

Available online at <http://ijdea.srbiau.ac.ir>

Int. J. Data Envelopment Analysis (ISSN 2345-458X)

Vol. 10, No. 2, Year 2022 Article ID IJDEA-00422, pages 39-50
Research Article



International Journal of Data Envelopment Analysis



Science and Research Branch (IAU)

Evaluating the Efficiency of Iranian Movie Theaters' Halls

Hamid Reza Izadi,^{*1}, Salimeh Amiri²

⁽¹⁾ Assistant Professor of Economics Department, Faculty of Management and Humanities,
Chabahar Maritime University

⁽²⁾ M.A. of Economics and Entrepreneurship Art

Received 30 January 2022, Accepted 28 April 2022

Abstract

This research tries to investigate the economic performance of the public movie Theaters halls through quantitative data through estimation of efficiency. The results of calculating the technical efficiency of the halls showed that assuming of constant return to scale (CRS), a small percentage of cinemas are efficient and the rest are inefficient, and assuming a variable return to scale (VRS), a higher percentage of cinemas are efficient. Also, the average of technical efficiency of public movie theatre halls during this period was equal to 0.60. In addition, the results show that the most important reasons for the possible inefficiency of public cinemas on the supply side, the lack of use and screening of commercial and revenue-generating movies, and on the demand side, the lack of attention to the audience's taste.

Keywords: The Data Envelopment Analysis (DEA), Technical Efficiency, Public Movie Theaters, Hall, Cinema

* Corresponding author: Email: izadi@cmu.ac.ir

1. Introduction

The economy of today's world has a special connection with the cultural industries. Among the cultural goods and services of the cultural economic sector, the film industry is very popular among people in society because of its special characteristics, and its importance is reflected in the days of film festivals. Overall, it can be said that cinema is a multifaceted phenomenon that is influenced by human culture and has an impact on other cultures. On the other hand, cinema tools contain various methods and technologies, and their application requires scientific and professional skills in technical studies [1]. The existence of a field such as cinema, which is a technology-based audiovisual medium, can be important for two reasons: first, economic activities are carried out in this field and second, it can be used for the arts. In fact, the field of cinema is very important because it has a great significance and beneficial effect on the people of a society in terms of cultural power, attitude, and behavior. The cultural industry plays an important role in increasing employment, economic growth, strengthening national identity, and achieving sustainable development, and cinema as a component of the cultural industry can promote and strengthen the art industry and its related arts while creating wealth, credit, and jobs for the art industry. In Iran, the film industry is one of the most popular cultural and art industries among the Iranian people, and therefore it is one of the models that can promote the country's cultural and economic growth [2].

Cinemas, like any business, consist of a set of inputs and a set of outputs. The inputs of cinemas are factors such as the number of seats, equipment, and advertising, while the outputs are the revenue generated from ticket sales and other sources of revenue for cinemas. Businesses must make the best use of the resources available to them

in order to achieve the desired maximum efficiency. This results in efficient firms such as the one under study using fewer inputs and producing more outputs. In all cinemas, the lower use of inputs not only saves these factors, but they are also used in other economic situations and positions. In addition, this contributes to the economic life of the company, industry, and society [3].

In today's competitive world, every organization demands optimum utilization of the facilities and capacities available in its various departments. Therefore, it seems very necessary and logical to have a model to provide feedback to improve the performance of different parts of organizations and obtain a tool that meets this need of managers. The present study investigates the efficiency of Iranian cinemas using the data envelopment analysis method and tries to answer the following questions about the efficiency of Iranian cinemas. How efficient are the country's cinemas? What are the causes of the inefficiency of cinemas? What solutions can be offered to improve the efficiency of inefficient cinemas?

Based on the above, this study is organized as follows: After the introduction, the second part will discuss the research's theoretical basis and background (literature). In the third part, we will present the model and results and analyze the data. Finally, conclusions and suggestions will be presented in the last part of the article.

2. Literature and research background

Farrell was one of the first to address the issue of efficiency, so performance measurement is currently based on his method. This article points out that economic planners who are concerned about the target industries should consider how to improve their performance without using additional resources. In 1957, Farrell introduced the concept of performance

professionally by presenting an article in the field of performance appraisal. This article is the first to use nonparametric methods to estimate the degree of efficiency. In other words, Farrell describes the nonparametric method of performance for the first time [4].

