The effect of raised the data envelope and benchmarking technique on competitive advantage Applied research in a group of Iraqi private banks

Alaa Hussein Abbas[1] **Dr. Fayhaa Abdullah Yaqoub2**

Received 25/1/2023
Accepted 8/2/2023
Published 30/3/2023

Abstract:

The current research aims to reveal the impact of the data envelope and benchmarking technique in the competitive advantage of a group of private Iraqi banks. In this work, the problem was that the banks of the research sample (Union Bank, Mansour Investment Bank, Development and Finance Bank for Investment and Finance, Middle East Bank, and Iraqi Investment Bank) do not apply the data envelope and the reference comparison technique proactively and enter them in all their banking operations adopting (DEAP.2.1, SPSS). This impacts their competitive advantage compared to international banks. The study was based on the basic premise that the possibility of applying the reference comparison technique and the method of analyzing the data envelope contributes to enhancing the competitive advantage of the commercial banks of the research sample, and it has been reached through the research to a set of conclusions, foremost of which is that the use of the data envelope and the reference comparison technique contributes to achieving competitive advantage. This study recommends increasing the percentage of banks' use of the data envelope and benchmarking to raise their sales to achieve competitive advantage.

Keywords: data envelope analysis, benchmarking, competitive advantage.

Introduction

Banks are characterized by high competition as a result of the presence of a large and diverse number of competitive banking services compared to the local market. Despite the long history that characterizes banks, it is noticeable that the services of public banks provided are characterized by high commission and the discount rate that they deduct from customers, which led to the reluctance of customers to deal with government banks. This affected their competitive value and the resort of most customers to deal with private banks for the purpose of achieving economic goals and high profitability contributing to the survival and continuation of these banks in the market. So, this research came to try to find possible solutions applicable in the local banking environment by adopting the application of the method of data envelope and benchmarking technique to achieve competitive advantage, and accordingly this research was divided into four sections. The first section focused on the research product. The second included the theoretical side, and the third section explained the practical side. The fourth section presented the conclusions and recommendations that the research aspires to take into account banks.

1. Postgraduate Student, Post Graduate Institute for Accounting and Financial Studies, University Baghdad, alaa.kadhem1701@pgiafs.uobaghdad.edu.iq
2.Professor, Post Graduate Institute for Accounting and Financial Studies, University Baghdad, fayhaa@pgiafs.uobaghdad.edu.iq

The first topic: research methodology

First: the research problem

The continuous and rapid developments in the business environment, especially the banking sector, the great challenges and competition for them, and the adoption of traditional methods in measuring performance efficiency, as a result, necessitated the management of banks to find effective methods that help them measure performance efficiency. The most important of these methods are benchmarking as well as the method of analyzing the data envelope, which are a reflective mirror of the activities and achievements of banking units.

The research deals with a basic problem of the adoption of traditional methods by commercial bank departments in measuring banking performance. This problem negatively affects the achievement of competitive advantage in light of recent developments in the business sector in general and banking in particular.

The most important elements of the research problem can be reviewed in the following questions:

1 What are the methods adopted by commercial banks operating in Iraq in evaluating their performance?

2 How efficient are the traditional methods in evaluating the performance of commercial banks? And its effectiveness in influencing competitive advantage?

3 What is the availability of the basic ingredients necessary to apply the data envelope analysis method in measuring the efficiency of performance in commercial banks operating in Iraq?

4 Can the application of benchmarking in evaluating the performance of commercial banks have a role in influencing competitive advantage?

Second: The importance of the study

The importance of the research lies in the importance of modern methods in evaluating banking performance and its impact on competitive advantage. This is especially in the application of modern methods in a business environment governed by many variables that led to its complexity significantly, as well as the exceptional circumstances in which Iraq is going through at all levels. This work is important because it is related to the typical field application of data envelope analysis and benchmarking beyond the case of performance measurement and evaluation, in particular the limited application of these models in the Iraqi environment and the small number of studies that I ate them together.

Third: Research Objectives

The aim of the research in:

1. Providing a theoretical introduction to the analysis of the data envelope and identify the most important accounting uses for it.
2. Demonstrating the extent to which data envelope analysis can be used to measure the efficiency of the performance of Iraqi private banks in the research sample.
3. Identifying the extent to which the benchmarking technique and the data envelope analysis method can be applied when evaluating the performance of commercial banks operating in Iraq and their impact on the competitive advantage in the Iraqi banking sector.
4. Identifying the better bank to use the same inputs and achieve the highest level of output in terms of efficiency compared to other banks.

Fourth: Research Hypothesis

To find appropriate solutions to the research problems, the researcher presents the following basic hypothesis:

"The possibility of applying the benchmarking technique and the data envelope analysis method contributes to enhancing the competitive advantage of the commercial banks of the research sample"

Fifth: The research community and its designation

The research community includes the commercial banks operating in Iraq, and a group of commercial banks will be taken as a sample for research according to the quantitative and statistical methods adopted in this field.

