pay attention to the social aspect, and this can only be achieved by using operations research and AIS. Given the tangible development in all economic units, it is necessary to develop these systems by adding some accounting methods to reach a high degree of efficiency and effectiveness for these systems, which enables the provision of a banking service that is easier and more accurate, helping administrative levels to make the best decisions [11].

In light of the challenges of the great technological progress that has begun and is accelerating, it has become obligatory for all users of AIS in all banks to provide sufficient data related to the problem in order to obtain accurate statistical information, which they can rely on in using quantitative analysis methods in the financial and banking departments due to the huge size of modern economic unit projects [10].

As administrative problems have become highly complex, and traditional methods that rely on personal experience are no longer sufficient to overcome them, it is necessary to know the impact of developing AIS and the expected risks in banking financing for banks. As a result, there is an urgent need to develop the skills of managers at various modern administrative levels. Based on the above, the basic question is: Does the use of operations research affect the effectiveness of AIS by providing the most appropriate information for the decision-making process in private banks [1]?

The research achieves the main objective, which is to study and analyze the impact of the use of OR on the effectiveness of AIS in private banks.

Zahra, Abbas and Jamal (2016) The importance of the study is attributed to the decision-making process, as it effectively contributes to the profitability of banks, increasing capital and strengthening public confidence in the banking sector, as well as reducing banking risks. The researchers concluded that the bank places great importance on the use of operational research and that the decision-making process in Algerian banks is of high quality [11]. Al-Fadel, Abdul Razzaq and Al-Jaali (2019) sought to study the impact of computerization of the accounting system on accounting information in commercial banks. Among the results achieved by the researchers: the management of electronic systems reduces errors and embezzlement operations and helps in relations with other economic institutions, the need to pay attention to electronic systems, which makes accounting information more reliable and

EISSN: 3005-3625, PISSN: 2790-2560, DOI: doi.org/10.58564/EASJ/5.1.2026.7

the need to develop the internal performance of economic institutions [1]. Saad El-Din, Shawky (2019) The researchers sought to study the impact of the efficiency and effectiveness of electronic accounting information systems on improving performance evaluation in Egyptian commercial banks. The research results concluded that there is a statistically significant relationship between the efficiency and effectiveness of electronic accounting information systems on improving performance evaluation in Egyptian commercial banks [7]. Sahil, Fulan (2021) The researchers sought to highlight the basis and role of the accounting information system, to understand the reality of the dependence of economic institutions on the accounting information system and the extent of its link with improving the performance of their financial function, and to attempt to highlight the relationship between the accounting information system and its official function [8].

On this basis, our study is distinguished from previous studies in its attempt to overcome the difficulties that system users may face in making decisions, and its attempt to make the decision-making process faster than it is now, in addition to satisfying accounting system users with the importance of operations research and developing its use.

2. Research Hypothesis

The research assumes that there is a statistically significant impact relationship at a significance level of (0.05) when using operations research on the effectiveness of accounting information systems, as it allows the system to provide more appropriate information for the decision-making process in private banks.

3. Accounting Information Systems (AIS) and Operations Research (OR)

Accounting Information Systems used to ensure the production of reports on cash flow and the organization on a historical basis. They record and follow up reports on business exchanges and economic events to produce budgets such as: the trial balance, the balance sheet, and by providing many accounting software to serve various purposes in institutions in order to preserve the company's financial assets and cash flow. As for the sub-systems of AIS, they are (general ledger systems, cost accounting systems, accounts receivable systems, in addition to laboratory systems such as order processing systems that track customer orders, and payroll record systems that work to straighten data on workers' attendance, employee records, and issuance of workers' checks [5][8].

Accounting information systems (AIS) are also defined as one of the components of an administrative organization that specializes in collecting, classifying, processing, analyzing and communicating financial and quantitative information to make decisions to internal and external parties [9].

Researchers also believe that the AIS is the basic nucleus of any economic unit that seeks to increase its effectiveness and efficiency in all administrative functions through what the accounting information system does in converting data into understandable information that can be used by its users from within or outside the economic unit.

