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Estimate the Efficiency of the Hotel Industry in Provinces of Iran Using Super Efficiency

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ABSTRACT: This study uses the data envelopment analysis (DEA) and the modified method Super Efficiency with the assumption of constant returns to scale and increasing returns to scale efficiency of the hotel industry in 31 countries.The data needed is obtained from the results of the survey restores in 2011. Inputs are included; the number of beds, the amount of energy (electricity, water, and fuel), gross capital formation, and compensation paid to employees and dedicated payments. Also, the output is the value added of restores. The results of games, software showed that the hotel operations had efficiently operate in six provinces with the efficiencies of under the constant returns to scale, 12 provinces have the terms of technical performance variable returns to scale and In 6 on the performance scale. The average of technical efficiency in the case of constant returns to scale is 0.75 and in the increasing returns to scale is 0.99. It means that, on average, 66.55 percent of the province should save intheir inputs of the hotel's activities to achieve technical efficiency and they should 69.51 percent save in their inputs of hotel activities to achieve to the technical and scale efficiency.
Key words*:*efficiency -hotel industry- DEA -Super Efficiency- Iran

INTRODUCTION

Tourism, by having 10.2 percent of the global GDP, has presented the largest industry in the world in 2011. The tourism Industry for the first time was recorded in the world with 983 million people inbound and 1.030 trillion dollar earnings, in 2011. This industry, with rapid growth from 25 million people in 1950 reached to 983 million people in 2011, which represents 2.6 percent an annual growth (Highlights, 2012).The tourism industry, has created jobs for 240 million people in 2011. Also, this industry accounted 10.6 percent of the total workplace in the world, in other words, from 9 of every employee, one person is employed in the tourism sector. This industry made to 655 billion dollar tax revenue, and 10.9 percent total payments of the world in 2011. On average, about 6.9 percent of the payments to the states and 10.7 percent of the world's total investments were accounted to the tourism industry (Rahimpour, 2013). Due to a variety of historical and natural attractions of Iran, it is one of the tourist areas in the world. The exchange revenues of international tourist arrivals in Iran increased from 1963 to 1978, which the most foreign tourist exchange revenues with 235 million dollars, was for the before revolution in 1978 in Iran. Theforeign tourist exchange revenues nearly was fixed and faced with minor changes from 1978 to 1988, and it was growing for the respect to the relative calm political and social conditions of the country from 1988 to 2008, but, it has taken a downward trend since2009until now. Each country should have two important characteristics to attract and generate income through tourism, firstly, having the potential to attract tourists, secondly, Ability to provide services and tourism products. Although, Iran is very rich in the potential of absorption, but, is poor in terms of providing services and products to tourists.One of the pillars of the tourism industry are hotels that offer an abundance of services, so development of the hotel industry could have a significant role in the tourism development (Khataei and etl, 2008). Considering the limited resources, the development of the hotel industry without increasing the physical facilities and the use of inputs, it is not possible except through increased efficiency. Many countries in order to strengthen the economic infrastructures for better allocation of resources and

