Optimization
Iranian Journal of Optimization
Volume 13, Issue 4, 2021, 241-254
Research Paper

Online version is available on: www.ijo.rasht.iau.ir

Islamic Azad University
Rasht Branch
ISSN: 2588-5723
E-ISSN:2008-5427

Analysis of Evaluation Model of Organizational Units' Performance with Sink-Tuttle Approach Using Data Envelopment Analysis

Nazila Adabavazeh[1*], Ahmad Edalatpanah[2] and Mehrzad Navabakhsh[3]

[1*]Department of Industrial Engineering, Najafabad Branch, Islamic Azad University, Najafabad, Iran
[2]Department of Applied Mathematics, Ayandegan Higher Education Institute, Tonekabon, Iran
[3]Department of Industrial Engineering, South Tehran Branch, Islamic Azad University, Tehran, Iran

Revise Date: 31 March 2022
Accept Date: 29 April 2022

Abstract

The existence of a performance evaluation system is inevitable due to the dramatic changes in the business environment. The comprehensive performance evaluation attempts to identify institutional units' potential strength and role in influencing the organizations' performance. This study aims to analyze the performance evaluation according to seven dimensions of the Sink and Tuttle model using data envelopment analysis. The result of the seven dimensions of the Sync-Tuttle model is the creation of a comprehensive performance evaluation system in organizations, which leads to the improvement of organizational performance. The proposed model covers all essential performance indicators and takes steps with more generalizability and more realistic evaluation than other performance evaluation systems. In this research, the performance of eight organizational units of the NIPA Company has been evaluated. A total of seven variables of the Sink-Tuttle model are input, and the performance level of organizational units is the output of the proposed model. Coordination between strategies, organizational learning, and knowledge management is recommended to improve organizational performance. The overlap of the evaluation results in the sink and Tuttle model and the data envelopment analysis indicates the validity of the proposed model. Action in the inefficient units can be taken by implementing training, changing key people, developing a participatory system, establishing a performance evaluation system with appropriate criteria, and developing management based on purpose. The results of the proposed performance evaluation model can be used as the main part of formulating and implementing organizations' policies.

Keywords:
Performance Evaluation
Sink-Tuttle Model
Data Envelopment Analysis

***Correspondence E-mail**: nazilaadabavazeh@yahoo.com

INTRODUCTION

According to the different approaches in performance evaluation, the performance evaluation process can be used in the fields of individual, process, team, organization, and supply chain. An appropriate evaluation system is a system that considers the financial and non-financial aspects in an integrated manner (Keegan et al., 1989). Financial indicators cannot appropriately and accurately identify qualitative costs and only encourage more production (Ghalayini et al., 1997). In modern performance evaluation models, quantitative models such as productivity criteria with a value-added approach, applicability criteria with an effectiveness and efficiency approach and profitability criteria with a performance audit approach, and qualitative models such as descriptive and value criteria with organizational commitment, organizational ethics, and several other criteria are used.

There are seven scales to evaluate the performance of an organization that is not necessarily distinct from each other. These scales consist of effectiveness, efficiency, profitability, productivity, quality of working life, innovation, and quality (Tavallaei,2007). In some studies, productivity includes efficiency, effectiveness, profitability, quality, innovation, and quality of work (Salimi,2015).

The appropriate approach used in the organizational units that covers all the critical performance indicators and is in accordance with the research topic is the Sink-Tuttle performance evaluation model proposed in 1989. In this model, performance is complex relationships between seven performance indicators, including *effectiveness, efficiency, quality, productivity, quality of working life, innovation, and profitability*. Although many changes have taken place in the industry since this model was proposed, these seven indicators are still of great importance in the organization's performance (Jafarnejad et al. 2013) (Nanni et al.,1992) (Tangen,2004).

Improvement in the performance of organizations needs an efficient performance evaluation system. The Sink-Tuttle model has a comprehensive view of organizational units' capabilities, behavior, and competencies among the various performance evaluation methods. Data envelopment analysis model with more generalizability and realistic evaluation and high adaptability power to be used in different performance evaluation issues help improve the performance evaluation system.