EISSN: 3005-3625, PISSN: 2790-2560, DOI: doi.org/10.58564/EASJ/5.1.2026.7

Accounting information systems (AIS) are considered a flexible and broad memory for decision makers in various economic units, as this system enables them to know the historical, current and future status of their economic units and helps them in drawing up economic policies by providing information about the overall economic performance of the economic unit. It can be said that the AIS is one of the oldest information systems, and it is still considered the main system as a source of economic information at the present time and in the future, due to the importance of financial information in decision-making [2][7].

Operations research (OR) is a broad field that includes all rational approaches to the administrative decision-making process, relying on the use of scientific methods as a basis and approach in research and study. These methods mean all mathematical and statistical means and methods and operations research methods that can be used in the economics of the project and in its decisions, and therefore some of these methods can be selected and used in accounting such as mathematical models and methods of differentiation and integration. The theory of algebraic groups and matrices and others that can be combined with accounting as advanced scientific methods. It is a mathematical method through which economic, administrative and marketing problems are addressed with the support of available resources of data, tools and methods used by decision makers to address problems [4][6].

4. The applied aspect

The questionnaire data taken from the research community were analyzed according to the designed questionnaire and the research hypotheses were analyzed by relying on some statistical analysis programs, where the research community is represented by the selection of Ashur International Bank and Elaf Islamic Bank, while the research sample is represented by the employees of private banks who were targeted through the research tool. To measure the respondents' response to the questionnaire paragraphs and then collect, organize, arrange and analyze the data in order to reach the required results, where the study community consisted of general managers, department managers, specialists and accountants. As for the research sample, the researchers relied on a sample from the research community, where the researchers distributed (100) questionnaires, (70) of which were answered, while the remaining (30) questionnaires were damaged.

First: Validity of the questionnaire

To identify the questions related to the research topic and to ensure their consistency with each other in order to achieve the research objectives and hypotheses, the questionnaire was presented to a group of accounting professors for evaluation and arbitration, and the amendments and suggestions were taken into account by the arbitrators and then distributed to the research sample. The credibility of the data was calculated using the credibility coefficient (Cronbach's alpha) to test the extent of stability and internal consistency between the answers to the questions. A credibility test was conducted on all answers to the questionnaire axes and the results were obtained as shown in the table below:

EISSN: 3005-3625, PISSN: 2790-2560, DOI: doi.org/10.58564/EASJ/5.1.2026.7

Table (1)

Cronbach's alpha coefficient

Axes	Number of phrases	Axis stability
1	12	0.859
Questionnaire overall reliability	12	0.926

It is clear from the table above that the overall reliability coefficient is very high, reaching 0.926 for all questionnaire items. This indicates that the questionnaire has a high degree of reliability according to the Nunnally scale, which adopted 0.70 as the minimum reliability.

We can say that the scales on which the research was based enjoy internal consistency for all statements, and these responses can be used to achieve the research objectives and analyze its results.

Second: Statistical methods used in data processing

Descriptive and inferential statistical methods were generally used to obtain detailed results about the characteristics of the research community. The methods included the frequency distribution of respondents' answers through several measures, including: arithmetic mean, standard deviation, linear correlation coefficient, and simple linear regression analysis.

As for the program used in data analysis, SPSS was used to calculate sample trends and arrange questionnaire paragraphs according to importance. The initial characteristics of the research sample are shown in the table below:

Table (2)

Shows the descriptive analysis of sample individuals according to personal variables

Variable	Statement	Frequency	Percentage
The age	Under 24	15	21.43%
	24-29	37	52.86%
	30-34	13	18.57%
	Over 34	5	7.14%
Academic qualification	Less than B.SC	7	10%
	B.SC	57	82.86%
	M.A.	5	5.71%
	PHD	1	1.41%
Academic specialization	Accounting	24	37.14%
	Economics	11	12.86%
	Statistics	22	31.43%