The second topic: the theoretical aspect

First: Data Envelope

1. Data envelope concept

The data envelope analysis method (DEA) is one of the modern quantitative methods that rely on linear programming to measure the efficiency of units of a homogeneous nature. This method is based in its analysis on identifying the best practices for the studied units in terms of performance. They form the so-called benchmarking curve, and it identifies the shortcomings in the low-performance units relative to the better units, and then calculates the necessary improvements for these units, both in terms of inputs (input routing) or in terms of output routing or both.

The method of data envelopment analysis (DEA) is one of the most important modern concepts for measuring efficiency, which relied mainly on the concepts presented by the economic thinker Farrell (Farrell) in 1957. This method was introduced for the first time by Charnes, Cooper and Rhodes (Charnes, Cooper Rhodes) who were interested in formulating it in the early seventies of the twentieth century, in response to the efforts of the doctoral thesis of Eduardo Rhodes under the supervision of W. W. Webber (W.W. Cooper), where the aim of conducting this thesis was to evaluate the educational programs of students who are struggling academically (Negroes and Spaniards) mainly with the support of the government of the federal states. The analysis required comparing the performance of a group of corresponding schools, and the difficulty of comparison appeared in estimating the technical efficiency of schools, as it included several inputs and several outputs without information about them, and this resulted in reaching unsatisfactory and unreasonable results despite the use of many econometric approaches. They collaborated with Charnes in formulating the Data Analysis Envelopment model in 1978, which was known as the CCR model (Cooper et al., 2011:2). Since this model was based on the assumption of constant return to volume, it became called Contestant Returns to Scale (CRS), which is known as the term simple model or the original model of the Data envelope analysis(Ben Musa et al, 2022).

DEA method was first introduced in 1978 in its current form, researchers in many fields have quickly realized that it is an excellent and easy-to-use methodology for modeling operational processes for evaluating performance. This has contributed to its continuous development (Cooper et al., 2011p2). This model was later developed by Banker, Charnes, & Cooper in 1984, where it was assumed that the return to scale (VRS) changed, so it became also called the (BCC) model, and later other types of efficiency measurement models appeared, such as: aggregate models, and deceleration models, but the most famous and most used models are (CCR) and (BCC) models.), or what is known as the fixed and variable volume yields models(Ben Musa et al, 2022).

There are many definitions of DEA, varying according to the target field or activity, comparison of business activities, products, processes, productivity measurement, etc.

These definitions include:

Table 1 definitions of DEA

Author Name and Year	Definition
2009:11,Chiang & Lin	An approach used to estimate the maximum output generated by inputs, characterized by its ability to deal with collected information, and is seen as a methodology that shows a starting point that is suitable for determining balanced performance.
Jamoui and Farid (2013)	A method based on linear programming, in measuring the relative efficiency of a set of (homogeneous) decision-making units that are comparable to each other, that is, they use the same inputs and produce the same outputs (with different quantities, of course) and these units can be banks, government agencies, hospitals, colleges, etc.
Bdeir (2020)	One of the modern mathematical methods that appear as a tool that uses linear programming to measure identical units, through the efficiency scale, which is one of the quantitative methods used to rationalize administrative decisions.
Al-Ra'i, Shireen, and Al-Harazin (2020)	A mathematical method that uses linear programming, to measure the relative efficiency of a group of similar economic units, by determining the optimal mix of a set of inputs and a set of outputs, and this is based on their actual performance.
Min et al,2008:351	A linear technology, which converts inputs into multiple outputs for each decision-making unit, to be a benchmark according to operational efficiency and relative to its competitors from other economic units.

2. Advantages and characteristics of the data envelope analysis method

The most important features of the data envelope analysis method are as follows:

a. It does not need a presupposition about the mathematical formula that links inputs and outputs to measure efficiency. This feature is important for the method. The method of analyzing the data envelope gives the data freedom to choose a certified format instead of being within the framework of a functional formula imposed on it and restricting it
(Omar, 2014: 36).

b. Nonparametric models use linear programming methods to solve them, and this distinguishes them from parametric models that use econometric methods to solve them(Battal, Juma, Hammoudi, & Abdulkarim, 2017).

c. It gives an assessment of both technical competence and boundary values for both inputs and outputs, as well as providing solutions, with the aim of improving efficiency (Omar, 2014: 36).

d. It provides corresponding units, providing an opportunity for other units to look at them to improve their processes, making data envelope analysis a useful tool for evaluation (Al-Sakka, 2009).

e. The characteristics of the data envelope analysis method are as follows(Battal et al., 2017): The DEA method is one of the best non-parametric methods for measuring and analyzing the efficiency of units of a homogeneous nature, by identifying the best peer units of low efficiency units based on multiple inputs and outputs.

a. The DEA method does not require advance information on input or output prices or weights.

b. It does not require that the inputs and outputs be of the same unit of measurement.

c. Focus on all units studied and not on the sample mean or central tendency characteristics, where the focus is on the best performance of the units and thus reveal the effective limit of the units under the evaluation as a whole.
d. Summarize the performance of each of the studied units as a single efficiency indicator, which reflects the extent to which the inputs (independent variables) are exploited to produce the outputs (dependent variables).
e. Meets the criteria of full fairness in the relative evaluation of each of the units studied.