REVIEW OF LITERATURE

The dynamic business environment and dramatic changes in management knowledge have made the existence of a performance evaluation system inevitable. Improvement in any organization requires a performance evaluation system. Despite significant advances in performance evaluation systems, many models address only conceptual and fundamental issues and are rarely operationalized. Therefore, how to use these operational frameworks in a particular organization to create a performance evaluation system is a topic that requires further study (Adabavazeh et al.,2020). The following are some research backgrounds in this field:

- Adabavazeh and Nikbakht (2020) have proposed a performance evaluation model for organizational units with the TOPP approach. This research has evaluated the organizational units of NIPA Technical and Engineering Company during the second half of 2019 in three dimensions, including *effectiveness, efficiency, adaptability/compatibility*. Three-dimensional data with three constructs have been analyzed using descriptive and inferential statistics. Performance evaluation manages all the factors and variables of the organization holistically and uses the desired results of the evaluation system as the principal capital of productivity. This study presents a comprehensive model based on the TOPP model with three dimensions, 14 variables, and 52 items.
- Sakhaei (2018) has evaluated the performance of the Social Security Organization using the meta-analysis method. This research is a meta-analytical review of studies implemented in this field. The results of the meta-analysis of the studies conducted in the field of stakeholder satisfaction of the organization indicate that *quality of medical services, staff accountability,* and the *status of facilities* are the most critical

factors affecting citizens' satisfaction and implementation of the per-case plan, nature of work, and payroll are the most critical factors affecting employees' satisfaction.

- Behboodi et al. (2018) have designed a pattern of criteria for marketing performance evaluation in the Iranian tourism industry. This model is in accordance with the Glaser approach and has been implemented with ten main categories and 42 indicators. Stakeholders and social, financial, brand, market, tourism responsibility, organizational and process factors, growth and learning, staff, tourism-related infrastructure, and technology were recognized as criteria for evaluating marketing performance in the tourism industry.
- Youseliani et al. (2016) have designed a model for evaluating the performance of the education research system. This qualitative model with content analysis method includes 15 categories, among which five are related to inputs and five are related to processes. Outputs, consequences and effects, efficiency, action research, and encouragement are the other five categories of the performance evaluation model of the research groups of the provincial education departments.
- Tavakoli Golpayegani et al. (2016) have explained the insurance industry's integrated strategic performance evaluation model. The data envelopment analysis approach has been used to determine the efficiency, and the ideal planning approach has been used to increase the separability of the model. The integrated model results show the high separability and flexibility of the model compared to the applied methods.
- Adabavazeh and Nikbakht (2020) have evaluated the organization's performance based on the main success factors of the reverse supply chain of the aviation industry with a service quality approach using the data envelopment analysis model. In this study, first, performance evaluation indicators have been identified, and then the efficiency of 24 primary factors of success of reverse supply chain of the aviation industry has been determined with output-oriented BCC model. The performance input index is the main factor in the success of the reverse supply chain, which is categorized into four quarters with an importance-performance analysis chart. The output index is the service quality gap with the modified SERVQUAL model. EMS software has determined the main factors of efficient and inefficient success. The proposed performance measurement model can be beneficial for managers to allocate resources since models are provided for inefficient units to achieve the efficiency limit and improve performance.
- Nguyen (2018) creates and tests the interaction framework between market orientation (MO) and accountants' participation in strategic decision making and its impact on the application of management accounting systems (MAS), which in turn increases the company's performance. The research hypotheses were tested using a minimum square of structural equation modeling. The variable-marketer technique was used to test the deviation of the method. The use of MAS (in terms of scope, timeliness, aggregation, and integration) is considered a mediator of the MO's impact on firm performance. Accountants' participation in strategic decision-making increases the positive relationship between MO and MAS application.
- Changa et al. (2018) have assessed the role of brand orientation in transforming managerial and organizational resources into the best brand performance. This study used data collected from 166 Chinese industrial companies operating in different industry sectors and found that entrepreneurial orientation and marketing capability positively affect firm brand orientation. Brand orientation can, directly and indirectly, impact firm performance by encouraging joint activities in creating customer value.
- In the study of Uygun and Dede (2016), a model based on integrated fuzzy MCDM (Multi-Criteria Decision Making) techniques is proposed to evaluate the performance of Green Supply Chain Management (GSCM) of the organizations in the field of green design, green procurement, green transportation and reverse transportation. The causal relationships among the dimensions of GSCM are understood using

the fuzzy DEMATEL method. Then based on these relationships, the Analytical Network Process (ANP) is implemented to calculate the weights of each of the relevant criteria. Finally, based on the calculated weights from the ANP method, the fuzzy TOPSIS method is used to evaluate and rank the GSCM performance of other companies.