EISSN: 3005-3625, PISSN: 2790-2560, DOI: doi.org/10.58564/EASJ/5.1.2026.7

	Financial and Banking Sciences	8	11.43%
	Other	5	7.14%
Years of experience	Less than 6 years	32	45.71%
	From 6 to 11 years	31	44.28%
	More than 11 years	7	10%
Job title	Specialist	18	24.28%
	Accountant	33	46.13%
	Administration Manager	11	15.68%
	General Manager	3	4.27%
	Assistant Manager	5	7.59

The above table shows that the percentage of respondents under 24 years of age was 21.43%, and the percentage of those aged between 24-29 years was 52.86%, which is the majority of the sample, while the percentage of those aged between 30-34 years was 18.57%, and the percentage of those over 34 years of age was 7.14% of the total respondents. We find that most of the sample members hold a B.SC degree, numbering (57) and a percentage of 82.86%, followed by those who hold a degree less than B.SC degree, at a rate of 10%, and the percentage of master's degrees was 5.71%, while those who hold a doctorate only one person, at a rate of 1.42%. On this basis, it is clear that most of the sample are scientifically qualified, and thus this leads to obtaining objective opinions on the research problem. The scientific specialization of most of the sample members was accounting, which represented 37.14% of the total sample, economics represented 12.86%, statistics represented 31.43%, financial and banking specialists represented 11.43%, and other specializations represented 7.14% of the total sample. It is also clear that the majority of the sample members were accountants, representing 46.13%, while specialists represented 24.28%, department managers represented 15.68%, general managers represented 4.27%, and assistant managers represented 7.59%.

Third: Test the research hypothesis

The descriptive statistics of the research sample's answers are explained, which reflects the research hypothesis statement

Using OR to enable AIS to provide more appropriate data for the decision-making process. The table below shows the sample members' answers.

EISSN: 3005-3625, PISSN: 2790-2560, DOI: doi.org/10.58564/EASJ/5.1.2026.7

Table (3)

Frequency distribution

Statement	Strongly agree	agree	neutral	disagree	Strongly disagree	Total
OR, together with AIS, contributes to providing primary data for financial decision-making.	31	38	1	0	0	70
	44.3%	54.3%	1.45	0	0	100%
OR enables AIS to get the maximum benefit from the available information using linear programming.	22	43	3	2	0	70
	31.4%	61.4%	4.3%	2.9%	0	100%
OR helps AIS provide all data and information related to the problem and determine the appropriate model to solve it.	24	45	1	0	0	70
	34.3%	64.3%	1.4%	0	0	100%
OR enables AIS to determine the final cost of investment alternatives.	19	46	2	3	0	70
	27.1%	65.7%	2.9%	4.3%	0	100%
OR, together with AIS, contributes to providing information to financial decision-makers quickly and at the lowest possible cost.	25	39	4	2	0	70
	35.7%	55.7%	5.7%	2.9%	0	100%
OR, together with AIS, contributes to providing information that helps in financial planning processes.	25	37	7	1	0	70
	35.7%	52.9%	10%	1.4%	0	100%
AIS provide the appropriate method for making financial decisions based on OR.	25	28	16	1	0	70
	35.7%	54.3%	8.6%	1.4%	0	100%
OR helps AIS achieve financial control when implementing financial decisions.	26	33	10	1	0	70
	35.7%	47.1%	14.3%	1.4%	0	100%
OR enables AIS to analyze raw financial data and information to make financial decisions.	28	34	7	0	1	70
	40%	48.6%	10%	0	1.4%	100%
Using of OR in AIS provides information that helps in financial planning processes.	25	38	5	2	0	70
	35.7%	54.3%	7.1%	2.9%	0	100%
OR enables the financial decision maker to	30	29	11	0	0	70

EISSN: 3005-3625, PISSN: 2790-2560, DOI: doi.org/10.58564/EASJ/5.1.2026.7

choose the best solutions after arriving at them through the analysis method used.	42.9%	41.4%	15.7%	0	0	100%
AIS take into account the return and risk of making financial decisions based on OR.	22	37	8	1	2	70
	31.4%	52.9%	11.4%	1.4%	2.9%	100%