Second: Benchmarking

1. The concept of benchmarking

Benchmarking is one of the most popular tools among organizations seeking to compete globally (Goetsch & Davis 1997:243). The word benchmarking originates from surveying and is derived from the process of ground surveying, through which a rock or tree is marked, for example, as a reference point, or indication (Slack et al 2010: 681). From the Arabic linguistic term, the labels differed from the concept of benchmarking, some called it (benchmarking), and some called it (analogy to pattern). Others called it "comparative benchmarks." Another name is comparison with a typical competitor, and it was also called establishing an ideal. It was also called (rules of comparison)(Al-Barwari, 2001), but the reference comparative label is more consistent and agreed, and has a clear significance and agreement with the origin and essence of this tool as a concept, objectives and requirements because it is more comprehensive.

The classification of reference comparison historical connotations dates back to the year (1800) and thanks to the efforts of the American industrialist (Francis Lowell), who studied the best methods used in British flour factories to reach the most successful applications in this aspect and then came the industrialist (Henry Ford) in (1913) who developed the assembly line as a distinct industrial method(Taleb & Mohammed, 2009). The Japanese were interested in applying the method of benchmarking in the early fifties when they visited many Western organizations and were able to absorb what they received of knowledge and skills and the development of their products and innovations, and at the end of the sixties Japan occupied a leading position in industrial production compared to competing American organizations in that field(Al-Tikriti, 2000).

Nowadays, all small and large organizations find in comparison an important and effective element towards achieving all their goals (Willmington wt al 2022).

It originally starts from the Japanese term Dantotsu, which means “the best of the best" and the applications of this moved to the United States of America, where Xerox Rank, the global leader in the production of photocopiers, is the first institution that applied the benchmarking technique as one of the methods of quality improvement in 1975. Also, it crystallized as a label and as a scientific method in the late seventies, as the branches of Japanese companies were in America. It produces world-class photocopiers and sells them at a lower price than the production costs of their counterparts in the United States, since then these companies began to look directly at the methods, practices and processes of their competitors to quote ideas for improvement and to surpass them, so Xerox made a benchmark with these companies to find out their weaknesses, and then make the necessary improvements to them, looking at others to quote ideas and ways to improve processes and products is a concept that is not new in itself. Yet, the method of formally and directly considering the products, methods and practices of competitors as a mechanism to improve the quality and performance of the operations of institutions became permissible only in the early nineties. This is as it was previously seen as "industrial espionage", and later became an inherent part of the organization's operations to acquire new knowledge and learn good practices from institutions that perform better for the same activity, and to benefit more from the efficiency

of productive resources, and so the process of benchmarking as a performance and management method spread widely in the early decade The nineties, and most international companies applied it as a tool, approaches and method for continuous improvement, while European companies, late realized the usefulness of benchmarking, as they applied it in an institutionalized way and adopted it as a basis for continuous improvements since the early nineties(Saleh & Saleh, 2021).

Benchmarking gives the company the opportunity to discover the gap or gaps in performance when comparing with other leading companies in the same field, and the company can know how leading companies achieve good performance in a particular area in order to improve performance in their operations (Jeffrey, 1995, P25)

There are many definitions of benchmarking, which vary according to the area or activity targeted for comparison, such as overall performance, business activities, products, processes, and productivity measurement:

Table 2 Definitions of productivity measurement

Author Name and Year	Definition
Noreen,et,al, 2011	The method by which the performance of the economic unit is compared with the performance of other units that are similar to its performance.
Sajjad&Amjad,2012	A tool through which the performance of the economic unit is improved, as well as enhancing its competitiveness, and its great role in enhancing both transparency and performance within the economic unit.
Al-qudhat and Nabulsi (2014)	A management tool used by organizations from the perspective of learning from the best performance to enhance their ability to manage their performance strategically, or it is a method of applying total quality that requires searching for the best applications of competitors, and then their performance is evaluated compared to the performance of competitors
Sammut-Bonnici (2015)	Compare products, services, and processes across departments that implement similar processes in the same organization, between competing companies in the same industry, or between similar companies.
Fouad (2017)	Compare the performance of the organization with competitors, especially those that are characterized by an excellent competitive position, in order to identify the strengths and weaknesses that affect the course of the organization, whether by comparing them in whole or in part
Al-Najar and Ahmed (2017)	A continuous process that does not stop at a certain limit and aims to improve performance, and takes place in the light of the best practice vision in a particular activity or field inside or outside the organization.
Reference Comparisons Guide in Academic Programs (2019)	One of the important methods used to evaluate the performance of economic units, and then compare them with an economic unit operating in the same field.