achieve sustainable development, requires the identification of their own resources. Also, in this study, using the data envelopment analysis and with the two assumptions of constant returns to scale and increasing returns to scale, survey the efficiency of hotel industry in different provinces in the country. The aim of this study was to increase the efficiency and optimal use of existing facilities in the hotel industry, which increased revenues for this industry, with increasing the quality and quantity of services in the hotels and restores. In connection with the performance of activities related to tourism have been several studies, which are mentioned below: Zargham Boroujeni et al (2013) to evaluate the performance of the services offered at hotels with a fuzzy balanced scorecard approach presented in Yazd province. The results showed that the performance of services in hotels is desirable in terms of customer and internal processes in Yazd province, while hotels have underperforming in the financial perspectives and the perspective of growth and learning. ZarghamBoroujeni and Mir Fakhr (2012) were ranked the performance evaluation index of the hotel services with an approach to balanced scorecard (BSC) and fussy Topsis. According to the results, 38 indexes as an indicator have been identified a ranked for assessing the performance of hotels. In this way, return on investment in terms of financial indicator, satisfaction of customers in terms of customers, security of employees and customers in term of internal business perspective and training programs, and, Staff development in terms of growth and learning, had the first rating importance in assessing the performance of services in hotels. Khrueatha et al (2011) examined the operational efficiency and technology gap in Thailand‘s hotels. They classified the hotels in Thailand into five groups with distinctive levels of operational technologies. A meta-frontier analysis is applied to evaluate the operational efficiency scores of the hotels in the same groups and between groups. The result shows that, the hotels in the five groups differ in the use they make of input operational efficiency. Meanwhile, the mean efficiency of the hotels with room rate between 300-900 Baht per night and total revenue lower than 1 million Baht per year is particularly low. This study suggests to transfer knowledge about the operational managementof the hotels with higher operational efficiency to the hotels that had low operational efficiency. Oliveira et al (2013) in their studied uses non-parametric techniques to investigate and compare the efficiency of Portuguese hotels in the Algarve, the comparison being made between those hotels possessing golf courses and those that do not. By using data envelopment analysis (DEA) this study investigates the influence of star ratings, golf courses and location on hotel efficiency. Additionally the study uses the test devised by Carvalho and Marques that takes into account the equality of the entire efficiency distribution. They conclude that the star rating is not a significant determinant of efficiency, butthe location and the existence of golf courses may have some relevance. A major finding is that it is those hotels that do not possess golf courses that are the more efficient. Oliveira et al (2013) discussed the efficiency of hotel companies in the Algarve (Portugal), a tourist destination of excellence in southwest Europe. In particular, they intend to assess the efficiency of the hotels in terms of star rating (four and five-star hotels), their location (Windward and Leeward), owning or not golf courses and owning just a single hotel or more than one. This analysis was based on the parametric method of stochastic frontier approach using a revenue function. They found relevant levels of inefficiency. The results also point out the important role of the operational environment, particularly the hotel location and the existence of golf facilities. Star rating and owning multiple hotels do not seem to be so relevant. Talebi Najaf Abadi et al (2013) evaluated the information technology influence on the efficiency of the accounting information systems. The statistical population of this research includes all the Iranian hotels, in which 37 three-star, four-star and five-star ones are located in Tehran, After distributing the questionnaires for data collection, the total number of 69 questionnaires were accepted. The average comparison of test (t-test) and correlation Solidarity tests were applied to test the theories. The results of this study reveal that the hotels utilize effective and high-tech accounting information systems and applying advanced technologies increases the efficiency of the accounting information systems.

METHODOLOGY

In this study, is investigating the performance figures of hotel industry in 31 provinces in 2011, using data envelopment analysis (DEA) and the modified method, super efficiency with the assumption of constant and variable returns to scale. The date obtained from the results of the survey of restores in 2011. Examining the inputs and outputs considered in previous studied, information and statistics, the inputs, including the number of beds, energy consumption (electricity, water and fuel), gross capital formation, and compensation paid to employees and dedicated payments. The output is the value added of restores. Value of specie payments is included the payment for equipment and low-durable consumer goods, replacement costs of residence appliances and dishes, meat products, cereals, rice, edible oil, fruits and vegetables, dairy products, soft drinks and beverages, and disposable containers. Compensation of employees includes wages, salaries and annual cash payments such as bonuses, overtime, food and clothing expenses, child allowance, transportation, bad weather, the right to housing, the

employer's share security and the monetary value of goods which take free of charge to employees who are paid. The data are analyzed by using the Gams software package.

Data Envelopment Analysis (DEA)

DEA is a non-parametric approach of frontier estimation, first developed by Charnes, Cooper, and Rhodes (CCR). Based on the original CCR model, Banker, Charnes, and Cooper (BBC) developed a variable returns to scale (VRS) variation. Various researchers have developed DEA ever since. A large number of empirical studies have adapted these models to deal with real economic problems. One adaptation is to rank decision-making units (DMUs), such as firms or industries. DMUs are divided into efficient and inefficient groups, and their ranks can be examined by using DEA. The research on ranking DMUs could be classified into six streams, including 1) cross-efficiency ranking methods; 2) benchmarks ranking method; 3) ranking with multivariate statistics in the DEA context; 4) ranking inefficient DMUs; 5) DEA and multi-criteria decision-making methods; and 6) super- efficiency ranking techniques. The most efficient unit is the one that can proportionally reduce outputs relative to the most efficient one without becoming inefficient (Khac Minh et al, 2012).