The above table shows that the majority of the sample agrees that OR contributes with AIS in providing primary data for making financial decisions, as the percentage of agreement was 98.6%, while the percentage of those who disagreed was 0, and the percentage of neutrals among the sample was 1.4%. The majority of the sample agrees that OR enables AIS to reach the maximum possible benefit from the information available using linear programming, as the percentage of agreement was 92.8%, while the percentage of those who disagreed was 2.9%, while the percentage of those who did not give specific answers was 4.3%. The majority of the sample agrees that OR helps AIS in providing all data and information related to the problem and determining the appropriate model to solve it, as the percentage of agreement was 98.6%, while the percentage of those who disagreed was 0, while the percentage of those who did not give specific answers was 1.4%, and the majority of the sample agrees that operations research contributes with AIS in providing information to financial decision makers quickly and at the lowest possible cost. The percentage of approval was 91.4%, while the percentage of opponents was 2.9%, and the percentage of sample members who did not provide specific answers was 5.7%. The majority of sample members agree that OR contributes with AIS in providing information that helps in financial planning processes, as the percentage of approval was 88.6%, while the percentage of opponents was 1.4%, and the percentage of sample members who did not provide specific answers was 10%. The majority of sample members agree that AIS provide the appropriate method for making financial decisions based on OR, as the percentage of approval was 90%, while the percentage of opponents was 1.4%, while the percentage of sample members who did not provide specific answers was 8.6%. The majority of sample members agree that OR helps accounting information systems in achieving financial control when implementing financial decisions, as the percentage of approval was 82.8%, while the percentage of disagreements was 2.8%, and the percentage of neutrals among sample members was 14.3%. The majority of the sample agree that OR enables AIS to analyze primary financial data and information to make financial decisions, as the percentage of agreement was 88.6%, while the percentage of opponents was 1.4%, and the percentage of sample members who did not provide specific answers was 10%. The majority of the sample agree that the use of OR leads, with AIS, to providing information that helps in financial planning processes, as the percentage of agreement was 90%, while the percentage of opponents was 2.9%, and the percentage of sample members who did not provide specific answers was 7.1%, and the majority of the sample members agree that operations research enables financial decision makers to choose the best solutions after reaching them through the analysis method used, as the percentage of agreement was 84.3%, while the percentage of opponents was 0, and the percentage of sample members who did not provide specific answers was 15.7%. The majority of the sample members agree that AIS take into account the return and risk of making financial decisions based on OR, as

EISSN: 3005-3625, PISSN: 2790-2560, DOI: doi.org/10.58564/EASJ/5.1.2026.7

the percentage of agreement was 84.3%, while the percentage of opponents was 4.3%. As for the sample members who did not provide specific answers, their percentage was 11.4%.

The table below shows the arithmetic mean, standard deviation, and relative importance of the scale statements and their arrangement according to the answers of the target sample.

Table (4)

Arithmetic mean, standard deviation, and relative importance of the scale statements and their arrangement according to the responses of the target sample

Statement	Arithmetic mean	standard deviation	Ratio	Sample Direction	Question Rank
OR, together with AIS, contributes to providing primary data for financial decision-making.	4.43	0.52	88.57	Strongly agree	1
OR enables AIS to get the maximum benefit from the available information using linear programming.	4.21	0.65	84.29	Strongly agree	9
OR helps AIS provide all data and information related to the problem and determine the appropriate model to solve it.	4.33	0.5	86.57	Strongly agree	2
OR enables AIS to determine the final cost of investment alternatives.	4.13	0.67	83.14	agree	10
OR, together with AIS, contributes to providing information to financial decision-makers quickly and at the lowest possible cost.	4.22	0.67	83.82	Strongly agree	5
OR, together with AIS, contributes to providing information that helps in financial planning processes.	4.21	0.67	83.54	Strongly agree	7
AIS provide the appropriate method for making financial decisions based on OR.	4.23	0.55	82.76	Strongly agree	6
OR helps AIS achieve financial control when implementing financial decisions.	4.12	0.80	81.76	agree	11
OR enables AIS to analyze raw financial data and information to make financial decisions.	4.24	0.72	84.12	Strongly agree	4