- Zhao and Li (2015) have proposed a new hybrid framework to evaluate the performance of thermal power companies in order to promote sustainable development. Based on the Sustainability Balanced Scorecard principle, the primary evaluation criteria are set out, covering environmental and sustainability perspectives to address social responsibility issues. Given the shortcomings of the Sustainability Balanced Scorecard in understanding the importance weights of the criteria and achieving a comprehensive evaluation, a hybrid evaluation model operating in a fuzzy environment is developed based on the analytical network process and prioritization technique based on similarity to the ideal solution. The analytical network process calculates the relative weights of the evaluation criteria to consider the interrelationships between the criteria. The proposed framework can help authorities promote the competitiveness of sustainable development decisions. In addition, this study expands the scope of this problem through different multi-criteria decision-making tools and different environments.

A performance evaluation system is essential for optimal resources and achieving as many goals as possible. Performance evaluation is also essential for the dynamism of organizations. With the help of a performance quality evaluation system, it is possible to allocate the minimum input resources and improve the current and future status of the organization. Therefore, a comprehensive performance evaluation model with a sink-Tuttle approach using data envelopment analysis is proposed in the present study.

Data envelopment analysis is a mathematical programming technique for performance assessment of decision-making units and now is widely utilized in different industrial fields (Hosseinzadeh Lotfi et al.,2020) (Moghaddas et al.,2020) (Vaez-Ghasemi et al.,2021) (Tajik Yabr et al.,2022).

THEORETICAL FOUNDATIONS

Sink-Tuttle performance evaluation model

- **Organizational effectiveness:** Talcott Parsons proposed AGIL's model to evaluate organizational effectiveness. He correctly assumes that the survival of the social system depends on the performance of four critical functions. These functions are fundamental to identifying other resources and can be the organization's goals (Mahmoudi and Derakhshani,2017). Organizational effectiveness has 28 items and includes four variables: innovation, organizational commitment, job satisfaction, and organizational health. Parsons organizational effectiveness structure data is analyzed using descriptive and inferential statistics via Microsoft Excel 2010 and SPSS 16.0. Scoring is based on a 5-point Likert scale, with the lowest score of 28 and the highest score of 140. The scores between 28 and 56 indicate poor organizational effectiveness, scores between 56 and 84 indicate moderate organizational effectiveness, scores between 84 to 112 indicate good organizational effectiveness, and scores above 112 indicate high organizational effectiveness.
- **Organizational efficiency:** Performance has a general concept and implicitly includes many variables (at the level of the organization and its circles). The extent to which multiple goals are met is judged during measuring organizational performance. Researchers believe that organizational efficiency is the central issue in all organizational analyses (Hashemi and Jafarpour,2019). Pinprayong and Siengthai (2012) list seven dimensions for measuring organizational performance: organizational strategy, organizational structure, management and leadership structure, employee work development and planning, employee commitment motivation, employee skills, and sub-goals. The organizational performance of

Pinprayong and Siengthai was analyzed with 21 items. Scoring is based on a 5-point Likert scale, with the lowest score of 21 and the highest score of 105. The scores between 21 and 42 indicate the low dimensions of efficiency, scores between 42 to 63 indicate the average dimensions of organizational efficiency, scores between 63 to 84 indicate good dimensions of organizational efficiency, and scores above 84 indicate high dimensions of organizational efficiency.