DEA Model Assuming Constant Returns to Scale (CRS)

Productivity index is based on units where an input (x) and one output (y), and includes the ratio of output to input (y/x). If there are the multi input and multi output, must be assigned coefficients for inputs and outputs. However, since the inputs to create outputs are different, so should be selected fit coefficients.

$= \frac{u_1 y_1 + u_2 y_2 + ...}{v_1 x_1 + v_2 x_2 + ...}$ Total productivity

CCR model was known in 1978 because it could solve the problem of calculating the coefficient on the side. This model after determining the efficient frontier curve indicated that where are the decision maker on the boundaries and what combination of inputs and outputs can be chosen to achieve the efficient frontier. If we assume that the production factor k and M product information for each of the N firms exist. To access decision variables and calculating the optimal weights will be as follows:

$$\mathrm{Max}_{\mathrm{u.v}} \left(\frac{\mathrm{u}' \mathrm{y}_\mathrm{i}}{\mathrm{v}' \mathrm{x}_\mathrm{i}} \right)$$

$$ST: u' y_j / v' x_j \le 1$$

$$v \ge 0 \ , u \ge \circ \qquad j = 1, 2, ..., n$$

In the above equation, the goal is to obtain optimal values of u and v, So that the total weight of the total weight of goods produced (the efficacy of any agent) be the maximum. Provided that, the performance of each business must be less than or equal one. This relationship is the ultimate solution for optimizing (this means that if (Xv and Xu) is the optimal solution, in this case (Xau, Xav) can also be an optimal solution and the same for every a>0). To solve this problem by putting the nominator equal to 1 the model is transformed into a linear programming model, also $v' x_i = 1$ as a constraint must be added to the model as an additional constraint.

$$\mathrm{Max}_{\mathrm{m.v}} \ (\mathrm{M}' \mathrm{y}_\mathrm{i})$$

$$ST: v' x_j = 1$$

$$M' y_i - x_j \le \circ \qquad j = 1, 2, ..., n$$

$$\mathbf{M, v} \ge \circ$$

It is noteworthy that the formula "A" is non-linear and non-convex and by restricting the denominator of the objective function of the form B, which to convert the liner transformation M and V signals applied instead of U and V. The form which provided in the form B is popular inthe increasingly form in the liner program in DEA (Coelli,1996). By using the dual linear programming can be gained the widespread form.

$$\mathrm{Min} \ \theta$$

$$- \mathrm{y}_\mathrm{i} + \mathrm{y} \lambda \ge \circ$$

$$\theta \mathrm{x}_\mathrm{i} - \mathrm{x} \lambda \ge \circ$$

$\lambda \geq \circ$

Here θ is a scalar value and λ is a 1*N vector and containing the weights which indicate the reference numbers. The value obtained θ identified the efficiency of the firm I. The value of θ is less or equal one. If θ=1 it means the firm is on the frontier production function and operates as a technically efficient firm and this is the definition of Farell (1957). The first constraint in above equation states that, if the actual value of the firm I is generated by the institutions can be more? The second constraint which is used implies that the produced by the firm I, at least, should be a reference to the factors used by the firm. It should be noted that the linear programming model should be solved N times, each time for a firm to θ values obtained for each firm.

DEA Model with Variable Returns to Scale Assumption (VRS)

Assuming constant returns to scale is correct when all firms operate at optimal scale. In conditions of imperfect competition, there are barriers such as restriction on investment that leads the firm does not work on the optimal scale. Group BCC (Bunker, Charner and Copper) extended the CCR model in 1984 and were calculated it to variable returns to scale. Assuming the assumption of constant returns to scale, when all firms do not operate at optimal scale, causes the results of technical efficiency being impaired due to the scale efficiency analysis. Using VRS assumption allows us to calculate the technical efficiency far as scale efficiency. The CRS linear programming problem can be easily modified to calculate the VRS (Yawe, 2010). It is only by adding the convexity $(NI'\lambda=1)$ constraint equation (c) is obtained:

$$\text{Min } \theta$$

$$\text{ST}: -y_i + y\lambda \geq \circ$$

$$\theta x_i - x\lambda \geq \circ$$

$$NI'\lambda = 1$$

$$\lambda \geq \circ$$

The Reference Set

In the DEA method for each of inefficient firms are introduced a firm or combination of two or more efficient firms as the reference model. Since the firm composites (combination of two or more efficient firms) does not exist in industry, is known as an efficient virtual enterprise. In other words a firm reference to an inefficient firm can be a real firm or the firm Virtual. If a firm is efficient, the reference set would be that firm. It should be noted that the share of each efficient firm in the formation of a virtual firm, depends on the weights $(\lambda_1, \lambda_2, \ldots, \lambda_m)\lambda$ in an inefficient firm which calculated and presented with a DEA method for each of the efficient enterprises.

Super Efficiency Model

The use of the super efficiency model can contribute to provide the more detailed list of functional units. The Super efficiency name used to refer the DEA modified model which units can have efficiency values greater than one. The reason is that, the firms to evaluate the efficiency do not have any restriction for the placement itself as a reference ahead. This method is presented by Anderson and Peterson for the first time, its main purpose is to provide a system for ranking the firms that can distinguish between firms on the frontier.

In this case to calculate the performance of the firm I, the data for the firm I will be removed from the matrix. Thus, in a linear programming model which runs for the firm I, the firm is not exist as a part of border basis, and, if the firm is quite efficient in the basic standard DEA model, in the current model would have efficiency more than one. Several applications are listed for the super efficiency model which includes: a) ranking efficient units, b) classification of decision making units, extreme efficient and extreme efficient noun, c) Sensitivity of efficiency classifications, d) double-performance ratio games, e) calculate and analyze the Malmquist index efficiency (Chen et al.2010).

Algebraic equation of a super-efficient model to calculate the efficiency of O decision-making as follows:

Min θ

Subject to

$$\sum_{j=1, j\neq O}^{n} \lambda_j x_{ij} \leq \theta x_{ij} \quad i = 1,2,\ldots,m$$

$$\sum_{j=1, j\neq O}^{n} \lambda_j y_{ij} \geq y_{rj} \quad r = 1,2,\dots,t$$

$$\sum_{j=1}^{n} \lambda_j = 1$$

$$u_r, v_i \geq \varepsilon \quad \forall \quad r \quad and\ i$$

RESULTS AND DISCUSSION

In this study, levels of efficiency of hoteling performance, has been calculated by using data envelopment analysis (with the assumption of constant and variable returns to scale) and the super efficiency model as a modified method in 31 provinces of Iran in 2011.To measure technical efficiency can be used two different approaches, one approach is to consider a fixed amount of output measuring the technical efficiency of the economic units by reducing used inputs, which it is like Farrell method in measuring the technical efficiency which is famous to input based approach. Another way is theoutput-based approach which measure the amount of technical efficiency of fixed the amount of the used inputs and increases the output. Although, the technical efficiency of enterprises is the same in use of both methods when the process governing the relations of production a firm is the constant returns to scale, but in terms of variable returns to scale the technical efficiency values calculated from the two approaches are not necessarily identical. To select of the type of input or output oriented models should be clear that managers have more control on outputs or inputs. According to the fact that the resorts and hotels are always looking to minimize their costs, so, we used the inputs approach for estimation of the efficiency the units. Using this approach, the input values of the units, is maximized conditions to a certain amount of outputs. In this study the inputs, including the number of beds, energy consumption (electricity, water, fuel), gross capital formation, compensation paid to employees and dedicated payments and the output is the value added of restores and hotels.

Technical Efficiency and Scale Efficiency of the Hotel Activities In Different Provinces

The results of the estimation of the efficiency of the hotel activities listed below with constant return assumption (CCR) and variable returns to scale(BCC) by using the technique of data envelopment analysis(DEA) and super efficiency(SGDEA) in different provinces:

The values in the above table shows, the hotel activities had efficiently operated in 6 provinces (19.35% of total) in terms of technical efficiency of constant returns to scale, in 12 provinces (38.71% of the total) in terms of variable returns to scale technical efficiency, and, in 6 provinces (19.35% of total) in terms of the performance scale. In other words, only 6 provinces (Ardabil, Ilam, Tehran, Khorasan, Gilanand Hamadan) have technical efficiency constant returns to scale in both cases the unit and variable returns to scale. In fact, these provinces have an efficiency managerial and scale. These states can be used to improve the efficiency of the activities of the hotel industry as a reference. In the case of constant returns to scale, technical efficiency included the scale effects. So, the province in which the technical efficiency is more than one as well as efficient in terms of scale.

