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InTraders International Trade Academic Journal is peer reviewed academic journal, open access and accepts "PRINCIPLES OF TRANSPARENCY", follows the practice guidelines prepared by the Publication Ethics Committee (COPE).

### **Aim**

InTraders International Trade Academic Journal aims to be able to publish scientific research of researchers; aims to create a platform that will contribute to academic development and increase the number of qualified academic studies.

### **Scope**

InTraders International Trade Academic Journal is a well-known international journal that publishes original and scientific research in the field of international trade in English. The journal has free and open access to all researchers. The language, science, legal and ethical responsibility of the articles published in the journals belong to the authors. Articles published in the journal can not be used without reference.

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The articles to be submitted for publication in InTraders must have never been published before, have not been accepted for publication, and have not been submitted for publication.

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In the Pre-Exam process, the article consists of three phases; formal, academic and written. In the formal review, the "similarity report", the keyword, the JEL code and the author information are checked. The preliminary examination is carried out by the secretariat board. At each stage, the writer is contacted and requested to complete the necessary transactions, and each subsequent step is passed to the next step. It is targeted to complete within 10 days according to the speed of the author.

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At least two scientific board member approval needs in favor of accepting the journal. If one of the referees is positive and the other is negative, the article is sent to a third science board member. Publication of the referee review process is completed with the approval of the editorial board of the journal.

### **Plagiarism Control**

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It is published twice a year. It is published in July and December. If it is deemed necessary, specific numbers / supplements may be issued for specific topics and for expanded notifications qualified by InTraders subject to conventions. Articles may always be accepted by InTraders.

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1.3. The authors accept that the contact information (mail, institution, ORCID) specified in their article will be included in their article to be published/published in InTraders. InTraders agrees not to publish the information of the authors anywhere other than the journal issues, and not to share them with third parties for commercial and advertising purposes.

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As of 2020, the TR Index-Journal Evaluation criteria have been updated and the articles related to the ethics committee permission, which should be in scientific research, in particular, have been detailed.

The "documents and information requested for studies requiring ethics committee approval" is not expected to be applied to studies submitted in previous years, the evaluation process of which has been completed but has not yet been published, and for which research data before 2020 has been used, although the evaluation process is still ongoing. The process will start in 2020 and research data will be mandatory for articles from 2020. The articles for which Ethics Committee Permission Document is required are explained below.

#### EXPLANATION AND INFORMATION on the Ethical Rules Made by TR Index

The articles related to the Code of Ethics, which were included in the previous years in the criteria, were detailed with explanations in 2020, and the issue of "include information about the permission in the article" was added to the criteria, assuming that the permissions were obtained for the studies requiring ethics committee permission in the research field.

QUESTION: Is ethics committee approval required for all articles?

No. In the criteria, it is stated as "articles that require the permission of the Ethics Committee".

Studies that require the approval of the Ethics Committee are as follows:

- All kinds of research conducted with qualitative or quantitative approaches that require data collection from the participants by using survey, interview, focus group work, observation, experiment and interview techniques.
- The use of humans and animals (including material/data) for experimental or other scientific purposes,
- Clinical studies on humans,
- Research on animals,
- Retrospective studies in accordance with the law on the protection of personal data,

Also;

- Indicating that an "informed consent form" was received in case reports,
- Obtaining and specifying permission from the owners for the use of scales, questionnaires, photographs belonging to others,
- Indication of compliance with copyright regulations for the intellectual and artistic works used

QUESTION: Should a retrospective Ethics Committee Permission be obtained for publications produced from studies and thesis completed in previous years?



Retrospective ethics committee approval is not required for articles that were published before 2020, produced from master's/doctoral studies (must be specified in the article), submitted an application for publication to the journal in the previous year, and accepted but not yet published.

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No. Non-university researchers can also apply to the Ethics Committees in their regions.

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In articles to be published in journals, it should be stated in the article whether ethical committee permission and/or legal/special permission is required. If it is necessary to obtain these permissions, it should be clearly stated from which institution, on what date and with which decision or number the permission was obtained.

If the study requires the use of human and animal subjects, an international declaration, guide, etc. should be declared appropriate.

### **3. Ethical Principles for Referees**

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3.2. The referees must submit an objective, impartial, scientific, understandable and constructive evaluation report about the study within the specified time.

3.3. Referee reports will also include an assessment of the scientific nature of the article (the subject covered, the method used, or the appropriate use of the relevant literature). This evaluation must be made about the content, whether positive or negative.

3.4. It is not recommended and considered unethical for the reviewer to request citations for their own work. If the referee's studies are related to the study he is examining, he can specify 1 or 2 studies, but the studies mentioned are advisory and it is up to the author whether to use the specified studies or not.

3.5. When it is understood that the work is plagiarized or has been previously published elsewhere, the referees should notify the editor.

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## **Appreciation**

I am gratified to have the honor to put forward the vote of thanks to all the InTraders Journal Committees, Writers and Authors who provided the intensive work performance for the InTraders under the name of InTraders Academic Platform.

InTraders topics; economy based topics.

In upcoming next issue, waiting your studies.

Wish to meet you all in this new international conferences...

**Kürşat ÇAPRAZ**

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## **Assessing the Challenges and Prospects of MSMEs Development: In the Case of Ethiopia<sup>12</sup>**

**Hanan TAHIR AHMED<sup>3</sup>**

**Nur ÖZER CANARSLAN<sup>4</sup>**

### **Abstract**

For a country like Ethiopia, Africa's second most populous nation, the development of Micro, Small, and Medium Enterprises (MSMEs) helps reduce unemployment and boost the country's overall economy by fostering the growth of industries. Therefore, the main objective of the study is to assess and analyze major challenges hindering the development of Micro, Small, and Medium Enterprises in Ethiopia. Wood and metalwork, food processing, textile and garment subsectors in Nifas Silk Lafto Sub-city/Addis Ababa were chosen for data collection due to the convenience. A questionnaire was used to collect survey data from 291 MSME owners or managers. Descriptive findings revealed that financial, infrastructural, workplace place, and technological factors were identified as the four most severe problems that challenged the development of MSMEs. On the other hand, the results of the inferential analysis indicated that technological, marketing, workplace, and political-legal factors all had a significant effect on the development of MSMEs, except for infrastructure.

**Keywords:** MSMEs, Challenges of MSMEs, Prospects of MSMEs, Development of MSMEs

**JEL Code:** M10, L26

### **1. Introduction and Background**

Micro, Small, and Medium Enterprises (MSMEs) play an important role in the development of countries' economic growth and social development (Mehta, 2013). MSMEs are critical for the development of a modern, dynamic, and knowledge-based economy because these enterprises encourage entrepreneurship and entrepreneurial skills. In addition, these enterprises are more adaptable to marketing changes, and climate change, and more flexible in their behaviors than large enterprises. Besides this, MSMEs encourage the creation of new jobs (Govori, 2013).

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Overall, the development of MSMEs has the potential to benefit the country's economy by producing substitute goods locally, making goods for domestics, and exporting goods to foreign markets. Furthermore, the growth of MSMEs increases productivity and cash inflow. It also enhances aggregate economic growth by increasing Gross domestic product and Gross National Product (Reinert, 2007).

Ethiopia is a country where agriculture is the primary source of income for the majority of the population. Agriculture is the primary source of employment, cash inflow from export food, and job security for the general public. Besides that, the majority of the country's population lives in rural areas, and their income is based on small businesses that are frequently vulnerable to drought (Lie and Berouk, 2018). What's more, as a developing and emerging country, the economic development system is supported by federal government investment. As one of the least developed African countries, Ethiopia relied on agriculture sectors to combat poverty and promote growth. Recently, the Ethiopian government has played an important role in increasing productivity, particularly in the agricultural sector. However, the agricultural sector's achievements in terms of economic development are unsatisfactory, as they are in other developing countries that rely solely on agriculture sectors. As a result of this problem and stagnation in the agriculture sectors, the federal government devised various policies, strategies, and plans aimed at reducing poverty through the promotion of economic growth, particularly by supporting private sectors.

Despite the contribution of MSMEs to economic growth and development, particularly the creation of job opportunities for a large portion of the Ethiopian population, Gross Domestic Product (GDP) from the manufacturing sector in particular and MSMEs, in general, remains unsatisfactory due to various constraints such as a lack of skilled human resources and finance to produce high-quality products (Abdissa & Fitw, 2016; Esubalew & Raghurama, 2017). In other words, although the Ethiopian government recognizes MSMEs as a tool for growth and has developed various strategies to support the sectors, MSMEs development in Ethiopia is still in its infancy. Considering this, the purpose of this study is to assess and analyze various significant factors that are hindering the development of MSMEs in Ethiopia.

The Ethiopian federal government, as well as international and local Non-Governmental Organizations (NGOs), supports the development of MSMEs in Ethiopia. Ethiopia's federal government supports MSMEs through various strategies, plans, and programs. Although the

government of Ethiopia recognizes MSMEs as a tool for growth and that these sectors are supported by the government and international organizations, the performance and productivity of these sectors are still in their infancy due to various factors. Thus, lack of access to finance (credit-related problems, collateral, late payment, and low level of saving), market-related problem (place to produce products, low-quality products due to a lack of raw materials and many to buy, low-level strategy to penetrate the market, absence of market strategy, low promotion, and inadequate price strategy), lack of infrastructure throughout the country, which is related to the availability of (electric supply, water, bad roads, and shortage of transportation facilities), lack of technology, lack of managerial skill, environmental problems, and government policies like tax-related issues were some of the major factors limiting the productivity and development of MSMEs in Ethiopia.

The extant literature suggest that government support seems to be the primary solution for the growth and development of MSMEs (Tambunan, 2019; Van Sheers, 2012; Zamberi, Ahmed, 2012; Govori, 2013). Despite the federal government's various initiatives, plans, and strategies to support MSMEs in Ethiopia, the contribution of MSMEs to economic development, particularly the contribution of manufacturing sectors, remains stagnant in comparison to other countries. Furthermore, the output generated by these enterprises is insufficient. As a result of this, the study intends to assess and analyze significant challenging factors that hinder the development of MSMEs in Ethiopia

Based on the problem mentioned above, the general objective of the research is to assess and analyze the challenges and prospects of MSME development in Ethiopia.

The specific objectives developed depending on the general objective are;

- To assess, if a lack of access to finance, management, marketing, infrastructure, technology, workplace, political, and legal issues is hindering the development of Micro, Small, and Medium Enterprises (MSMEs) in Ethiopia.
- Identifying various prospects and making recommendations to help in the development of MSMEs in Ethiopia.



## **2. Theoretical Background**

### **2.1. Defining Micro, Small, and Medium Enterprises (MSMEs)**

MSMEs are the economic backbone of both developed and developing countries, contributing to economic growth, job creation, and the delivery of public goods and services, as well as mitigating poverty and inequality (Ke Liu, 2009). According to Getahun (2016), countries cannot achieve economic growth unless they develop small-scale businesses. As a result, the most important thing for development is the establishment of MSMEs. MSMEs are important for economic development for the following reasons: MSMEs play an important role in increasing productivity and overall growth, reducing unemployment rates, and enhancing the quality of life. Despite these contributions, no universally accepted and confirmed uniform definition of MSMEs exists (Agyapong, 2010; Gidado & Babakura, 2019). It is instead based on the perspectives of individual countries, regions, or organizations. As a standard, most countries use the following criteria to define these enterprises: i.e. on the basis of capital, number of employees, output, and so on (Gidado & Babakura, 2019). Even though there is no internationally accepted definition of MSMEs.

### **2.2 Key Factors Enhancing the Growth and Development of MSMEs**

MSMEs' growth is influenced by a variety of factors. These are managerial ability, owner objectives, access to finance such as capital and credit, and technology (Weldeslassie et al., 2019). According to Weldeslassie et al. (2019) findings, three factors influence MSMEs' survival: access to credit, capital size, and the gender of the MSMEs' owner/manager. Similarly, skills, finance knowledge regarding networks and information, adequate infrastructure, innovation, training and, education for workers and managers are critical factors for developing MSMEs (OECD, 2017). Several factors contribute to the expansion and development of SMEs. For instance, Muhammad et al. (2015) study, discovered that managerial skills, access to finance, and government support are important factors for the development of SMEs in Pakistan. Whereas, Indarti and Langenberg (2004) found that marketing, access to capital, and technology have a positive effect on the success of SME businesses.

### **2.3 Problems and Challenges of Micro, Small, and Medium Enterprises**

Understanding the overall challenges that constrain the development of MSMEs is a critical and pivotal point. Because some challenges or factors can stifle enterprise growth or harm the establishment of SMEs, these factors may have an immediate impact on the firm's operation or

internal growth. However, in the long run, it impacts overall economic development (Abraham et al., 2017).

### **2.3.1 Lack of access to market and marketing skill**

Every enterprise or organization that is involved in business requires marketing to continue or survive. Marketing knowledge helps SMEs gain a competitive edge in the market by increasing customer demand and understanding, as well as identifying and capturing the target market position (Jovanov and Stojanovski, 2012). Marketing is critical for businesses to identify their customers' needs and desires. Customer satisfaction is more important for businesses to profit, grow, and survive. In this perspective, marketing supports enterprises by determining market size, targeting niche markets, identifying appropriate strategies, and selecting market segments. Although marketing is essential in the development of enterprises, various marketing-related problems and other factors are adversely affecting the growth of these enterprises. SMEs face a variety of challenges, including access to finance or capital, inefficient management, a lack of skilled labor, a lack of infrastructure, and a lack of marketing skills, particularly in marketing research and development. According to Ebitu et al. (2016), most small enterprises are unaware of the value of marketing research and development. Moreover, this hindered the development of these enterprises compared to large enterprises because marketing-related problems are problems related to marketing barriers that limit the growth and development of small enterprises and other firms. Moreover, marketing issues are the primary impediments to enterprises making a profit, obtaining consumer satisfaction, generating income, and creating value for enterprises. Besides that, problems related to marketing skills, such as the inability to analyze market opportunities, a lack of promotion and advertising for their product, inefficiency in operation and production, a lack of product standardization, low-level quality products, and a lack of an effective pricing strategy, are some factors that affect the performance and profitability of these sectors (Ebitu et al., 2015). In the lack of marketing skills, it isn't easy to get potential customers for product and services. According to Van Scheers (2011), no one will do business with you if the potential consumer in the market does not have adequate information or awareness about the product and service you provide.

### **2.3.2 Lack of managerial skills**

SMEs are critical development tools that require various improvements in terms of business competitiveness. In this regard, managerial skills are the most critical factor in improving the

internal problems and competitiveness of SMEs. Management skills are required to develop adequate and appropriate strategic planning, which aids in developing MSMEs. Moreover, these management skills assist managers in determining and implementing enterprise goals. Enterprises will achieve market competitiveness through management skills (Leyva Carreras et al., 2018). The success of SMEs is determined by an entrepreneur's or manager's managerial abilities. This means that managers can make businesses succeed or fail (Popescu et al., 2020). According to the findings of Leyva Carreras et al. (2018), strategic planning and managerial skills are internal factors that influence SMEs' competitiveness. According to Muhammad et al. (2015), internal and external factors are vital to the success and performance of SME entrepreneurs in their businesses. Internal factor skills related to SME management, such as conceptual, technical, and interpersonal skills, are crucial for developing MSMEs. Managerial skills are required to efficiently and effectively manage, control, and operate the activities of MSMEs. Moreover, for small enterprises, skilled human labor and material resources are essential tools for running their operations efficiently and effectively. Even though managerial skills and knowledge are the most important factors for businesses, the majority of MSMEs in developing countries lack managerial skills such as planning, organizing, directing, and controlling. Furthermore, small businesses in these countries have been constrained by a lack of basic skills and techniques to operate and sustain their operations (Abehi, 2017).

### **2.3.3 Lack of finance**

Access to finance is one of the most important factors that allow MSMEs to keep growing. Finance can assist the development of enterprises from start-up to operation throughout their life cycle. Finance can include the cost of organizing and arranging products, machines, equipment, and sales premises in a startup (MOUDH, 2016). Finance supports the development of SMEs in a variety of ways. The first is that it increases their investment, which supports the growth of production in businesses, export, product, and service diversification (World Bank, 2018). Access to credit, particularly adequate and timely credit supply, promotes enterprise development and helps to solve problems (Getahun, 2016).

However, many African MSMEs, which include Ethiopia, are experiencing difficulties obtaining financial support. Although some African countries have established institutions to facilitate loans to small enterprises, most Sub-Saharan African countries remain financially constrained (Appui au Développement Autonome, 2016). One of the most significant barriers

to the growth and development of SMEs in developing and emerging countries is a lack of access to finance. In comparison to large enterprises, the ability of SMEs to obtain bank loans is limited. Because of this problem, most SMEs rely on internal resources, such as cash from their own savings families, and friends, especially during the start-up period (World Bank, 2018). Even though finances are required for businesses to start, develop, or expand more successfully way, the majority of MSMEs in Ethiopia are financially constrained. These challenges affect the enterprises both during the start-up phase and in ongoing activities; for instance, a lack of capital hindered the establishment of the enterprises, while other access affects ongoing business activities (Wami, 2020). Lack of finance is one of the major challenges that impede the development, growth, and productivity of MSMEs (Owens & Wilhelm, 2017).

#### **2.3.4 Lack of adequate infrastructure**

Adequate infrastructure is essential for overall development. Besides, it is the most critical factor for the survival and growth of small enterprises (Ebitu et al., 2016). Hence, the least-developed countries in the world are known for low infrastructural development, and Ethiopia is one of those countries, according to Getahun (2016), the country's economy has characterized by low-level infrastructure. And this low-level development of infrastructure constrained the overall economic growth, particularly the productivity of small enterprises. According to Geiger & Moller (2015) the main barriers to developing MSMEs in Ethiopia are lack of infrastructure such as electricity, roads, and telecommunications.

#### **2.3.5 Lack of access to technology**

Technology is an essential factor in the growth and development of MSMEs. MSMEs benefit from access to technology in a variety of ways. Modern technology will increase enterprise productivity because technology will change product quality and quantity. This boosts the overall growth of businesses. Moreover, technology, particularly the use of modern technology, reduces production costs in businesses by shortening production time. As a result, while access to technology promotes enterprise productivity and growth, inadequate technology hampers internal operations and overall growth. Besides that, a lack of adequate technology is a common problem among Ethiopian MSMEs (Wami, 2020).

#### **2.3.6 Lack of supportive government policy and regulation**

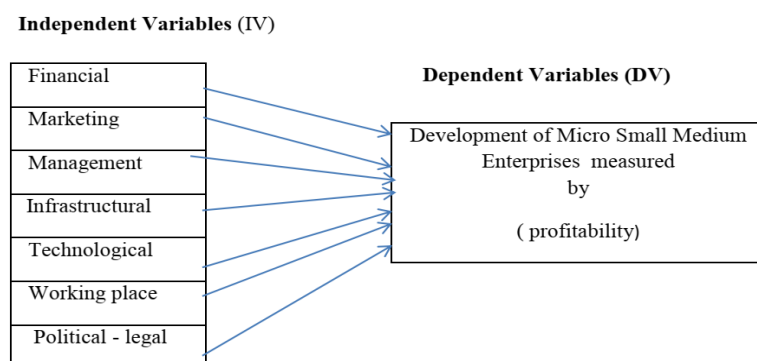
MSMEs promote equitable development, which boosts overall economic growth. Despite this, a variety of factors have an impact on the growth and productivity of MSMEs. Among these

factors, one major impediment to the development of this sector is government-related problems. Government problems include a lack of transparency and integrity, as well as red tape and corruption. Lack of transparency and integrity, particularly from public administration to SMEs, could have a wide-ranging impact on business growth and development. Besides that, red tape and corruption are major hindrances to the development of these enterprises (Weddeslassie et al., 2019). Furthermore, small enterprises are more reliant than large enterprises in their behavior. In this regard, policy inefficiency, market inconsistency, failure, regulatory complexity, and uncertainty affect these enterprises more than large enterprises. Because large enterprises have more capacity and can obtain information more easily than small businesses. In addition, most SMEs are at a disadvantage in terms of fixed costs such as tax and record-keeping payment processes (OECD, 2017).