- **Organizational quality:** Inclusive quality management is a customer-oriented management method in which all people constantly strive to improve their work processes to provide better quality goods and services to all customers (Liaqatvarz , 2014). In this research, quality management consists of customer orientation, internal/external cooperation, continuous improvement, leadership, employee fulfillment, learning, and process management. The comprehensive quality data of Wang et al. is analyzed with 25 items. Scoring is based on a 5-point Likert scale, with the lowest score of 25 and the highest score of 125. The scores between 25 and 50 indicate a low level of quality management, scores between 50 and 75 indicate the average level of quality management, scores between 75 and 100 indicate a good quality limit, and scores above 100 indicate a high level of quality management.
- **Organizational productivity:** Productivity is the relationship between the output of a production system and the data used to produce that output (Nayeri ,2014). Productivity in the present study is the score from the 26-item Hershey-Blanchard-Goldsmith questionnaire, which includes seven effectiveness variables: ability, understanding and recognizing the job, organizational support, motivation, feedback, credibility, and adaptability. The scoring is based on the 5-point Likert scale, with the lowest score of 26 and the highest score of 130. Scores between 26 and 52 indicate a low level of organizational productivity, scores between 52 to 78 indicate the average level of organizational productivity, scores between 78 to 104 indicate a good level of organizational productivity, and scores above 104 indicate a high level of organizational productivity.
- **Quality of working life:** Quality of life is people's perception of their life situation based on the culture, value system, goals, expectations, standards, and concerns of the individual (Boostani ,2013). The operational definition of quality of life is the score obtained from the PedsQL Quality of Life Questionnaire, with variables including physical performance, emotional performance, social performance, educational performance, wellbeing, and understanding of health. The quality of working life of Wang et al. is analyzed with 25 items. Scoring is based on a 5-point Likert scale, with the lowest score of 25 and the highest score of 125. Scores between 25 and 50 indicate a low quality of working life, scores between 50 and 75 indicate an average quality of working life, scores between 75 to 100 indicate good quality of working life, and scores above 100 indicate a high quality of working life.
- **Organizational Innovation:** Organizational innovation is currently one of the most critical sustainable sources of competitive advantage for organizations (Camisón and Villar-López, 2014). The Organizational Innovation Questionnaire was designed and developed by Okas and Sak (2013) to measure organizational innovation in organizations as a single factor. This questionnaire was analyzed with six items. Scoring is based on a 5-point Likert scale. The scores range between 6 and 30. The higher the score, the more innovative it will be, and vice versa.
- **Financial Performance - ROA Profitability:** A company's financial performance can be defined by profit, profit growth, sales returns, dividends, cash flows, earnings per share, financial ratios (including ROA), and market value to book value ratio (Allahyarzadeh,2014). In this study, financial performance is the score from the financial performance questionnaire. Financial performance data are analyzed with 18 items as a single factor. Scoring is based on a 5-point Likert scale, with the lowest score of 18 and the highest score of 90. Scores between 18 and 36 indicate low financial performance,

scores between 36 and 54 indicate average financial performance, scores between 54 and 72 indicate good financial performance, and scores above 72 indicate high financial performance.

Based on fig. 1, the Sink-Tuttle model consists of seven variables: effectiveness, efficiency, quality, productivity, quality of working life, innovation, and profitability. Seven structures consisting of 149 items have been designed to analyze the performance of organizational units. In the performance evaluation structure of the Sink-Tuttle model, scores between 149 and 298 indicate poor organizational performance (level 2), scores between 298 to 447 indicate average organizational performance (level 3), scores between 447 to 596 indicate good organizational performance (level 4), and Scores above 596 indicate excellent performance (Level 5). The organizational performance model's minimum score for each structure is 149, and the maximum score is 745.