Also, the 8 provinces (Qom, Golestan, Luristan, Mazandaran, Markazi and Yazd) have the lowest efficiency amount, or, in other words, they have the greatest distance from the efficient frontier. In the meantime the efficiency calculated for Yazd (0.361) is lower than other provinces. In other words, this province is efficient 36 percent compared with the provinces that make up the reference set. This means that the hotel estimates in this state can reduce its inputs at a rate of 63.3 percent, without any reduction in output.

Table 1. Technical efficiency, pure technical efficiency and scale efficiency of provinces in the hotel industry -2011

DMU	Technical efficiency DEA-CRS	Pure technical efficiency DEA-VRS	Efficiency of scale	Returnsto scale
East Azerbaijan	0.63	0.71	0.89	Irs
West Azerbaijan	0.56	0.60	0.93	Irs
Ardabil	1.00	1.00	1.00	-
Isfahan	0.81	0.82	0.98	Irs
Alborz	0.65	0.72	0.89	Irs
Ilam	1.00	1.00	1.00	-
Bushehr	0.67	0.93	0.73	Irs
Tehran	1.00	1.00	1.00	-
Chaharmahal and Bakhtiari	0.63	1.00	0.63	Irs
South Khorasan	0.36	1.00	0.36	Irs
Razavi Khorasan	1.00	1.00	1.00	-
North Khorasan	0.54	1.00	0.54	Irs
Khozestan	0.56	0.61	0.93	Irs
Zanjan	0.27	0.51	0.53	Irs
Semnan	0.60	0.63	0.95	Irs
Sistan and Baluchestan	0.90	0.98	0.92	Irs
Fars	0.56	0.57	0.98	Irs
Ghazvin	0.63	1.00	0.63	Irs
Qom	0.39	0.47	0.84	Irs
Kurdistan	0.67	0.69	0.97	Irs
Kerman	0.55	0.56	0.99	Irs
Kermanshah	0.83	1.00	0.83	Irs
Kohgiluyehand Boyer - Ahmad	0.45	1.00	0.45	Irs
Golestan	0.48	0.58	0.84	Irs
Gilan	1.00	1.00	1.00	-
Loristan	0.38	0.51	0.75	Irs
Mazandaran	0.43	0.43	0.99	drs
Markazi	0.49	0.70	٠/70	Irs
Hormozgan	0.85	0.88	0.97	drs
Hamadan	1.00	1.00	1.00	-
Yazd	0.36	0.37	0.98	Irs
Average	0.65	0.78	0.85	-

Source: research findings

In the case of variable returns to scale, technical efficiency is calculated without the effects of scale. Then a province that shows the technical efficiency more than one, May not work in terms of scale. The hotel industry in variable returns to scale which the technical efficiency is calculated without the effects of scale, operate efficiently in 12 provinces. While in the constant return to scale which have technical efficiency effects of scale, only six provinces have efficiency more than unite. Thus, it can be concluded that inefficiency of 6 provinces in the constant return to scale as shown the Efficiency less than unit, is only due to the inactivity in the optimal scale. In terms of scale, most of the provinces which are operating in non-optimal scale have increasing returns to scale. Thus, there are the optimization potentials for expanding the scope of their activities in the provinces to improve the performance, adjustment costs and improve the efficiency values. The provinces are: Chaharmahaland Bakhtiari, South Khorasan, North Khorasan, Gazvin, Kohgiluyehand Boyer-Ahmad and Kermanshah.

The following table shows the efficiency values of the provinces' hotel industry in two in both cases of constant and increasing returns to scale. In the case of constant returns to scale among the 6 efficient provinces, in order of preference, Tehran, Ardabil, Ilam, Hamadan, Gilan and Razavi Khorasan have been the highest efficiency in the hotel industry. In the case increasing returns to scale, in order of preferences, North Khorasan, Tehran, Kermanshah, Ilam, Ardabil, Hamadan, Kohgiluyeh and Boyer-Ahmad, Gilan, Gazvin, RazaviKhorasan, South Khorasan and Caharmahal and Bakhtiari, had the most efficient hotel industry in 2011.