## 2.4 Conceptual Framework

Various factors influence the development of Micro, Small, and Medium Enterprises (Weddeslassie et al., 2019). Internal or external factors could influence the development of this enterprise. Financial, marketing, infrastructural, technological, workplace, political, and legal factors are external factors that influence MSME development. Management factors were identified as internal factors influencing the development of MSMEs (Ebitu et al., 2016; Getahun, 2016; Muhammad, et al., 2015; Seyoum, et al., 2016; Tambunan, 2019; Weddeslassie et al., 2019; Zamberi Ahmad, 2012). However, in this study, the conceptual framework is drawn specifically from Abera's (2012), Getahun's (2016), Serawitu's (2016) theory of firm growth.

**Figure 1. Conceptual Framework**



### 3. Methodology

To assess the various factors that hinder the development of MSMEs, using applicable research methodology is a must (Kothari, 2004). The researcher conducted the study using descriptive and explanatory research methods. The primary goal of descriptive research is to describe the current state of affairs. The study then describes and critically evaluates the various challenges or factors impeding the development of MSMEs in Ethiopia, specifically in Addis Ababa's Nifes Silk Lafto sub-city. The purpose of explanatory research designs in this study, on the other hand, is to establish the relationship between variables in terms of causes and effects (Vanhamme, 2000). Generally speaking, this study employs a quantitative research approach to address research purposes through empirical assessment by comprehending numerical measurements and conducting research analysis.

#### 3.1 Sample Size

According to Dawson (2009, p.54), the sample size of a study is determined by the nature of the population being studied, the research type, and the purpose of the study. In this study, the total population for the study is 1183 MSMEs formally registered in “Addis Ababa City Administration Micro and Small Enterprises Development Agency” until May 2021, which was used to determine the sample size. Aside from that, the enterprises have a limited population and are heterogeneous. To reduce bias in population sampling, the frame can be organized into relatively homogeneous groups or strata to select appropriate elements for the sample. According to the Addis Ababa City Administration Micro and Small Enterprises Development Agency, the strata include metal and woodwork (608), food processing (339), and textile and garment (236) until May 2021. The sample size chosen by the researcher here is through undertaking the representative of metal and woodwork, food processing, and textile and garment manufacturing.

The following formula was used to calculate sample size with a 95% confidence level ( $z_{\alpha/2}=1.75$  from the z-distribution table) and a 5% tolerable error (e). Furthermore, according to Kothari (2004), the most conservative sample size for success proportion (p) is 50%, so by using the most conservative sample size 50% (P), the estimation of failure (q) will be calculated as follows ( $q=1-p$ ). Then, in the formula, substitute the value of both:

$$n = \frac{z^2 \cdot p \cdot q \cdot N}{e^2(N - 1) + z^2 \cdot p \cdot q}$$

Where  $n$  = sample size required

$N$  = number of population = 1183

$p$  = estimated success proportion = 50%

$q$  = estimated failure proportion = 50%

$e$  = margin of error = 5

$Z$  = confidence level = 1.96 for 95% confidence

According to the result of equation 291 Micro, Small, and Medium Enterprises (MSMEs) were chosen proportionally from the total population ( $N$ ) according to the size of each stratum identified in the above paragraph. The sample unit for each sub-sector was selected by using a non-probability sampling technique called the convenience sampling method.

### 3.2 Data Processing and Analysis

After data is collected from a sample of the population, it is analyzed to answer research questions. Sekaran and Bougie (2016) suggest that some preliminary steps must be completed before beginning to analyze data. Because it aids in ensuring that the data gathered is accurate, complete, and suitable for further analysis. In quantitative research, data collected via questionnaires is coded, keyed, and edited to filter out inconsistent and blank responses.

After completing the preceding preliminary steps, the next step in conducting research is data analysis. This means that in this step, the original numerical representation of quantitative data coded in the previous process will be changed to a different value. This is accomplished through the use of descriptive and inferential statistical analysis methods. In this study, the Statistical Package for Social Science (SPSS) 22 version was used to analyze data from questionnaires. In this study, descriptive statistics such as mean, standard deviation, and chart, as well as inferential statistical analysis such as correlation and regression, were used to analyze the data.

#### 3.2.1. Model Specification

In this study, linear regression is used to describe changes in some phenomena caused by independent

$$y_i = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + \beta_5x_5 + \beta_6x_6 + \beta_7x_7$$

$\beta_0$  is the intercept term-constant which would be equal to the mean if all slope coefficients are 0. Where  $\beta_0$  is the intercept constant term at time zero,  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$ ,  $\beta_5$ ,  $\beta_6$ , and  $\beta_7$  represent



parameters of a coefficient related to each independent variable.  $X_1, X_2, X_3, X_4, X_5, X_6,$  and  $X_7$  represent:  $X_1$ =Finance,  $X_2$ =Marketing,  $X_3$ =Management,  $X_4$ =Technology,  $X_5$ =Infrastructure,  $X_6$ =Workplace, and  $X_7$ =Political–legal are independent variables and  $\varepsilon$  are error term for variables. So,  $y_i$  is the development of MSMEs measured in terms of profit.

#### 4. Results and Discussion

The table below shows that approximately 68.7 percent (184 MSMEs) of the selected sample populations were males, while 31.3 percent (84 MSMEs) were females. This demonstrates that men own or manage the majority of MSMEs, and women have a lower participation rate as owners or managers of these businesses than men. According to the findings, the majority of respondents are between the ages of 25 and 35, accounting for 46.3 percent; the majority of respondents from the sample population were married, accounting for 56.7 percent; 34.7 percent of respondents had a first degree; and 32.2 percent of owners or managers in this study have 5-10 years of experience.

**Table 1. Demographic Characteristics of the Respondents and Business-Related Profile of the MSMEs**

<b>Gender</b>	<b>N</b>	<b>%</b>	<b>Age</b>	<b>N</b>	<b>%</b>
Male	184	68.7	18-24	44	16.4
Female	84	31.3	25-35	124	46.3
<b>Marital status</b>	<b>N</b>	<b>%</b>	36 – 44	81	30.2
Married	152	56.7	Above 45	19	7.1
Single	100	37.3	<b>Education</b>	<b>N</b>	<b>%</b>
Divorce	16	6	No formal education	17	6.3
<b>Work Experience</b>	<b>N</b>	<b>%</b>	Primary	18	6.7
Below one year	23	8.6	Secondary	45	16.8
1_4	89	33.2	Diploma	84	31.3



5-10 years	105	39.2	Degree	93	34.7
11 and above years	51	19	Second-degree & above	11	4.1
<b>Number of Employees</b>	<b>N</b>	<b>%</b>	<b>Working sectors</b>	<b>N</b>	<b>%</b>
1-5 Employees	86	32.1	Textile and garment	52	19.4
6-10 Employees	109	40.7	Food processing	77	28.7
11-15 Employees	52	19.4	Wood and metalwork	139	51.9
Above 15 Employees	21	7.8			
<b>Profitability trend of MSMEs</b>	<b>N</b>	<b>%</b>	<b>Financial sources of MSMEs</b>	<b>N</b>	<b>%</b>
Profitable	163	60.8	Personal saving	60	22.4
Not Profitable	52	19.4	Microfinance institutions	95	35.4
break-even income	53	19.8	NGOs	41	15.3
			Family/ Friends	34	12.7
			Banks	8	3
			Iqub/Idir	23	8.6
			Others (specify	7	2.6

Furthermore, the study results show that the majority of respondents (51.9 percent) worked in wood and metal work, followed by food processing (28.7 percent) and textile and garment (19.4 percent), 40.7 percent of the enterprises have 6-10 employees, and the majority of MSMEs get financial support from Micro Finance Institutions (MFI) (which represents 35.4 percent of the MSMEs). Further to that, the majority of enterprises (60 percent) of the 163 MSMEs who responded to the survey said their business is profitable. While 52 MSMEs (19.4%) stated that their business is not profitable. Moreover, 53 MSMEs (19.8 percent) reported a break-even point in their profitability trend. This means that their business is neither profitable nor incurring losses.

#### 4.1 Regressions and Correlational Analysis

To describe the association between dependent variables and independent variables, and to know how changes in the independent variables relate to changes in the dependent variable and to predict the impact of independent variable on dependent variable multiple regression analysis was employed for this study. Hence, the result of multiple regression analysis was presented and discussed.

**Table 2 Regression Analysis**

Model	Beta	Std. Beta	Err. Beta	T	Sig	Tolerance	VIF
Constant	-.111	.117		-.952	.342		
Finance	-.027	.048	-.024	-.565	.573	.394	2.538
Management	.078	.050	.082	1.567	.118	.259	3.857
Marketing	.246	.067	.230	3.649	.000	.178	5.625
Infrastructural	.100	.048	.103	2.095	.037	.291	3.439
Technology	.294	.050	.290	5.843	.000	.288	3.475
Workplace	.181	.038	.197	4.798	.000	.421	2.377
Political legal	.172	.048	.163	3.620	.000	.350	2.855

Model Summary: R Square: .816 Adjusted R Square: .811 Durbin Watson: 1.994

Table 2 above demonstrates the estimates of the multiple regression of development against its variables for the sample of 268 MSMEs. Before doing multivariate analysis Multicollinearity test was applied. Multicollinearity occurs when the independent variables are highly correlated. There is "overlap" or sharing of predictive power when independent variables are multicollinear. This could result in a paradoxical effect (Ho, 2006). In this study, the multicollinearity test value, which is stated in the variance inflation factor (VIF) indicates that the relationship between the independent variables is acceptable since it has a value < 10. Besides tolerance values are greater than 0.1. Furthermore, we used the Durbin-Watson statistic to determine whether or not there is autocorrelation between variables. Normally, the Durbin-Watson statistic ranges between 0 and 4. A value close to 2 indicates that there is no autocorrelation; a value close to 0 indicates that there is positive autocorrelation; and a value close to 4 indicates that there is negative autocorrelation. The Durbin-Watson statistic in our study has a value of 1.994, which is close to 2, indicating that autocorrelation does not exist.

**Table 3 Correlational Analysis (Pearson Correlation Values)**

	Finance factors	Management factors	Marketing factors	Infrastructural factors	Technological factors	Working place factors	Political & legal factors	Development
Financial factors	1							
Management factors	.495**	1						
Marketing factors	.637**	.838**	1					
Infrastructural factors	.729**	.505**	.660**	1				
Technological factors	.610**	.725**	.815**	.649**	1			
Working place factors	.602**	.508**	.636**	.691**	.653**	1		
Political & legal factors	.475**	.674**	.697**	.679**	.666**	.633**	1	
Development	.611**	.735**	.826**	.714**	.826**	.734**	.755**	1

Moreover, the study finding shows that all variables are significant with a value  $<0.05$  except finance and management. Given this, the multiple correlation coefficients between all of the independent variables finance, management marketing infrastructure, technology workplace, and political legal and the dependent variable (development) are .903a, as shown by multiple R. In addition R-Square value or squared value of R .816 which is used to describe the goodness-of-fit and adjusted R square value of .811 depicted that 81.1% of the variation in the development of MSMEs can be explained by the predictor variables, while the remaining 18.9 % of the variance is explained by other variables not included in this study. The unstandardized coefficients B column provides us with the coefficients of the independent variables in the regression equation including all the predictor variables as listed below.

$$\text{Predicted development score} = 0.111 + .230 (\text{Marketing}) + .103 (\text{Infrastructure}) + .290 (\text{Technology}) + .197 (\text{Workplace}) + .163 (\text{Political legal})$$

Table 2 also demonstrates that the five explanatory variables mentioned above included in this study can significantly explain a 95% confidence level of the variation in the development. The standardized beta coefficient column displays the contribution of each variable to the model.

The beta weight is the average increase in the dependent variable when the independent variable increases by one standard deviation (all other independent variables remain constant). We can compare them because they are standardized. Thus, the most significant influence on the development of MSMEs came from the technology factor (.290) and followed by the marketing factor (.230). On the other hand Finance with a beta value of (-.024) and management with a beta value of (.082) are the poorest predictor of development when it is compared with the other explanatory variables under study.

Taking the above findings into account, the following statements could be made about the study's hypothesis, as well as the summary of results and discussions based on inferential and descriptive data presented below.

**4.1.1 Financial Factors:** This factor is statistically insignificant, according to the statistical results, although it was ranked as the top problem that MSMEs face based on the results of central tendency and descriptive analysis. On the other hand, the factor had a negligible impact on impeding the development of MSMEs. In contrast with this finding, Serawitu (2018) discovered that financial factors were the fourth most significant influential factor affecting MSMEs and ranked as the third most severe problem in the descriptive analysis, In contrast, Abera (2012) discovered that financial factors were the second most significant influential factor affecting MSMEs and ranked as the second most severe problem in the descriptive analysis. However, due to the result from regression analysis for financial factors being statistically insignificant, we reject the hypothesis which is stated: “lack of access to finances negatively influences the development of MSMEs in Ethiopia”. In contrast, Abet et al. (2015) conducted research on "Financing Small and Medium Enterprises in Asia and the Pacific." The study found that a lack of finance, a lack of accounting skills related to managing their capital, particularly by the owner of the enterprise, a lack of information between banks and MSMEs, and an inadequate market strategy had hampered the development of MSMEs. According to the authors, the main reason for the underdevelopment of MSMEs is a lack of funds (Abe et al., 2015).

**4.1.2 Management Factor:** Table 2 from the regression analysis shows that the management factor has a negligible impact on the development of MSMEs. This suggests that the management factor is not a critical determinant of MSMEs' development. In the descriptive analysis, this factor was ranked as the seventh least problematic issue that MSMEs faced. As a

result, we reject the alternative hypothesis that "a lack of management skills harms the development of MSMEs in Ethiopia" and accept the null hypothesis. According to this, Serawitu (2018) discovered that the management factor is statistically insignificant for MSMEs development and ranked it as the eighth least problem impeding MSMEs development in Ethiopia. Similarly, Abera (2012) discovered that the management factor is the poorest predictor of development and the fifth-ranked problem that enterprises face. In contrary to the study, Osotimehin et al.( 2012), studied "An evaluation of the challenges and prospects of micro and small scale enterprises development in Nigeria". Found that a lack of management skills and lack of finance constrained the development of MSMEs.

**4.1.3 Marketing Factor:** According to the regression analysis, marketing was the second most significant factor for the development of MSMEs at the 1% level of significance. Furthermore, the Correlation results from Table 3 demonstrated a strong relationship between marketing factors and development ( $r = .826^{**}$ ,  $p < 0.01$ ). The descriptive results of this factor revealed that the marketing factor was the sixth major issue impeding the development of MSMEs. The hypothesis that "lack of marketing skills negatively influences the development of MSMEs in Ethiopia" was found to be significant in this case and may thus be accepted. In line with this, Serawitu (2018) discovered that marketing factors were the first significant influential factor affecting MSMEs, whereas Abera (2012) discovered that marketing factors were the third significant influential factor affecting the enterprises and ranked as the third most severe problems in descriptive analysis.

**4.1.4 Infrastructure Factors:** Multiple linear regression results revealed that infrastructure factors have a significant impact on the development of MSMEs, and this was tested at a 5% level of significance. In descriptive statistics, it was ranked as the second most significant impediment to the development of MSMEs. Power outages (electricity power), insufficient and interrupted water supply, a lack of business development services, a lack of adequate and timely transportation, and a lack of an appropriate dry waste and sewerage system were identified as major constraints affecting enterprises under this factor. Besides the hypothesis that "lack of infrastructures negatively affects the development of MSMEs in Ethiopia" was also found to be significant and may thus be accepted. Similarly, Abera (2012) and Serawitu (2018) discovered that infrastructure factors were the most influential factors influencing enterprises.

**4.1.5 Technological Factors:** In the regression analysis, technological factors were discovered to be the first most significant and determinant factor affecting the development of MSMEs at the 1% level of significance. Furthermore, it was ranked as the fourth most serious problem of the enterprises in descriptive analysis. The major problems that MSMEs face are a lack of appropriate machinery and equipment, a lack of skills to handle new technology, a lack of money to acquire new technology, and an inability to select appropriate technology. Furthermore, when the hypothesis "Lack of technology negatively influences the development of MSMEs in Ethiopia" was tested at a 1% level of significance, it was found to have a significant impact on MSMEs development and thus may be accepted. Serawitu (2018) discovered that technological factors were the third most important factor affecting MSMEs. While Abera (2012) discovered that technological factors were the seventh least influential factor affecting enterprises.

**4.1.6 Workplace Factors:** At the 1% level of significance, the workplace factor was identified as the third most significant influential factor affecting MSMEs in the regression analysis. Correlation analysis results also revealed a strong relationship between workplace factors and development ( $r = .734$ ,  $p < .01$ ). Similarly, the descriptive analysis findings ranked this factor as the third core problem affecting the development of MSMEs, which included the current workplace being inconvenient, the house rent being too high, and the absence of own premises. Furthermore, the hypothesis that "Lack of workplace negatively influences the development of MSMEs in Ethiopia" was found significant and may thus be accepted. According to the findings, Abera (2012) discovered that workplace factors were the first and most significant factor affecting enterprises and were ranked as the second core problem affecting enterprises in descriptive analysis. Similarly, Serawitu (2016) discovered that working premise factors were the second most significant issue affecting businesses.

**4.1.7 Political Legal Factors;** the econometric result exhibited that the political legal factor is the fourth most statistically significant for MSMEs development at a 1% level of significance. In Descriptive analysis, it was found the fifth challenging problem that hinders MSMEs development. Under this factor, lack of accessible information on government regulations that are relevant to my business, Political intervention, the tax levied on my business is not reasonable, lack of government support, and bureaucracy in company registration and licensing respectively were included as core problems for the development of MSMEs. Considering this, the hypothesis which states that "Instability of country politics, government policy and

regulation, bureaucracy and lack of state government support negatively influences the development of MSMEs in Ethiopia” tested at a 1% level of significance was discovered to have a significant impact on MSMEs and thus may therefore be accepted. Contrary to this Abera(2012) found that political-legal factors were the six least significant influential factors affecting enterprises and prioritized descriptively as also the six most affecting problems. Besides Serawitu (201) found that the political legal factor is a statistically insignificant factor affecting enterprises development and descriptively, it was found that, the fourth challenging problem affecting MSMEs.

## **5. Conclusions**

This study was carried out in Ethiopia, specifically in the Nifes Silk Lafto sub-city of Addis Ababa, to critically assess and analyze the challenges that MSMEs engaged in metal and furniture work, food processing, and textile and garment manufacturing face. The study attempted to assess the influence of financial, management, marketing, infrastructure, technology, workplace, political, and legal factors on the development of MSMEs. The following conclusions should be drawn based on the study's objectives and findings.

Financial, infrastructural, workplace, technological, political, and legal factors were found to be the five top most problems that have a significant impact on the development of MSMEs, according to the descriptive analysis findings. Financial factors, in particular, are shown to be a major constraint for the development of these businesses in the descriptive results. The reason for this problem is that the main sources of capital for businesses to start up and operate come from informal financial sources. According to the findings of the study, 56.6 percent of the funds for these businesses come from informal sources such as family, friends and NGOs. The formal financial institutions (Banks) have been unable to meet MSMEs' credit needs. Most MSMEs have been forced to use informal institutions for credit due to the high-interest rate and collateral requirements. However, as a study shows, the supply of credit from informal institutions is frequently insufficient to meet the credit needs of MSMEs.

