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Qualitative and quantitative assessment of selected Melli bank branches in northern Tehran by using data envelopment analysis based on the balanced scored card in Iran

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Abstract: *In today's competitive world, many manufacturing and service companies have been forced to take up new approaches to management. Among these approaches, we can point to one of the new methods of performance evaluation called data envelopment analysis technique that has an important role in improving the performance of an organization. Among challenges of this technique is to select appropriate indicators in order to introduce input and output variables for DEA, therefore the approach of balanced scored card (BSC) is used to mitigate this challenge that as a new tool for performance evaluation allows the research variables to be explained in order to be employed in DEA technique based on a holistic vision and various organizational aspects (financial, internal processes, customer, growth and learning). In this study, we tried to measure the efficiency of 48 top and grade-one branches of Tehran-North in the 2013 timeframe, not only the financially, but also the aspects of financial, customer, internal process and learning and growth; by combining the DEA-BSC technique and with the model of "yield super-efficiency in constant scale of DEA enveloping input-oriented form" that is capable to announce the efficiency ranking for units and to rank the efficient units simultaneously. The results showed that average efficiency rate from four perspectives: financial, customer, internal process and learning and growth of BSC model is 0.68, 0.63, 0.44, 0.65, respectively, and in total, the average efficiency of branches is 0.6 in this year and it indicates that the most major alignment with macro- strategies of branches is in the financial perspective. Also, Anahita branch was introduced as the most efficient unit from each four perspectives of the BSC model in compared to the other branches.*

Keywords: *Efficiency Evaluation, Data Envelopment Analysis, Balanced Scored card, Composition of DEA-BSC, DEA Super Efficient Models.*

I. Introduction

In a world where modern technology is growing every day through computer and telecommunications and creates an intense competition context for organizations, performance evaluation and modeling has become as a tool for continuous improvement for commercial units. Performance evaluation system has undergone significant changes in compared to the past. The results of measurements is true, if the action of comparison to be conducted for similar with similar and yesterday with today. Different methods have been developed for measuring and evaluating performance, that the managers of organizations take advantage of certain models according to the purpose of the assessment and the type of organization or design the required model with the combination of several models. One of the performance evaluation methods is Data Envelopment Analysis. The approach of data envelopment analysis with a focus on balanced scored card is considered as a new method of performance evaluation, in fact the approach of balanced scored card allows the research inputs and outputs selection to be explained in order to be employed in DEA technique based on a holistic vision and various organizational aspects (financial, internal processes, customer, growth and learning). Therefore in this study, we tried to measure the efficiency of top and grade-one Melli bank branches in northern Tehran with combination of DEA and BSC models.

II. Problem Statement

Today, due to intense competition, speed, volume of information and the challenges facing organizations, it is more than ever essential to have performance evaluation models in order to determine the position of organization and also to develop the strategic planning based on the strengths and weaknesses of the organization. Generally, the performance evaluation can be defined as a system by which a company can monitor the daily operations and assess the fulfillment of its goals. The issue of performance evaluation of banks' branches is also a challengeable decision-making which is always facing decision-makers and managers. This issue needs multi-criteria decisions associated with the overall objectives and mission of banks, strategic potentials and probability of technical and commercial success. Therefore this study has measured the efficiency

of top and grade-one Melli bank branches in northern Tehran in 2013 with combination of DEA and BSC models.

Given the above, the main research questions are as follows:

- Does the combination of two models of DEA and BSC provide appropriate tools for performance evaluation of banks?
- Do the top and grade-one branches of Tehran-North work efficiently?

Research objectives:

Given that the importance of companies' performance evaluation and that nowadays one of the most important issues in companies' finance is the measure of their performance and to what extent the companies have attempted to increase the interests of their shareholders, and what indicators are being considered by banks and credit institutions in granting facilities to companies,

So, the scientific objectives are the study will be:

- To provide a comprehensive and hybrid model by the tools of "balanced scored card" and " Data Envelopment Analysis" to evaluate the top and grade-one Melli bank branches in northern Tehran
- To evaluate the top and grade-one Melli bank branches in northern Tehran by super efficient models of " Data Envelopment Analysis"

And applied objectives of the research will be:

- To provide an improved method to prioritize banks
- To demonstrate the importance of the banks' efficiency for development of capital markets, and country's economic.
- To determine the branches of reference Mellil Bank as a pattern unit
- To show the importance of modeling for top and grade-one inefficient Melli bank branches in northern Tehran, from efficient branches in order to speed up the improvement process of these units, reduction in costs, and more profitably
- To create a context for planning and targeting the branches' managers, in order to use available resources optimally, identify balanced score, according to the efficiency score estimated by DEA technique

Research Questions:

This study is to answer the following questions:

Main Question:

- Does the combination of two models of DEA and BSC provide appropriate tools for performance evaluation of banks?
- Do the top and grade-one branches of Tehran-North work efficiently?

Sub-questions:

- Can appropriate indicators be offered by model BSC to evaluate the performance of DEA technique for top and grade-one Melli bank branches in northern Tehran?
- What extent is the efficiency score of investigated units?
- What are the pattern units?

Collection and analysis of data / information

In this study, library and field methods are used to collect data in a way that at first, library approach is used for data collection for the research literature and finally, information about the variables was collected from the balance sheet, profit and loss account, recommendation system database, office of human capital and employees' personnel files of top and grade-one Melli bank branches in northern Tehran, existing databases of the Melli Bank, in order to collect data related to the input and output variables taken from four perspectives of model BSC, by the researcher. "The enveloping form of the model of super-efficiency under return in constant scale of input nature" related to DEA is used for data analysis in the general case and is analyzed by GAMS software.

Analyzing the results of BSC model in financial perspective

- Branch of Khwaja Abdullah Ansari:

According to the data collected in the third chapter, the general form of the model of Enveloping Input-Oriented Super-Efficient in order to obtain technical efficiency score of mentioned branch in financial perspective will be as follows:

It should be explained that the value of s was used for zero due to avoid error in computing in GAMS software.

$$\min Z_0 = \theta$$

$$st$$

$$\lambda_1 0.12 + \lambda_2 0.2 + \lambda_3 0.7 + \lambda_4 0.22 + \lambda_5 0.3 + \ldots\ldots + \lambda_{48} 0.2 \le \theta 0.43$$

$$\lambda_1 0.65 + \lambda_2 0.85 + \lambda_3 0.15 + \lambda_4 0.32 + \lambda_5 0.03 + \ldots\ldots\ldots + \lambda_{48} 0.42 \le \theta 0.1$$

$$\lambda_1 0.33 + \lambda_2 0.12 + \lambda_3 0.24 + \lambda_4 0.23 + \lambda_5 0.02 + \ldots\ldots + \lambda_{48} 0.56 \le \theta 0.65$$

$$\lambda_1 0.54 + \lambda_2 0.03 + \lambda_3 0.02 + \lambda_4 0.09 + \lambda_5 0.06 + \ldots\ldots + \lambda_{48} 0.002 \ge 0.02$$

$$\lambda_1 0.8 + \lambda_2 0.75 + \lambda_3 0.55 + \lambda_4 0.45 + \lambda_5 0.2 + \ldots\ldots + \lambda_{48} 0.002 \ge 0.23$$

$$\lambda_1 0.7 + \lambda_2 1 + \lambda_3 0.3 + \lambda_4 0.45 + \lambda_5 0.23 + \ldots\ldots + \lambda_{48} 0.25 \ge 0.2$$

$$\lambda_1 \ge 0,$$

$$\lambda_2 \ge 0,$$

$$\lambda_3 \ge 0,$$

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$$\lambda_{48} \ge 0,$$

Above model is capable to calculate the efficiency score and determine the model units for the branch of Khajeh Abdollah Ansari in financial perspective.