Table 2. Ranking the hotel industry ranking provinces with super efficiency model

Dmu	Super Efficiency (BCC)	Super Efficiency (CCR)
Ardabil	1.51	1.49
Ilam	1.67	1.47
Tehran	2.74	2.46
Chaharmahal and Bakhtiari	1.00	-
South Khorasan	1.07	-
RazaviKhorasan	1.07	1.04
North Khorasan	2.96	-
Qazvin	1.11	-
Kermanshah	1.68	-
Kohgiluyeh and Boyer - Ahmad	1.24	-
Gilan	1.11	1.09
Hamadan	1.27	1.11

Source: research findings

As can be seen, in DEA method in constant returns to scale, the average of technical efficiency is 0.654 and in increasing return to scale is 0.783. It means that the states must save up an average of 22 percent in the hotel activities; inputs attain technical efficiency, and save up 35 percent in their inputs to achieve the technical and scale efficiency in hotel activities. Therefore, the hotel industry in different provinces in both terms of scale and management, have the blank space (assuming all other conditions constant), and must arrange for optimal use of these resources. The amount of 0.654 the average of technical efficiency in the hotel industry in different provinces and in the constant returns to scale implies that only 654 units of 1000 capacities of hotel industry to be used and 355 units will be useless practiced. In other words, the hotel industry can increase its output by 35 percent without increasing the capacity of existing facilities. This can be explained on the basis of a scientific process that the hotel industry in Iran operates by 35 percent under its capacities'.

Also, the average of technical efficiency in the modified super efficiency technique, and in the case of constant returns to scale equal to 0.75 and 0.99 in the increasing returns to scale. Therefore, the provinces should save 66.55 percent on average in the inputs hotel industry activities to achieve the technical efficiency, and save 69.51 percent in their inputs to achieve both technical and scale efficiency. In this case, the average of technical efficiency is 0.75 percent in the case of constant returns to scale, this mean; the hotel industry can increase its output to 69.5 percent without increasing the capacity of existing facilities.

The next table shows summarizes of efficiency indicators in the hotel industry in different provinces of the country, in cases of constant and increasing returns to scale by DEA and super efficiency methods.

Table 3. The average of efficiency indicators in hotel industry of provinces by DEA and super efficiency methods

	Super Efficiency (BCC)	Super Efficiency (CCR)	Efficiency of scale	A pure technical efficiency DEA-VRS	Technical efficiency DEA - CRS
Total Average of Provinces	0.99	0.75	0.85	0.78	0.65
Average of inefficient provinces	0.64	0.57	0.8	0.64	0.57
Minimum	0.37	0.27	0.36	0.37	0.27
Maximum	2.96	2.46	1	1	1
Number of efficient	12	6	6	12	6
Number of inefficient	19	25	25	19	25

Source: research findings

The Reference Set

The reference sets are characterized by the provinces which show the best performance by the boundary determined by sample data, in other words, it has the unique Efficiency. These provinces can be proposed as the reference province for inefficient provinces to improve performance. Each of the inefficient provinces should try to modify their inputs and outputs based on the used input and output to achieve the efficient frontier.

The estimated weights of the reference sets for each of the inefficient provinces show the relative importance of each of the provinces in the form of target sets for each inefficient province. For more explain about the reference set, the province Yazd (which have the lowest efficiency among the evaluated provinces) is studied as an example. The reference sets for this state are Ilam, Tehran, North Khorasan and Gazvin. Among the provinces that make up the reference set for this state, Ilam Province has the highest weight. Then, this province should be considered as the reference set to modulating the values of its inputs and outputs. Similarly, the main reference set for EastAzarbaijan is Kermanshah(0.964), for West Azarbaijanis is North Khorasan (0.787), for