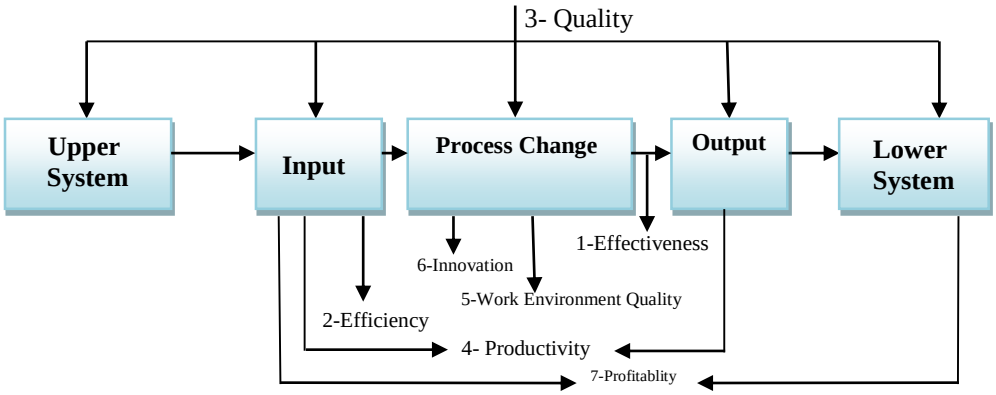

Fig.1. Sink-Tuttle model (Sink & Tuttle, 1989).

METHODOLOGY

The research method of this study is a descriptive survey. The present research is applied and developmental in terms of purpose. The theoretical framework of the research is taken from the Sink-Tuttle model. Input is the seven variables of effectiveness, efficiency, quality, productivity, quality of working life, innovation, and profitability, and output is the level of organizational performance. The present study evaluates the performance of NIPA's organizational units using the Sink-Tuttle model and data envelopment analysis. In order to determine the highest efficiency ratio and to involve the inputs and outputs of other decision-making units in determining the optimal weights for the unit under study, the input-oriented basic BCC model is proposed. Since the secondary models can determine the optimal recovery rate (reference set) of inefficient inputs and outputs, this research uses the input-oriented BCC cover model.

Definition 4-1- If the total dimensions of the Sink-Tuttle model are 596 to 745, it is considered level 5 and desirable organizational performance. Since efficiency is an indicator that measures the ability of a decision-making unit to manage the optimal use of inputs to produce outputs, a unit is considered more efficient when it can produce more output with less input. Therefore, 596 was divided by organizational performance to attain a lower numerical value for more desirable performance and a higher numerical value for undesirable organizational performance.

Model 1 is proposed by adding the definition 4-1 to the basic input-oriented BCC cover model to evaluate the organizational performance of the Sink-Tuttle model.

Min θ
St:

$$(596/\theta\, x_{io}) - \sum_{i=1}^{m}(596/\lambda_j x_{ij}) \geq 0 \text{ , } i = 1, \dots, m$$

$$\sum_{j=1}^{n} \lambda_j y_{rj} \geq y_{ro} \text{ , } r=1,\dots,s$$
$$\sum_{j=1}^{n} \lambda_j = 1$$
$$\lambda_j \geq 0, \forall_j$$

(1)

Since the pattern of the secondary model is input-oriented, the objective function tries to reduce the level of inputs (θ) by keeping the output level constant. In fact, θ is a real decision variable and λ is a non-negative vector of decision variables. In this model, the selection of each λ_j vector creates a high limit for the outputs and a low limit for the DMU_0 data. In contrast, the limitations θ related to λ≥0 offers a better option to relate to min θ=θ*, which causes θ* to represent the optimal improvement rate as a target model for other inefficient units.

Definition 4-2- In model 2, a decision-making unit is efficient when **θ^*=1**

FINDINGS

We consider eight decision-making units that use one input to produce an output. Input and output scores are shown in Table 1. The lowest score of organizational performance variable belongs to organizational unit 7 and the highest score belongs to organizational unit 5. The calculated scores of 7 structures for the organizational units are shown in Table 1. The radar chart (spider chart) of the variables of the Sink-Tuttle model is shown in Fig. 2.