EISSN: 3005-3625, PISSN: 2790-2560, DOI: doi.org/10.58564/EASJ/5.1.2026.7

Using of OR in AIS provides information that helps in financial planning processes.	4.21	0.6	82.52	Strongly agree	8
OR enables the financial decision maker to choose the best solutions after arriving at them through the analysis method used.	4.24	0.69	82.41	Strongly agree	3
AIS take into account the return and risk of making financial decisions based on OR.	4.08	0.83	79.69	agree	12
Total	4.23	0.67	82.69		

The table above shows that the arithmetic mean of the sample members for the first statement was (4.43) with a standard deviation of (0.52). These values indicate that most of the sample members strongly agree, at a rate of (88.57), that operations research contributes with AIS in providing primary data for making financial decisions. As for the second statement, the arithmetic mean of the sample members was (4.21) with a standard deviation of (0.65). These values indicate that most of the sample members strongly agree, at a rate of (84.29). This indicates that operations research enables AIS to reach the maximum possible benefit from the available information using linear programming. The third statement had a mean value of (4.33) for the sample members and a standard deviation of (0.5). These values indicate that most of the sample members strongly agree with a percentage of (86.57). This shows that OR helps AIS in providing all data and information related to the problem and determining the appropriate model to solve it. The fourth statement had a mean value of (4.13) for the sample members and a standard deviation of (0.67). These values indicate that most of the sample members agree with a percentage of (83.14) that OR enables accounting information systems to determine the final cost of investment alternatives. The fifth statement had a mean value of (4.22) for the sample members and a standard deviation of (0.67). These values indicate that most of the sample members strongly agree with a percentage of (83.82). This indicates that OR contributes with AIS in providing information to financial decision-makers quickly and at the lowest possible cost. The sixth statement had a mean value of (4.21) for the sample members and a standard deviation of (0.67). (0.67) These values indicate that most of the sample members strongly agree with a percentage of (83.54) indicating that OR contributes with AIS in providing information that helps them in financial planning processes. As for the seventh sample members, the arithmetic mean value was (4.23) with a standard deviation of (0.55). These values indicate that most of the sample members strongly agree with a percentage of (82.76). This indicates that accounting information systems provide the appropriate method for making financial decisions based on OR. The eighth sample members had an arithmetic mean value of (4.12) with a standard deviation of (0.80). These values indicate that most of the sample members agree with a percentage of (81.76) that OR helps accounting information systems in achieving financial control when implementing financial decisions. The arithmetic mean value for the sample members for the ninth statement was (4.24) with a standard deviation of (0.72). These values indicate that most of the sample members strongly agree with a percentage of (84.12) that operations research AIS enable the analysis of primary financial data and information to make financial decisions.

EISSN: 3005-3625, PISSN: 2790-2560, DOI: doi.org/10.58564/EASJ/5.1.2026.7

As for the sample members for the tenth statement, the arithmetic mean value was (4.21) and a standard deviation of (0.6). These values indicate that most of the sample members strongly agree at a rate of (82.52) that the use of OR in AIS leads to providing information that helps in financial planning processes. The sample members for the eleventh statement, the arithmetic mean value was (4.24) and a standard deviation of (0.69). These values indicate that most of the sample members strongly agree at a rate of (82.41), indicating that OR enables the financial decision-maker to choose the best solutions after reaching them through the analysis method used. As for the sample members for the twelfth statement, the arithmetic mean value was (4.08) and the standard deviation was (0.83). These values indicate that most of the sample members agree at a rate of (79.69) that AIS take into account the return and risk of making financial decisions based on OR.

-Results of testing the study hypothesis:

There is a statistically significant effect relationship at a significance level of (0.05) for the use of OR in enabling AIS to provide appropriate information for the decision-making process.

Table (5)

Correlation between study variables

Model	Correlation Coefficient	Coefficient of Determination	R^2 modification	Estimation Error
1	0.627	0.403	0.389	0.309

The correlation rate between the use of OR in enabling AIS to provide appropriate data for the decision-making process and the objectives of AIS is shown to be a medium correlation. The results explain that the use of OR in enabling AIS to provide appropriate data for the decision-making process explains 40.3% of the variance in the objectives of AIS, and the remainder is subject to other factors.