The purpose of measuring the efficiency of each decision-making unit is to obtain the highest ratio of weighted outputs to weighted inputs, taking into account the existing deficiencies, whose magnitude is equal to or less than one. It should also be noted that terms such as efficiency, effectiveness and productivity belong to the elements that do not differ significantly in their understanding and are close to each other. As for the decision-making process, efficiency, i.e., work well, is the result of comparing internal parameters, while effectiveness, i.e., good work, is the result of comparing external parameters [5].

Efficiency means that a process works properly and achieves the expected output level of the input quantity. Efficiency means that a task or process is performed correctly and that the expected output level is clearly achieved relative to the input. In general, the goal of efficiency is the extent to which a company uses its resources to produce so that it achieves the best performance in a cross-section of time compared to the performance of other similar companies [6].

2.1 Types of Efficiency

2.1.1 Technical Efficiency

Technical efficiency can be defined as the maximum output of a given amount of input at a specified state of the art. This type of efficiency is unrelated to the price of factors of production, but is highly dependent on minimizing the quantity of factors of production to achieve a given quantity of output. According to Kopman, a producer of a production enterprise has technical efficiency if the rate of increase

of one product requires the reduction of at least one other product or the reduction of the factor of production requires the increase of at least one other factor of production. Technical efficiency can be divided into two areas: pure technical efficiency and scale efficiency [7].

2.1.2 Price efficiency

This type of efficiency pursues the goal of reducing costs to a minimum and increasing the company's revenues to a maximum. In this method, it is assumed that the company is technically fully efficient.

2.1.3. Structural efficiency

By comparing the performance of an industry with the efficient production function, structural efficiency is obtained by comparing the performance of the firms that make up the industry. In general, technical efficiency in this type of firm is made possible by keeping the best firms in the industry, i.e., the firms with the optimal size and lowest cost. The optimal production of the industry leads it to be divided among the companies in the short term. The point is that an industry in which the producing firms are uniformly inefficient has higher structural efficiency than an industry in which there are both efficient and inefficient producing firms. This means that structural efficiencies must be compared with curves of equally efficient production.

2.1.4. Overall or Economic Efficiency

This type of efficiency results from multiplying technical efficiency by allocative efficiency. Economic efficiency aims to achieve the highest possible profit using given prices and the level of inputs. One of the most important methods to consider is the difference between technical price and technical performance. The former measures and evaluates the

company's success in selecting an optimal set of inputs. The second method measures the company's success in producing the maximum product using the available inputs.

2.1.5. Scale Efficiency

It is the ratio between the observed efficiency divided by the efficiency of the optimal scale and is used to produce at the optimal scale. When performance scores differ on both variable returns to scale (VRS) and constant returns to scale (CRS), it indicates that the organization or institution has scale inefficiencies. That is, the optimal scale for an organization or firm producing goods and services is equal to a consistent return to scale.

2.1.6. Absolute efficiency

In this type of efficiency, it is assumed that the global standard for an input-output unit is equal to Y^* for certain decision-makers. In this case, if the decision-maker uses one input unit and produces Y_0 of output, absolute efficiency is defined as $\frac{Y_0}{Y^*}$.

However, if community standards are not available, existing community standards are not met, or the community being evaluated is very far from existing standards, absolute efficiency is not used, and relative efficiency is used instead.

2.1.7. Relative efficiency

Usually, the performance gap of real units, especially in developing countries such as Iran, is very different from international standards, so that a solution to reach the standard level is not possible. This kind of measurement is unacceptable from the point of view of some managers of organizations or companies producing goods and services, because it is compared with the outside world, so there is no real model for inefficient units to be efficient. According to the above cases, one of the main advantages of relative efficiency is that it shows the real position of the units.

For this reason, relative efficiency is often used to evaluate the performance of decision-makers [8].