2. Objectives of the benchmarking technique

It is clear from the above that the use of the benchmarking technique achieves a number of objectives, the most important of which are(Fawzi & Jabr, 2010):

a. Improving and develop the organization's current processes by acquiring the best ways to reach and exceed

b. Better-ranked benchmarks set better performance standards for success in the associated industry.

c. Enhancing competitive positioning or competitiveness as a world-class organization, or even retain a leading position.

d. Setting competitive standards.

e. Learning from others.

f. Learning about quantity and, more importantly, knowing how a company can achieve excellent results is more important and valuable than measuring these results.

g. Better understanding the critical factors of our success.

h. Knowing how to make improvements to an organization's processes to increase its competitiveness

i. Increase customer satisfaction and increase competitive advantage.

j. Helping organizations to fight for excellence.

k. The organization feels ineffective or incapable enough to satisfy its customers as competing institutions do.

l. Good knowledge of the organization's capabilities and weaknesses through the best and best self-assessment.

m. Achieving growth in revenues and profits by understanding the organization and knowing the positions that distinguish competitors from it, and that customers value (for example, the commodity may be good but after-sales services are not good).

n. Knowing how a company gets excellent results is more important and valuable than measuring those results.

Third: Competitive Advantage

1. The concept of competitive advantage

Competition is the basis for success or failure in the enterprise and as it determines the appropriateness of the activities of the enterprise and its participation in terms of proper implementation of performance. Therefore, enterprises are looking for competitive strategies for competitive positions that they like in the field of work in which enterprises are specialized through research and investigation. All aim to achieve a position that achieves sustainability in services to face market competitive forces (Porter, 1998, p1).

Therefore, in these periods of rapid change, organizations are characterized by a highly competitive work environment, which leads them to allocate time, energy, human and financial resources to measure performance in order to achieve strategic objectives. This shows that some of the establishments that neglected the strategic objectives. It was negatively affected, which made it difficult to gain a competitive advantage over other enterprises. So. It is very important for enterprises to differentiate their performance from their competitors to achieve a sustainable competitive advantage with strategic planning (Niven, 2008, p157).

It has been mentioned (Gomes & Mario, 2015, p46-50.) that one of the questions discussed in the field of strategic management is how can enterprises achieve a competitive advantage? Competitive advantage must be seen as the main source of achieving outstanding performance for enterprises.

Many researchers and academics have defined competitive advantage with definitions that agree in essence and differ in their exact details. The most famous to familiarize themselves with their contents and come up with a comprehensive definition that makes it easier for the reader to understand what is meant by competitive advantage:

Table 3Definitions of competitive advantage

Author Name	Definition
Porter, 1998:11	He defined competitive advantage as "the result of an organization's ability to efficiently perform a set of activities necessary to obtain a lower cost than competitors and organize these activities in a unique way to enable it to obtain an advantage in value for customers."
Epetimehin,2011:18	In his paper, he defined competitive advantage as the ability of an organization to perform in one or several ways that competitors cannot perform and match, which is recognized in marketing strategy, strategy application and context that competition does not fold.
(Abdul Ghafour, 2015:30)	He defined competitive advantage as "the ability of an enterprise to outperform its competitors in a way that leads to satisfying the desires of its employees and customers and achieving its benefit, excellence and progress in the long term."
Al-Ghazi & Al-Musawi,2020:27	It refers to the concept of competitive advantage as the ability of an organization to formulate and apply strategies that make it in a better position relative to other organizations operating in the same activity, and is achieved through the better utilization of technical, material, financial and organizational capabilities and resources in addition to capabilities, competencies, knowledge and others.

Based on the above table, the researcher defines competitive advantage procedurally as the state that enterprises reach when they develop or possess a set of characteristics and resources or implement a set of procedures that allow them to outperform their competitors.

2. The importance of competitive advantage

Competitive advantage is of great importance to enterprises because of its important role in achieving the objectives and strategies of enterprises, the most important of which is the sustainability of making profit.

Yet, the finding a competitive advantage compared to what competitors offer is the essence of the marketing strategy, because competitive advantage contributes to achieving the following(Al-Ghabban & Al-Ghabban, 2022):

a. Achieving market power by controlling the market share of the commodities or brands they offer in the target markets.
b. Development of new goods or services.
c. Finding niche and new markets.
d. Find new distribution outlets.
e. Finding and developing new technology that leads to cost reduction for the commodity or brand.
f. Finding new raw materials.
g. Develop strong financial positions for the organization.