The second phase of above model in order to calculate the surplus and shortage amounts for the branch is as follows.

$$\max w = s_1^- + s_2^- + s_3^- + s_1^+ + s_2^+ + s_3^+$$

$$st$$

$$\lambda_1 0.12 + \lambda_2 0.2 + \lambda_3 0.7 + \lambda_4 0.22 + \lambda_5 0.3 + \ldots\ldots + \lambda_{48} 0.2 + s_1^- = \theta 0.43$$

$$\lambda_1 0.65 + \lambda_2 0.85 + \lambda_3 0.15 + \lambda_4 0.32 + \lambda_5 0.03 + \ldots\ldots\ldots + \lambda_{48} 0.42 + s_2^- = \theta 0.1$$

$$\lambda_1 0.33 + \lambda_2 0.12 + \lambda_3 0.24 + \lambda_4 0.23 + \lambda_5 0.02 + \ldots\ldots + \lambda_{48} 0.56 + s_3^- = \theta 0.65$$

$$\lambda_1 0.54 + \lambda_2 0.03 + \lambda_3 0.02 + \lambda_4 0.09 + \lambda_5 0.06 + \ldots\ldots + \lambda_{48} 0.002 - s_1^+ = 0.02$$

$$\lambda_1 0.8 + \lambda_2 0.75 + \lambda_3 0.55 + \lambda_4 0.45 + \lambda_5 0.2 + \ldots\ldots + \lambda_{48} 0.002 - s_2^+ = 0.23$$

$$\lambda_1 0.7 + \lambda_2 1 + \lambda_3 0.3 + \lambda_4 0.45 + \lambda_5 0.23 + \ldots\ldots + \lambda_{48} 0.25 - s_3^+ = 0.2$$

$$\lambda_1 \ge 0,$$

$$\lambda_2 \ge 0,$$

$$\lambda_3 \ge 0,$$

.

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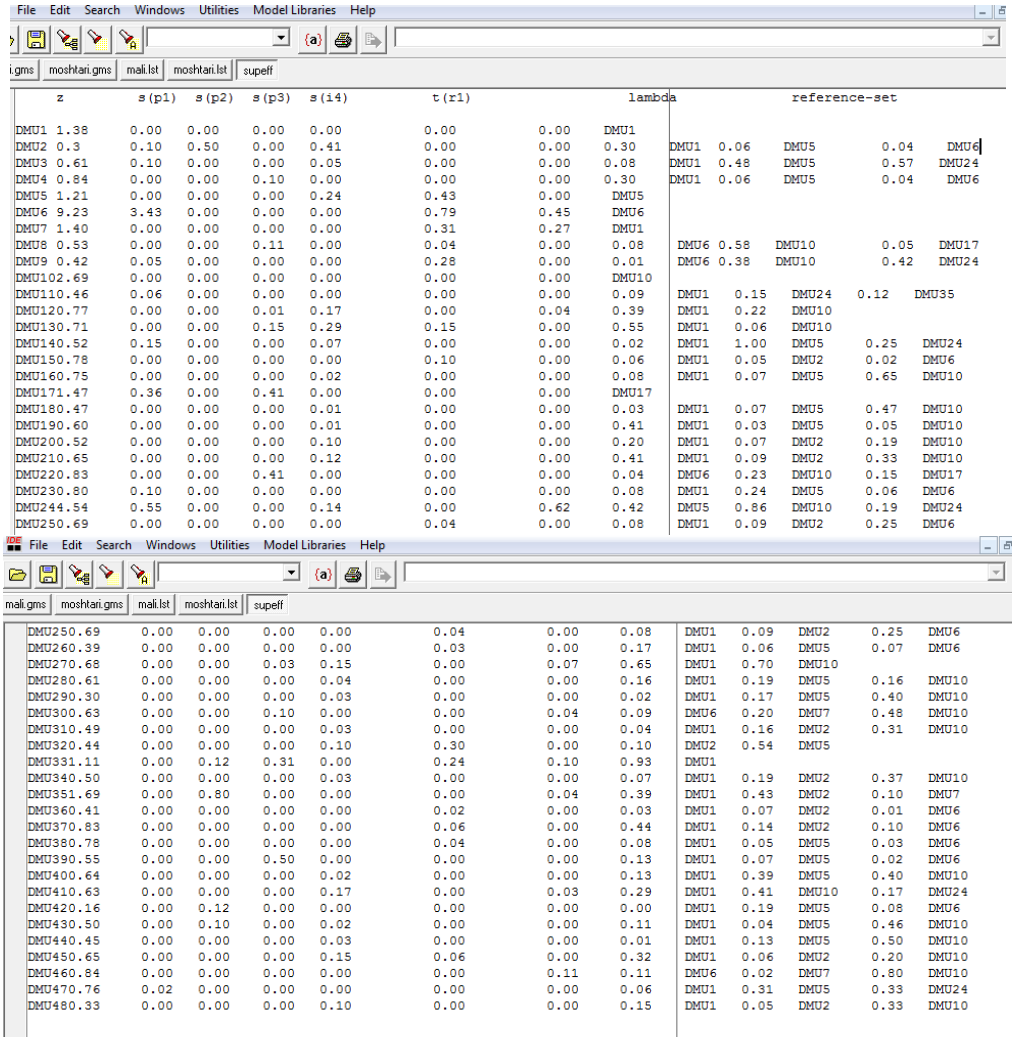
$$\lambda_{48} \ge 0,$$

The result of the above model will calculated the surplus and shortage amounts during the providing services for the branch of Khwaja Abdullah Ansari.

The overall output of software GAMS for the model of "enveloping input-oriented super-efficiency under return in constant scale" with financial perspective data for 48 units is as follows:

Table 1 the total output of the software GAMS for 48 branches, financial perspective