In his article, Hussain et al. (2019) evaluated the impact and performance of M-cinema software for cinemas. This study shows that Golden Screen Cinema (GSC) is a software that lists GSC movies and provides real-time show times and the ability to select seats and purchase movie tickets through smartphones. GSC's mobile software is available on all smartphone operating systems, including IOS and Android. GSC also offers other functions such as e-shopping, anytime and anywhere, via Hong Leong Connect, Maybank2u, CIMB Clicks, PayPal, Visa Checkout, AMEX or credit cards. It has a QR code and prevents queues and waiting times [9].

Kleine & Hoffman (2016), in an article entitled Dynamic Performance Evaluation of German Multimedia Theaters using the RC-DEA method, studied the performance of 31 German multimedia theatres between 2004 and the end of 2010. The results obtained in the study show that the RC-DEA model can increase the reliability of performance evaluation of different theatres by combining different categories and constraints for all disciplines [10].

In an article, Collins et al. (2008) discussed the impact of different factors on the supply index in the specific field of cinema. In this research, a standard index of audience habits was developed and analyzed for the first time. The econometric analysis is designed to examine the determinants of change in this decision-making index with an empirical focus on the distribution of the movie screening market, with an emphasis on product differentiation. To answer questions such as: Is there a difference between cinemas in urban areas and cinemas in rural areas in general? Or is their concentration different? Econometric analyzes were used to examine samples from three regions of Italy during 2006.

Many studies have examined the degree of product differentiation in art establishments [11].

Artistic activities tend to be concentrated on artistic events such as symphony orchestras, operas, and playhouses. In this paper, a general attempt is made to analyze the development of film programs in Italy. According to Durmaz et al. (2008), in recent years, the concept of creativity has become a new agenda as well as a new concept for urban planning, development and production. Creative city, creative class, creative capital, creative economy, and creative industries are new concepts many researchers and urban decision-makers use. Creativity is defined as an action, an idea that transforms an existing field into a new one. The film industry builds other creative industries around it, providing a creative environment and attraction for creative industries and contributing to the formation of creative cities. The film and cinema industries strengthen the economic vitality of a city by organizing various sectors (such as photography, music, video, computer games, and advertising). While competition is important for creative cities, there must be a balance between growth and internal competition. It is important to keep in mind that growing or becoming fully aware of what others are doing happens in the face of evolving strategies, and in the meantime, depending on global standards, can stop local innovation [12].

Sabaghian et al. (2014), using a model, found that the elements and factors of marketing are of great importance from the point of view of view of viewers, actors, and film producers, but in the process of preparation, production, and distribution of films, there is no proper place for them. On the other hand, if we look at the box

office results of the films produced, we find that there is no proportionality between the revenue of the films and the production costs of the films. So, we must expect that every year more filmmakers go bankrupt, but the interesting thing is that in this situation the number of films produced increases every year. In fact, in such a situation, it is not at all possible to predict that the signs of the market will determine the right and optimal way of production and consumption [13].

Shahtahmasbi et al. (2014) studied a model for the city of Zanjan and found that the increase in income has a great impact on people's decision to go to the cinema. According to this model, the demand for movie theatres decreases as the monthly cost of living increases. Since Zanjan is a small city and the cinema is located in the city centre, it is certain that the factor of distance cannot be an effective factor in the decision to go to the cinema [14].

3. The Model, Results and Discussions

In this study, to estimate the average efficiency of Iranian cinemas, the method of data coverage and the two assumptions of constant output to variables (BCC²) and variable output to variables (CCR³) are used. (DEA⁴) is a mathematical programming approach to calculating the efficiency of (DMUs⁵) that have multiple inputs and multiple outputs. Performance measurement has always been of interest to researchers because of its importance in evaluating the performance of a company or production organization. In 1957, Farrell measured efficiency per unit of output using a method similar to efficiency measurement in engineering. The DEA approach also provides many opportunities for alignment between the researcher and the decision-maker. These opportunities can be efficient in selecting

² Bencer, Charnes & Cooper

³ Charnes, Cooper & Rhodes

⁴ Data Envelopment Analysis

⁵ Decision-Making Units

the inputs and outputs of the units to be measured, evaluating them, and finding an appropriate model that is close to efficient. The main models in DEA are divided into two general categories:

The first category is the CCR model: in this model, the efficiency of DMUs is measured under the assumption of constant returns to scale, i.e., each multiple of inputs produces the same multiple of outputs. Thus, small, and large units are compared. This model was presented by Charans, Cooper and Roders and is known as (CCR), which is made up of the initial letters of the names of the three people mentioned. The following equation shows the performance analysis of n , which has m inputs and s outputs, using this model, which can be seen as follows.

$$MAX_{DMU(k)} \rightarrow Ek =$$

$$\frac{\sum_{r=1}^s u_r y_{rk}}{\sum_{i=1}^m v_i x_{ik}} \rightarrow (k = 1, 2, \dots, n)$$

s.t.

$$E_j = \frac{\sum_{r=1}^s u_r y_{rj}}{\sum_{i=1}^m v_i x_{ij}} \leq 1 \rightarrow (j = 1, 2, \dots, n)$$

$$MAX_{DMU(k)} \rightarrow Ek =$$

$$\frac{\sum_{r=1}^s u_r y_{rk}}{\sum_{i=1}^m v_i x_{ik}} = \frac{u_1 y_{1k} + u_2 y_{2k} + \dots + u_s y_{sk}}{v_1 x_{1k} + v_2 x_{2k} + \dots + v_m x_{mk}} \rightarrow$$

s.t

$$DMU_1 \rightarrow E_1 = \frac{\sum_{r=1}^s u_r y_{r1}}{\sum_{i=1}^m v_i x_{i1}} \leq 1$$

$$DMU_2 \rightarrow E_2 = \frac{\sum_{r=1}^s u_r y_{r2}}{\sum_{i=1}^m v_i x_{i2}} \leq 1$$

$$DMU_n \rightarrow E_n = \frac{\sum_{r=1}^s u_r y_{rn}}{\sum_{i=1}^m v_i x_{in}} \leq 1$$

$$v_i, u_r \geq 0$$

The values u_i and v_r are the weights assigned to the output and input values. x_{in} and y_{rn} are input and output parameters, respectively. The mentioned model is very difficult to solve due to its nonlinearity. Therefore, the mentioned programming model uses a series of mathematical techniques, such as equating the denominator of the objective function to the number one as well as the denominator of each constraint and restricting it to the

number on the right side of the constraints, and then transforming the equations to the left of the inequality into a linear form, which can be seen as follows:

$$MAX_{DMU(k)} \rightarrow E_k = \sum_{r=1}^s u_r y_{rk}$$

$$s.t \sum_{i=1}^m v_i x_{ik} = 1$$

$$\sum_{r=1}^s u_r y_{r1} - \sum_{i=1}^m v_i x_{i1} \leq 0$$

$$\sum_{r=1}^s u_r y_{r2} - \sum_{i=1}^m v_i x_{i2} \leq 0$$

$$\sum_{r=1}^s u_r y_{rn} - \sum_{i=1}^m v_i x_{in} \leq 0$$

$$u_r, v_i \geq 0$$

When the output-oriented orientation is used to calculate efficiency, the model is modified as follows:

$$MIN_{DMU(k)} \rightarrow E_k = \sum_{i=1}^m v_i x_{ik}$$

$$s.t \sum_{r=1}^s u_r y_{rk} = 1$$

$$\sum_{r=1}^s u_r y_{r1} - \sum_{i=1}^m v_i x_{i1} \leq 0$$

$$\sum_{r=1}^s u_r y_{r2} - \sum_{i=1}^m v_i x_{i2} \leq 0$$

$$\sum_{r=1}^s u_r y_{rn} - \sum_{i=1}^m v_i x_{in} \leq 0$$

$$u_r, v_i \geq 0$$

The second category is the BCC model: by modifying the CCR model, Charans et al. introduced a new model known as the BCC model. The BCC model is one of the models of data envelopment analysis that evaluates the relative efficiency of units with variable returns to scale [15].

Consonant returns to scale models are more restrictive than variable returns to scale models because the consonant returns to scale model includes fewer units of output and less efficiency. The difference between this model and the CCR model is the presence of a free variable in the symbol W. The variable symbol W in this model indicates the type of returns to scale as follows:

- Whenever $W < 0$, the nature of the returns to scale is decreasing.
- Whenever $W=0$, the nature of returns to scale is constant.
- Whenever $W > 0$, the nature of the returns to scale is incremental.