Correlation analysis results show that all independent variables (financial, management, marketing, infrastructure, technological, workplace, and political-legal factors) have a significant positive association with the dependent variable (development). The results of multiple regression analysis show that technological, marketing, workplace, political legal, and infrastructure factors all have a significant effect on the development of MSMEs at the 1% level



of significance, except for infrastructure, which has a 5% level of significance. Similarly, standardized coefficient results show that technological factors, followed by marketing factors, workplace factors, and political-legal factors, are the top four significant influential factors in the development of MSMEs. Finance and management, on the other hand, were found to have insignificant influence on the development of MSMEs.

### **5.1 Recommendations**

The following recommendations were made for the Ethiopian government:

- To promote gender equality in business and economic growth, the Ethiopian government should promote more women entrepreneurs in Addis Ababa's Nifes Silk Lafto sub-city. Men outnumber women in the ownership of MSMEs, according to this study.
- Introducing entrepreneurial skills in training courses will go a long way in boosting the development of these enterprises, according to this study, which found more graduate entrepreneurs and diploma and degree holders.
- Because young entrepreneurs make up the majority in Addis Ababa's Nifes Silk Lafto sub-city, the focus of government and non-governmental organizations (NGOs) and authorities responsible for promoting entrepreneurs in Ethiopia should be on them.
- Government of the country should assist the enterprises by analyzing external market opportunities. More by facilitating an exhibition place for their product.
- Government of the country should assist the enterprises by enhancing infrastructure development such as roads, electricity, a marketplace for products, etc.
- The government's determined regulations should be directed toward policies that benefit Micro, Small, and Medium Enterprises (MSMEs). The government's facilities and mediation in assisting entrepreneurs should focus on facilitating access to finance/capital resources, technical and managerial training, the ease of obtaining a business license, the availability of business centers/locations, and market information.
- More over government should have to diversify channels of financing to support this enterprise.



- Government and non-governmental organizations should hold regular seminars for potential and actual small and medium business owners on how to plan, organize, direct, and control their businesses, and micro, small, and medium business owners should always devise effective marketing strategies and maintain good customer relations.
- The government should encourage the growth of MSMEs by providing appropriate service and financial support. Improving the problem of value chains, taking advantage of regional market opportunities, growing digitalization, and supporting business owners, entrepreneurs, and employees by providing skill training
- To support the development of MSMEs, the country's government must improve legal regulators as well as policies regarding financing, taxation, and licensing as well as enterprise formalization.
- Government should be providing assistance and enhancements to business development services
- Government should provide financial support for MSMEs so the enterprises to obtain advanced technology and support innovation
- Government should facilitate institutions that provide training skills for Entrepreneurs

The following recommendations were made for the owners or managers of Ethiopian (MSMES)

- Owners or managers of (MSMEs) must improve their entrepreneurship skills to compete in the market. MSMEs are expected to achieve better growth and development by using an effective marketing strategy. Effective marketing can assist the performance of MSMEs. Taking this MSMEs managers should have to train themselves and implement a good marketing strategies to succeed in day competitive environment.
- Operators of micro, small, and medium-sized enterprises should devise effective marketing strategies. This includes promotional strategies such as advertising and maintaining good customer relations at all times.
- Owners or managers of MSMEs in Nifes Silk Lafto sub-city should use various networking channels to freely exchange services such as advertising. Because this will increase the competitiveness of the enterprises by lowering the cost of production. In

the long run, this will improve MSMEs' sustainability, performance, profitability, and development.

## **5.2 Limitations and Future Directions of the Study**

Overall, assessing various factors based on relevant information is critical for the growth and development of any enterprise, large or small. This can be accomplished by conducting additional research in related areas. This study's primary focus was on MSMEs, specifically those in the manufacturing sectors of wood and metal work, food processing, and textile and garment. Furthermore, this study focuses solely on the financial, management, marketing, infrastructure, technological, workplace, political, and legal factors that influence the development of MSMEs. This demonstrates the presence of a large area for further investigation by taking into account various internal and external factors that influence the development of MSMEs. Aside from that, the field of MSMEs is very broad and diverse. Given this, future research could focus on larger businesses. Furthermore, it is strongly advised that researchers interested in the growth and development of MSMEs engage themselves and conduct additional research because it is an interesting area with many unresolved problems. As a result, it would be commendable to obtain more remedies to many arising issues that contribute to better identifying, analyzing, and determining more effective ways to address constraints and widen the success factors of MSMEs

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## **Kiracı Konumundaki Şirketlerin Finansal Kiralama İşleyişlerindeki Muhasebeleştirme Hataları veya Hileleri<sup>1</sup>**

**Gökhan BARAL<sup>2</sup>**

### **Özet**

Finansal Kiralama veya Finansal İcare ile bankalar, katılım bankaları, finansal kiralama şirketleri işletmelerin ihtiyacı varlıkları uygun sürede taksitlendirerek şirketlere kiralamaktadırlar. Kiralama; işletmede kullanılacak bir varlığın satın alınarak sermayenin ona bağlanması, satın almak için kredi alınması veya varlığı edinmek için yeni ortak alınması problemlerine alternatif bir yoldur. Kiralamada, kiraların ve faiz/kâr paylarının gider yazdırılmasına izin verilmektedir. Yatırım mallarının kiralanması durumunda daha düşük KDV ödenmesi söz konusudur. Muhasebe Tebliğleri ile vergi usul kanunlarının işleyişlerinin farklılık göstermesi, muhasebenin temel görevi olan bilgi verme görevinin yerini vergi borcu hesaplamaymış gibi algılanması muhasebe kayıtlarını özünden ayıştırmaktadır. Muhasebe; ortaklara, yöneticilere, devlete bilgi veren bir bilim dalıdır. Muhasebe kayıtları doğru olursa mali tablolar da doğru olur. Gerek iç denetçilere gerekse bağımsız denetçilere göre muhasebe kayıtlarındaki farklılıklar hata/hile ile yapılmaktadır. Çalışmadaki amacımız; yeminli mali müşavirlerin, mali müşavirlerin ve muhasebe denetçilerinin; finansal kiralama veya icare yapan kiracı konumundaki şirketlerin muhasebeleştirme farklılıklarına, hata/hilelerine dikkat çekmektir. Şirketin kiralama konusu varlığı teslim aldığı anda, kira faizlerinin veya kâr payları ödendiğinde, amortisman ve katma değer vergisi gösterildiğindeki muhasebe kayıtlarında yapılan hata/hileler tespit edilmiştir. Muhasebe denetimi yapanlara, muhasebe çalışanlarına, muhasebe eğitimi alanlara yardımcı olacaktır düşüncesiyle çalışma hazırlanmıştır.

**Anahtar Kelimeler:** Finansal Kiralama, İcare, Muhasebe Hataları, Muhasebe Hileleri

**JEL Kodu:** M41, M42

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## **Accounting Errors or Frauds in Financial Leasing Operations of Tenant Companies**

### **Abstract**

With Financial Leasing or Financial Icare, Banks, Participation Banks, Financial Leasing Companies lease the assets needed by the businesses in installments within a reasonable period of time. Hire; It is an alternative way to the problems of purchasing an asset to be used in the business and tying the capital to it, obtaining a loan to purchase or hiring a new partner to acquire the asset. In leasing, it is allowed to print out rents and interest/profit shares. In case of renting investment goods, there is a lower VAT payment. The differences in the functioning of the Accounting Communiqués and the tax procedure laws, and the perception that the duty of providing information, which is the main duty of accounting, is perceived as calculating the tax debt distinguishes the accounting records from their essence. Accounting; It is a science that provides information to partners, managers and the state. If the accounting records are correct, the financial statements will be correct. According to both internal auditors and independent auditors, differences in accounting records are made by mistake/deceit. Our aim in the study; sworn charter accounts, charter accounts certified and accounting auditors; is to draw attention to the accounting differences, errors/deceptions of companies in the position of tenants engaged in financial leasing or leasing. Mistakes/deceptions made in the accounting records when the company receives the leased asset, when the rental interests or dividends are paid, and when depreciation and value added tax are shown have been detected. The study has been prepared with the idea that it will help those who make accounting audits, accounting employees, those who receive accounting education.

**Keywords:** Leasing, Leasing, Accounting Errors, Accounting Fraud

**JEL Code:** M41, M42

### **Giriş**

Şirketler kredi alarak, tahvil satarak, bono satarak, hisse senedi satarak yeni ortak alarak finansman sağlarlar. Ancak hisse senedi satmak, yeni ortak almak kardan pay vermek ve yönetimde söz hakkı vermek anlamına gelmektedir. Kredi almak, tahvil, bono satmak, borçlanmak; faiz giderlerine katlanmak anlamına gelmektedir. Şirketler kiracı konumunda finansal kiralama yapmak suretiyle; kardan pay vermeden, yönetimde söz hakkı vermeden, yüksek faiz ödemediği avantajlı duruma geçebilirler. Türkiye’de ilk olarak Finansal Kiralama



Kanunu 1985 yılında 3226 sayılı kanunla yürürlüğe girmiştir. 21.11.2012 tarihinde ise Finansal Kiralama, Faktoring ve Finansman Şirketleri Kanunu TBMM'de kanun numarası 6361 olarak revize edilerek kabul edilmiştir. 2012 yılından beri 6361 sayılı kanun güncelliğini korumaktadır.

Kiralama türleri: a) Faaliyet Kiralaması b) Finansal Kiralama c) Satış ve Geri Kiralama (Ceylan ve Korkmaz, 2015:188) genel olarak sayılır. Çalışmada Finansal Kiralama konu edilmiştir. Bankalar ve finansal kiralama şirketlerince; Finansal Kiralama veya Leasing olarak tanımlanır. Katılım bankalarınca(faizsiz bankacılık) ise Finansal Kiralama yerine Finansal İcare terimini kullanmaktadır.

Hata; muhasebe sürecinde kasıtlı olmadan yapılan yanlışlıklardır (Alagöz, 2008:116). Hile ise başkaları üzerinden haksız kazanç elde etmek için dürüstlük dışı yapılan (Karabınar ve Akyel, 2009:692) ve aldatma içeren kasıtlı eylemlerdir (BDS, 240:9). Finansal Kiralama/Finansal İcare banka/katılım bankası veya kiralama şirketi ile varlık kiralaması yapan kiracı işletme arasındaki kiralama işlemleridir. Çalışmamızda kiracı işletmenin kiralama muhasebe süreçlerindeki hatalar ve hileler konu edilmiştir.

Finansal Kiralama'da; leasing şirketi, banka veya katılım bankası tarafından yatırım konusu emtia alınır ve kiracının yapacağı kira ödemeleri karşılığında bu varlığın kiracıya kullanım hakkı tanınır. Kira sözleşmesi sonunda sembolik bir bedelle veya bedelsiz kiracıya emtianın sahiplik hakkı devredilebilir. Kira ödemelerinin içinde olan faiz ödemeleri/kâr payı ödemeleri gider kaydı yapılabilmektedir. Sermaye sabit bir kıymete bağlanmamış olur. Kiracı banka kredisi almadan veya yeni bir ortak almadan fonlanmış olur. İndirimli KDV oranlarından yararlanılabilir. Satın alındığında bir kerede ve tamamı ödenecek olan KDV taksitlendirilmiş olur. Kiracı amortisman gideri yazabilir. Türkiye'de Kamu Gözetimi Muhasebe ve Denetim Standartları Kurumu (KGK); Türkiye Muhasebe Standartları'nı (TMS) ve Türkiye Finansal Raporlama Standartları'nı (TFRS) yayınlamaktadır. Faizsiz işlem yapan katılım bankaları içinde Faizsiz Finansalans Muhasebe Standartları (FFMS) yayınlamıştır (İbiş, 2018:6). FFMS'ler katılım bankalarınca kullanılır. Şirketler katılım bankalarından kiralama(İcare) yapsalar bile muhasebe kayıtlarını TMS/TFRS ye göre yaparlar. Şirketleri FFMS'ler bağlayıcı değildir. Bankadan, leasing şirketinden veya katılım bankasından kiralama yapmaları şirketlerin muhasebe sürecini etkilemez. Ancak bankalar, leasing şirketleri veya katılım bankası kendi içinde uymaları gereken standartlara göre kayıtlarını yaparlar. Örneğin; katılım bankası FFMS'lere göre kayıtlarını yapar. FFMS'lere göre kiralanan emtiaya katılım bankası

amortisman gideri yazarken bankalar amortisman gideri yazamazlar. TMS/TFRS'lere göre kiralama yapan şirket amortisman gideri yazabilir (Kısacık, 2021:301). Finansal Kiralama ile damga vergisi ve harçlardan muafiyet avantajı vardır. Kiralama vadesi bir yıl veya daha az ise 7 nolu maliyet muhasebesi hesaplarına kiralama gideri aylık veya üç aylık (geçici vergi dönemleri) periyotlarda gider yazılır ve amortisman ayrılmaz (Pratik Bilgiler, 2022:59). Çalışmamızda kiralama süresi bir yıldan uzun olan kiracı konumundaki şirketlerin muhasebe kayıtları tartışılmıştır.

### **1.Finansal Kiralama Muhasebe Standartları ve Finansal Kiralama Literatür Çalışmaları**

Türkiye'de Kamu Gözetimi Muhasebe ve Denetim Standartları Kurumu (KGK); Türkiye Muhasebe Standartları'nı(TMS) ve Türkiye Finansal Raporlama Standartları'nı (TFRS) yayınlamaktadır. Faizsiz işlem yapan katılım bankaları içinde Faizsiz Finansalans Muhasebe Standartları (FFMS) yayınlamıştır(kgk.gov.tr).

Bankalar ve Şirketler(Kiracılar) KGK'nın yayınladığı TFRS 16 Kiralamalar Standartı'na göre kayıtlarını yaparlar (Kısacık, 2021:283). Katılım bankaları ise KGK'nın yayınladığı FFMS 8 İcare ve İcare Müntehiye Bittemlik Standartı'na göre muhasebe kayıtlarını yaparlar (Çetin, 2020:111).

### **Finansal Kiralama konusundaki Literatür Çalışmalarında**

Duman (2016) Yeni Finansal Kiralama Kanunu'na göre finansal kiralama işletmelerinin finansal kiralama şirketlerince muhasebeleştirilmesi konusunu işlenmiş ağırlık olarak Finansal Kiralama çeşitlerine tanım olarak yer vermiştir.

Topçu (2022) çalışmasında TFRS 16, BOBİ FRS 15, FFMS 32 Standartları'nın Finansal Kiralama muhasebe uygulamalarındaki ve raporlamalarındaki kiraya verenler ve kiracılar açısından benzerlikleri ve farklılıkları ele almıştır.

Kepenek (2022) çalışmasında Finansal Kiralamaların TFRS 16 Standart'ı çerçevesinde muhasebeleştirilmesi ve raporlanması konu edilmiş, daha çok standartla ilgili konular işlenmiştir.

Çakmak (2017) çalışmasında Finansal Kiralama yoluyla ithalatın ve ihracatın muhasebeleştirilmesi işlenmiştir.

Açıkalin'in (2021) çalışmasında katılım bankacılığında Finansal Kiralama konusunu işlenmiş olup muhasebe uygulamalarının olmadığı görülmüştür.

Varış (2019) çalışmasında katılım bankalarının Finansal Kiralama oranlarına, sektörel dağılımına yer vermiştir.

Mollaoğulları (2011) çalışmasında tek düzen hesap planına göre ve muhasebe standartlarına göre karşılaştırılma yapmıştır.

Akça (2013) çalışmasında vergi usul kanunlarına göre ve TMS 17 ye göre Finansal Kiralama işlemlerindeki benzerliklerine ve farklılıklara yer vermiştir.

## 2. Örnek Uygulama

Türkiye Katılım Bankaları Birliği tarafından Dr.Harun Kısacık'ın doktora tezi "Katılım Finans Ürünleri ve Muhasebe Süreçleri" adıyla kitap olarak basımı yapılmıştır. Kitapta; İcare Muhasebe Uygulaması temel alınarak bankalar(kiralayanlar), katılım bankaları(kiralayanlar), şirketler(kiracılar) açısından kiralama kayıtlarındaki farklılıklar ortaya konmuştur. Bu çalışmada ise özellikle şirketler(kiracılar) açısından kiralama kayıtlarındaki farklılıklar, yanlışlıklar, eklenmesi gerekenler çalışılmıştır. Kitaptan aşağıdaki örnek alınarak tartışılmıştır. A1 yevmiyesi kitaptan aynen alınmıştır.

"ABC Bakliyat San. Tic. A.Ş. ihtiyacı olan eleme-entegre makinelerinin temini için 01.01.2020 tarihinde KLM Katılım Bankası Çorum Şubesi ile Finansal icâre (İcâre Muntehiye Bittemlik) sözleşmesi düzenlemiştir. Eleme-entegre makinelerinin toplam fiyatı % 1 KDV Hariç 250.000,00 TL'dir. Aylık % 1,5 kâr oranı üzerinden 36 ay vadeli olarak sözleşme gerçekleştirilmiştir. Makinelerin ekonomik ömrü 10 yıldır ve hurda değerleri yoktur. Bir yıllık kira tutarı 9.128,48 TL dir. Birinci yılın faiz tutarı 3.750 TL dir. Tüm kira bedelleri işletme tarafından düzenli bir şekilde ödendiğinde makineler hibe yöntemi ile (bedelsiz) işletmenin olacaktır. 01.01.2020 tarihinde makineler ABC Bakliyat San. Tic. A.Ş. tarafından teslim alınmıştır."

Finansal Kiralama (Leasing veya İcare) yapan şirketin muhasebe kayıtlarında hata veya hileler incelenmiştir. Şirketin kiralama konusu varlığı teslim aldığı yapılan muhasebe kayıtlarında; 253 Tesis Makine Cihazlar Hesabı'nın yerine 260-265-266 Finansal Kiralama Konusu Kıymetler Hesapları'nı kullanımının daha doğru olacağı tespiti yapılmıştır. Finansal Kiralama borçlanma maliyetlerinde; bir yıla kadar ve bir yıldan uzun şeklinde ayrı muhasebeleştirilmesi gerektiği aksi hâlde borçlanma maliyetlerinin hepsinin bir yıla veya hepsinin bir yıldan uzun hesaplara yazılmasının hatalı bilgi sunum olacağı belirtilmiştir. Kiralandığı hâlde alınmış gibi veya alındığı hâlde kiralananmış gibi muhasebeleştirilme hatalarının tespiti yapılmıştır. Kira

faizlerinin veya kâr paylarının muhasebe kayıtlarında; kira bedelleri ile faiz/kâr payı ödemelerinin birleştirilmemesi sadece faiz/kâr payı ödemelerinin gider olarak ve doğru hesaplara yazılması gerekliliğinin üstünde durulmuştur. Amortisman kayıtlarında; 257 nolu hesap yerine 268 Birikmiş Amortisman Hesabı'nın kullanılması gerektiği, azalan bakiyeler yönteminin kullanılmayacağı, yazılmayan yılın amortisman giderinin sonraki yıllarda gider yazılmayacağı, amortisman kaydının kiralanan varlık kullanım yerine göre muhasebeleştirilmesinin gerekliliklerinin örnekleri verilmiştir. Katma Değer Vergisi kaydında(KDV); Finansal Kiralamaya konu emtia yatırım malı kapsamında ise %1 KDV ye tabi olduğu %18 KDV ödenmiş gibi kayıt yapılmamasının ve kiralama süresine KDV'nin yayılması gerekliliği üzerinde durulmuştur.