The importance of competitive advantage can also be determined by:

a. It serves as a key weapon in facing market challenges and various competitors through the establishment to meet the needs of customers in the future by developing its competitive knowledge and its ability to create appointments and production skills in a way that enables it to adapt to rapidly changing opportunities (Lara&Yaqoub,2018).

b. It represents an important criterion for determining a successful facility from others because successful enterprises are characterized by finding new models that are difficult to imitate and simulate constantly because old models have become widely known and available as competitors are aware of them. As a result, successive innovations and accelerated knowledge can make an organization's competitive advantage the best for it in any case.

c. It represents a positive indicator towards the company's tendency to occupy a strong position in the market by obtaining a larger market share than its competitors, which means that it will have more satisfied and loyal customers compared to competitors, which will achieve an increase in sales volume and profits(Al-Taie & Hassoun, 2010).

3. Competitive Advantage Strategies

Enterprises tend to follow strategies that enable them to obtain a competitive advantage over their competitors in order to maintain the sustainability of the facility and achieve its strategic objectives, including the following:

a. Cost Leadership Strategy:

Competitive advantage is achieved by achieving the lowest cost in the manufacture of the product or the provision of the service through the adoption of enterprises for a set of policies and procedures to reduce costs. They include optimal utilization of resources (Hussein& Yaqoub,2014), taking advantage of economies of scale, obtaining price advantages from suppliers, controlling expenses, increasing productivity and others as mentioned (12. Porter, 1998, p).

b. Differentiation Strategy:

It includes providing a product or service distinct from competitors, provided that these products and goods are seen as distinctive and unique by customers (Al-ZUBAIDI&Al- Ghabban,2022:36). Also, excellence can be achieved through product or service design or through the technology used, commercial relations, after-sales services, distribution methods, reputation and good mental image of the facility (National Competitiveness Observatory, 2011, p. 13).

c. Focus Strategy:

Focus strategy is conducted by focusing the establishment on a specific sector, a specific category of customers or a specific market segment, so that the enterprises work to define their marketing goal accurately. They are based on satisfying its needs, whether by driving the lowest cost or excellence or both(Ismail, 2011).

The third topic: the practical side

This section is concerned with measuring the impact of benchmarking in competitive advantage by addressing the measurement of competitive advantage in terms of (productivity and profitability) by extracting the general arithmetic mean for them according to the statistical package of the program (SPSS.V.27). The hypothesis is accepted or rejected by comparing it with the value of tabular (T) at the level of (0.05) as the value of (**T**) tabular (2.015), as follows:

First: The impact of the data envelope and benchmarking on competitive advantage according to the financial axis index

It is noted from the results of the table (4) that there is a multiple effect of the data envelope and benchmarking on the competitive advantage according to the financial axis index and the International Development Bank for Investment and Finance, which means that the bank's events

to improve by one unit leads to improving the competitive advantage by a fixed amount of (5.439), and a multiple slope value (5.551) for reference comparison, and (2.206) for the bank, and this came as a result of the significant value of (**T**) calculated as being greater than the value of (**T**)) Tabular , as follows:

$$\text{competitive advantages} = a + \beta\ r\text{eference comparision} + \beta\ data\ envolope$$

$$\text{competitive advantages} = 5.439 + 5.551\ \text{reference comparision} + 2.206\ \beta\ data\ envolope$$

The results of the table (4) also showed the existence of a multiple effect of the data envelope and benchmarking in the competitive advantage according to the financial axis index and the Union Bank of Iraq. This means that the bank's actions to improve by one unit leads to improving the competitive advantage by a fixed amount of (5.159), and a multiple regression value (6.606) for reference comparison, and (3.724) for the bank, and this came as a result of the significant value of (T) calculated being greater than the value of (**T**):

$$\text{competitive advantages} = a + \beta\ r\text{eference comparision} + \beta\ data\ envolope$$

$$\text{competitive advantages} = 5.159 + 6.606\ r\text{eference comparision} + 3.724\ data\ envolope$$

On the other hand, there is no effect of the data envelope and benchmarking on the competitive advantage of the Middle East Investment Bank, Al-Mansour Investment and Iraqi Investment.