In this model, any multiple of inputs can produce the same multiple of outputs, or fewer or more outputs. The BCC model assumes that the returns to scale of a variable are variable. The following

equation shows the performance analysis using this model.

$$\begin{aligned} MIN_{DMU(k)} \rightarrow E_k &= \sum_{i=1}^m v_i x_{ik} \\ \text{s.t } \sum_{r=1}^s u_r y_{rk} &= 1 \\ \sum_{r=1}^s u_r y_{r1} - \sum_{i=1}^m v_i x_{i1} &\leq 0 \\ \sum_{r=1}^s u_r y_{r2} - \sum_{i=1}^m v_i x_{i2} &\leq 0 \\ \sum_{r=1}^s u_r y_{rn} - \sum_{i=1}^m v_i x_{in} &\leq 0 \\ u_r, v_i &\geq 0 \end{aligned}$$

3.1 Introducing research inputs and outputs to measure efficiency

3.1.1. Inputs

To estimate the efficiency of movie theatres, there are two types of inputs: fixed inputs and variable inputs.

1- Fixed inputs

- Cinema equipment:
Depending on the size of the cinema building, each cinema has equipment that includes: the number of seats in the cinema hall taking into account the number of halls in the cinema building, the heating and cooling systems in place, and the sound systems in place, and the most important is the cinema screen. The sum of these items, that is, the value of the cinema screen, sound system, cooling system and heating system as the value of the equipment, is one of the inputs of this study to measure efficiency.

2- Variable inputs

- Wages of workers
The amount of salary or income of cinema staff may vary depending on the number of cinema workers per year and the number of movies shown in the cinema. In addition to the fixed salary and the cost of employer's insurance, cinema staff income also includes expenses for business trips and overtime.

- Advertising expenses

The cost of advertising varies during the cinema year depending on the number of

films shown in the cinema, but in general the cost of advertising for public cinemas and for some private cinemas is borne by the Bahman Sabs Institute, which is under the supervision of the Arts.

3.1.2. Outputs

Output is actually the amount of revenue that cinemas can generate, and its importance is twofold given the special characteristics of cinema. On the one hand, this industry is economically active, and on the other hand, it has the ability to be used in the arts. The film industry deserves more and more attention and effective planning in terms of the power of culture and its impact on people's attitudes and behavior in society.

3.2. Calculating the Efficiency of the Iranian Movie Theaters' Halls During the years 2018 to 2020 by the Output orientated method

Table (1) shows the results of calculating the technical efficiency in two modes consonant return to scale (CRS) and variable returns to scale (VRS), as well as the scale efficiency for the years 2018, 2019, 2020, and finally, the average of the years 2018 to 2020 for cinemas using the output-oriented method.

Examination of the results for the average of years 2018-2020 in the above table shows that the average technical efficiency of cinemas in the years 2018-2020 is about 61% in the case of consonant returns to scale and 86% in the case of variable returns to scale. In the case of scale efficiency, this figure is about 64%. In the (CRS) model, the auditoriums of some cinemas have a relative efficiency of 90% and are therefore called efficient cinemas, while other cinemas are inefficient. Also, in the case of (VRS), with the exception of some auditoriums, the other movie theatres have a relative efficiency of 90% and are therefore efficient.

Table 1 Estimating the Ranking of the Iranian Movie Theaters’ Halls Efficiency by The Output Orientated Method

Average 2018 to 2020			2020			2019			2018			year
CRS	VRS	SCALE	CRS	VRS	SCALE	CRS	VRS	SCALE	CRS	VRS	SCALE	
0.608	0.855	0.643	0.597	0.853	0.630	0.448	0.882	0.460	0.608	0.855	0.643	the Efficiency average of Movie Theaters’ Halls

Source: Research calculations

Table 2 Estimating the ranking of the Iranian Movie Theaters’ Halls Efficiency by the Input orientated method