Finansal Kiralama (Leasing veya İcare) Yapan Şirketin Muhasebe Kayıtları:

A1) Şirketin Kiralama Konusu Varlığı Teslim Aldığında Yapılan Muhasebe Kayıtları:

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253 Tesis Makina Cihazlar 250 000

302 Ertelenmiş Finansal Kiralama Borçlanma Maliyetleri 36.684.98

402 Ertelenmiş Finansal Kiralama Borçlanma Maliyetleri 38.686,58

301 Finansal Kiralama İşlemlerinden Borçlar 108.457,19

401 Finansal Kiralama İşlemlerinden Borçlar 216.914,37

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Muhasebe yevmiyelerinin yapılması, kullanılacak hesaplar ve bu hesapların kodlarıyla raporlama süreçleri tek düzeni sağlamak üzere “Tek Düzen Hesap Planı” 1986 yılından itibaren yürürlüğe girmiştir (Sevilengül, 1999:16). 26 Maddi Olmayan Duran Varlıklar Grubu; bir seneden daha uzun bir süre elde tutulmak amacıyla alınan varlıkları kapsar. Yukarıdaki yevmiyede 253 Tesis Makina Cihazlar Hesabı'nın kullanılması, ileride varlığın zaten işletmenin olacağı düşüncesiyle kullanılsa da veya işletmenin varlıkları güçlü gösterilmek istense de (hata veya hileyle), literatür taraması sonuçlarına ve uzman görüşlerine göre 26 Maddi Olmayan Duran Varlıklar Grubu alt hesaplarının kullanımı daha doğru olacağı anlaşılmıştır. 260 Haklar Hesabı'nın alt hesabında kullanıldığı veya nadiren boş olan hesaplar; 265 veya 266 kullanıldığı görülmüştür. Muhasebe temel kavramlarından olan Özün Önceliği İlkesi gereği 26 nolu grubun kullanılması daha doğru olacaktır (1 nolu muhasebe tebliği, 1992).

Çünkü ileride mülkiyeti işletmeye geçecek olsa da henüz geçmemiştir. Aşağıda şirketin kiralama konusu varlığı teslim aldığında yapılması gereken ve literatür taramalarında(Karabınar,2018:400 ve Bozdemir,2016:226 & Cemalcılar ve diğ.2009: 204 ve web adresliler kaynakçada belirtilmiştir) daha çok görülen yevmiye verilmiştir:

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260 Finansal Kiralama Konusu Kıymetler 250 000

veya

265 Finansal Kiralama Konusu Kıymetler 250 000

veya

266 Finansal Kiralama Konusu Kıymetler 250 000

302 Ertelenmiş Finansal Kiralama Borçlanma Maliyetleri 36.684.98

402 Ertelenmiş Finansal Kiralama Borçlanma Maliyetleri 38.686,58

301 Finansal Kiralama İşlemlerinden Borçlar 108.457,19

401 Finansal Kiralama İşlemlerinden Borçlar 216.914,37

---

A2) Şirketin Kiralama Konusu Varlığı Teslim Aldığında Hata veya Hileyle Yapılan Muhasebe Kayıtları:

---

260 Finansal Kiralama Konusu Kıymetler 250.000

302 Ertelenmiş Finansal Kiralama Borçlanma Maliyetleri 75.371.56

301 Finansal Kiralama İşlemlerinden Borçlar 75.371.56

---

Bir yıldan uzun vadeli olan 402 Ertelenmiş Finansal Kiralama Borçlanma Maliyetleri kullanılmazsa şirketin cari oran gibi likidite oranlarının düşük çıkması(şüpheli olarak) isteniyor olabilir.

### A3) Şirketin Kiralama Konusu Varlığı Teslim Aldığında Hata veya Hileyle Yapılan

Muhasebe Kayıtları:

---

260 Finansal Kiralama Konusu Kıymetler 250 000

402 Ertelemiş Finansal Kiralama Borçlanma Maliyetleri 75.371.56

401 Finansal Kiralama İşlemlerinden Borçlar 75.371.56

---

Bir yıla kadar olan 302 Ertelemiş Finansal Kiralama Borçlanma Maliyetleri kullanılmazsa şirketin cari oran gibi likidite oranlarının yüksek çıkması(şüpheli olarak) isteniyor olabilir. Gerek yeni ortak alınacağına gerekse kredi taleplerinde şirketin likidite oranları daha iyi (şüpheli olarak) gösterilmek istenebilir.

### A4) Şirketin Kiralama Konusu Varlığı Teslim Aldığında Hata veya Hileyle Yapılan

Muhasebe Kayıtları:

Kiralandığı hâlde alınmış gibi gösterilebilmektedir:

---

253 Tesis Makina Cihazlar 250 000

102 Bankalar 250 000

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Bununla birlikte varlık gerçekte alındığı hâlde kiralanmış gibi göstererek faiz/kaâr payı ödemeleri yapıyormuş gibi gider yazılabilmektedir.

### B1) Kira Faizlerinin veya Kar Paylarının Muhasebe Kayıtları:

İlk yılı baz alırsak:

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780 Finansman Giderleri 3.750,00

302 Ertelemiş Finansal Kiralama Borçlanma Maliyetleri 3.750,00

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Hata veya hile ile yukarıdaki kayda eski mevzuatın izin verdiği kira bedelleri de gider olarak eklenebilmektedir. Kira ve faiz/kâr payı eklenerek, şöyle ki;

---

780 Finansman Giderleri 9.038,1

302 Ertelenmiş Finansal Kiralama Borçlanma Maliyetleri 9.038,1

---

Finansal Kiralanan varlık için zaten amortisman gideri yazılması yapılacakken bir gider mükerrer kayıt yapılmış şirketin gideri arttırılmış olur.

B2) Kira Faizlerinin veya Kâr Paylarının Muhasebe Kayıtları:

---

780 Finansman Giderleri 3.750,00

302 Ertelenmiş Finansal Kiralama Borçlanma Maliyetleri 3.750,00

---

Yukarıdaki kayıt yerine;

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730 Genel Üretim Gideri 3.750,00

Veya

770 Genel Yönetim Gideri 3.750,00

302 Ertelenmiş Finansal Kiralama Borçlanma Maliyetleri 3.750,00

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780 Finansman Giderleri yerine (şüpheli olarak) 730 Genel Üretim Gideri veya 770 Genel Yönetim Gideri yazılması hâlinde gelir tablosu alındığında faaliyet kârı veya zararı rakamı etkilenmiş olacağından şirketin iyi yönetilmediği izlenimi verilmek istenebilmektedir.

### B3) Kira Faizlerinin veya Kâr Paylarının Muhasebe Kayıtları:

İlk yıl yapılması gereken kayıt:

---

780 Finansman Giderleri 3.750,00

302 Ertelenmiş Finansal Kiralama Borçlanma Maliyetleri 3.750,00

---

Yukarıdaki ilk yıl yapılması gereken yevmiye yapılmayarak(şüpheli olarak) ikinci yıla eklenebilmektedir. Şöyle ki;1.yıl:3.750 TL+ 2.yıl:3.670.68 TL=7.420.68 TL(Kıısacık, 2021:284)

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780 Finansman Giderleri 7.420,68

302 Ertelenmiş Finansal Kiralama Borçlanma Maliyetleri 7.420,68

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Yukarıdaki kayıt muhasebenin temel kavramlarından “Dönemsellik Kavramı” ile çelişmektedir. İlk yıl gider yazmayarak şirket iyi gösterilmek istenmiş veya vergi denetimine takılmamak için azda olsa vergi ödenmek istenmiş olabilir.

### C1) Amortisman Kaydı:

Kira ödemelerinin anaparaları amortisman yoluyla giderleştirilebilir. (6361 sayılı Finansal Kiralama Kanunu, 2021)

$250.000/10=25.000$ TL varlığın ömrü 10 yıl ise “Normal Amortisman Yöntemi’ne” göre amortisman oranı(VUK,333, 2004) ve amortisman gideri hesaplanır ve yevmiyesi aşağıdadır:

Tek düzen hesap planına göre 25 nolu maddi duran varlıkların amortisman hesabı 257’dir. Ancak yukarıda da belirtildiği gibi 260 Haklar hesabının alt hesabında kiralama kaydı yapıldığında amortisman hesabı da 268 nolu hesap olmalıdır.



---

730 Genel Üretim Gideri(Amortisman) 25.000

257 Birikmiş Amortismanlar 25.000

---

Yukarıdaki kayıt yerine aşağıdaki kayıt önerilmektedir çünkü kullanılması gereken 268 Birikmiş Amortismanlar hesabı kullanılmıştır:

---

730 Genel Üretim Gideri(Amortisman) 25.000

268 Birikmiş Amortismanlar 25.000

---

TMS/TFRS ye göre yukarıdaki yevmiye kaydını kiracı yaparken katılım bankaları, Faizsiz Finansman Muhasebe Standartları (FFMS) gereği varlığın mülkiyeti kendilerinde olduğu için kendileri amortisman gideri yazarlar.

C2) Amortisman Kaydı:

$1/10=0,10*2=0,20$  “Azalan Bakiyeler Yöntemi” kullanılarak amortisman oranı bulunur. Amortisman gideri böylece ilk yıllar yüksek göstermek istenerek daha az vergi ödenmek istenmiş olabilir.

$0,20*250.000=50.000$ TL amortisman gideri yazılırsa;

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730 Genel Üretim Gideri(Amortisman) 50.000

268 Birikmiş Amortismanlar 50.000

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Oysa, finansal kiralama azalan bakiyeler yöntemine mevzuat izin vermemektedir (Mollaoğulları, 2011:17). Bu yöntem sadece normal duran varlık alımlarında kullanılması gerekmektedir.

C3) Amortisman Kaydı:

İlk yıl yapılması gereken amortisman kaydı;

\_\_\_\_\_ / \_\_\_\_\_

730 Genel Üretim Gideri(Amortisman) 25.000

268 Birikmiş Amortismanlar 25.000

\_\_\_\_\_ / \_\_\_\_\_

İlk yıl yapılması gereken amortisman kaydı yapılmayıp ikinci yıla eklenmesi;

\_\_\_\_\_ / \_\_\_\_\_

730 Genel Üretim Gideri(Amortisman) 50.000

268 Birikmiş Amortismanlar 50.000

\_\_\_\_\_ / \_\_\_\_\_

Yukarıdaki kayıt vergi mevzuatı gereği hatalıdır. Amortisman gideri yazma hakkı her yıla özeldir. Amortisman gideri yazma hakkı ertesi yıllara devredilemez.

C4) Amortisman Kaydı:

İlk yıl yapılması gereken amortisman kaydı;

\_\_\_\_\_ / \_\_\_\_\_

730 Genel Üretim Gideri(Amortisman) 25.000

268 Birikmiş Amortismanlar 25.000

\_\_\_\_\_ / \_\_\_\_\_

İlk yıl yapılması gereken amortisman kaydı kiralanan varlık kullanım yerine göre muhasebeleştirilmelidir:

---

750 Ar-Ge Giderleri 25.000

Veya

760 Pazarlama Satış Dağıtım Gider 25.000

Veya

770 Genel Yönetim Gideri 25.000

268 Birikmiş Amortismanlar 25.000

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D)Katma Değer Vergisi Kaydı:

Finansal kiralamaya konu emtia yatırım malı kapsamında ise %1 KDV'ye tabi olmaktadır.(3065 sayılı KDV Kanunu, 2019) Diğer kapsamlardaki emtialar ise %8 veya %18 KDV'ye tabidirler.

$250.000 * 0.01 = 2.500$  TL KDV hesaplanır. Bu rakam 191 İndirilecek KDV olarak gösterilir. Aynı zamanda bu KDV tutarı bütün taksit ödemelerine paylaşılır. Küçük taksitlerle uzun süreye yayılmış olur.

D1) Ancak hata veya hile ile eski kanun veya mevzuata göre yanlış kayıt(%18 KDV ödenmiş gibi) yapılabilmektedir:

$250.000 * 0.18 = 45.000$  TL

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260 Haklar 250 000

191 İndirilecek KDV 45 000

102 Bankalar 295 000

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D2)  $250.000 \times 0.01 = 2.500 \text{ TL}$  %1 KDV uygulansa da bir kerede ödenmiş gibi gösterilebilmektedir oysa kiralama süresine KDV ödemesi yayılması gerekmektedir:

---

260 Haklar 250 000

191 İndirilecek KDV 2 500

102 Bankalar 252 500

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## Sonuç

Piyasalarda, finansal kiralama terimiyle anılan çalışma konumuz, katılım bankalarınca finansal icare olarak kullanılmaktadır. İki terimin mahiyeti aynı olmakla birlikte banka veya katılım bankası olması kendi içlerinde tabi oldukları muhasebe standartlarına göre işleyişi farklı olabilmektedir. Bununla birlikte kiracı pozisyonundaki şirketler, muhasebe tebliğlerine ve KGK'nın yayınladığı TFRS 16 Kiralamalar Standart'ına göre kayıtlarını yaparlar. Finansal Kiralama ile kredi yerine finansman desteği sağlayan işletmeler kira tutarlarını ve faizi/kâr payını gider yazabilmektedirler. Düşük KDV oranları ödeyerek emtiaya sahip olabilmektedirler. Satın almaları durumunda %18 KDV ödeyecekken finansal kiralanan unsurun özelliğine göre %1 KDV ödeyebilmektedirler. %17 gibi KDV avantajı sağlamaktadırlar. Aynı zamanda bu %1'lik KDV'yi de taksit taksit ödeme fırsatı bulmaktadırlar. Muhasebe tebliğlerine göre muhasebe kayıtları yapılmalıdır ki mali tablolardan istenen bilgiler daha doğru alınsın. Vergi usul kanunları devletin vergi alacağına artmasına hedeflenmiştir. Vergi usul kanunlarına göre vergisel kayıp yoksa muhasebe kayıtlarının olması veya olmaması esnetilebilir. Ancak bu durumda muhasebenin temel işlevi bilgi verme görevi tam olarak yerine gelmemiş olur. Vergi usul kanunları esneklik tanısa bile; muhasebe tebliğleri ve muhasebe standartları her zaman muhasebe kayıtları yaparken öncelikli olarak uyulması gereken kurallardır. Örnek olarak; bir borcun 3 nolu kısa vadeli borç grubunda olması veya 4 nolu uzun vadeli grubunda olması vergisel bir problem oluşturmayabilir. Bir giderin 7 nolu bir gider hesabına yazıldıktan sonra bu gider hesabının ne olduğu vergisel bir problem oluşturmayabilir. Herhangi bir yılın amortisman giderinin yazılmaması vergisel bir problem oluşturmayabilir. Bu örnekler çoğaltılabilir muhasebenin görevi doğru bilgi vermesidir. Vergi usul kanunlarına göre yapılan veya yapılmayan muhasebe kayıtları ile işletme vergi cezası

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yemez ve vergisel görevler yapılmış olur. Ancak kayıtlardan alınacak raporlar ve bilgiler hatalı olmuş olur. Gerek vergi usul kanunlarına göre ve gerekse hata/hileyle yapılan muhasebe kayıtları muhasebenin temel bilgi verme görevini yerine getirmesine engel olacaktır.

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## **Impact of Smart Classroom Modification on Student Performance in Ekiti State Secondary Schools<sup>1</sup>**

**Ogunlade BAMIDELE OLUSOLA<sup>2</sup>**

**Olubusayo Victor FAKUADE<sup>3</sup>**

### **Abstract**

Until recently, education in Nigeria was delivered using ancient classroom techniques that required students to sit through lengthy teacher monologues. However, the advancements in science and technology to make learning more interactive, intelligent, and practical led to a paradigm shift in the educational system. The study strategy was a descriptive survey to gather primary data by creating pertinent questionnaires and employing a quantitative data-collection technique. As a result, the researcher discovered a reliability coefficient of 0.75. The population of this study consisted of students in public schools with cutting-edge learning environments. In addition, 277 male and female students were chosen for this study using random sampling methods. According to the findings, there is a strong connection between effective classroom instruction and students' academic performance. Therefore, smart classrooms should be promoted and implemented to close the knowledge gap between learners in rural and urban areas.

**Keywords:** Smart classroom, Modification, Intelligent, Students performance, Secondary schools, Ekiti State

### **Introduction**

The main objective of educational modification is to change the way we instruct our students. This circumstance might involve anything from modifying how we assess and track student development to integrating cutting-edge technology into the classroom. The goal of any modifications should, of course, be to increase student performance generally. There are several

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benefits to switching to smart classrooms in education. It improves the learning outcomes for students, which is one advantage. Additionally, it increases school security by defending against online dangers. On the other hand, it aids in managing and meeting the IT requirements of a smart classroom learning environment. Ogunlade (2011) is aware that schools in the twenty-first century require complete solutions that can accommodate any public school, no matter how big or small, and educational technology assistance for their students, instructors, and staff.

Through the use of innovative teaching and communication techniques, schools have begun integrating technology to enhance the teaching and learning process. Additionally, technology is being used in schools for research and diagnostic purposes. As a result, the educational system's overall effectiveness is enhanced. One way that schools are utilizing technology is by implementing new teaching strategies. For instance, teachers can engage students using interactive whiteboards and smart boards. Teachers can also give students assignments online. In addition, many schools provide their students with computers or tablets to use the internet outside of class (Gazzola & Didriksson, 2018; Ogunlade et al., 2018; Fakuade, 2021).

The traditional learning method has evolved into a more intelligent approach with the advent of wireless, ubiquitous mobile, the Internet of Things (IoT), and other information and communication technology(Laru & Jarvela, 2015). Although the traditional classroom setup, which involves teachers standing on elevated platforms and students seated at fixed desks in long rows with their eyes glued to the instructor, has been effective for hundreds of years, more is needed for the information age.

Other technologies, including film strips, overhead projectors, desktop computers, interactive whiteboards, smartphones, tablets, and, most recently, sensor-based devices (IoT), have replaced the chalkboard since it was created in 1890. The "smart classroom" idea was created due to this paradigm shift using technologies like clickers, symposiums, multichannel audio systems, multimedia communication support systems and platforms, ambient intelligence, cloud computing, big data, artificial intelligence, and the Internet of Things. (Yang, Pan, Zhou, & Huang, 2018).

A smart classroom uses recent hardware, software, web technologies, and signal processing developments. A smart classroom design aims to improve the learning and teaching environment, close the communication gap between students and teachers, and help teachers teach more effectively. Implementing smart classrooms requires mobile technologies, learner mobile devices,

and automatic communications. In a smart classroom, digital content is displayed on projectors and interactive whiteboards. An innovative classroom design aims to improve the learning and teaching environment, close the communication gap between students and teachers, and help teachers teach more effectively. A sensor-enabled, bright physical environment that regulates temperature, humidity, air quality, and acoustics is also present, along with tools for interacting with the teacher and other students, automated assessment and feedback tools, cameras for recording and storing, and other technologies (Thivanka et al., 2020).

Most smart classrooms are outfitted with the following technology: An indispensable component of a smart classroom is a computer or laptop. In addition, presentations, graphics, or other forms of multimedia are used to teach in a smart classroom. The word "projector" describes an optical device. It uses a projector to show still or moving objects on a screen. They create images by beaming light through a clear lens or using a laser. A screen is a flat surface that displays images projected by a projector. Many screens are available, including wall-mounted, pull-down, fixed-frame, electrical, switchable projection, and portable. Sometimes, a microphone is called a "mic" or "mike." This gadget turns electrical signals into audio signals. The signs are then transmitted, improved upon, or recorded. Electronic devices that increase a sound's volume include amplifiers and speakers. Finally, a podium is a raised platform, typically made of wood that allows the audience to see the person using it.

Document cameras are visual presenters, visualizers, and digital overheads. They are applied when a large audience needs to see something. For instance, a document camera exhibits photos of two- and three-dimensional objects. The teacher will put the item in front of the document camera. The camera's image is transformed into a live shot.

Alternatively known as a smart board or a bright LCD, an intelligent podium is a type of smart podium. It is an interactive display with a pen that can be connected to a laptop or desktop computer through a USB or RGB port. It can be described as an external display with integrated digital-ink features. Annotate documents, presentations, and multimedia files using a digital pen on an intelligent podium. Even if many videos are available online, some have copyrights and require a purchase. Thus, a VCD or DVD player is still required. These often come on CDs or DVDs (Huang et al., 2015).