Table 4 Results of the impact of the data envelope and benchmarking on competitive advantage according to the financial axis index

Hypotheses	Competitive Advantage				
	Constant	Beta	T value	Sig.	R^2
Benchmarking	2.239	9.028	.347	.752	0.117
Middle East Investment Bank Data Envelope		5.593			
Benchmarking	5.439	5.551	2.461	0.001	0.713
Data Envelope for the International Development Bank for Investment and Finance		2.206			
Benchmarking	2.537	7.438	.206	.850	0.534
Data envelope for Mansour Investment Bank		2.565			
Benchmarking	4.959	9.011	-1.249	.300	0.216
Data envelope for the Investment Bank of Iraq		-3.975			
Benchmarking	5.159	6.606	3.061	0.001	0.659
Union Bank of Iraq Data Envelope		3.724			

Second: The impact of the data envelope and benchmarking on competitive advantage according to the internal operations axis index

It is noted from the results of the table (5) that there is a multiple effect of the data envelope and benchmarking on the competitive advantage according to the index of the internal operations axis and the Iraqi Investment Bank. This means that the bank's actions to improve by one unit leads to an improvement in the competitive advantage by a fixed amount of (5.458), and a multiple regression value (-1.321) for reference comparison, and (-3.184) for the bank, and this came as a result of the significant value of (**T**) calculated as being greater than the value of (**T**)) Tabular , as follows:

$$\text{competitive advantages} = a + \beta\ r\text{eference comparision} + \beta\ data\ envolope$$

$$\text{competitive advantages} = 5.458 - 1.321\ r\text{eference comparision} - 3.184\ data\ envolope$$

On the other hand, there is no effect of the data envelope and benchmarking on the competitive advantage of the Middle East Investment Bank, the International Development Bank for Investment and Finance, Al-Mansour Investment, and the Iraqi Union.

Table 5 Results of the impact of the data envelope and benchmarking on competitive advantage according to the internal operations axis index

Hypotheses	Competitive Advantage				
	Constant	Beta	T value	Sig.	R^2
Benchmarking	3.761	-1.013	-1.110	.348	0.435
Middle East Investment Bank Data Envelope		-1.212			
Benchmarking	4.028	-4.229	-1.050	.371	0.263
Data Envelope for the International Development Bank for Investment and Finance		-1.518			
Benchmarking	1.246	2.923	.637	.569	0.228
Data envelope for Mansour Investment Bank		1.767			
Benchmarking	5.458	-1.321	-2.372	0.001	0.733
Data envelope for the Investment Bank of Iraq		-3.184			
Benchmarking	2.581	7.332	.163	.881	0.379
Union Bank of Iraq Data Envelope		2.943			

Third: The impact of the data envelope and benchmarking on competitive advantage according to the customer axis index

It is noted from the results of the table (6) that there is a multiple effect of the data envelope and benchmarking on the competitive advantage according to the customer axis index and the Investment Bank of Iraq, which means that the bank's actions to improve by one unit leads to an improvement in the competitive advantage by a fixed amount of (4.514), and a multiple slope value (1.100) for reference comparison, and (-2.408) for the bank, and this came as a result of the significant value of (**T**) calculated as being greater than the value of (**T**). tabular and adult (6), as follows:

$$\text{competitive advantages } = a + \beta \, r\text{eference comparision} + \beta \, data \; envolope$$

$$\text{competitive advantages} = \mathbf{4.514} + \mathbf{1.100} \, r\text{eference comparision} - \mathbf{2.408} \, data \; envolope$$

On the other hand, there is no effect of the data envelope and benchmarking on the competitive advantage of the Middle East Investment Bank, the International Development Bank for Investment and Finance, Al-Mansour Investment, and the Iraqi Union.

Table 6 Results of the impact of the data envelope and benchmarking on competitive advantage according to the customer axis index

Hypotheses	Competitive Advantage				
	Constant	Beta	T value	Sig.	R^2
Benchmarking	3.061	9.612	-.446	.686	0.102
Middle East Investment Bank Data Envelope		-7.068			
Benchmarking	4.479	1.082	-1.210	.313	0.330
Data Envelope for the International Development Bank for Investment and Finance		-2.535			
Benchmarking	3.168	1.340	-.421	.702	0.337
Data envelope for Mansour Investment Bank		-8.182			
Benchmarking	4.514	1.100	-2.789	.0010	0.759
Data envelope for the Investment Bank of Iraq		-2.408			
Benchmarking	4.308	-1.402	-1.635	.201	0.187
Union Bank of Iraq Data Envelope		-1.524			

Fourth: The impact of the data envelope and benchmarking on competitive advantage according to the indicator of the learning and growth axis

It is noted from the results of the table (7) that there is a multiple effect of the data envelope and benchmarking in the competitive advantage according to the indicator of the learning and growth axis and Mansour Investment Bank. It means that the bank's events to change by one unit leads to its realization to improve the competitive advantage by a fixed amount of (4.423), and a multiple

regression value (-3.690) for reference comparison, and (-86152.261) for the bank, and this came as a result of the significant value of (T) calculated as being greater than the value of (**T**)) Tabular , as follows:

$$\text{competitive advantages} = a + \beta\ r\text{eference comparision} + \beta\ data\ envolope$$

$$\text{competitive advantages} = \mathbf{4.423E9} - \mathbf{3.690}\ r\text{eference comparision} - \mathbf{86152.261}\ data\ envolope$$