Average 2018 to 2020			2020			2019			2018			year
CRS	VRS	SCALE	CRS	VRS	SCALE	CRS	VRS	SCALE	CRS	VRS	SCALE	
0.608	0.890	0.614	0.597	0.890	0.602	0.448	0.892	0.453	0.608	0.890	0.614	the Efficiency average of Movie Theaters’ Halls

Source: Research calculations

Examination of the results for the average of years 2018-2020 in the above table shows that the average technical efficiency of cinemas in the years 2018-2020 is about 61% in the case of consonant returns to scale and 89% in the case of variable returns to scale. In the case of scale efficiency, this figure is about 61%. In the (CRS) model, the auditoriums of some cinemas have a relative efficiency of 90% and are therefore called efficient cinemas, while other cinemas are inefficient. Also, in the case of (VRS), with the exception of some auditoriums, the other movie theatres have a relative efficiency of 90% and are therefore efficient.

So, in general, according to the research results based on the descriptive statistics in terms of inputs and outputs used to calculate the technical efficiency for Iranian cinemas using constant returns to scale and variable returns to scale, we can say: the results of reviewing and

calculating the efficiency of Iranian cinemas in two dimensions of supply and demand show that: The main reasons for the efficiency of efficient cinemas are the use of commercial and high-income films, paying attention to audience tastes, organizing concerts, theatres and festivals, reducing overhead costs and staff turnover, and converting single-screen cinemas into multiplexes. The main reasons for the inefficiency of inefficient cinemas are lack of knowledge about audience tastes, cinemas with only one auditorium, lack of film diversity, lack of social systems such as cooling and heating systems, lack of facilities such as parking, delays in updating cinemas, lack of specialized and professional staff, and lack of cultural equipment.

As a result, proposals and strategies to increase efficiency can be achieved through the use of appropriate and sufficient equipment, such as: Cinema

screens, cooling and heating systems, audio and video systems; hiring and employing knowledgeable and specialized labor; increasing adequate social benefits to attract audiences; creating a culture in the community to increase people's knowledge of this creative industry; converting single-screen cinemas into multi-screen cinemas and creating a multiplex cinema; Enhancing the activities of Iranian cinemas in film and cinema festivals (festivals such as Fajr Film Festival, Holy Defense Film Festival, Children and Adolescent Film Festival); enhancing side activities such as special tickets for certain groups of people to attract them to this creative industry; organizing concerts, theaters and related festivals; recognizing the audience taste and the taste of a large number of people in such a way that the film represented by the community and their taste are shown in cinemas.

4. Conclusions and Suggestions

The study of the efficiency of Iranian cinemas in two modes with consistent and variable returns to scale and with two methods with input and output orientation for the average of 2018-2020 shows that in both the output-oriented model and input-oriented mode in constant returns to scale mode, the halls of some cinemas have a relative efficiency of 90% and therefore are known as efficient cinemas and other cinemas do not have the necessary efficiency, in other words, they are inefficient. As for the average efficiency of Iranian cinemas, it can be said that the average efficiency of cinemas for the average years 2018-2020 was achieved by the output-oriented method assuming a constant return to scale of about 61% and assuming a variable return to scale of about 95% and by the input-oriented method assuming a constant return to scale

of about 61% and assuming a variable return to scale of about 89%.

As for the main reasons for the possible inefficiency of Iranian cinemas, it can be said that the reasons for the possible inefficiency of these cinemas are the non-use of commercial and lucrative films in the said cinemas. In some cases, the lack of proper equipment such as audio and video systems, cooling and heating systems, lack of expertise, and the increase of some ancillary costs have caused the inefficiency of these cinemas. In conclusion, the following suggestions can be made to increase the efficiency of inefficient movie theatres:

1. Using appropriate and sufficient equipment such as cinema screen, cooling and heating systems, and audio and video systems in the desired cinema;
2. Hiring and employing a knowledgeable and specialized workforce;
3. Providing adequate social services to attract the audience;
4. Creating culture at the community level to increase the attraction of this creative industry to various groups of the population;
5. Converting single-screen cinemas into multiple screens and creating a cinema complex or multiplex (a cinema complex is a cinema in which several films can be shown on several separate screens that have more than three screens. Depending on the welfare services offered by the cinema complex, they can be divided into two types: 1. Excellent complex, and 2. Modern complex);
6. Enhancing the activities of cinemas in film and cinema festivals such as the Fajr Film Festival, Holy Defense Film Festival and Children and Adolescent Film Festival;
7. Increasing ancillary activities such as special tickets for certain groups of

- people to attract them to this creative industry, and the organization of concerts, theatres, and related events;
8. Recognizing the tastes of the public and the tastes of a large number of people in society, so that the films desired by a large number of people are shown in cinemas.