A translucent acetate sheet is the basis for an overhead projector, which projects larger images onto a screen. This method has been commonly employed recently, but computer-based projectors are slowly replacing it (Prakosa et al., 2018).

With the help of computer hardware, software, and other multimedia resources, students can learn in "smart classrooms," a technology-based educational resource that is becoming increasingly popular around the globe. It is among the simplest ways to employ modern technology to update outdated instructional strategies. Because of advancements in ICT, researchers focus more on smart classrooms, but more attention needs to be given to how these classrooms affect students' performance in Nigerian secondary schools.

Assessment and diagnosis are two more ways that schools use smart classrooms. Software applications that assess students' knowledge of the class content are now available in classrooms; additionally, these tools aid in locating any areas that would require extra teacher attention. To cut down on wasted time, some schools are also keeping track of the statistics of students on an activity or assignment (Li & Guo, 2021; Adewale et al., 2021).

Academic performance is how well students perform in academic areas covered in secondary education. As a metric of academic education, academic success is critical for individual and social prosperity. Academic achievement, however, is undoubtedly significant to student life. As a result, as predictors of student happiness and psychological development, researchers and policymakers are paying more attention to social and emotional factors and how they interact with one another. As a result, academic performance has long been regarded as the most crucial outcome of formal educational experiences (Noonoo, 2017).

Reviewing the research on academic performance has shown that several things affect how well students do in school. According to Ogunlade, Bahago, and Ogunmodede (2021), the physical environment significantly impacts any activity, improving its favorability, viability, and success. Several factors influence the classroom environment, including acoustics, visual appeal, lighting, physical layout, ventilation system, amenities, and teaching tools. The secondary school's ability to evaluate its objectives and instructional strategies to promote active interactions among groups of students determines the achievement of learning outcomes in an intelligent classroom culture (Li & Guo, 2021). Because they allow for multitasking and can accommodate more students in less time than traditional classrooms, smart classrooms offer multi-dimensional student evaluation. A

computer-based assessment or test is used to gauge the effectiveness of a specific learning process and track individual students' progress.

One problem with traditional ways of grading is that they do not show how well students understand ideas. Drill and practice, learning by rote, and learning without questioning are just a few issues that can result from this. Teachers can use digital platforms and devices to carry out various learning activities. The task-based simulations used in the qualitative teaching method allow students to apply their learning abilities and resources in a real-world setting (Akhigbe & Ogunlade, 2022).

### **Statement of the Problem**

A "smart classroom" is a place to learn where technology is used to help students improve their skills. Educators can design engaging, more appealing, and participatory lessons with this teaching and learning approach.

The most recent research on the effects of smart classrooms has been done from the point of view of information and communication technology (ICT), focusing on validity, reliability, usability, flexibility, and user experiences. Nevertheless, more needs to be done to look at how academic skills are learned, achieved, and used from the user's point of view. Also, there is not enough research on how smart classrooms affect how well students do in school in Nigerian secondary schools.

This study examines the effects of smart classroom modifications on students' academic performance in secondary schools in Ekiti State, Nigeria. It accomplishes this by closing a knowledge gap and resolving the abovementioned issues.

### **Objectives of the Study**

The objectives of this study include to;

- i. links students' comfort and availability to their academic performance in the smart classroom.
- ii. determine the decisive characteristics of a smart classroom that influence students' academic performance.
- iii. assess the influence of smart classes on students' academic performance in school.

## Research Questions

This research question underpin the current research:

1. What connection exists between academic performance and smart classroom elements that impact learning, such as availability?
2. How does a smart classroom comfortability affect student performance

## 2. Methodology

In this investigation, the researcher employed logical reasoning and analyzed data to evaluate a research question about the theoretical backdrop after determining the theoretical foundation. The population of this study consisted of students in public schools with cutting-edge learning environments. The study combined focus group sampling with a quantitative data collection method to collect primary data. A sample of 14 public schools in urban and rural areas was used, focusing on Ekiti State. To determine the effects of smart classroom comfort and availability on student performance, the parameters were examined using three scales and closed-ended questions in a survey questionnaire. The reliability of the items was assessed using the test-retest approach, and a coefficient of 0.75 was found.

The researcher collects primary data by constructing relevant questionnaires using a quantitative data collection method. There were 250 surveys distributed in total, and 240 usable responses were collected, representing 96.0% of respondents, which seems enough for this study.

### 3. Data Analysis

**Research Question 1.** What connection exists between academic performance and smart classroom elements that impact learning, such as availability?

#### **The Modification of Education Setting of Smart Classroom Availability on Student Performance**

Table

1: The Impact of Smart Classroom Availability on Student Performance

Question	Variable	Yes		No		Do not Know	
		Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Does having access to databases for learning improve what you learn in class?		238	99.0	1	0.4	1	0.4
Do the smart devices in your class make it simple for you to access the internet?		235	97.9	4	1.6	1	0.4
Do the smart devices in		239	99.5	-	-	1	0.4

your class  
enable you to  
collaborate on  
digital  
projects with  
classmates?

Can the smart gadgets in your classroom access the videos the teachers utilize?	238	99.1	-	-	2	0.8
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Does having access to smart devices in class help you understand concepts better?	235	97.9	3	1.2	2	0.8
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<b>Average (%)</b>		98.7		0.64		0.56
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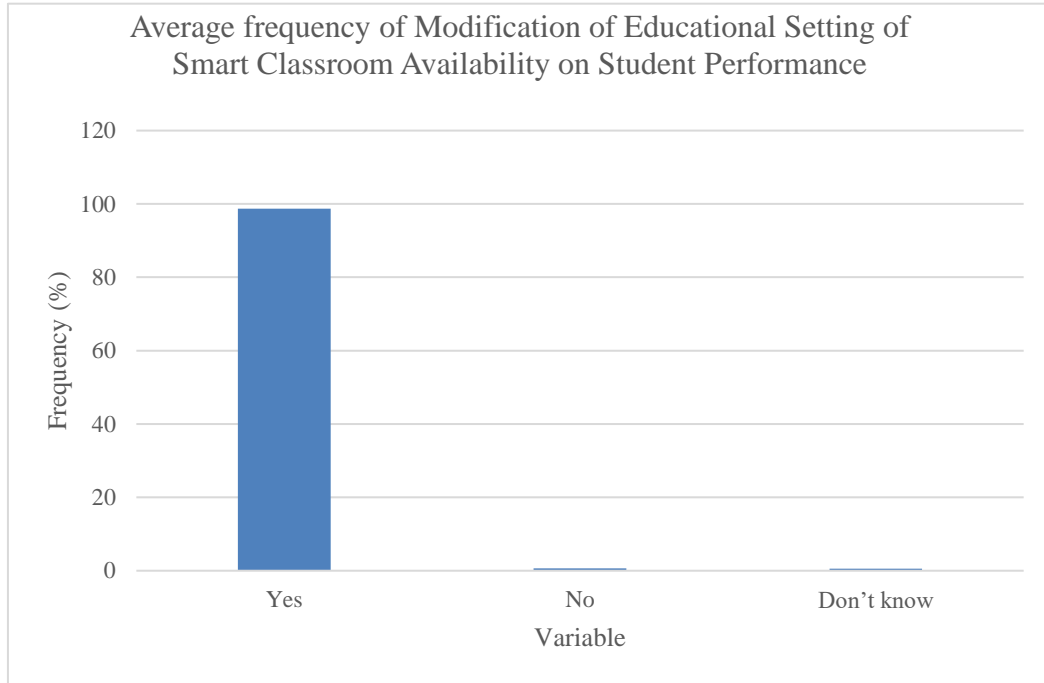


Figure 1 Impact of Smart Classroom Availability on Student Performance. From Table 1, and Figure 1 above according to Sandhya et al. (2018) and Thivanka et al. (2020), 98% of students who have used one type of smart classroom device agreed that having access to them improves learning, while 0.64 and 0.56% disagreed and said they were unsure. It could be challenging for students who have never used a smart device to gauge their significance (Adewale et al., 2021)

**Research Question 2.** How does a smart classroom comfortability affect student performance?

**Modification of Education Setting of Smart Classroom Comfortability on Student Performance**

Table 2: The Influence of Smart Classroom Comfortability on Student Performance

Question	Variable		Variable		Variable	
	Yes	No	Yes	No	Do not Know	Do not Know
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)

Does learning at your own pace with the smart devices in your class seem simple?	234	97.5	4	1.7	2	0.8
Do you notice any differences between a standard classroom and a smart classroom?	238	99.2	1	0.4	1	0.4
Do you pay closer attention when teachers use smart devices in the classroom?	238	99.2	2	0.8	-	-
Are visuals displayed on smart	239	99.6	1	0.4	-	-

gadgets  
superior to  
drawings  
on  
chalkboard  
s?

Do you favour smart classroom learning environment over traditional classroom?	239	99.6	-	-	1	0.4
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**Average** - 99.02 - 0.45 0.29  
**(%)**

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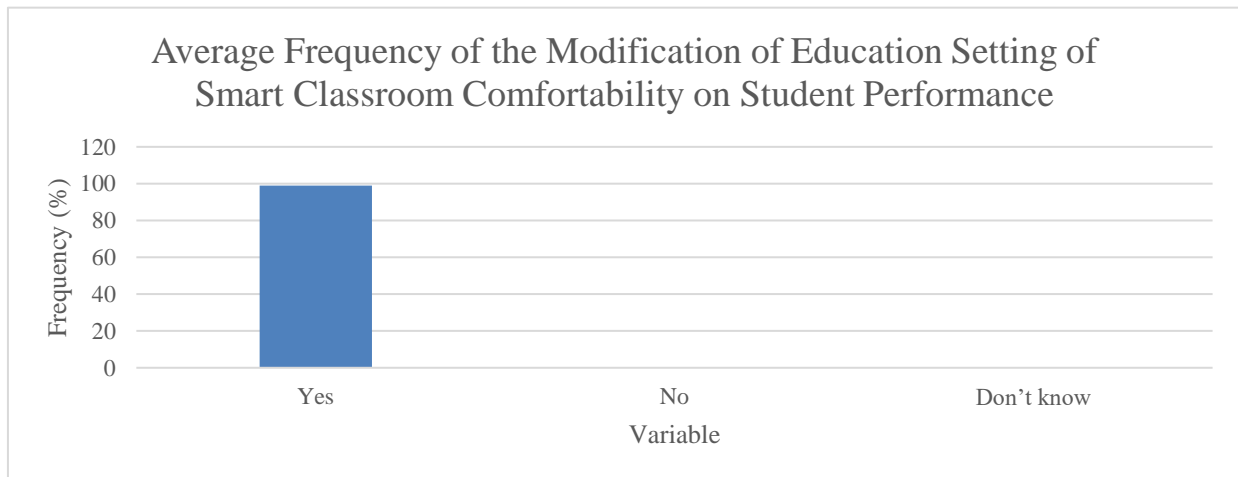


Figure 2 shows the average Frequency of the Influence of Smart Classroom Comfortability on Student Performance

From Table 2 and Figure 2, 99.02% of students accepted that the smart classroom is highly comfortable for learning and this enhances their performance greatly, which conforms with the work of Thivanka et al. (2020), whereas 0.45 and 0.29% opined that its comfortability has no influence on their performance and they do not know respectively.

### **Findings**

The impact of smart classrooms on students' academic performance was evaluated in this study. The data gathered from students who learned in both a smart classroom and a traditional classroom revealed that a smart classroom improves student performances and aids teachers in making learning more interesting, enticing, and simple to understand while also offering a variety of opportunities for students to learn new skills (Thivanka et al., 2020). This study also demonstrated that smart classrooms could improve learning and teaching while reducing absenteeism. Out of 240 returned questionnaires, 152 students are delighted with using the smart classroom, 54 are of medium satisfaction, 20 are low satisfaction, seven are not satisfied, and seven have a reserved opinion.

This study found that learning in an innovative classroom is more effective than learning in a traditional classroom because students are more attentive and comfortable in a creative classroom environment.

### **Recommendations**

The study proved a link between student comfort and academic progress. It is therefore recommended to consider students' comfort in constructing learning tools and environments. Training should be given to teachers for the pedagogical use of innovative classes. A technical assistant should be provided in schools to assist teachers with technical problems related to intelligence courses. The projects, seminars, and home assignments should be given while considering digital learning.

The study proved a considerable correlation between student availability and academic accomplishment. Therefore, smart classroom technology should be adopted to increase intellectual achievement, especially in African schools, as it limits the high absenteeism rate.

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## **Empirical Analysis Of The Efficiency Of The Banking Sector In Western Balkan Countries<sup>1</sup>**

**Berkan İMERI<sup>2</sup>**

### **Abstract**

Financial intermediation plays a crucial role in the economy of both the developed and the developing countries. At the same time, the banking sector represents the leading financial intermediary through which developing countries can enhance or boost economic growth in their country. The importance is given to the profitability and efficiency of the banking sector for fulfilling such macroeconomic objectives of the country.

In this regard, the main objective of this study is to analyse the efficiency of the banking sector of Western Balkans countries by utilizing secondary data collected from the official reports of the National Banks of the respective countries for the period 2004 – 2020. Thus, Data Envelopment Analysis was implemented to analyse the efficiency of the banks in Western Balkan for the period 2004 – 2020. Moreover, DEA results conclude that banks in Western Balkans operate at a good efficiency level due to an average score above 85% from 2004 – 2020. Montenegro had a continuous high-efficiency score during the last five years, followed by Serbia, Bosnia and Herzegovina, Kosovo, Albania, and North Macedonia.

In the light of the results of the efficiency of the banking sector of the Western Balkans and the specific analysis of the case of the Republic of North Macedonia, specific policy recommendations are given to improve the efficiency of banks in the Republic of North Macedonia.

**Keywords:** Efficiency, Banking Sector, DEA, Western Balkans.

**JEL Code:** E50

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## 1. INTRODUCTION

The bank represents a financial institution that has as a primary activity and objective the collection of deposits and the granting of loans, as well as the execution of payment transactions. Worldwide the banks are the most important financial institutions, measured by their participation in the total assets of the financial sector.

Banks play an essential role in society because they are the lifeblood of the financial system. They are even more significant, especially in countries in transition and developing countries, where financial markets still need to be developed or are in the process of creating. In addition to their traditional services, banks also offer other types of services, from currency and securities trading to leasing and insurance services. Innovation and expansion of a bank's services continue, especially not in times of globalization and a more extended period of low-interest rates where operations need to be justified and the ultimate primary goal achieved - making a profit. This lets us know that the banking system plays a vital role in supporting economic activity and, at the same time, can represent a basis for investment ventures and technological innovation.

Globalization, the rapid and advanced development of technologies and the trend of low interest rates did not bypass the countries of the Western Balkans. The Western Balkan countries are especially dependent on trade from the largest economies. The liberalization of financial markets and integration into the European Union (EU) make them even more connected and dependent on developments in the EU. Therefore, prudent management of banks' profitability and efficiency in such a dynamic environment is crucial.

There are various areas of inquiry on this topic. The central objective of this study is to analyze the efficiency of the banking sector in the region of Western Balkans by utilizing secondary data from esteemed institutions such as National Banks of the respected surveyed countries of the Western Balkans for the period 2004 – 2020. A critical methodology used to analyze banks' efficiency is the DEA methodology. In this paper, the CCR model will be applied as one of the most used models in the application of DEA.

So far, there exists plenty of theoretical and empirical research that has been dealing with the analysis and investigation of the efficiency of the banking sector of developed and developing countries; however, this study is focused on the empirical research of the efficiency of the banking



sector of the countries of Western Balkans. Thus, Data Envelopment Analysis has been used to determine the efficiency of the banking sector of the Western Balkan countries. Such results will be used as an essential contribution to the existing empirical literature about the efficiency of the banking sector of developing countries, particularly as findings and evidence for the banking sector of the Western Balkan region.

Taking into account the main objective of the work, the structure of this study is organized in a first section, which is dedicated to the "Introduction", where the main purposes and objectives are represented and discussed. The second section, entitled "Literature Review", illustrates the existing theoretical and empirical literature on the efficiency of the banking sector. The third part deals with the "Research Methodology". On the other hand, the fourth section, titled "BANK EFFICIENCY IN THE WESTERN BALKANS COUNTRIES", analyses the efficiency results of the banking sector in the countries of the Western Balkans region. Finally, in the last section the main conclusions are presented as well as the recommendations given based on the empirical findings taken from the results of the empirical analysis of the efficiency of the banking sector in the Western Balkans.

## **2. LITERATURE REVIEW**

The banking sector plays a crucial importance in the economy; therefore, they must be profitable due to the role of the stability of the financial system at the time of economic crisis that we have faced even recently with the Covid–19 pandemic as well as the financial problems in 2007. Many papers and research have tried to determine the factors that can affect the banks' profitability and efficiency since this acknowledgment will have a significant role for different groups of individuals and firms like managers, investors, and even the governments.

There is empirical evidence investigating the determinants of bank profitability at different levels and directions, as well as the efficiency of the banking sector in developed and developing countries, using different approaches. However, the results are mixed and controversial; therefore, the main objective of this research is to create a comprehensive model that incorporates the bank-specific and macroeconomic determinants that impact the profitability and efficiency of the banking system.

The productivity measurement could be done in two ways; by using the productivity level and productivity trend. The productivity ratio shows a level at a given time, a relation between an output produced and a combination of inputs utilized in the process. Using the ratio analysis could provide insignificant data considering the effect of the scale economy and overall measurement of a bank's performance. The ratios are used to identify trends over time for one bank or to compare two or more banks at one point (Knežević et al., 2011). As an alternative to traditional bank tools for bank efficiency management, the frontier DEA analysis was used to enable management to objectively identify the best practices in the dynamic environment in which banks operate (Yang, 2009). DEA comprehensively analyzes the relative efficiencies for defined inputs and outputs (Banker, 1984).

The parametric approach evaluates the parametric function (for example, the cost function) based on statistical data, and the residuals reflect the measure of organization inefficiency (Resti, 1997). SFA supposes that empirical inputs cannot be above the function of the cost function (optimal production). It expresses that the same perspective involves suggesting presumptions about the proper form of production functions; more accurately, it helps receive an econometric estimation of the functional form for the function of production. However, it is worth noting that the efficiency boundary that the parametric approach allows to build is a theoretical ideal, and the researcher, both because of the inefficiency of the object and because of a random error (Berger & Humphrey, 1997), can interpret the deviations from this boundary.

A non-parametric approach does not imply the creation of assumptions about the form of the production function. The efficiency boundary in the case of the non-parametric approach is based on the best Decision-Making Units (DMUs). The approach itself suggests considering each bank as a microeconomic firm that uses resources (inputs) to create a release (outputs) with the help of some production function. The critical disadvantage of this technique is that it is non-statistical, and, therefore, it is difficult to test hypotheses about the results' significance. This disadvantage is almost leveled using the bootstrapping method, which assumes that the proper data distribution can be approximated empirically. This approach allows the researcher to construct a piecewise-linear bound of efficiency as a particular "shell" of actual observations available to the researcher. Deviations from the efficiency boundary are interpreted, in this case, as a result of the inefficiency

of the object (Coelli et al., 2005). This is also an omission of the model since there is no random error.

Furthermore, it is crucial to understand that when using the DEA technique to analyze banking efficiency, the proper selection of variables has the most crucial role. There are three options to configure and choose the variables, and each of them ensures the evaluation of the banks in a particular way to highlight your objectives. It should be noted that the methods of "production" and "intermediation" are derived from cases of an original one. In general, the results obtained with the three approaches, according to (Golovan, 2006), do not differ. However, the author points out that the modified approach is preferable, as it allows deposits to be treated in a more general way.

Although the banking industries of emerging economies are more studied than the industries of the other economies, in the existing literature, many studies have investigated the efficiency of banking systems in developed and developing countries using the DEA approach.