Isfahan is Gilan(0.518), For Alborz is North Khorasan(0.814), for Bushehr is North Khorasan(0.671), For Khozestan are North Khorasan(0.606) and Hamadan(0.204), for Zanjan are Ilam(0.649) and Gazvin(0.351), for Semnan are Ilam(0.346) and Tehran(0.641), For Sistan and Balochestan are Ilam(0.443) and Hamadan (0.557), for Fars are Tehran (0.404) and Hamadan, for Qom is North Khorasan(0.849), for Kordestan is Ilam(0.742), for Kerman are Ilam(0.219) and North Khorasan(0.396), for Golestan is North Khorasan(0.662), for Loristan are Ilam(0.219) and North Khorasan(0.777), for Mazandaran is Ilam(0.863), for Markazi is North Khorasan (0.934), for Hormozgan is Hamadan(0.989), for Yazd are Ilam(0.576) and North Khorasan(0.376), known as the best reference. Among the provinces the province of North Khorasan is in the first rank in the number of references.

Table 4. Reference sets for the provinces with inefficient hotel industry in 2011

Province	Objective function	Hamadan	Gilan	Kerman Shah	Qazvin	North Khorasan	Razavi Khorasan	Tehran	Ilam	Ardabil
East Azarbaijan	0.021			0.964				0.021		0.015
West Azarbaijan	0.018					0.787	0.008	0.018	0.187	
Isfahan	0.518		0.518	0.401		0.019		0.062		
Alborz	0.814	0.174				0.814		0.012		
Bushehr	0.013			0.316		0.671		0.013		
Khozestan	0.204	0.204	0.032	0.094		0.606		0.064		
Zanjan	0.351				0.351				0.649	
Semnan	0.346					0.012		0.641	0.346	
Sistan and Balochestan	0.557	0.557				0.443				
Fars	0.585		0.585	0.011				0.404		
Qom	0.849		0.132	0.007		0.849		0.012		
Kurdistan	0.742	0.129				0.119		0.011	0.742	
Kerman	0.569					0.396		0.035	0.569	
Golestan	0.008	0.228				0.662		0.008	0.102	
Lorestan	0.002	0.002				0.219		0.002	0.777	
Mazandaran	0.058						0.058	0.079	0.863	
Markazi	0.015			0.051		0.934		0.015		
Hormozgan	0.011	0.989						0.011		
Yazd	0.025				0.025	0.376		0.022	0.576	

Source: research findings

Excess Factor

Optimal values for each of the hotel industry inputs are obtained from the following formula:

$$\hat{X}_i = \theta_i X_i - S^-_j$$

The amount of savings required in each of the inputs to the provinces with the inefficient hotel industry is in following table.

Table 5. The amount of saving in inputs for efficiency the inefficient hotel industry provinces

Province	The savings on input Special payments(USD)	Number of Beds	Compensation of employees(USD)	Gross capital formation(USD)	Energy(USD)
East Azarbaijan			12566.11	339954.44	62443.88
West Azarbaijan		847.04		392045	
Isfahan			1809623.33	3007275.55	
Alborz	29391.11	567.43			11953.33
Bushehr			103576.11	250652.11	27588.33
Khozestan			130078.88		
Zanjan	345034.44		218553.88	6835	20631.11
Semnan	113371.11	977.13			26821.66
Sistan and Balochestan	333600.55	650.37	80996.11		209 035.55
Fars		2.2	484596.11	4163853.33	
Qom			134316.11	806381.66	
Kurdistan	90141.11	286.23			
Kerman	253694.44	625.89			52666.11
Golestan	276638.88		30556.66		
Loristan	118973.33		170278.88		
Mazandaran	58060.55			461261.66	529173.88
Markazi			315023.88	313814.44	63875.55
Hormozgan	519882.77	555.16	517665.55		428690
Yazd	298149.44				29490

Source: research findings

The results showthat restores in the West Azarbaijan, Alborz, Bushehr, Zanjan, Semnan, Sistan and Baluchestan, Kerman, Mazandaran,Markazi, Hormozgan and Yazd provinces could not be able to use the energy source like other provinces operate efficiently. The provinces of East Azerbaijan, West Azerbaijan, Isfahan, Bushehr, Zanjan, Fars, Qom, Mazandaran, andMarkazi in use of capital inputs are not fulfilled successful and efficient.