Acknowledgments

The author thanks the anonymous reviewers and editor for their valuable contribution.

Disclosure Statement

The author has not any competing financial, professional, or personal interests from other parties.

References

- [1] Musai, M. & Shiani M. (2007). The Estimation of Household Demand for Going to Cinema in Provinces of Iran. *Journal of Social Welfare*, 6 (25), 301-320.
- [2] Garai Nezhad, GH., Hadi Nezhad, M. & Bakhtiari, A. (2010). Study on the Popularity Reasons of the Best-Seller Movie in Iranian Cinema Throughout History. *Journal of Culture-Communication Studies*, 11(9), 89-112.
- [3] Hababou, M., Amrouche, N., & Jedidi, K. (2016). Measuring economic efficiency in the motion picture industry: a data envelopment analysis approach. *Customer Needs and Solutions*, 3(3-4), 144-158.
- [4] Farrell, M.J. (1957). The measurement of productive efficiency. *Journal of the Royal statistical society*, 120(3),253-290.
- [5] Charnes, A., C.T.C., Clark, C. T., Cooper, W. W., & Golany, B. (1984). A developmental study of data envelopment analysis in measuring the efficiency of maintenance units in the US Air Forces. *Annals of Operations Research*,2 (1), 95-112.
- [6] McKenzie, J. (2012). The economics of movies: A literature survey. *Journal of Economic Surveys*, 26(1), 42-70.
- [7] Baradaran, V. & Valijani, M. (2016). A Model to Improve the Labor Productivity at Iranian Tax Organization (Case Study of the Eastern Tehran General Tax Directorate). *Journal Tax Research*, 24 (29) :165-184.
- [8] Rahimi, A., Musai, M., Peikarjo, K., Azad, N. & Seyed ali akbar, S. (2012). An Estimation of Demand for Cinema Function and Analysis of Factors Influencing It Case Study; Cinema Demand in Tehran. *Journal of Culture-Communication Studies*, 12(16), 235-263.
- [9] Hussain, A., Mkpojiogu, E. O., Tam, K. L., Hilaluddin, K., & Jamaludin, S. (2019). A measure of the effectiveness and efficiency of an m-cinema app. *International Journal of Recent Technology and Engineering*, 8, 127-130.
- [10] Kleine, A., & Hoffmann, S. (2016). Dynamic Efficiency Evaluation of Germany public multidisciplinary theatres by RC-DEA model. *Data Envelopment Analysis and its Applications*, 33.
- [11] Collins, A., Scorcu, A.E. & R. Zanola, R. (2008). Distribution Conventinality in the Movie Sector: An Econometric Analysis of Cinema Supply. *Managerial and Decision Economics*, 30 (8), 517-527.
- [12] Durmaz.B., Yigitcanlar.T. & Velibeyoglu, k. (2008). Creative Cities and the Film Industry: Antalya's Transition to a Eurasian Film Centre, *The Open Urban Studies Journal*, 1-10.
- [13] Sabaghian, A., Ebrahimi, A. & Farhangi, A. (2014). Designing a strategic model of the marketing mix in the Iranian Cinema industry, *Journal Strategic Management Research*, 20(55), 55-82
- [14] Shahtahmasbi, E., Taheri, H. & Shamsullahi, S. (2014). An Assessment of Relative Effectiveness of Provinces

in Economic Indexes of Culture during the Third and Fourth Development Plans: Data Envelop Analysis, *Journal of Cultural Strategy*, 6(24), 163-183.

- [15] Bancer, R. D., Charnes, A., & Cooper, W. W. (1984). Some models for estimating technical and scale inefficiencies in data envelopment analysis. *Management Science*, 30(9), 1078-1092.