Aleskerov et al. (2009) in their article, have stated that the analysis of bank efficiency can be adequately carried out using the data envelopment analysis approach. While the quantitative indicators used are not complex, such as the number of newly opened transaction accounts for the period, interest income from disbursed loans. Sometimes, especially within the US banking system, the aggregate rating of the bank's performance is used, for example, CAMEL (Vishnyakov, 2001).

These techniques captivate the researchers with their simplicity but produce a one-sided cutoff of the defined position. They do not give a full image of the present situation compared to the DEA. The notion of technical efficiency was first formulated and introduced in work (Koopmans, 1951). Moreover, it is known that the DEA approach was initially introduced by Charnes, Cooper, and Rhodes (1978), known as the CCR method, and assumed constant return to scale (CRS). There is no significant relationship between the scale of operations and efficiency, together with input orientation. The usage of the DEA technique could not be appropriate in case all DMUs used in the model are performing at an optimal level. Thus, to overcome this limitation, a second modification was introduced as BCC by Banker (1984), based on the presumption of a "variable return to scale" (VRS).

Firdaus and Hosen (2013) gauged the efficiency of ten Islamic banks in Indonesia via the two-stage CRS DEA method from the second quarter of 2010 until the fourth quarter of 2012. Achieved results show that the banks in Indonesia operate on a scale of efficiency between 72.12% and 93.82%, showing that there is a potential for developing efficiency.

Zeitun and Benjelloun (2013) examined the relative efficiency of 12 Jordanian banks over the period 2005-2010, that is, the period after bank deregulation. The authors conducted CRS and VRS DEA model techniques. Within each model, they tested three options of inputs and outputs to discover how the efficiency results are affected by the mix. The results of the current research show that most of the Jordanian banks are inefficient in properly allocating their resources (there was a decreasing trend of cost efficiency management in the observed period) and that the global financial crisis affected the efficiency score of the banking industry.

Using the DEA approach, authors Hosen and Muhari (2014) tried to investigate the efficiency of 73 Sharia Rural Banks in Indonesia for June 2011 - March 2013. Finally, the findings revealed that the average efficiency score for banks in Indonesia for the analysed period was 65.23%.

In their paper, authors Mustafa and Behmood (2015) analyzed the technical efficiency of the banks in Pakistan by investigating 11 commercial banks from 1998 to 2012 by conducting the VRS DEA and CRS DEA, and Malmquist productivity index (MPI), to get the scores of productivities. Moreover, they have divided the period into pre-digital reforms (1998-2005) and post-digital reforms (2006-2012). In addition, the findings suggested that the sector's efficiency was growing in the post-digital period, thus was observed 15% growth in pure technical efficiency, where the average result was 94.2% with the CRS assumption and 97% with the usage of VRS assumption.

Furthermore, by analysing the efficiency of the banks in Serbia, authors Marković et al. (2015) tried to investigate 33 banks from 2007 to 2010 using CRS DEA and MPI. The results revealed no crucial change in the sector's efficiency; thus, the findings suggested that the mean efficiency score equals to 72%.

A recent study by the authors Shyu et al. (2015) analysed the efficiency of 56 banks in Taiwan, Hong Kong, and Mainland China for the period 2004-2009 by using a three-stage DEA model. Their empirical results showed that banks capitalized better; those with operational freedom and

long years of experience in the market have higher slack of waste in deposits, fixed assets, and employee numbers.

Moreover, Soba et al. (2016) investigated the efficiency of 10 Turkish banks during 2005-2015 by utilizing the DEA approach and panel regression analysis. In addition, the findings revealed that board size, major shareholder, and NOC variables have a positive and statistically significant effect on bank efficiency.

Furthermore, a study conducted for the banks in Singapore by Sufian and Majid (2007) analysed the bank efficiency for 1993-2003 using DEA and panel regression techniques. The results claimed that the average efficiency level was relatively high, ie. 95.4%.

By analysing the banks and their efficiency in Brazil, Wanke et al. (2016) used the two-stage DEA model, where they used the outputs of the former model as inputs for the latter one. Finally, the results suggested that banks in Brazil were less efficient, with an average efficiency score of 43%.

In their study, Kutlar et al. (2015) analysed the efficiencies of 23 Turkish banks through the usage of input-oriented CRS and VRS DEA. Finally, their results revealed that all banks were efficient in 2008 and highlighted that smaller banks are less efficient than bigger banks. Similarly, the efficiency of the banks in Brazil was investigated by Cava et al. (2016) for the year 2013 by conducting the CRS DEA model. The empirical findings revealed that 26 banks are efficient, and the average efficiency score is 49%, which is not very high.

Authors Thu and Bhaiyat (2016) analysed the efficiency of Vietnamese banks during the period 2011-2014 by using the CRS and VRS DEA models. The empirical findings revealed that the mean efficiency score is 87%, indicating that Vietnamese banks were operating at 13% waste of banking resources.

Sanjeev (2006) investigated the efficiency of the banks in India for the period 1997-2001 by including data from 27 public banks and 33 private and 38 foreign banks. Using the DEA methodology, the results revealed that public banks are less efficient than private and foreign banks and that the efficiency scores negatively correlate with the percentage of non-performing loans. Further, by using the DEA model approach, Mostafa (2009) analysed the efficiency of 85 Arab banks for the year 2005 by using the CCR and BCC and DEA, indicating that the average efficiency score is 31%.

In addition, authors Gaganis and Pasiouras (2009) analysed the efficiency of banks in Greece from 1999-2004 using the DEA approach. Moreover, the findings suggested that the efficiency score for these banks during the analysed period was 73.25%.

In Algeria, the efficiency of the banks was analysed by Henni and Chachoua (2016) for the period 2009 – 2013 by using the CRS DEA model. The findings at the end showed that they could not accept their central hypothesis that government intervention helps domestic banks to improve their efficiency. On the other hand, Ramakrishna et al. (2016) investigated the efficiency of the banks in India for the period 2002-2013 by using the VRS DEA model. By dividing the banks into three groups, they stated that the efficient score for all three groups was 73%.

As was already mentioned, plenty of studies have investigated banks' efficiency in developed and developing countries using different methodologies. However, since this research used the DEA approach, important papers of different authors using this technique in their studies to analyse bank efficiency by discussing their approaches and comparing their empirical results were summarized.

### **3. RESEARCH METHODOLOGY**

The research methodology of this study consists of the investigation of the efficiency of the banking sector of the Western Balkan countries for the period 2004 – 2020 by utilizing the Data Envelopment Analysis – DEA, by utilizing the MaxDea 8 software. In this regard, three inputs (assets, size, and deposits) and two outputs (loans and interest income) have been included in the DEA model, as well as two intermediary variables (GDP -capita and inflation rate).

Data Envelopment Analysis represents a mathematical programming-based technique that can be used to evaluate the relative performance of firms or organizations. While the primary applications have been in the evaluation of not-for-profit organizations, this technique can be successfully applied to other situations competing with other techniques such as cost-benefit analysis and multi-criteria decision making as can be seen, for instance, in a recent study about the best choice for traffic planning, namely, the design and location of a highway in Memphis (Bougnol et al., 2005)

Data Envelopment Analysis was initially introduced by Charnes et al. (1978) based on the research of Farrell (1957), who defined a simple measure of a firm's efficiency that could account for multiple inputs. DEA is a non-parametric linear programming approach capable of handling multiple inputs and outputs (Asmild et al., 2004). This technique ensures conducting different

forms of “input” and “output” together. A DEA technique can be developed to reduce inputs or boost the outputs. An input orientation objects to reducing the input amounts as much as possible while keeping at least the present output levels. In contrast, an output orientation aims at maximizing output levels without increasing the use of inputs. (Cooper & Lovell, 2000).

### 3.1.SPECIFICATION OF THE DATA

The primary purpose of this study is to analyze the efficiency of the commercial banks operating in six countries from the Western Balkan region for the time spin 2004 – 2020 such as Albania, Bosnia & Herzegovina, Kosovo, Montenegro, North Macedonia, and Serbia, where two analyses were conducted.

Firstly, it investigated the efficiency of the banking sector of the Western Balkan countries for the period 2004 – 2020 by utilizing the Data Envelopment Analysis – DEA, where three inputs (assets, size, and deposits) and two outputs (loans and interest income) have been included in DEA model, as well as two intermediary variables (GDP -capita and inflation rate).

Table 4.4. Variables – explanation, acronyms, and source.

VARIABLE	ACRONYM	SOURCE
<b>Assets</b>	assets	National Banks of WB
<b>Size of bank</b>	size	National Banks of WB
<b>Deposits</b>	deposits	National Banks of WB
<b>Loans</b>	loans	National Banks of WB
<b>Interest income</b>	interest_income	National Banks of WB
<b>GDP per capita</b>	gdp_cap	World Bank
<b>Inflation rate</b>	inflation	World Bank

Source: author’s source

The following table shows the descriptive statistics of the variables included in the first analysis, where it is investigated the efficiency of the banking sector of the countries in Western Balkans for the period 2004 - 2020. As we can see, the number of observations for assets is 100. At the

same time, for the deposits and size of banks, we have a total of 102 and 100 observations, respectively, for the countries of Western Balkans for the corresponding period 2004 - 2020. The total number of observations for GDP per capita growth and the inflation rate is 102. Regarding the mean value of assets, deposits, and bank size, we have 9696.4, 6741.5 and 8.81, respectively, while for loans and interest, income is 6298.2 and 152.8.

Furthermore, the mean value of GDP per capita and the inflation rate is 2.88 and 2.67. The bank's standard deviation of assets, deposits, and size has marked the values of 8815.6, 6710.7, and 0.8679, while the same for loans and interest income is 7061.03 and 93.9. In addition, the standard deviation of GDP per capita and the inflation rate is 3.42 and 3.25. The minimum value of assets, deposits, and size is 816.5, 273.1, and 6.71, respectively, while the maximum values are 40877.4, 36672.9, and 10.62. The minimum and maximum GDP values per capita are -15.2 and 10.15, respectively. The minimum value of the inflation rate is -2.42, while the maximum value is 16.25, as reflected in the following table.

Table4. Descriptive Statistics (DEA analysis for Western Balkans, 2004 - 2020)

Variables	Number of observations	Mean value	Standard deviation	Minimal value	Maximum value
<b>Assets</b>	100	9696.4	8815.6	816.5	40877.4
<b>Size</b>	100	8.81	.867	6.71	10.62
<b>Deposits</b>	102	6741.5	6710.7	273.1	36672.9
<b>Loans</b>	100	6298.2	7061.0	373.6	32124.09
<b>Interest</b>	49	152.8	93.9	23.88	354.66
<b>Income</b>					
<b>GDP - capita</b>	102	2.88	3.42	-15.2	10.15
<b>Inflation rate</b>	102	2.67	3.25	-2.42	16.25

Source: author's calculations.

#### 4. EMPIRICAL RESULTS OF THE EFFICIENCY OF THE BANKS IN THE WESTERN BALKANS

The following table represents the results from the DEA analysis, where firstly it needs to be taken into account that one of the main advantages of the DEA model is that different input and output variables can be used in the model, and where the efficiency scores depend on the sample and



variables that are selected to be covered in the model, and therefore results show relative efficiency measures.

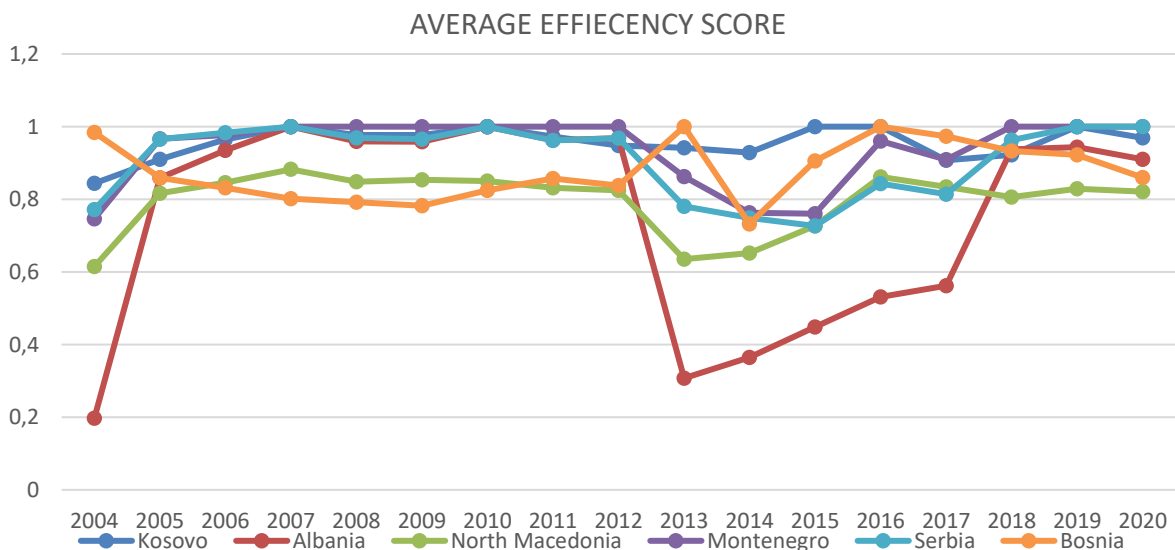
Table2. Data Envelopment Analysis Results (Western Balkans)

<i>AVERAGE EFFICIENCY SCORE</i>						
<i>WESTERN BALKANS BANKS ( 2004 – 2020)</i>						
	<b>Kosovo</b>	<b>Albania</b>	<b>N.Macedonia</b>	<b>Montenegro</b>	<b>Serbia</b>	<b>Bosnia</b>
<b>2004</b>	0.84384	0.197021	0.614652	0.746430371	0.771596567	0.984323
<b>2005</b>	0.910414	0.858738	0.817041	0.966534691	0.965515433	0.85916
<b>2006</b>	0.964836	0.934415	0.845692	0.977215091	0.983038776	0.831946
<b>2007</b>	1	1	0.882318	1	1	0.801785
<b>2008</b>	0.97738	0.959407	0.848314	1	0.968706406	0.792339
<b>2009</b>	0.976736	0.958876	0.853238	0.999636622	0.965397955	0.782212
<b>2010</b>	1	1	0.850004	1	1	0.824472
<b>2011</b>	0.972866	0.962541	0.831463	1	0.961681118	0.856945
<b>2012</b>	0.948083	0.968611	0.824187	1	0.968347763	0.837971
<b>2013</b>	0.941659	0.30741	0.634947	0.862584041	0.780369734	1
<b>2014</b>	0.92865	0.364653	0.651979	0.763091088	0.748990675	0.732399
<b>2015</b>	1	0.448195	0.726471	0.760442699	0.726656861	0.905429
<b>2016</b>	1	0.531674	0.861411	0.960613404	0.842853481	1
<b>2017</b>	0.907559	0.56243	0.834118	0.908798741	0.814088764	0.973682
<b>2018</b>	0.922543	0.93739	0.806204	1	0.962733208	0.933359
<b>2019</b>	1	0.943117	0.829222	1	0.999926074	0.922025
<b>2020</b>	0.968895	0.910165	0.821309	1	1	0.85983

Source: authors' calculations.

In this study, the Data analysis was conducted using DeaMax software using the variable return-to-scale DEA technique, where the focus is on the output. This was achieved to understand who are the operating banks that have been shown to have efficiently operated and those that have to increase the efficiency through a higher level of output variables. Furthermore, the following figure illustrates the results received from the output-oriented DEA model with a variable return to scale. From the discovered results, it can be concluded that banks in Western Balkans operate at a good efficiency level due to an average score above 85% from 2004 – 2020. Montenegro had a continuous high-efficiency score during the last five years, followed by Serbia, and Bosnia and Herzegovina. Albania had a low average efficiency score below 85% in 2004, 2013, 2014, 2015, 2016, and 2017, but in 2018 and 2019, it increased its average efficiency score to above 85%. The banks in North Macedonia had a constant average efficiency score from 2004 – 2012, a slide decrease until 2016; then, the average efficiency score remained above 85% from 2016 - 2020. During 2020, the average efficiency score for Western Balkan countries was above 80%, where Serbian banking sector efficiency was the highest during this year, while the efficiency of the banks in North Macedonia, even though higher than 80%, is among the lowest compared with the other Western Balkan countries.

Figure1. DEA analysis of bank sector efficiency, WB, 2004 – 2020.



Source: authors' calculations.

## **5. CONCLUSIONS AND RECOMMENDATIONS**

Taking into consideration the importance of the efficiency of the banking sector as well as the mixed results and evidence present in the literature, the primary purpose of this study is to analyse the efficiency of the banking sector of the countries of Western Balkans by using secondary data collected from National Banks of the Western Balkans for the period 2004 – 2020. To realize such objectives, Data Envelopment Analysis (DEA) was conducted to analyse the efficiency of the banks in Western Balkan for the period 2004 – 2020.

From the DEA results, it can be concluded that banks in Western Balkans operate at a good efficiency level due to an average score above 85% from 2004 – 2020. In addition, from the WB countries, Montenegro had at continuous high-efficiency score during the last five years, followed by Serbia and Bosnia and Herzegovina, then by Kosovo, Albania, and North Macedonia.

In the light of the results of the efficiency of the banking sector of the Western Balkans and the specific analysis of the case of the Republic of North Macedonia, specific policy recommendations are given to improve the efficiency of banks in the Republic of North Macedonia.

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## **Comparison Of The Efficient Of Domestic And Foreign Banks With Data Envelopment Analysis: In The Case Of The Poland Banking System (2016-2022 Period)<sup>1</sup>**

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### **Abstract**

The main reason for this research is to analyze the Polish banking systems with Data Envelopment analysis and its sub-models, to measure efficiency, and then to compare the banks of both countries separately and together, according to the results of the analysis. In this study, the measurement of the efficiency of all 19 banks operating in Poland between 2016-2022 was investigated with CCR and BCC models of an input-oriented the Data Envelopment Analysis. According to the analysis result, efficient and inefficient banks were identified and compared, and potential improvement suggestions were developed for inefficient banks. It has been observed that the efficiency of the banking system has estimated to increase linearly over the years. Results of efficient banks of Poland have been compared and recommended as benchmarks and potential improvement suggestions for inefficient banks.

**Keywords:** DEA, BCC Model, CCR model, Poland banking system

**JEL Code:** D61, D70, E42, E50, G24

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## 1. Introduction

The banking sector is particularly important for the stability of financial systems. The main role of a financial system is the efficient allocation of national savings for investments. The financial system provides the possibility of achieving a compromise between reward and risk in terms of capital allocation from a macroeconomic point of view, as well as the use of diversification possibilities. The banking system in Poland was adapted to the conditions of a market economy with the introduction of the Act of February 26, 1982, the Banking Law. Another transformation of the banking system in Poland is the result of the amendment carried out in 1989. According to the amended act, a model of a universal bank emerged, i.e., an institution that is completely free in terms of the services offered and operation on financial markets. This model has been in force in Poland up to now (Banking Law of Polish, 1997).

In Poland, the structure of the banking system is two-tier. It is shaped by the central bank, which is the National Bank of Poland, as well as commercial banks. In addition to the above-mentioned components of the banking system in Poland, we include the Polish Financial Supervision Authority, and the Bank Guarantee Fund. In Poland, banks are managed by the Polish Financial Supervision Authority. She took over this function in 2008 from the Banking Supervision Commission. In turn, the work of the Polish Financial Supervision Authority is supervised by the Prime Minister. In addition, each bank has its own president who manages the institution from the inside. The two-tier banking system in force in Poland consists of three groups of institutions, namely: stabilizing, market-creating, and auxiliary institutions. Stabilizing institutions – these are institutions that are responsible for supervising the proper functioning of the entire system. These include the National Bank of Poland, the Polish Financial Supervision Authority, and the Bank Guarantee Fund. The National Bank of Poland is responsible for regulating the liquidity of banks and supporting financial stability (including the banking sector). The Polish Financial Supervision Authority ensures control over the conduct of banking activities and takes measures to ensure the proper functioning of the financial market.