Workforce to be used as a key input in hotels. Major part of the hotel staff is a surplus on the lower consumer seasons and while hotels have a flexible system of attracting, enable to major saving in labor costs. The results show that the provinces of East Azarbaijan, Isfahan, Bushehr, Tehran, Zanjan, Sistanand Baluchestan, Fars, Qom, Loristan, Markazi and Hormozganin the use of labor performance in reference provinces had not efficiency like other hotel activities. West Azerbaijan province,Alborz, Semnan, Sistan and Baluchestan, Fars, Kurdistan, Kerman and Hormozgan provinces compared with the reference provinces inthe number of beds is not efficient, that the main reasons for the weakness are in management, marketing and competitive factors in the provinces. Alborz province, Zanjan, Semnan, Sistan and Baluchistan, Kurdistan, Kerman, Golestan, Lorestan, Mazandaran and Yazd have not efficient operation in the payment of its own costs relating.

Based on the results of the study can be offered that, at first, the hotel activities in different provinces in Iran, the average of technical efficiency (0.783) are less than the average scale efficiency. This indicates that the major part of the problem for restores is related to the management problems. Therefore, strengthening of the management system, including training, recruitment of staff, etc. are essential. The second, because the 12 provinces have the inefficient use of human resources for seasonal activity, also, creates the flexible employment system can be cost-effective. Finally, to following the efficient provinces by provinces with the inefficient activities and improve their performance, recommended that they continually monitor the performance of the resorts and create necessary driving such as transfer province's knowledge With hotel activities directly or indirectly reference and holding classes and courses, etc.

REFERENCES

Coelli T.1996. A guide to DEAP version2.1: A data envelopment analysis (computer) program. CEAP working paper.

Highlights.2012. unwto (World Tourism Organization 1. Data as collected by UNWTO. August 2012 Madrid, Spain

Khac Minh N, Van Khanh P, Anh Tuan P.2012. A New Approach for Ranking Efficient Units in Data Envelopment Analysis and Application to a Sample of Vietnamese Agricultural Bank Branches. American Journal of Operations Research. Second.

Khataei M, Mosavi A.2008. Measuring the performance of hotels in Tehran, using data envelopment analysis (DEA). Journal of Economic Research. Eighth Year. No.2. 1-24.

Khrueathai P, Untong A, Kaosa-ard M, Villano R.2011. Measuring Operation Efficiency of Thai Hotels Industry: Evidence from Meta-Frontier Analysis. International Conference On Applied Economics: 315-323

Oliveia R, Pedro MI, Marques RC.2013. Efficiency and its determinants in Portuguese hotels in the Algarve. Tourism Management 36.

Oliveia R, Pedro MI, Marques RC.2013. Efficiency performance of the Algarve hotels using a revenue function. International Journal of Hospitality Management 35.

Rahimpoor A. 2013. Analysis of the tourism industry, the future market and position of Iran. Journal of Tourism of University of Science and Culture. Issue 1. No. 1. 115-132.

Talbi Najaf Abadi AH, KamaliKermni N, Zoqian M, Mollaabsi H, Talebi Najaf Abadi R, ZangiAbadi M, Fanaean H, Farzani H.2013. The influence if information technology on the efficiency of the accounting information systems in Iran Hotel industry. International Research Journal of Applied and Basic Sciences.

Yawe B.2010. Hospital performance evaluation in Uganda: A super efficiency data envelopment analysis model. Zambia Social Science Journal. Volume 1. Number 1.

Yu-Huan Ch, Ung-Ho Ch, Chin-Wei H.2010. Measuring super efficiency of financial and non-financial holding companies in Taiwan An application of DEA models. African Journal of Business Management. Vol.4 (13).

ZarghamBrojeni H, Ebrahimi M, Mirfakhredini F.2013. Evaluate the performance of the services provided at hotels with the fuzzy balanced scorecard approach. (Case Study: Selected hotels in Yazd). Tourism Studies Journal. Eighth Year. No 22. 25-50.

ZarghamBrojeni H, Mirfakhredini F.2012. Rating the Indicators of Performance Evaluation Hotel Services Based on the Balanced Scorecard Approach (BSC) and TOPSIS fuzzy. Planning and Development of Tourism Journal. First Year. No. 1. 59-82.