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	z	s(p1)	s(p2)	s(p3)	s(i4)	t(r1)	lambda		reference-set				
DMU1	1.38	0.00	0.00	0.00	0.00	0.00	0.00	DMU1					
DMU2	0.3	0.10	0.50	0.00	0.41	0.00	0.00	0.30	DMU1	0.06	DMU5	0.04	DMU6
DMU3	0.61	0.10	0.00	0.00	0.05	0.00	0.00	0.08	DMU1	0.48	DMU5	0.57	DMU24
DMU4	0.84	0.00	0.00	0.10	0.00	0.00	0.00	0.30	DMU1	0.06	DMU5	0.04	DMU6
DMU5	1.21	0.00	0.00	0.00	0.24	0.43	0.00	DMU5					
DMU6	9.23	3.43	0.00	0.00	0.00	0.79	0.45	DMU6					
DMU7	1.40	0.00	0.00	0.00	0.00	0.31	0.27	DMU1					
DMU8	0.53	0.00	0.00	0.11	0.00	0.04	0.00	0.08	DMU6	0.58	DMU10	0.05	DMU17
DMU9	0.42	0.05	0.00	0.00	0.00	0.28	0.00	0.01	DMU6	0.38	DMU10	0.42	DMU24
DMU10	2.69	0.00	0.00	0.00	0.00	0.00	0.00	DMU10					
DMU11	0.46	0.06	0.00	0.00	0.00	0.00	0.00	0.09	DMU1	0.15	DMU24	0.12	DMU35
DMU12	0.77	0.00	0.00	0.01	0.17	0.00	0.04	0.39	DMU1	0.22	DMU10		
DMU13	0.71	0.00	0.00	0.15	0.29	0.15	0.00	0.55	DMU1	0.06	DMU10		
DMU14	0.52	0.15	0.00	0.00	0.07	0.00	0.00	0.02	DMU1	1.00	DMU5	0.25	DMU24
DMU15	0.78	0.00	0.00	0.00	0.00	0.10	0.00	0.06	DMU1	0.05	DMU2	0.02	DMU6
DMU16	0.75	0.00	0.00	0.00	0.02	0.00	0.00	0.08	DMU1	0.07	DMU5	0.65	DMU10
DMU17	1.47	0.36	0.00	0.41	0.00	0.00	0.00	DMU17					
DMU18	0.47	0.00	0.00	0.00	0.01	0.00	0.00	0.03	DMU1	0.07	DMU5	0.47	DMU10
DMU19	0.60	0.00	0.00	0.00	0.01	0.00	0.00	0.41	DMU1	0.03	DMU5	0.05	DMU10
DMU20	0.52	0.00	0.00	0.00	0.10	0.00	0.00	0.20	DMU1	0.07	DMU2	0.19	DMU10
DMU21	0.65	0.00	0.00	0.00	0.12	0.00	0.00	0.41	DMU1	0.09	DMU2	0.33	DMU10
DMU22	0.83	0.00	0.00	0.41	0.00	0.00	0.00	0.04	DMU6	0.23	DMU10	0.15	DMU17
DMU23	0.80	0.10	0.00	0.00	0.00	0.00	0.00	0.08	DMU1	0.24	DMU5	0.06	DMU6
DMU24	4.54	0.55	0.00	0.00	0.14	0.00	0.62	0.42	DMU5	0.86	DMU10	0.19	DMU24
DMU25	0.69	0.00	0.00	0.00	0.00	0.04	0.00	0.08	DMU1	0.09	DMU2	0.25	DMU6

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DMU250.69	0.00	0.00	0.00	0.00	0.04	0.00	0.08	DMU1	0.09	DMU2	0.25	DMU6
DMU260.39	0.00	0.00	0.00	0.00	0.03	0.00	0.17	DMU1	0.06	DMU5	0.07	DMU6
DMU270.68	0.00	0.00	0.03	0.15	0.00	0.07	0.65	DMU1	0.70	DMU10		
DMU280.61	0.00	0.00	0.00	0.04	0.00	0.00	0.16	DMU1	0.19	DMU5	0.16	DMU10
DMU290.30	0.00	0.00	0.00	0.03	0.00	0.00	0.02	DMU1	0.17	DMU5	0.40	DMU10
DMU300.63	0.00	0.00	0.10	0.00	0.00	0.04	0.09	DMU6	0.20	DMU7	0.48	DMU10
DMU310.49	0.00	0.00	0.00	0.03	0.00	0.00	0.04	DMU1	0.16	DMU2	0.31	DMU10
DMU320.44	0.00	0.00	0.00	0.10	0.30	0.00	0.10	DMU2	0.54	DMU5		
DMU331.11	0.00	0.12	0.31	0.00	0.24	0.10	0.93	DMU1				
DMU340.50	0.00	0.00	0.00	0.03	0.00	0.00	0.07	DMU1	0.19	DMU2	0.37	DMU10
DMU351.69	0.00	0.80	0.00	0.00	0.00	0.04	0.39	DMU1	0.43	DMU2	0.10	DMU7
DMU360.41	0.00	0.00	0.00	0.00	0.02	0.00	0.03	DMU1	0.07	DMU2	0.01	DMU6
DMU370.83	0.00	0.00	0.00	0.00	0.06	0.00	0.44	DMU1	0.14	DMU2	0.10	DMU6
DMU380.78	0.00	0.00	0.00	0.00	0.04	0.00	0.08	DMU1	0.05	DMU5	0.03	DMU6
DMU390.55	0.00	0.00	0.50	0.00	0.00	0.00	0.13	DMU1	0.07	DMU5	0.02	DMU6
DMU400.64	0.00	0.00	0.00	0.02	0.00	0.00	0.13	DMU1	0.39	DMU5	0.40	DMU10
DMU410.63	0.00	0.00	0.00	0.17	0.00	0.03	0.29	DMU1	0.41	DMU10	0.17	DMU24
DMU420.16	0.00	0.12	0.00	0.00	0.00	0.00	0.00	DMU1	0.19	DMU5	0.08	DMU6
DMU430.50	0.00	0.10	0.00	0.02	0.00	0.00	0.11	DMU1	0.04	DMU5	0.46	DMU10
DMU440.45	0.00	0.00	0.00	0.03	0.00	0.00	0.01	DMU1	0.13	DMU5	0.50	DMU10
DMU450.65	0.00	0.00	0.00	0.15	0.06	0.00	0.32	DMU1	0.06	DMU2	0.20	DMU10
DMU460.84	0.00	0.00	0.00	0.00	0.00	0.11	0.11	DMU6	0.02	DMU7	0.80	DMU10
DMU470.76	0.02	0.00	0.00	0.00	0.00	0.00	0.06	DMU1	0.31	DMU5	0.33	DMU24
DMU480.33	0.00	0.00	0.00	0.10	0.00	0.00	0.15	DMU1	0.05	DMU2	0.33	DMU10

Based on the table, the technical efficiency score of the branch of "Khwaja Abdullah Ansari" in financial perspective is 0.3. As shown in Table, the reason of inefficiency in mentioned branch is 0.04 shortages in the variable of return on assets rate in outputs toward its potential and confirms the conclusion that because of this weakness, it hasn't reach common financial goals of profitability, growth and shareholder value in financial perspective toward the other branches. As described, DEA models allow the units of the model to be determine, for example the reference units of Anahita, Zafar St., Pasdaran have been introduced as a model unit for the branch of Khwaja Abdullah Ansari, the weight of reference branch λ is the coefficient which is shown in Table and shows the participation rate of the reference branches in the assessment of inefficient branches. For example coefficient λ (Shadow Prices) with score 0.02 in fact indicates that the similarity of Khwaja Abdullah Ansari unit for modeling from reference model is 0.02 higher than any other reference units, that finally, with the composition of reference units of Anahita, Zafar St., Pasdaran, a virtual unit will be achieved as follows:

$$0.02\begin{bmatrix}0.12\\0.17\\0.4\end{bmatrix}=\begin{bmatrix}0.002\\0.003\\0.008\end{bmatrix}$$ As can be seen, the inputs of virtual unit is equal to $\begin{bmatrix}0.002\\0.003\\0.008\end{bmatrix}$, while the real input of the branch of Khwaja Abdullah Ansari is $\begin{bmatrix}0.43\\0.1\\0.65\end{bmatrix}$. According to this results, the surplus amounts of use in resources and shortage of output related to the model of enveloping input-oriented super-efficient indicates that the amount of output shortage in the variable of return on assets rate has caused to obtain score 0.3 in technical efficiency. Also, as it was said before, the model of enveloping input-oriented super-efficient, in addition to

calculating the efficiency score is capable to tank the efficient units that the ranking of efficiency units for financial perspective is as follows:

Table 1: The ranking of efficiency units for financial perspective

Efficiency Score	Branch Name	Unit
2.69	Pasdaran	10
1.69	International Exhibition	35
1.44	Afrigha	2
1.47	Seyyed Jamal Al-din Asad Abadi St.	17
1.38	Anahita	1
1.35	Parsa	23
1.21	Zafar St.	5

Analyzing the results of BSC model in customer perspective

- Branch of Khwaja Abdullah Ansari:

According to the data collected in the third chapter, the general form of the model of Enveloping *Input-Oriented* Super-Efficient in order to obtain technical efficiency score of mentioned branch in customer perspective will be as follows:

It should be explained that the value of $\varepsilon = 0.00001$ was used for zero due to avoid error in computing in GAMS software.

$$\min Z_0 = \theta$$

st

$$\lambda_1 0.3 + \lambda_2 0.55 + \lambda_3 0.33 + \lambda_4 0.37 + \lambda_5 0.73 + ... + \lambda_{48} 0.13 \le \theta 0.3$$

$$\lambda_1 0.5 + \lambda_2 0.4 + \lambda_3 0.2 + \lambda_4 0.45 + \lambda_5 0.5 + ... + \lambda_{48} 0.23 \le \theta 0.35$$

$$\lambda_1 0.33 + \lambda_2 0.42 + \lambda_3 0.04 + \lambda_4 0.13 + \lambda_5 0.62 + ... + \lambda_{48} 0.56 \ge 15$$

$$\lambda_1 1 + \lambda_2 0.73 + \lambda_3 0.2 + \lambda_4 0.9 + \lambda_5 0.6 + ... + \lambda_{48} 0.2 \ge 0.2$$

$$\lambda_1 0.35 + \lambda_2 1 + \lambda_3 0.003 + \lambda_4 0.09 + \lambda_5 0.2 + ... + \lambda_{48} 0.15 \ge 0.23$$

$$\lambda_1 \ge 0,$$

$$\lambda_2 \ge 0,$$

$$\lambda_3 \ge 0,$$

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$$\lambda_{48} \ge 0,$$

Above model is capable to calculate the efficiency score and determine the model units for the branch of Khajeh Abdollah Ansari in internal process customer perspective.

The second phase of above model in order to calculate the surplus and shortage amounts for the branch is as follows.

$$\max w = s_1^- + s_2^- + s_1^+ + s_2^+ + s_3^+$$

st

$$\lambda_1 0.3 + \lambda_2 0.55 + \lambda_3 0.33 + \lambda_4 0.37 + \lambda_5 0.73 + \ldots\ldots + \lambda_{48} 0.13 + s_1^- = \theta 0.3$$

$$\lambda_1 0.5 + \lambda_2 0.4 + \lambda_3 0.2 + \lambda_4 0.45 + \lambda_5 0.5 + \ldots\ldots + \lambda_{48} 0.23 + s_2^- = \theta 0.35$$

$$\lambda_1 0.33 + \lambda_2 0.42 + \lambda_3 0.04 + \lambda_4 0.13 + \lambda_5 0.62 + \ldots\ldots + \lambda_{48} 0.56 - s_1^+ = 15$$

$$\lambda_1 1 + \lambda_2 0.73 + \lambda_3 0.2 + \lambda_4 0.9 + \lambda_5 0.6 + \ldots\ldots + \lambda_{48} 0.2 - s_2^- = 0.2$$

$$\lambda_1 0.35 + \lambda_2 1 + \lambda_3 0.003 + \lambda_4 0.09 + \lambda_5 0.2 + \ldots\ldots + \lambda_{48} 0.15 - s_3^- = 0.23$$

$\lambda_1 \geq 0,$

$\lambda_2 \geq 0,$

$\lambda_3 \geq 0,$

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$\lambda_{48} \geq 0,$

The result of the above model will calculated the surplus and shortage amounts during the providing services for the branch of Khwaja Abdullah Ansari.

The overall output of software GAMS for the model of "enveloping input-oriented super-efficiency under return in constant scale" with customer perspective data for 48 units is as follows:

Table 3: The total output of the software GAMS for 48 branches, customer perspective

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	z	s(p1)	s(p2)	s(p3)	s(i4)	t(r1)	lambda		reference-set			
DMU1	1.00	0.00	0.00	0.58	0.00	0.08	0.63	DMU28	1.54	DMU44		
DMU2	1.52	0.00	0.00	0.00	0.00	0.00	1.50	DMU19	0.79	DMU39		
DMU3	0.41	0.05	0.00	0.04	0.00	0.06	0.36	DMU28				
DMU4	0.89	0.00	0.00	0.42	0.00	0.25	1.20	DMU28	0.55	DMU44		
DMU5	0.61	0.23	0.00	0.00	0.00	0.02	1.44	DMU22	0.38	DMU28		
DMU6	0.44	0.07	0.00	0.00	0.09	0.00	0.06	DMU2	1.01	DMU22		
DMU7	0.80	0.00	0.00	0.23	0.25	0.00	0.36	DMU2	0.21	DMU35		
DMU8	0.64	0.00	0.00	0.28	0.00	0.00	0.04	DMU2	0.07	DMU28	0.83	DMU44
DMU9	0.65	0.00	0.00	0.28	0.00	0.00	0.12	DMU2	0.02	DMU35	1.43	DMU44
DMU10	1.12	0.00	0.00	0.00	0.22	0.00	0.23	DMU35	0.06	DMU43	0.51	DMU44
DMU11	0.50	0.00	0.00	0.06	0.00	0.00	0.05	DMU2	0.03	DMU35	0.47	DMU44
DMU12	0.72	0.22	0.00	0.00	0.00	0.04	1.39	DMU22	0.51	DMU28		
DMU13	0.30	0.00	0.00	0.00	0.00	0.04	0.24	DMU22	0.26	DMU28	0.00	DMU44
DMU14	0.38	0.00	0.00	0.00	0.00	0.10	0.81	DMU22	0.02	DMU28	0.45	DMU44
DMU15	0.44	0.05	0.00	0.00	0.00	0.06	0.87	DMU22	0.47	DMU28		
DMU16	0.37	0.00	0.00	0.00	0.00	0.02	0.46	DMU22	0.36	DMU28	0.30	DMU44
DMU17	0.44	0.1	0.2	0.00	0.00	0.00	0.04	DMU2	0.54	DMU22	0.16	DMU28
DMU18	0.46	0.15	0.00	0.00	0.00	0.00	0.03	DMU2	1.95	DMU22	0.50	DMU28
DMU19	0.96	0.16	0.00	0.00	0.00	0.00	0.50	DMU2	0.55	DMU22	0.03	DMU28
DMU20	0.76	0.06	0.00	0.00	0.00	0.08	0.50	DMU22	1.06	DMU28		
DMU21	0.54	0.03	0.00	0.00	0.00	0.00	1.27	DMU22	0.35	DMU28		
DMU22	1.11	0.00	0.00	0.00	0.00	0.00	1.27	DMU22	0.57	DMU44	0.15	DMU48
DMU23	0.62	0.06	0.00	0.00	0.00	0.00	0.11	DMU2	0.11	DMU22	0.14	DMU28
DMU24	0.41	0.00	0.00	0.00	0.30	0.00	0.07	DMU2	0.66	DMU22	0.33	DMU44
DMU25	0.40	0.00	0.00	0.00	0.17	0.00	0.06	DMU2	1.51	DMU22	0.05	DMU44
DMU26	0.39	0.00	0.00	0.00	0.50	0.00	0.13	DMU10	0.03	DMU39	1.37	DMU44