The Bank Guarantee Fund is an institution that guarantees bank deposits in Poland. It also provides assistance to banks that are at risk of bankruptcy. Market-creating institutions (in other words, the banking sector) are the banks that operate within a given banking system. In Poland, these are

commercial banks, cooperative banks, and branches of credit institutions. Auxiliary institutions these include institutions that do not conduct deposit and lending activities. The following entities should be mentioned here: non-bank issuers of payment cards, insurance institutions, the National Depository for Securities, the National Clearing House, the Credit Information Bureau, and institutions associating banks (e.g., the Polish Bank Association).

The banking system in Poland performs the following functions (System Bankowy, 2001):

- issue: only the National Bank of Poland (NBP) has the right to issue banknotes and coins. In addition, the coins introduced into circulation: “grosz” and “zloty,” have the statutory power to release from all liabilities, and no person can refuse to accept them as a form of payment;
- regulatory: this function is based on controlling the supply of money, taking into account the demand for it, due to the fact that the central bank cannot create "empty" money, devoid of cover in goods and services;
- deposit and credit; this is related to the system of converting deposits into credits and loans.
- settlement: money is transferred by the bank from debtors to creditors;
- allocative, because this allows the flow of financial resources from less efficient branches of the economy and business entities to be feasible;
- financial and advisory: this function is based on the protection of clients' interests through the assistance of appropriate advisory staff;
- stimulating: it has an impact on the development of local entrepreneurship due to the fact that the bank transfers capital.

Since 1996, Poland has been a member of the OECD (Organization for Economic Cooperation and Development). From then on, the Polish banking system could no longer introduce new restrictions on capital turnover and was obliged to gradually eliminate the existing restrictions and the uniform treatment of entities from all countries. Poland also committed that, starting in 1999, it would not restrict banks from OECD countries from opening their branches on the territory of the Republic of Poland (Solarz, 1996).

According to the Banking Law of 27, August 1997, which is in force today (Ustawa Prawo bankowe, 1997). In light of previous regulations, foreign entities can be present in Poland in the form of joint-stock companies established by them, the purchase of shares in an existing bank or branch, or the representative office of a foreign bank. Since Poland's accession to the European Union, i.e. since May 1, 2004, the principle of a uniform banking license has been in force, according to which each credit institution authorized to conduct banking activity in one of the Member States has the right to conduct such activity in other EU countries. This activity concerns the opening of branches in other countries and the provision of services within the EU on a cross-border basis (Pawłowska, 2019).

As a result of the literature review in the study, after the investigation the efficiency analysis section about the banking sector, in the second sector, information about the theoretical background of the methods used in the study was presented. In the third sector, banks and input - output variables that are within the scope of the study are introduced. In the fourth sector, the analysis findings are presented and interpreted. In the last section, discussion and a conclusion are given.

## **2. Literature Review**

There are many efficiency analyses in the literature to examine the banking sector. Most of these studies were examined for the selection of the model and variables to be applied in the research.

In the study conducted by Drake, Hall, and Simper in 2009, the efficiency of the Japanese banking system was investigated with data envelopment analysis by using total deposits, total operating expenses, total provisions, total non-interest expenses, total other operating expenses as inputs and total loans, total other earning assets, net commission, fee, and trading income, other operating income, net interest income as outputs.

In a study conducted by Küçükaksoy and Selcan in 2013, with the balance sheet and income statement data of the years 2004 and 2011 of 10 private capital deposit banks and 5 foreign capital deposit banks operating in the Turkish banking sector between 2004 -2011, the efficiency of banks by using data envelopment analysis model and 3 input (total deposit, interest expenses and personnel expenses) and 2 output (total loan and interest income) variables were used. As a result of the study, it was determined that 7 banks in 2004, 2005, 2008, 2010 and 2011, 6 banks in 2006,

8 banks in 2007 and 5 banks in 2009 were technically efficient under the assumption of variable returns by scale.

Dutta, Jain, and Gupta (2020) analyzed the performance of non-banking financial companies (NBFCs) in the Indian context by using data envelopment analysis. In the first stage, panel data for the years 2014-2018 were taken to calculate super efficiencies, and in the second stage, in order to find exogenous factors significantly affecting the model, Tobit regression analysis was used. As a result of the study, where total assets and employee cost are considered as input, interest income, non-interest income, and operating profit as output, according to traditional models, the total number of efficient decision-making units is 8 out of 43 and considering the super efficiency algorithm, 15 units were found. Malmquist Indices, productivity indices of NBFCs in 5 years, have been found to have a maximum productivity increase of 8.53%.

Hammami et al. (2020) , in their study, by ranking of the Euclidean common weight set (ECSW) with DEA It has been applied to the banking sector in the euro zone. In the Euro Area in 2014-2018, of 59 of 67 banks traded in 17 countries that a data set has been obtained. In the study, deposits, number of employees and operating costs are used as input variables, and operating income and total assets are used as output variables. As a result of the ECSW approach, it has been observed to perform better from other common weight approaches in terms of ranking consistent with banks' credit ratings in and both numerical and real life examples.

Tsionas (2020) measured the efficiency of 285 banks in the USA by using the DEA method. In the study, consumer loans, real estate loans, commercial and industrial loans, and securities as input variables; the number of employees, physical capital, purchased funds, interest-bearing transaction accounts, and non-transaction accounts were considered as output variables.

In the study, Balçı and Ayvaz (2020) measured the efficiency of 15 deposit banks operating in the Turkish banking sector between 2014-2018 with the data envelopment analysis that of 3 public, 6 private and 6 foreign deposit banks and the Malmquist index. As input, personnel expenses / total assets (%), total loans / total assets (%), equity / total assets (%), total deposits / total assets (%), and as output, earning power of assets (net profit / total assets), earning power of equity (net profit / equity) (%) were used to analysis efficiency of banks. As a result of the study, with the assumption

of constant return to scale 4 banks, 8 banks were found efficient under the variable return to scale assumption between 2014-2018.

In their study, Yagubov and Yagubov (2020) investigated the efficiency of ten commercial banks with the highest total number of assets in Azerbaijan in 2016, by using the DEA method in the period 2011-2016. Three inputs (total assets, total equity, and interest expenses) and two output variables (interest income and net profit) are used in the study by using the CCR (Charnes, Cooper, Rhodes) model. As a result of the study, it was determined that only Turan Bank was efficient in the period before the devaluation that took place in 2015, while the banks in the post-devaluation period were generally efficient, and Pasha Bank achieved the highest efficiency.

The efficiency measurement of all 25 banks operating in Azerbaijan during 2015-2019 was investigated by Salamzade Fuad and Bagirov Alig using constant return to scale, variable return to scale, and Super efficiency models of an input-oriented Data envelop analysis. In the research, interest expenditures, personnel expenditures, general and retained expenditures and deposits have been used as input and loans, interest income and non-interest income as output. As a result, it has been determined that the efficiency of the banks included in the analysis increased from 2015 to 2019 and that the banks worked and developed more efficiently.

In the study conducted by Czerwonka (2019), the efficiency of Poland's 12 largest commercial banks between 2013 and 2018 was measured. The aim of the research was to examine whether the largest commercial banks are more efficient than the others and to determine the main reasons for the inefficiency of commercial banks. Data Envelopment Analysis (DEA) was used as the research method. The obtained results indicate that the average efficiency is 0.903. It turns out that the largest banks are, on average, quite efficient and do not have much room for improvement. In the case of large banks, the average technical efficiency PE is 0.96, while in the case of pure technical efficiency PTE, it is as high as 0.99.

### **3. RESEARCH METHODOLOGY**

In this study, 2 models of Data Envelopment Analysis (DEA) - CCR Model and BBC Model were used to measure the efficiency of banks.

### 3.1. Input Oriented CCR Model

In this study, a constant scale of returns to CCR model with input - oriented DEA was used. The constant scale of returns CCR model using the analysis by (Charnes, Cooper, & Rhodes 1978) was the first tool that provided the basis for the development of DEA approach (Baghirov 2017). Variable weight method is used in DEA. The weights are created linearly from data obtained as a result of multiple assumptions and constant weight selected calculations are omitted (Kutlar & Salamov 2018).The following are the three factors to be kept constant in determining these weights through linear programming; All data and weights must be positive; the ratio of weighted outputs to weighted inputs must assume a value between 0 and 1, and weights must be used for all DMUs included in the model (Charnes A. , Cooper , Lewin, & Seiford 1997).

In the literature, these weight values are called "virtual input-output" or "virtual weights," and the weights are tested for determination in order to maximize the efficiency rate through linear programming (Kutlar & Salamov 2018).The mathematical representation of the model is as shown below (Cooper, Seiford, & Zhu 2011).

$$\frac{\text{virtual output}}{\text{virtual input}} = \frac{u_1y_{1o} + u_2y_{2o} + \dots + u_sy_{so}}{v_1x_{1o} + v_2x_{2o} + \dots + v_mx_{mo}}$$

In this analysis,an input oriented CCR model will be discussed. Input oriented model CCR, a solution model that aims to minimize the input level by determining the most appropriate set of inputs to optimize the most efficient rate for a given set of output has been implemented. The purpose of the CCR model is to maximize the ratio of virtual output and input, and the ratio of virtual output to virtual input for DMU, provides efficiency measurement, which is a function of multipliers. If j is the efficiency of the decision unit h<sub>j</sub>, the goal is to maximize this value . In this case, the input-oriented function can be expressed in the following formula (Charnes, Cooper, & Rhodes 1981).

$$Maxh_j = \frac{\sum_{s=1}^n u_s y_s}{\sum_{i=1}^m v_i x_i}$$

The first restriction has been imposed so that the efficiency rate of DMU does not exceed 1. If it exceeds 1, it means the efficiency rate is over 100%. Restrictions can be shown as in the formula below (Charnes, Cooper, & Rhodes 1978).

$$\frac{\sum_{s=1}^n u_s y_s}{\sum_{i=1}^m v_i x_i} \leq 1$$

The following restriction has been introduced so that the weights of the inputs and outputs to be used are not negative.

$$u_r \geq 0; v_i \geq 0;$$

$j$ : DMUs,  $j = 1, 2, \dots, s$ ;  $s$  : number of output ,  $s = 1, 2, \dots, n$ ;  $i$  : number of input,  $i = 1, 2, \dots, m$

In the formula;  $y_s$  :  $j$ 'th, the value of the  $s$ 'th output produced by the DMU,  $x_i$  :  $j$ 'th the value of the  $r$ 'th input produced by the DMU,  $u_r$  : weight given to  $r$ 'th output,  $v_i$  : weight given to the  $i$ 'th input. If the efficiency scores are 1, the DMU included in the analysis is efficient, if it is less than 1, it indicates that it is not efficient (Kutlar & Salamov 2018).

### 3.2. Input Oriented BCC Model

A study conducted by (Banker, Charnes, & Cooper 1984) on the assumption of scale of return it was named BCC formulation. This model was developed on the basis of the CCR model based on the assumption of constant scale of return and a model based on the assumption of variable return to scale was created (Baghirov 2017). BCC method measures efficiency by considering only technical efficiency. The BCC model's efficiency score limits will always be less than or equal to the CCR efficiency score limits. As in the CCR model, the BCC model also uses two methods, input-oriented and output-oriented (Banker, Charnes, & Cooper 1984). In this study, an input-oriented BCC model will be used. The Input Oriented BCC Model has been created in order to provide the intended output to determine the best amount of input. The function of the input-oriented BCC model is as follows (Kutlar & Salamov 2018):

$$MaxZ = \sum_{r=1}^s u_r y_{r0} - \mu_0$$

According to the following conditions:

$$\sum_{i=1}^m v_i x_{i0} = 1; \quad j = 1, \dots, n;$$

$$\sum_{r=1}^s u_r y_{rj} - \sum_{i=1}^m v_i x_{ij} - \mu_0 \leq 0; \quad r = 1, \dots, p; i = 1, \dots, m;$$



The following restriction has been introduced so that the weights of the inputs and outputs to be used are not negative.

$$u_r \geq \varepsilon ; v_i \geq \varepsilon , \mu_0 : \text{unrestricted}$$

Here;  $u_r$ : The weight given to the  $r$ 'th output by DMU,  $v_i$ : The weight given to the  $i$ 'th input by DMU,  $y_{r0}$ :  $i$ 'th input used by DMU,  $y_{rj}$ :  $r$ 'th output produced by the  $j$ 'th DMU,  $x_{ij}$ :  $i$ 'th input used by the  $j$ 'th DMU,  $\varepsilon$ : a small enough positive number,  $\mu_0$ : the scale of return is defined as variable. The efficiency value of the effective DMUs in the Input Oriented BCC model is equal to one (Selamzade 2019). In the case of efficiency, it is impossible to make any changes to the input and output vectors. The efficiency value of ineffective DMUs is less than one (Yalçın 2012).

### 3.3. Determination of Decision Units and Variables

In order to meet the minimum conditions of the analysis and come to a clear result, the number of banks we take part in determining the Determination of Decision Units and Variables. All domestic and foreign banks operating in the Poland Republic are included in the analysis, and which has been accepted as the Decision Making Unit (DMU). The input and output data used in this study were collected on the basis of the banks' year-end independent audit reports. In the analysis, efficiency scores of DMUs were calculated without making any distinction between domestic and foreign banks. In the study, input-oriented Data Envelopment Analysis (DEA) was conducted for 19 banks in Poland with the data of 2016-2022. Of the 19 Polish banks included in the analysis, 9 are domestic banks and 10 are foreign (BNP Paribas Bank Polska and Crédit Agricole Bank Polska, mBank and Deutsche Bank Polska from Germany, ING Bank Śląskione from Niderlanin, DNB Bank Polska from Norway, Nest Bank from the United Kingdom, Bank Handlowy w Warszawie USA, Bank Millennium from Portugal and Santander Bank Polska from Spain). The input-oriented analysis method is to calculate how much the inputs are minimized to produce the current outputs of DMUs. Fixed-return-to-scale Charnes, Cooper Rhodes (CCR) and variable-return-to-scale Banker, Charnes, Cooper (BCC) models were used in the analysis. The names of the banks of Poland included in the study are shown in the table below.



**Table 1: Names of banks of Poland included in the analysis**

N	Name of Polish Domestic Banks	N	Name of Polish Foreign Banks
1	Bank Polska Kasa Opieki	1	Bank Millennium
2	SGB-Bank	2	DNB Bank Polska
3	PKO Bank Polski	3	mBank
4	Bank Pocztowy	4	Nest Bank
5	Bank Polskiej Spółdzielczości	5	Bank Handlowy w Warszawie
6	Plus Bank	6	ING Bank Śląski
7	Getin Noble Bank	7	Crédit Agricole Bank Polska
8	Alior Bank	8	Santander Bank Polska
9	Bank Ochrony Środowiska	9	Deutsche Bank Polska
		10	BNP Paribas Bank Polska

The input and output variables shown in Table 2 were used to analyze the efficiency of banks operating in the Polish banking sector. In the study, 3 inputs (interest and non-interest expenses and deposits) and 3 outputs (loans, interest and non-interest income) were used for efficiency analysis. Non-interest income includes dividend income, commission and fee income and other operating income and Non-interest expenditures, commission and fee expenses, other operating expenses, general and administrative expenses.

**Table 2: Input and Output Variables**

Input			Output		
Interest Expenditures	Non-Interest Expenditures	Deposits	Loans	Interest Income	Non-Interest Income

The data taken from the annual accounts of banks were zlotys for Poland. The Polish zloty was included in the analysis by converting it to the average exchange rate of the US dollar in all years. All the data included in the analysis are given on the basis of US dollar and analyzed with the DEA-Solver program.

## 4. RESEARCH FINDINGS

### 4.1. BCC Model

The results of 19 banks' scores by years and 7-year average scores of the fixed return to scale BCC model of input-oriented DEA for the period 2016-2022 are shown in Table 3. The ranking is made according to the annual average performance of the banks.

**Table 3: BCC Efficiency Scores between 2016-2022**

*Calculated by the co-authors according to the analysis results.*

*C-Constant, I-Increasing and D-Decreasing, RTS-returns to scale*

N	Name of Banks	2016		2017		2018		2019		2020		2021		2022		AS of Banks
		Scores	RTS	Scores	RTS	Scores	RTS	Scores	RTS	Scores	RTS	Scores	RTS	Scores	RTS	
1	Bank Polska Kasa Opieki	1,00	C	1,00	C	1,00	C	1,00	C	1,00	D	1,00	C	1,00	I	1,00
2	SGB-Bank	1,00	C	1,00	C	1,00	C	1,00	C	1,00	C	1,00	C	1,00	D	1,00
3	Bank Millennium	1,00	C	1,00	C	1,00	C	1,00	C	1,00	C	1,00	C	1,00	C	1,00
4	DNB Bank Polska	1,00	C	1,00	C	1,00	C	1,00	C	1,00	I	1,00	C	1,00	C	1,00
5	mBank	1,00	C	1,00	C	1,00	C	1,00	C	1,00	C	1,00	D	1,00	C	1,00
6	Nest Bank	1,00	C	1,00	C	1,00	C	1,00	C	1,00	D	1,00	D	1,00	C	1,00
7	PKO Bank Polski	1,00	D	1,00	D	1,00	D	1,00	C	1,00	D	1,00	C	1,00	D	1,00
8	Bank Pocztowy	1,00	I	1,00	I	1,00	I	1,00	I	1,00	I	1,00	I	0,89	D	0,98
9	Bank Handlowy w Warszawie	1,00	I	0,88	I	1,00	C	1,00	I	1,00	C	1,00	C	1,00	C	0,98
10	ING Bank Śląski	1,00	D	1,00	C	1,00	C	1,00	C	0,91	D	1,00	C	0,86	D	0,97
11	Crédit Agricole Bank Polska	1,00	C	1,00	C	1,00	C	1,00	C	1,00	D	1,00	C	0,76	C	0,97
12	Santander Bank Polska	1,00	C	0,88	C	1,00	C	0,99	D	0,86	D	0,94	D	1,00	C	0,95
13	Bank Polskiej Spółdzielczości	1,00	C	1,00	C	1,00	C	1,00	C	1,00	I	1,00	C	0,66	C	0,95
14	Deutsche Bank Polska	1,00	D	0,91	D	0,89	D	1,00	D	1,00	D	0,85	D	1,00	C	0,95
15	Plus Bank	1,00	D	0,78	C	0,84	C	0,97	D	0,94	D	1,00	C	1,00	C	0,93
16	BNP Paribas Bank Polska	1,00	D	0,95	D	0,88	D	0,88	D	0,45	I	0,96	D	1,00	I	0,87
17	Getin Noble Bank	1,00	D	0,99	D	1,00	D	0,78	D	0,37	I	0,72	D	1,00	C	0,84
18	Alior Bank	0,90	D	0,91	D	0,89	D	0,96	I	0,44	I	0,89	D	0,79	D	0,83
19	Bank Ochrony Środowiska	0,77	D	0,75	D	0,77	C	0,83	D	0,57	I	1,00	C	1,00	C	0,81

According to the BCC model analysis result shown in Table 3, 7 banks were full efficient with a score of 100% between the years 2016-2022. Of the 7 full efficient banks, 3 were domestic (Bank Polska Kasa Opieki, SGB-Bank and PKO Bank Polski), and 4 were foreign banks (Bank

Millennium, DNB Bank Polska, mBank and Nest Bank). Between these years, the number of banks with an average efficiency score close to full efficiency and between 0.90-1.00 is 8. Of these 8 banks, 5 were foreign banks and 3 were domestic banks. The average efficiency score of other 4 banks was 0.81-0.90. Efficiency scores of banks according to years and banks in the analysis made with the BCC method

- In 2016, 17 out of the 19 banks included in the analysis have performed fully effectively and productively. While each of the foreign banks was fully efficient, 2 domestic banks (Alior Bank and Bank Ochrony Środowiska) were inefficient banks. In 2016, the average efficiency score was higher than the average efficiency score of domestic banks.