It is also noted from Table (7) that there is a multiple effect of the data envelope and benchmarking on the competitive advantage according to the indicator of the learning and growth axis and the Iraqi Investment Bank, which means that the bank's changes by one unit leads to its realization to improve the competitive advantage by a fixed amount of (4.059), and a multiple regression value (-2.767) for reference comparison, and (-130600.925) for the bank, and this came as a result of the significant value of (T) calculated as being greater than the value of (**T**)) Tabular , as follows:

$$\text{competitive advantages} = a + \beta\ r\text{eference comparision} + \beta\ data\ envolope$$

$$\text{competitive advantages} = 4.059 - 2.767\ r\text{eference comparision} - 130600.925\ \ data\ envolope$$

On the other hand, there is no effect of the data envelope and benchmarking on the competitive advantage of the Middle East Investment Bank, the International Development Bank for Investment and Finance, and the Iraqi Union.

Table 7 Results of the impact of the data envelope and benchmarking on competitive advantage according to the indicator of the learning and growth axis

Hypotheses	Competitive Advantage				
	Constant	Beta	T value	Sig.	R^2
Benchmarking	1.395	4.563	1.191	.319	
Middle East Investment Bank Data Envelope		63780.178			
Benchmarking	2.291	2.187	.500	.651	
Data Envelope for the International Development Bank for Investment and Finance		31168.537			
Benchmarking	4.423	-3.690	-3.323	0.001	
Data envelope for Mansour Investment Bank		-86152.26			
Benchmarking	4.059	-2.767	-2.461	0.001	
Data envelope for the Investment Bank of Iraq		-130600.925			
Benchmarking	2.276	1.135	.361	.742	
Union Bank of Iraq Data Envelope		80513.626			

Fourth: The impact of data envelope indicators and benchmarking on competitive advantage

It is noted from the results of Table (8) that there is a multiple effect of the data envelope and benchmarking on competitive advantage according to an indicator of the financial axis. So, the bank's changes by one unit lead to its realization to improve the competitive advantage by a fixed amount of (-2.596), and a multiple regression value (5.146) for reference comparison, and (6.543) for the bank.

On the other hand, there is no effect of data envelope and benchmarking on the competitive advantage of the axis of operations, customers, learning and growth.

Table 8 Results of the impact of data envelope and benchmarking indicators on competitive advantage

Hypotheses	Competitive Advantage				
	Constant	Beta	T value	Sig.	R^2
Benchmarking	-2.596	5.146	2.720	.001	
Data envelope for financial axis		6.543			
Benchmarking	7.204	-4.518	-1.745	.179	
Data envelope for operations hub		-5.712			
Benchmarking	4.988	8.537	-1.831	.164	
Data envelope for customer hub		-3.262			
Benchmarking	7.635	-1.341	-1.512	.228	
Data envelope for the learning and growth hub		-347182.982			

Fourth Theme: Conclusions and Recommendations

First: Conclusions

1- Traditional methods of measuring performance efficiency lacks the possibility of providing a strategic benefit, due to the rapid development in the competitive business environment. So, there was a need to use an integrated and interconnected set of financial and non-financial procedures in measuring the performance of economic units, which is consistent with changes in the contemporary business environment.

2- Banking efficiency refers to the study of the impact relationship between the inputs and outputs of the banking unit, either the bank increases its inputs within the limits of the level of outputs. It wishes to achieve, or increases its outputs in light of a certain level of inputs.

3- The method of analyzing the data envelope is one of the non-parametric measures. One of the mathematical programming methods that calculate the relative efficiency of multiple decision-making units on the basis of inputs and outputs, and its basic concept lies in measuring the efficiency of a particular economic unit against an expected point within the limits of efficiency.

4- Integration between modern methods (benchmarking technique, DEA) helps to enhance the role of measuring performance efficiency. This is by taking advantage of the advantages of methods with each other and getting out of the limited scope of internal comparisons, and complementing them with external comparisons in order to judge performance results more objectively and clearly.

5- The existence of a significant effect of using the analysis of the data envelope with its four indicators in measuring the competitive advantage in the private Iraqi banks of the research sample during the research period.

Second: Recommendations

1- Because of the changes and developments that occur in the contemporary business environment, economic units, out of the limited scope and expansion of the use of sophisticated, and the basic principles necessary for their application, which provide the objective basis for measuring performance efficiency, and provide better performance are required.

2- Directing expenses to calculate relative efficiency on an annual basis, and offer to stand on the financial position, and measure and evaluate performance better than not using appropriate models to measure relative efficiency in the future.