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DMU27	0.39	0.00	0.00	0.00	0.05	0.00	0.05	DMU2	1.76	DMU22	0.21	DMU44
DMU28	1.23	0.00	0.00	0.00	0.00	0.00	0.52	DMU1	0.16	DMU22		
DMU29	0.40	0.00	0.00	0.00	0.00	0.00	0.20	DMU2	0.07	DMU35	0.04	DMU39
DMU30	0.45	0.07	0.00	0.00	0.06	0.00	0.10	DMU2	1.07	DMU22		
DMU31	0.46	0.17	0.00	0.00	0.11	0.00	0.20	DMU2	0.99	DMU22		
DMU32	0.99	0.00	0.00	0.15	0.11	0.00	0.17	DMU2	0.66	DMU35		
DMU33	0.49	0.00	0.00	0.30	0.00	0.00	0.19	DMU2	0.15	DMU35	1.39	DMU44
DMU34	0.51	0.00	0.00	0.00	0.00	0.00	0.17	DMU2	0.05	DMU35	0.07	DMU39
DMU35	12.14	0.00	0.00	0.00	0.00	0.00	0.05	DMU35	1.21	DMU44		
DMU36	0.44	0.03	0.00	0.00	0.00	0.06	0.95	DMU22	0.35	DMU28		
DMU37	0.49	0.00	0.00	0.01	0.00	0.06	0.38	DMU28	0.30	DMU44		
DMU38	0.41	0.00	0.00	0.00	0.11	0.00	0.04	DMU2	0.08	DMU39	0.30	DMU44
DMU39	1.06	0.00	0.00	0.00	0.14	0.00	0.05	DMU2	0.27	DMU10	0.08	DMU39
DMU40	0.47	0.00	0.00	0.00	0.00	0.08	0.16	DMU22	0.19	DMU43	0.36	DMU48
DMU41	0.53	0.00	0.00	0.00	0.07	0.00	0.10	DMU2	0.31	DMU22	0.58	DMU44
DMU42	0.50	0.09	0.00	0.00	0.03	0.00	0.35	DMU2	1.06	DMU22		
DMU43	1.22	0.00	0.00	0.00	0.00	0.00	1.04	DMU10	0.09	DMU44		
DMU44	1.29	0.00	0.00	0.00	0.00	0.00	0.01	DMU1	0.06	DMU2	1.03	DMU22
DMU45	0.32	0.00	0.00	0.00	0.00	0.00	0.15	DMU2	0.55	DMU22	0.15	DMU28
DMU46	0.70	0.03	0.00	0.00	0.00	0.01	0.99	DMU22	0.27	DMU28		
DMU47	0.50	0.00	0.00	0.01	0.02	0.00	0.11	DMU2	0.17	DMU35		
DMU48	1.01	0.00	0.00	0.00	0.20	0.00	1.35	DMU22	0.07	DMU43	0.06	DMU44

Based on the table, the technical efficiency score of the branch of "Khwaja Abdullah Ansari" in customer perspective is 0.4. As shown in Table, the reason of inefficiency in the branch of Khwaja Abdullah Ansar is the surplus amounts of using inputs in amount of advertising and marketing cost, and shortage 0.2 in gaining the market share, toward its potential. Indeed, lack of cost management and lack of adequate programs in advertising has been caused the shortage in attracting customers. In fact, the branch has been poor in customer

service in compared to other branches due to the mentioned weakness. As described, DEA models allow the units of the model to be determine, for example the reference units of Afrigha, International exhibition, *Elahiyeh* Golnar Tower, Dezaship have been introduced as a model unit for the branch of Khwaja Abdullah Ansari, the weight of reference branch λ is the coefficient and indicates the participation rate of the reference branches in the assessment of inefficient branches. That finally, with the composition of mentioned reference units, a virtual unit will be achieved as follows:

$$0.2\begin{bmatrix}0.55\\0.4\end{bmatrix}+0.07\begin{bmatrix}0.01\\0.65\end{bmatrix}+0.04\begin{bmatrix}0.09\\0.2\end{bmatrix}+0.03\begin{bmatrix}0.1\\0.23\end{bmatrix}=\begin{bmatrix}0.1\\0.14\end{bmatrix}$$

As can be seen, the inputs of virtual unit is equal to $\begin{bmatrix}0.1\\0.14\end{bmatrix}$, while the real input of the branch of Khwaja Abdullah Ansari is $\begin{bmatrix}0.3\\0.35\end{bmatrix}$. The ranking of efficiency units for customer perspective is as follows:

Table 2: The ranking of efficiency units for customer perspective

Efficiency Score	Branch Name	Units
12.14	Sepehr	25
1.52	Afrigha	2
1.29	Dezaship	44
1.23	pesian	28
1.22	Zaferanieh	43
1.21	Pasdaran	10
1.11	Mother Square	22
1.01	efficiency	10
1.09	*Elahiyeh* Golnar Tower	39
1.01	Velenjak	48
1	Anahita	1

Analyzing the results of BSC model in internal process perspective:

- Branch of Khwaja Abdullah Ansari:

According to the data collected in the third chapter, the general form of the model of Enveloping *Input-Oriented* Super-Efficient in order to obtain technical efficiency score of mentioned branch in customer perspective will be as follows:

It should be explained that the value of $\varepsilon = 0.00001$ was used for zero due to avoid error in computing in GAMS software.

$$\min Z_0 = \theta$$

st

$$\lambda_1 0.53 + \lambda_2 0.4 + \lambda_3 0.14 + \lambda_4 0.45 + \lambda_5 0.32 + \ldots\ldots\ldots + \lambda_{48} 0.06 \le \theta 0.32$$

$$\lambda_1 1 + \lambda_2 0.2 + \lambda_3 0.03 + \lambda_4 0.45 + \lambda_5 0.12 + \ldots\ldots\ldots + \lambda_{48} 0.08 \ge 0.06$$

$$\lambda_1 0.4 + \lambda_2 0.55 + \lambda_3 0.55 + \lambda_4 0.04 + \lambda_5 1 + \ldots\ldots\ldots + \lambda_{48} 0.02 \ge 0.02$$

$$\lambda_1 0.5 + \lambda_2 0.4 + \lambda_3 0.2 + \lambda_4 0.5 + \lambda_5 0.4 + \ldots\ldots\ldots + \lambda_{48} 0.23 \ge 0.35$$

$$\lambda_1 \ge 0,$$

$$\lambda_2 \ge 0,$$

$$\lambda_3 \ge 0,$$

.

.

$$\lambda_{48} \ge 0,$$

This model is capable to calculate the amounts of input surplus and output shortage.

$$\max w = s_1^- + s_1^+ + s_2^+ + s_3^+$$

st

$$\lambda_1 0.53 + \lambda_2 0.4 + \lambda_3 0.14 + \lambda_4 0.45 + \lambda_5 0.32 + \ldots\ldots\ldots + \lambda_{48} 0.06 + s_1^- = \theta 0.32$$

$$\lambda_1 1 + \lambda_2 0.2 + \lambda_3 0.03 + \lambda_4 0.45 + \lambda_5 0.12 + \ldots\ldots\ldots + \lambda_{48} 0.08 - s_1^+ = 0.06$$

$$\lambda_1 0.4 + \lambda_2 0.55 + \lambda_3 0.55 + \lambda_4 0.04 + \lambda_5 1 + \ldots\ldots\ldots + \lambda_{48} 0.02 - s_2^+ = 0.02$$

$$\lambda_1 0.5 + \lambda_2 0.4 + \lambda_3 0.2 + \lambda_4 0.5 + \lambda_5 0.4 + \ldots\ldots\ldots + \lambda_{48} 0.23 - s_3^+ = 0.35$$

$\lambda_1 \geq 0,$

$\lambda_2 \geq 0,$

$\lambda_3 \geq 0,$

.