- In 2017, 12 out of the 19 banks included in the analysis have performed fully effectively. While 7 the foreign banks and 5 domestic banks have been fully efficient. The two banks with the lowest scores have been domestic banks Plus Bank (0.78) and Bank Ochrony Środowiska (0.75).

- In 2018, full efficiency was observed in 14 banks, 6 of which were domestic and 8 foreign banks, while the effect was not observed in 5 banks. 5 banks were inefficient. Three of these were domestic banks and two were foreign banks. The number of foreign fully effective banks was more than that of domestic banks.

- In 2019, full efficiency was observed in 13 banks, including 5 domestic and 8 foreign banks. 6 banks were inefficient. Of the 6 ineffective banks, two are foreign and four are domestic banks.

- In 2020, 12 out of the 19 banks included in the analysis have performed fully effectively and productively. Of the 7 banks that were ineffective, three were foreign and four were domestic banks. The efficiency scores of Bank Ochrony Środowiska (0,57), BNP Paribas Bank Polska (0,45), Alior Bank (0,44) and Getin Noble Bank (0,37) were below 0.60 and showed ineffective operation.

- In 2021, 14 out of the 19 banks included in the analysis have performed fully effectively and productively. Of the 5 banks that were ineffective, three were foreign and two were domestic banks.

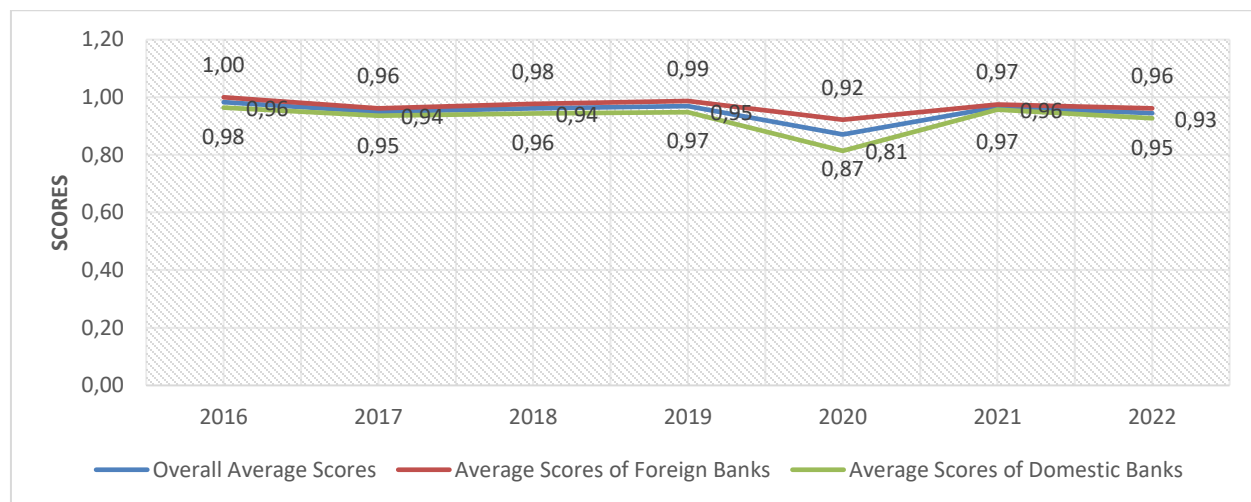
- In 2022, 14 out of the 19 banks included in the analysis have performed fully effectively and productively. Of the 5 banks that were ineffective, two were foreign and three were domestic banks.

According to the frequency of reference to other banks mBank, SGB-Bank and Credit Agricole Bank Polska were recommended to other banks 20, 19 and 17 times, respectively, in 2016.

According to the results of the analysis, it is seen that the number of recommendations of foreign banks to other banks is relatively higher than that of domestic banks. This means that foreign banks are predicted to operate more efficiently. In order to make it efficient, the banks should reduce the capacity and use efficient resources, in other words, it can be said that the banks could be efficient when they produce available outputs with lesser inputs. Between 2016 and 2022, the returns to scale of fully effective banks remained stable, except for PKO Bank Polski. Decreasing returns to scale were observed in the majority of ineffective banks. The Increasing returns to scale was observed in 2020. The lowest effectiveness score was not found in 2020. In fact, the efficiency threshold of three banks was below 0.50.

The evaluation in terms of average score of foreign and domestic bank for Poland and average score for overall of 19 banks included in BCC Model analysis between 2016-2022 years is shown in the figure 1 below.

**Figure 1: Average Efficiency ofryq the BCC Model of Banks by Years (%)**



When the efficiency scores of foreign and domestic banks of Poland between 2016-2022 were compared on the basis of average scores, it is estimated that foreign banks operate more effectively than domestic banks. When the efficiency scores of foreign and domestic banks are compared on the basis of average scores, it is also observed that foreign banks operate more effectively than domestic banks. In terms of overall average scores, when the efficiency scores of the polish banks

included in the analysis are investigated, it is seen that the efficiency of the banks' performed varies between 0.87 score and 0.98 score between 2016 and 2022. The lowest average efficiency was in 2020 with 0.87 scores. The lowest average score in 2020 appears to be due to the 2019 COVID pandemic.

In terms of the average scores of foreign banks, when the efficient scores of the Polish banks included in the analysis are investigated, it is seen that the efficiency of the banks between the years 2016-2022 has changed between 0.81 scores and 0.96 scores. The lowest average efficient of foreign banks was realized in 2020 with 0.81 scores. The lowest average score for foreign banks in 2020 appears to be due to the 2019 COVID pandemic.

In terms of the average scores of domestic banks, when the efficient scores of the Polish banks included in the analysis are investigated, it is seen that the efficiency of the banks between the years 2016-2022 has changed between 0.92 scores and 1.00 scores. The lowest average efficient of foreign banks was realized in 2020 with 0.92 scores. The lowest average score for domestic banks in 2020 appears to be due to the 2019 COVID pandemic, as well as for foreign banks.

It is estimated that the reason for the decrease in the average efficiency scores of banks in 2019 and 2020 is the COVID 19 pandemic that started in 2019. While it had the lowest efficiency scores with 0.81 scores in 2020 for domestic banks and with 0.87 scores in 2020 for foreign banks it was observed that efficient in the activities of banks increased as the severity of the COVID 19 pandemic decreased as of 2021. While the general average scores are evaluated in terms of the average scores of foreign and domestic banks, the effect of the 2019 COVID pandemic is seen. The COVID 19 pandemic has affected both domestic and foreign banks, and the efficiency of banks has decreased. When the efficient of domestic banks and foreign banks is compared, it is seen that the average efficient and scores of domestic banks is lower.

#### **4.2. CCR Model**

Efficiency scores and averages for 41 banks in 2016-2022 and 41 banks in other years with fixed return CCR model of input-oriented DEA to scale are shown in Table 3. The ranking is based on the annual performance average of the banks.

**Table 4: CCR Efficiency Scores between 2016-2022**

No	Bank Names	2016	2017	2018	2019	2020	2021	2022	Average
1	Bank Millennium	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
2	SGB-Bank	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
3	mBank	1,00	1,00	1,00	1,00	1,00	0,89	1,00	0,98
4	Bank Handlowy w Warszawie	0,95	0,85	1,00	1,00	1,00	1,00	1,00	0,97
5	Crédit Agricole Bank Polska	1,00	1,00	1,00	1,00	0,52	1,00	1,00	0,93
6	Bank Polska Kasa Opieki	1,00	1,00	1,00	1,00	0,68	1,00	0,81	0,93
7	ING Bank Śląski	0,93	1,00	1,00	1,00	0,55	1,00	1,00	0,93
8	DNB Bank Polska	1,00	1,00	1,00	1,00	0,56	1,00	0,86	0,92
9	Nest Bank	1,00	1,00	1,00	1,00	0,50	0,68	1,00	0,88
10	Santander Bank Polska	1,00	0,87	1,00	0,94	0,46	0,90	1,00	0,88
11	Plus Bank	0,80	0,93	0,98	1,00	0,56	1,00	0,73	0,86
12	Bank Polskiej Spółdzielczości	1,00	1,00	1,00	1,00	0,27	1,00	0,65	0,85
13	PKO Bank Polski	0,94	0,78	0,74	0,90	0,39	1,00	0,97	0,81
14	Alior Bank	0,83	0,88	0,88	0,96	0,43	0,86	0,78	0,80
15	Bank Pocztowy	0,92	0,85	0,85	0,88	0,38	0,69	1,00	0,80
16	Bank Ochrony Środowiska	0,76	0,74	0,77	0,83	0,35	1,00	1,00	0,78
17	BNP Paribas Bank Polska	0,79	0,80	0,80	0,87	0,45	0,91	0,66	0,75
18	Getin Noble Bank	0,91	0,83	0,87	0,64	0,31	0,69	0,71	0,71
19	Deutsche Bank Polska	0,62	0,54	0,64	0,65	0,23	0,69	0,64	0,57

In Table 4 According to the result of the analysis made with the variable returns to scale CCR model, 2 banks: Bank Millennium and SGB-Bank have been seen to be full efficient between 2016-2022. 5 banks: Bank Handlowy w Warszawie, Crédit Agricole Bank Polska, ING Bank Śląski, DNB Bank Polska and Bank Polska Kasa Opieki efficiency score have been between 90% and 99% has received efficiency score. The average score of the other 7 banks was 0.80-0.90, the score of 3 banks was 0.70-0.80. Deutsche Bank Polska had the lowest average score of 0.57. The average efficiency score of all banks included in the analysis has realized above 0.50. The banks with the full and lowest efficient scores in the analysis made by the CCR method have been

- In 2016, 9 fully efficient banks, including 3 domestic and 6 foreign banks and banks with the lowest efficient scores were BNP Paribas Bank Polska (0.79), Bank Ochrony Środowiska (0.76) and Deutsche Bank Polska (0.62). This means that 33% of domestic banks and 60% of foreign banks were operating at full efficiency.

- In 2017, 9 fully efficient banks, including 3 domestic and 6 foreign banks and banks with the lowest efficient scores were PKO Bank Polski (0.78), Bank Ochrony Środowiska (0.74) and Deutsche Bank Polska (0.54). This means that 33% of domestic banks and 60% of foreign banks were operating at full efficiency.

- In 2018, 11 fully efficient banks, including 3 domestic and 8 foreign banks and banks with the lowest efficient scores were PKO Bank Polski (0.77), Bank Ochrony Środowiska (0.74) and Deutsche Bank Polska (0.64). This means that 33% of domestic banks and 80% of foreign banks were operating at full efficiency.

- In 2019, 11 fully efficient banks, including 4 domestic and 7 foreign banks and banks with the lowest efficient scores were Bank Ochrony Środowiska (0.83) and Deutsche Bank Polska (0.64) and Getin Noble Bank (0.64). PKO Bank Polski, which was ineffective in 2016-2018, worked more efficiently and increased its efficient score by 0.90. This means that 44% of domestic banks and 70% of foreign banks were operating at full efficiency.

- In 2020, only 4 banks were able to operate fully efficiently. One of the four efficient banks was a domestic bank (SGB-Bank) and the other three were foreign banks (Bank Millennium, mBank and Bank Handlowy w Warszawie). Efficient banks constitute 21% of the total bank. The reduction in the number of active banks and inefficient activity has resulted from the onset of the 2019 COVID



pandemic. Due to the COVID 19 pandemic, the activity of 10 banks was extremely inefficient and below 0.50. The activity of the other 5 banks was close to inefficiency with a score of 0.50-0.70. The 3 most inefficient banks were Getin Noble Bank (0.31), Bank Polskiej Spółdzielczości (0.27) and Deutsche Bank Polska (0.23), respectively.

- In 2021, 11 banks were able to operate fully efficiently. One of the 11 efficient banks was a domestic bank and the other 5 were foreign banks. Efficient banks made up 58% of the total banks. This means that 67% of domestic banks and 50% of foreign banks were operating at full efficiency. The 3 banks with the lowest efficient scores were Getin Noble Bank (0.69), Deutsche Bank Polska (0.69) and Nest Bank (0.68). After the negative impact of the COVID 19 Pandemic, domestic banks are observed to be more efficient than foreign banks in 2021.

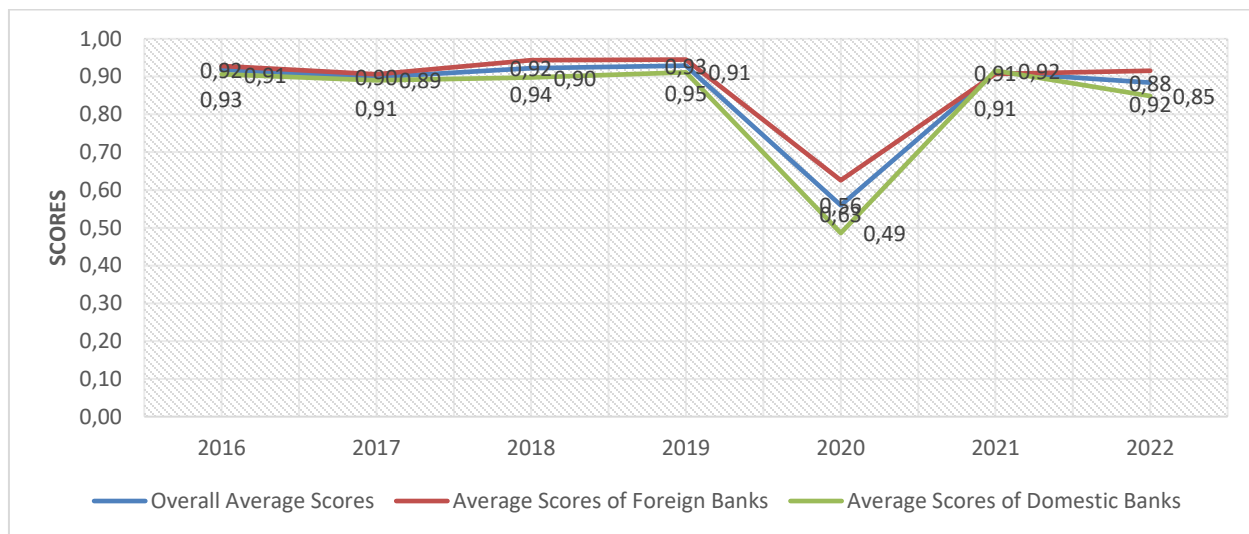
- In 2022, 10 banks were able to operate fully efficiently. 3 of the 10 efficient banks was a domestic bank and the other 7 were foreign banks. Efficient banks made up 53% of the total banks. This means that 33% of domestic banks and 70% of foreign banks were operating at full efficiency. The 3 banks with the lowest efficient scores were BNP Paribas Bank Polska (0.66), Bank Polskiej Spółdzielczości (0.65) and Deutsche Bank Polska (0.64). When foreign and domestic banks were compared in terms of 2021 and 2022, it was observed that foreign banks have increased their efficiency in 2022.

In accordance with the CCR model analysis result, in terms of recommendation weight to other banks, the top 3 most recommended banks between 2016-2022 were Bank Millennium, SGB-Bank and mBank. According to the results of the analysis, it is seen that the number of recommendations of foreign banks to other banks is relatively higher than domestic banks. Namely, foreign banks are predicted to operate more efficiently. When evaluated over the years, it has been determined that the COVID 19 pandemic has had a negative impact on Poland's domestic and foreign banks.

The evaluation in terms of average score of foreign and domestic banks and for overall of 19 banks included in CCR Model analysis between 2016-2022 years is shown in the figure 2 below.



**Figure 2: Average Efficiency of the CCR Model of Banks by Years (%)**



When the efficiency scores of the Polish banks included in the analysis are generally compared on the basis of foreign and domestic banks, foreign banks have operated more effectively and productively than domestic banks in the years 2016-2022. In terms of overall average scores, when the efficiency scores of the domestic banks included in the analysis are investigated, it is seen that the efficiency of the banks' performed varies between 0.56 score and 0.92 score between 2016 and 2022. The lowest average efficiency was in 2020 with 0.56 scores. The lowest average score in 2020 appears to be due to the 2019 COVID pandemic.

In terms of the average scores of foreign banks, when the efficient scores of the Polish banks included in the analysis are investigated, it is seen that the efficiency of the banks between the years 2016-2022 has changed between 0.63 scores and 0.95 scores. The lowest average efficient of foreign banks was realized in 2020 with 0.63 scores. The lowest average score for foreign banks in 2020 appears to be due to the 2019 COVID pandemic.

In terms of the average scores of domestic banks, when the efficient scores of the Polish banks included in the analysis are investigated, it is seen that the efficiency of the banks between the years 2016-2022 has changed between 0.49 scores and 0.91 scores. The lowest average efficient of foreign banks was realized in 2020 with 0.91 scores. The lowest average score for domestic banks in 2020 appears to be due to the 2019 COVID pandemic, as well as for foreign banks.

It is estimated that the reason for the decrease in the average efficiency scores of banks in 2019 and 2020 is the COVID 19 pandemic that started in 2019. While it had the lowest efficiency scores with 0.49 scores in 2020 for domestic banks and with 0.56 scores in 2020 for foreign banks it was observed that efficient in the activities of banks increased as the severity of the COVID 19 pandemic decreased as of 2021. While the general average scores are evaluated in terms of the average scores of foreign and domestic banks, the effect of the 2019 COVID pandemic is seen. The COVID 19 pandemic has affected both domestic and foreign banks, and the efficiency of banks has decreased. When the efficient of domestic banks and foreign banks is compared, it is seen that the average efficient and scores of domestic banks is lower.

## 5. CONCLUSION

The importance of the banking sector in a globalizing world is increasing day by day. In this study, the comparison of selected decision-making units has been examined with measurements of CCR and BCC models of input-oriented DEA for the period between 2016 and 2022. In the input-oriented DEA model, it is aimed at minimizing the level of inputs in order to produce existing outputs. Inputs and outputs providing the minimum conditions for analysis in the selection of decision-making units have been investigated, and all 19 banks operating in Poland were selected as decision-making units. In the study, three variables as input (interest expenses, general and administrative expenses, and deposits) and three variables as output (loans, interest income, and non-interest income) have been used as a thousand US dollars. In order to determine which year is more efficient, analyses made with CCR and BCC models have been made, and improvement suggestions have been developed for the inefficient years.

According to the results of the BCC and CCR model analyses, the COVID-19 pandemic has affected the efficiency and productivity of both domestic and foreign banks in 2019–2020. During these years, the average productivity and efficiency scores for both domestic and foreign banks included in the analysis decreased both on a bank basis and on an average score basis.

According to the BCC model analysis result shown in Table 3, two banks were fully efficient with a score of 100% between the years 2016 and 2022. Of the two fully efficient banks, one was a foreign bank and one was a domestic bank. According to the result of the analysis made with the variable returns to scale CCR model, two banks, Bank Millennium and SGB-Bank, have been seen

to be fully efficient between 2016 and 2022. According to the frequency of references to other banks, Poland's Crédit Agricole Bank Polska was recommended to other banks the most. As a result of the CCR and BCC models, it was determined that foreign banks are more efficient than domestic banks. It has been suggested for both countries to examine the functioning and working systems of domestic banks in line with the data of foreign banks and implement them in their own banks.

In addition, it was suggested that domestic banks should study foreign banks and activities and increase their efficiency by applying them to their own banks that are suitable for them. In line with the increase in bilateral economic relations and mutual cooperation between foreign and domestic banks, it is recommended that both banks increase their effectiveness by learning about each other's banking systems and activities and applying them together. The results of the article were shown in the literature study, and the results of the studies were appropriate. This article will provide a resource for future researchers working with the DEA.

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