Table (6)

Analysis of variance

The model	Non-standard transactions		Standard transactions	t value	Sig significance level	F value	Sig significance level
	B	Estimate Deviation	Beta				
Using operations	0.489	0.201	0.535	2.285	0.019	45.554	0.00
research to enable AIS	0.660	0.111		5.723	0.00		

The regression equation can be constructed as follows:

EISSN: 3005-3625, PISSN: 2790-2560, DOI: doi.org/10.58564/EASJ/5.1.2026.7

Objectives of Accounting Information Systems = 0.660 * (Use of Operations Research to Enable Accounting Information Systems) + 0.489 Based on the previous data and because the significance level value of 0.00 is lower than the significance level of 0.05 and with a confidence level of 0.95% and the calculated F value is greater than the tabular F value, the hypothesis is therefore accepted.

5. Conclusions

There is a statistically significant effect relationship at a significance level of (0.05) for the use of OR in AIS in providing appropriate data for the decision-making process. The latest accounting systems are used in banks equipped with OR, with the expansion of the use of OR in AIS when solving problems and making financial decisions, and the establishment of a special department for the use of OR in establishments to contribute to decision-making.

Funding

None

Acknowledgement

None

Conflicts of Interest

The author declares no conflict of interest.

English References:

Al-Fadel, Al-Radhiya Bushra, Abdul-Razzaq, Safaa Tariq, & Al-Jaali, Nahed Jamal. (2019). The impact of computerization of the accounting system on the quality of accounting information in commercial banks: A case study of the Nile Bank - Rabak Branch, White Nile University.

Bushra Mahdi Saleh Al-Taie, & A.M.D. Iman Shaker Mohammed. (2017). Internal banking supervision requirements and their impact on the development of electronic accounting information systems applied research in a sample of Iraqi private banks. Journal of Accounting and Financial Studies, 12(40).

Carter, M., Price, C. C., & Rabadi, G. (2018). Operations research: a practical introduction. Chapman and Hall/CRC.

Hillier, F. S., & Lieberman, G. J. (2015). Introduction to operations research. McGraw-Hill.

Kieso, Donald, J., Weygandt, Jerry, J & Kimmel, Paul, D, (2014), Financial Accounting, 13 th, update package, John Wiley & sons, USA.

Mahmoud, A. S. (2023). Opportunities to use operations research methods to develop economic performance: a case study of a sample of companies listed in the Iraq Stock Exchange. ECONOMICS AND ADMINISTRATIVE STUDIES JOURNAL (EASJ)(formerly AL-DANANEER JOURNAL), 2(3).

Saad El-Din El-Ghabour, A., El-Sayed Fouda, S., Shawky, Abdel-Fattah Sayed, & Sayed. (2019). The impact of the efficiency and effectiveness of electronic accounting information systems on improving performance

EISSN: 3005-3625, PISSN: 2790-2560, DOI: doi.org/10.58564/EASJ/5.1.2026.7

evaluation in commercial banks with a field study. Journal of Contemporary Business Studies, 405-359, (6)5,

Sahel, Mohamed El Amin, & Foulane, Mohamed El Amin. (2021) The role of accounting information systems in improving the financial performance of commercial banks: A case study of the Bank of Agriculture and Rural Development BADR.

Schroeder, R. G., Clark, M. W., & Cathey, J. M. (2022). Financial accounting theory and analysis: text and cases. John Wiley & Sons.

Slowiński, R. (Ed.). (2012). Fuzzy sets in decision analysis, operations research and statistics (Vol. 1). Springer Science & Business Media.

Zahra, Laroussi Qurain, Abbas, Farhat, & Jamal, Ben Saadi. (2016). The importance of using quantitative methods in decision-making in commercial banks: A case study of the Bank of Agriculture and Rural Development - M'Sila Agency. Conference Complex of the Faculty of Economics, Commerce and Management Sciences, University of Mohamed Boudiaf, M'Sila, Algeria.