.

$\lambda_{48} \geq 0,$

The overall output of software GAMS for the model of "enveloping input-oriented super-efficiency under return in constant scale" with internal process perspective data for 48 units is as follows:

Table 3: The total output of the software GAMS for 48 branches, internal process perspective

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	z	s(p1)	s(p2)	s(p3)	s(i4)	t(r1)	lambda			reference-set
DMU1	1	0.00	0.00	0.00	0.00	DMU1				
DMU2	0.58	0.00	0.00	0.40	0.00	0.97 DMU3	0.38	DMU6	0.16	DMU30
DMU3	2.62	0.00	0.10	0.00	0.01	0.97 DMU3	0.92	DMU28		
DMU4	0.79	0.00	0.00	0.00	0.00	0.00 DMU3	1.10	DMU6	0.25	DMU30
DMU5	0.36	0.00	0.00	0.00	0.03	1.81 DMU3	0.18	DMU6		
DMU6	1.03	0.00	0.00	0.00	0.42	0.18 DMU6	1.71	DMU30		
DMU7	0.27	0.00	0.00	0.00	0.00	0.13 DMU3	0.34	DMU30	0.34	DMU32
DMU8	0.10	0.00	0.00	0.00	0.00	0.11 DMU3	0.13	DMU32	0.73	DMU34
DMU9	0.49	0.00	0.00	0.00	0.00	0.24 DMU6	0.33	DMU32		
DMU10	0.40	0.00	0.20	0.01	0.00	0.17 DMU6	0.48	DMU32		
DMU11	0.47	0.10	0.00	0.00	0.00	0.00 DMU3	0.48	DMU32	0.30	DMU34
DMU12	0.32	0.10	0.00	0.00	0.00	0.03 DMU3	0.38	DMU32	0.18	DMU34
DMU13	0.54	0.00	0.00	0.00	0.00	0.01 DMU3	0.37	DMU32	0.59	DMU34
DMU14	0.19	0.00	0.00	0.00	0.00	0.01 DMU3	0.47	DMU32	0.44	DMU34
DMU15	0.33	0.00	0.00	0.00	0.00	0.06 DMU3	0.97	DMU32	0.14	DMU34
DMU16	0.45	0.00	0.00	0.00	0.01	0.12 DMU3	0.82	DMU6		
DMU17	0.33	0.00	0.00	0.00	0.00	0.05 DMU3	0.22	DMU30	1.62	DMU32
DMU18	0.09	0.00	0.00	0.00	0.00	0.03 DMU6	0.58	DMU32		
DMU19	0.28	0.00	0.00	0.00	0.00	0.00 DMU3	0.22	DMU30	0.64	DMU32
DMU20	0.08	0.00	0.00	0.00	0.00	0.23 DMU3	0.20	DMU32	0.50	DMU34
DMU21	0.29	0.00	0.00	0.00	0.00	0.29 DMU6	0.06	DMU30	0.05	DMU32
DMU22	0.17	0.00	0.00	0.00	0.00	0.14 DMU6	0.20	DMU32		
DMU23	0.05	0.00	0.00	0.00	0.00	0.00 DMU3	0.08	DMU30	0.22	DMU32
DMU24	0.46	0.00	0.00	0.00	0.00	0.07 DMU3	0.59	DMU30	0.44	DMU32
DMU25	0.57	0.00	0.00	0.00	0.00	0.12 DMU3	0.59	DMU30	0.72	DMU32

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DMU26	0.53	0.00	0.00	0.01	0.00	1.59 DMU32	0.18	DMU34		
DMU27	0.57	0.00	0.00	0.00	0.00	0.23 DMU3	0.70	DMU32	0.65	DMU34
DMU28	0.53	0.00	0.00	0.00	0.09	1.07 DMU3	0.30	DMU6		
DMU29	0.14	0.00	0.00	0.00	0.00	0.03 DMU3	0.59	DMU32	0.07	DMU34
DMU30	1.00	0.00	0.00	0.00	0.00	DMU30				
DMU31	0.20	0.00	0.00	0.00	0.00	0.06 DMU3	0.17	DMU30	0.82	DMU32
DMU32	1.35	0.00	0.00	0.00	0.00	DMU32				
DMU33	0.87	0.00	0.01	0.00	0.00	0.36 DMU3	1.33	DMU34		
DMU34	1.40	0.00	0.14	0.01	0.00	1.40 DMU32	1.33	DMU34		
DMU35	0.13	0.00	0.00	0.00	0.00	0.35 DMU3	1.09	DMU32	0.05	DMU34
DMU36	0.25	0.00	0.00	0.00	0.00	1.09 DMU3	0.05	DMU32	0.36	DMU34
DMU37	0.16	0.00	0.00	0.00	0.00	0.00 DMU3	0.29	DMU32	0.25	DMU34
DMU38	0.36	0.00	0.00	0.00	0.00	0.13 DMU3	0.06	DMU6	0.45	DMU30
DMU39	0.33	0.00	0.00	0.00	0.00	0.33 DMU6	0.17	DMU32		
DMU40	0.34	0.00	0.00	0.00	0.00	0.04 DMU3	0.39	DMU30	0.28	DMU32
DMU41	0.25	0.00	0.00	0.00	0.00	0.01 DMU3	0.69	DMU32	0.10	DMU34
DMU42	0.30	0.00	0.00	0.01	0.00	0.31 DMU6	0.98	DMU32		
DMU43	0.08	0.00	0.00	0.00	0.00	0.01 DMU3	0.29	DMU32	0.12	DMU34
DMU44	0.48	0.00	0.00	0.00	0.00	0.00 DMU3	0.45	DMU30	0.05	DMU32
DMU45	0.15	0.00	0.00	0.00	0.00	0.69 DMU32	0.30	DMU34		
DMU46	0.79	0.00	0.00	0.00	0.00	0.14 DMU3	0.25	DMU32	0.21	DMU34
DMU47	0.39	0.00	0.00	0.00	0.00	0.14 DMU6	0.50	DMU32		
DMU48	0.82	0.00	0.00	0.00	0.00	0.02 DMU3	0.29	DMU30	0.19	DMU32

Based on the table, the technical efficiency score of the branch of "Khwaja Abdullah Ansari" in financial perspective is 0.14. As shown in Table, the reason of inefficiency in mentioned branch is surplus amounts of the costs of new banking services in the amount 0.1.In fact, internal activities of the branch including the provision of modern banking services to attract customers have been with lack of cost management in the context of modern banking services more than other branches. According to data, the units of Momtaz Melli, Pardis, Zebarjad have been introduced as a model unit for the inefficient branch of Khwaja Abdullah Ansari in

internal process perspective. And finally, with the composition of reference units, a virtual unit will be achieved as follows:

$$0.03[0.14]+0.59[0.06]+0.07[0.06]=[0.04]$$

As can be seen, the inputs of virtual unit is equal to $[0.04]$, while the real input of the branch of Pasdaran is $[0.4]$. The ranking of efficiency units for internal process perspective is also as follows:

Table 4: The ranking of efficiency units for internal process perspective

Efficiency Score	Branch Name	Units
2.62	Momtaz Melli	3
1.35	Pardis	32
1.03	Dr. Shariati	6
1	Anatita	1
1	Mokhaberat	30

Analyzing the results of BSC model in Growth and Learning perspective

- Branch of Khwaja Abdullah Ansari:

According to the data collected in the third chapter, the general form of the model of Enveloping *Input-Oriented* Super-Efficient in order to obtain technical efficiency score of mentioned branch in Growth and Learning perspective will be as follows:

It should be explained that the value of $\varepsilon = 0.00001$ was used for zero due to avoid error in computing in GAMS software.

$$\min Z_0 = \theta$$

st

$$\lambda_1 0.12 + \lambda_2 0.2 + \lambda_3 0.7 + \lambda_4 0.22 + \lambda_5 0.3 + ... + \lambda_{48} 0.2 \le \theta 0.3$$

$$\lambda_1 0.65 + \lambda_2 0.75 + \lambda_3 0.15 + \lambda_4 0.32 + \lambda_5 0.03 + ... + \lambda_{48} 0.42 \le \theta 0.24$$

$$\lambda_1 0.03 + \lambda_2 0.12 + \lambda_3 0.24 + \lambda_4 0.13 + \lambda_5 0.02 + ... + \lambda_{48} 0.46 \ge 0.23$$

$$\lambda_1 0.54 + \lambda_2 0.03 + \lambda_3 0.02 + \lambda_4 0.09 + \lambda_5 0.06 + ... + \lambda_{48} 0.002 \ge 0.002$$

$$\lambda_1 0.8 + \lambda_2 0.75 + \lambda_3 0.55 + \lambda_4 0.45 + \lambda_5 0.2 + ... + \lambda_{48} 0.25 \ge 0.23$$

$$\lambda_1 0.03 + \lambda_2 1 + \lambda_3 0.3 + \lambda_4 0.45 + \lambda_5 0.23 + ... + \lambda_{48} 0.5 \ge 0.2$$

$\lambda_1 \ge 0,$

$\lambda_2 \ge 0,$

$\lambda_3 \ge 0,$

.

.

$\lambda_{48} \ge 0,$

This model is capable to calculate the amounts of input surplus and output shortage.

$$\max w = s_1^- + s_1^+ + s_2^+ + s_3^+$$

st

$$\lambda_1 0.12 + \lambda_2 0.2 + \lambda_3 0.7 + \lambda_4 0.22 + \lambda_5 0.3 + \ldots\ldots + \lambda_{48} 0.2 + s_1^- = \theta 0.3$$

$$\lambda_1 0.65 + \lambda_2 0.75 + \lambda_3 0.15 + \lambda_4 0.32 + \lambda_5 0.03 + \ldots\ldots + \lambda_{48} 0.42 + s_2^- = \theta 0.24$$

$$\lambda_1 0.03 + \lambda_2 0.12 + \lambda_3 0.24 + \lambda_4 0.13 + \lambda_5 0.02 + \ldots\ldots + \lambda_{48} 0.46 - s_1^+ = 0.23$$

$$\lambda_1 0.54 + \lambda_2 0.03 + \lambda_3 0.02 + \lambda_4 0.09 + \lambda_5 0.06 + \ldots\ldots + \lambda_{48} 0.002 - s_2^+ = 0.002$$

$$\lambda_1 0.8 + \lambda_2 0.75 + \lambda_3 0.55 + \lambda_4 0.45 + \lambda_5 0.2 + \ldots\ldots + \lambda_{48} 0.25 - s_3^+ = 0.23$$

$$\lambda_1 0.03 + \lambda_2 1 + \lambda_3 0.3 + \lambda_4 0.45 + \lambda_5 0.23 + \ldots\ldots + \lambda_{48} 0.5 - s_4^+ = 0.2$$

$\lambda_1 \geq 0,$

$\lambda_2 \geq 0,$

$\lambda_3 \geq 0,$

.

.

$\lambda_{48} \geq 0,$

The overall output of software GAMS for the model of "enveloping input-oriented super-efficiency under return in constant scale" with Growth and Learning perspective data for 48 units is as follows:

Table 5: The total output of the software GAMS for 48 branches, Growth and Learning perspective

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	z	s(p1)	s(p2)	s(p3)	s(i4)	t(r1)	lambda	reference-set
DMU1	1.38	0.00	0.00	0.00	0.00	0.00	0.00	DMU1
DMU2	1.28	0.00	0.00	0.00	0.00	0.00	0.00	DMU2
DMU3	0.31	0.00	0.00	0.14	0.06	0.00	0.00	0.60 DMU10 0.25 DMU14 0.43 DMU24
DMU4	0.64	0.00	0.00	0.27	0.00	0.00	0.00	0.05 DMU1 0.18 DMU2 0.80 DMU10
DMU5	0.50	0.00	0.00	0.37	0.00	0.00	0.00	0.55 DMU10 0.30 DMU17 0.05 DMU22
DMU6	0.54	0.00	0.00	0.32	0.00	0.42	0.00	1.02 DMU7 0.14 DMU33 0.07 DMU37
DMU7	1.89	0.00	0.00	0.00	0.00	0.00	0.26	DMU7
DMU8	0.74	0.00	0.00	0.35	0.00	0.08	0.23	0.47 DMU22 0.44 DMU46
DMU9	0.35	0.00	0.00	0.40	0.00	0.08	0.00	0.31 DMU10 0.38 DMU17 0.36 DMU22
DMU10	1.57	0.00	0.00	0.00	0.06	0.00	0.00	DMU10
DMU11	0.21	0.00	0.00	0.09	0.00	0.00	0.10	0.06 DMU1 0.16 DMU10 0.40 DMU14
DMU12	0.85	0.00	0.00	0.00	0.10	0.00	0.01	0.27 DMU1 0.18 DMU14 0.24 DMU45
DMU13	0.43	0.00	0.00	0.00	0.13	0.00	0.02	0.25 DMU1 0.16 DMU140.09 DMU45
DMU14	1.22	0.00	0.00	0.00	0.00	0.00	0.00	0.15 DMU1 1.04 DMU10 0.16 DMU14
DMU15	0.16	0.00	0.00	0.00	0.01	0.10	0.00	0.44 DMU10 0.03 DMU17 1.01 DMU22
DMU16	0.60	0.00	0.00	0.04	0.02	0.00	0.00	0.02 DMU2 0.85 DMU10 0.30 DMU14
DMU17	1.51	0.00	0.00	0.00	0.00	0.00	0.00	DMU17
DMU18	0.70	0.00	0.00	0.00	0.05	0.00	0.00	0.14 DMU10 0.11 DMU14 0.97 DMU22
DMU19	0.59	0.00	0.00	0.51	0.07	0.00	0.00	0.02 DMU2 1.38 DMU10 0.51 DMU14
DMU20	0.52	0.00	0.00	0.00	0.11	0.00	0.00	0.16 DMU1 0.08 DMU2 0.64 DMU10
DMU21	0.74	0.00	0.00	0.00	0.02	0.00	0.00	0.20DMU1 0.24 DMU2 0.53 DMU10
DMU22	2.75	0.00	0.00	0.00	0.00	0.00	0.00	0.99 DMU10 0.68 DMU17
DMU23	0.44	0.00	0.00	0.25	0.00	0.00	0.08	0.03 DMU1 0.01 DMU7 0.9
DMU24	2.30	0.00	0.00	0.00	0.00	0.00	0.00	DMU24
DMU25	0.63	0.00	0.00	0.20	0.00	0.15	0.00	0.28 DMU7 0.45 DMU 0.11 DMU46
DMU26	0.35	0.00	0.00	0.23	0.00	0.06	0.00	0.01 DMU7 0.93 DMU10.04 DMU37