3- The banks of the research sample must increase attention to modern strategic aspirations, especially in the case of integration between them, represented in reference comparison, and the method of analyzing and measuring the data envelope. This is because it is one of the most important methods that can be deduced in performance efficiency studies, which shows the success of the economic unit and its continuity in the business environment.

4- Rejecting the null hypothesis, which states that there is no significant impact of the use of benchmarking in measuring the performance efficiency of the research sample banks.

5- Confirming the null hypothesis that there is a contribution of inputs (financial indicator, growth and learning index) in achieving the highest level of relative efficiency.

References

1. Al-Barwari, N. A. M. (2001). Benchmarking and its Possibilities for Application as a Tool for Continuous Transformation in Organizations. Iraqi Journal of Administrative Sciences, 1(1).

2. Al-Ghabban, F. I. M., & Al-Ghabban, T. S. M. (2022). The possibility of adopting strategic management accounting techniques to increase the competitiveness of Iraqi economic units in light of the changes in the contemporary business environment. Journal of Accounting and Financial Studies, 17(59).

3. Al-Ghazi, M. A. A. H., & Al-Musawi, A. N. K. (2020). Integration of material cost accounting and green design progress required. Al-Kout Journal of Economics and Administrative Sciences, 38(12).

4. Al-Najar, F., & Ahmed, J. (2017). Total Quality Management, Productivity and Technological Planning for Excellence, Leadership and Excellence: Alexandria University House.

5. Al-qudhat, I. H., & Nabulsi, Z. H. (2014). The impact of benchmarking on achieving total quality standards in Jordanian universities. Paper presented at the Conference on Integration of Education Outcomes with the Labor Market in the Public and Private Sectors, Amman.

6. Al-Ra'i, M., Shireen, T., & Al-Harazin, M. (2020). Measuring the Efficiency of Commercial Banks Operating in Palestine Using Data Envelope Analysis. An-Najah University Journal for Research, 34(7).

7. Al-Sakka, M. I. (2009). Analysis of Technical Efficiency and Profitability Efficiency of Commercial Banks in the State of Kuwait Compared to GCC Banks. King Abdulaziz University Journal(2).

8. Al-Taie, Y. H., & Hassoun, A. M. (2010). Strategic planning and its role in achieving competitive advantage. Journal of Kufa Studies, 19.

9. Al-Tikriti, I. (2000). Benchmarking: A Performance Evaluation Tool and a Method for Continuous Development. Journal of Economic and Administrative Sciences, VII(24).

10. Al-ZUBAIDI.F &Al- Ghabban.T,2022, Compatibility of costs based on activity that focused on performance and value engineering to improve competitive advantage: An applied research in Wasit Textile and Knitting Factory, An applied research Rights and privileges of Doctorate Degree.

11. Battal, A. H., Juma, A. O., Hammoudi, & Abdulkarim, Q. (2017). Using the Malmcost Index to measure overall productivity growth in banks.

12. Bdeir, A. S. M. (2020). Relative Efficiency of Taiz University Using Data Envelope Analysis (DEA) Method: Case Study. (PhD), Taiz University, Faculty of Education.

13. Ben Musa et al. (2022). Measuring the efficiency of human resources and its relationship to training in Islamic banks using the data envelope analysis method.

14. Fawzi, A.-A. H., & Jabr, A.-D. W. A. (2010). The Role of Benchmarking in Achieving the Dimension of Tanaf (Cost), A Comparative Study between Najaf Cement Factory and Al-Sharaf. And the new Kufa cement factory. Journal of the Kufa Studies Center,(16).

15. Fouad, H. (2017). Benchmarking. Paper presented at the the Egyptian Association for Comparative Education and Management Meeting, Cairo.

16. Hussein.E, & Yaqoub.F. (2014). Activating financial performance measures based on value and its impact on corporate performance in light of corporate governance. Journal of Accounting and Financial Studies, 9(26).

17. Ismail, A.-T. (2011). Benchmarking: A Performance Appraisal Tool and a Method for Continuous Development. Journal of Economic and Administrative Sciences, VII(24).

18. Jamoui, K. M., & Farid, B. K. (2013). Measuring the efficiency of Algerian banks using encapsulated analysis.

19. Lara. K , & Yaqoub.F. (2018). Effect of Continuous Improvement in Achieving Competitive Advantage for Iraqi Universities And Their Research Projects. Journal of Accounting and Financial Studies, 13 (44).

20. Reference Comparisons Guide in Academic Programs. (2019). Qassim University, Deanship of Development and Quality.

21. Saleh, A. F., & Saleh, S. J. E. (2021). A proposed model for measuring cost based on performance-based activity using fuzzy logic - an applied study. Egyptian Journal of Business Studies, 43(5).

22. Taleb, A. F., & Mohammed, A. F. (2009). Fundamentals of Benchmarking. Amman: Dar Safa.