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DMU26	0.35	0.00	0.00	0.23	0.00	0.06	0.00	0.01 DMU7 0.93 DMU10.04 DMU37
DMU27	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.28 DMU1 0.15 DMU0.88 DMU10
DMU28	0.40	0.00	0.00	0.17	0.04	0.00	0.00	0.05 DMU2 0.64 DMU 0.48 DMU14
DMU29	0.29	0.00	0.00	0.00	0.06	0.00	0.02	0.47 DMU10 0.14 DMU14 0.60 DMU22
DMU30	0.84	0.00	0.00	0.00	0.00	0.06	0.00	0.24 DMU7 0.33 DMU10 0.77DMU22
DMU31	0.47	0.00	0.00	0.00	0.06	0.00	0.00	0.08 DMU1 0.08 DMU2 0.57 DMU10
DMU32	0.23	0.00	0.00	0.00	0.01	0.00	0.00	0.99 DMU10 0.05 DMU140.10 DMU22
DMU33	1.62	0.00	0.00	0.00	0.00	0.00	0.00	DMU33
DMU34	0.46	0.00	0.00	0.00	0.10	0.00	0.00	0.15 DMU1 0.08 DMU2 0.96 DMU10
DMU35	1.22	0.00	0.00	0.00	0.00	0.00	0.00	DMU35
DMU36	0.44	0.00	0.00	0.00	0.00	0.03	0.00	0.02 DMU2 0.24 DMU10 0.04 DMU33
DMU37	1.03	0.00	0.00	0.00	0.00	0.27	0.00	DMU37
DMU38	0.63	0.00	0.00	0.00	0.00	0.05	0.00	0.04 DMU2 0.47 DMU10 0.04DMU37
DMU39	0.68	0.00	0.00	0.03	0.01	0.01	0.00	0.90 DMU10 0.15 DMU17
DMU40	0.37	0.00	0.00	0.24	0.03	0.00	0.00	0.07 DMU2 0.91 DMU10 0.05DMU14
DMU41	0.62	0.00	0.00	0.00	0.12	0.00	0.00	0.18 DMU1 0.06 DMU2 0.69DMU10
DMU42	0.18	0.00	0.00	0.44	0.00	0.00	0.00	0.09 DMU10 1.31 DMU22 0.05DMU24
DMU43	0.45	0.00	0.00	0.00	0.06	0.00	0.00	0.03 DMU1 0.07 DMU2 1.08DMU10
DMU44	0.50	0.00	0.00	0.00	0.06	0.09	0.00	1.14 DMU10 0.06 DMU22 0.00DMU45
DMU45	1.73	0.00	0.00	0.00	0.00	0.00	0.00	DMU45
DMU46	1.21	0.00	0.00	0.00	0.00	0.00	0.00	DMU46
DMU47	0.50	0.00	0.00	0.42	0.06	0.04	0.00	0.02 DMU2 1.47 DMU10
DMU48	0.64	0.00	0.00	0.00	0.05	0.13	0.00	0.23 DMU2 0.59 DMU10 0.19DMU45

Based on the table, the technical efficiency score of the branch of "Khwaja Abdullah Ansari" in learning and growth perspective is 0.29. In fact, the activity of the branch in the field of training and attracting innovation to

create more value for customers and continuously improving the operational efficiency has been inefficient toward other branches.

The amounts of shortage in output to the amount 0.06 in the employees' training courses and 0.02 in the number of notes receivable toward the potential of the branch is the reason of inefficiency in mentioned branch. In fact, with the same amount of investment in the sources it can have more output and output. As described, DEA models allow the model units to be determined. For example, reference units of Pasdaran, Soheil, Mother square have been introduced as a model unit for the branch of Khwaja Abdullah Ansari. The weight of reference branch λ is the coefficient which is given in table and indicates the participation rate of the reference branches in the assessment of inefficient branches. Finally, with the composition of mentioned reference units, a virtual unit will be achieved as follows:

$$0.47\begin{bmatrix}0.1\\0.021\end{bmatrix}+0.14\begin{bmatrix}0.1\\0.1\end{bmatrix}+0.6\begin{bmatrix}0.11\\0.01\end{bmatrix}=\begin{bmatrix}0.12\\0.02\end{bmatrix}$$

As can be seen, the inputs of virtual unit is equal to $\begin{bmatrix}0.12\\0.02\end{bmatrix}$, while the real input of the branch of Khwaja Abdullah Ansari is $\begin{bmatrix}0.43\\0.1\end{bmatrix}$. According to the results, Table 2.4.1.1 shows the surplus amounts of use in resources related to the model of enveloping input-oriented super-efficient. The ranking of efficiency units for learning and growth perspective is as follows:

Table 5: The ranking of efficiency units for learning and growth perspective

Efficiency Score	Branch Name	Unit
2.75	Mother Square	22
2.30	Valiasr Abshar	24
1.89	Velenjak	7
1.73	Park St.	45
1.57	Pasdaran	10
1.51	Seyyed Jamal Al-din Asad Abadi St.	17
1.38	Anahita	1
1.22	Soheil	14
1.21	Sheikh Bahaei St.	46
1.03	Moghaddas Ardebili St.	37

III. Conclusion

The main problem of present research is to select the appropriate indicators for DEA technique and measure the efficiency of banks, not only from financial aspects, but also from other perspectives as well. That the model BSC was used to moderate this challenge in order to measure the technical efficiency of banks. On the other, traditional models of DEA technique are not capable to announce the score of efficient units more than one. Super efficient models of DEA technique were used to mitigate this challenge which they are capable to announce the efficiency score and rank the efficient units simultaneously. So, we measured the technical efficiency of 48 top and grade-one Melli bank branches in northern Tehran by the model of return in constant scale of enveloping input-oriented super-sufficient in four perspective of DEA model. The results showed that average efficiency rate from four perspectives: financial, customer, internal process and learning and growth of BSC model is 0.68, 0.63, 0.44, 0.65, respectively, and in total, the average efficiency of branches is 0.6 in this year and it indicates that the most major alignment with macro- strategies of branches is in the financial perspective. Also, Anahita branch was introduced as the most efficient unit from each four perspectives of the BSC model in compared to the other branches. After determining the efficient units from every 4 aspects of balanced scored card, model units were introduced. Given the research aims at analyzing, the results of Zafar St. branch showed that based on the results of technical efficiency score the financial is 1.21, customer 0.61, internal process 0.36, and growing and learning 0.5.These scores for this company indicate the local efficiency of the branch during the provision of service. Because this branch has taken steps in order to profitability and maintain shareholder value by adopting short-term strategies and due to the lack of attention to marketing issues to attract customers, use of advanced technologies in the internal process perspective, also due to the lack of adequate attention to the part of human resources to enhance the employees' skills, are factors that indicates the

short-term profitability of the branch, that finally model units were also determined for each perspective. Finally, banking industry is considered as strategic industry, during the modeling according to calculations carried out for the final decision, the opinions of bank professionals and experts should be used for appropriate allocation of resources.

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