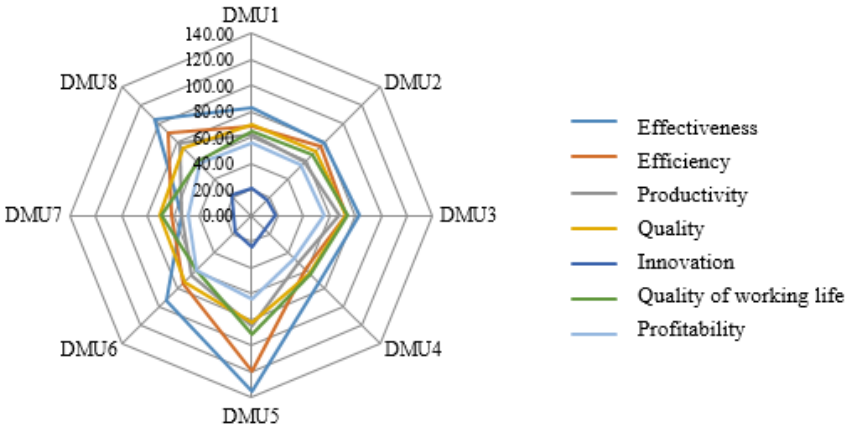

Fig. 2. Radar chart (spider chart) of the variables of the Sink-Tuttle model.

Table 1: Scores of organizational performance variables of NIPA company based on the Sink-Tuttle model.

organizational unit	effectiveness	efficiency	productivity	quality	innovation	quality of working life	quality of working life	organizational performance	Input	output
DMU_1	82.36	68.82	62.45	70.64	20.75	64.73	55.36	425.11	1.051	3
DMU2	78.64	74.82	57.91	69.73	16.36	66.73	54.64	418.82	1.067	3
DMU3	83	73	67.33	72.33	18	73.67	55.67	443	1.009	3
DMU4	73.38	58.38	51.38	62.71	14.50	64.14	46.57	371.05	1.204	3
DMU5	125	120	85	82	24	91	64	601	0.743	5
DMU6	92.33	74.73	65.27	72	18.07	59.47	60	441.87	1.011	3
DMU7	53.40	62	53.40	71	14	69.60	48.40	371.80	1.202	3
DMU8	105.10	89.80	78.60	73	22	58.10	56.40	483.70	0.924	4
Poor	Average	Good	Excellent							

According to table 1, the findings of the study show:

- The mean of the effectiveness variable is 87.90. The lowest score of the organizational effectiveness variable belongs to unit 7, and the highest score belongs to unit 5. The radar chart (spider chart) of the effectiveness variable is shown in Figure 3. Based on Table 1, the effectiveness of Unit 5 was high, the effectiveness of Unit 7 was low, the effectiveness of Units 6 and 8 was good, and the effectiveness of other units was moderate.

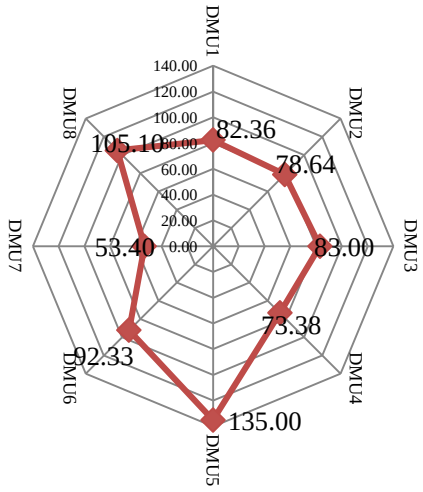

Fig. 3. The radar chart (spider chart) of the organizational effectiveness variable.

- The organizational productivity variable has an average of 77.69. The lowest score of the organizational productivity variable belongs to unit 4, and the highest score belongs to organizational unit 5. The radar chart (spider chart) of the organizational productivity variable is presented in Fig. 4.

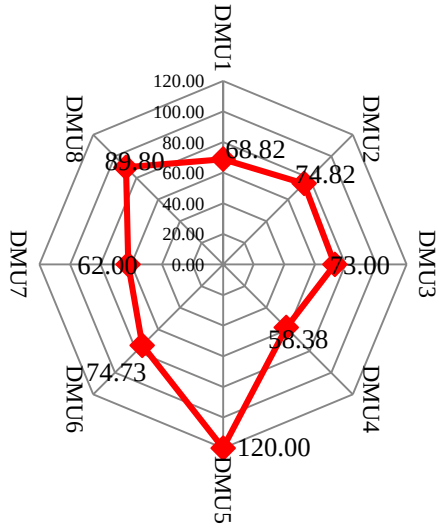

Fig. 4. The radar chart (spider chart) of the organizational productivity variable.

- The mean of the organizational efficiency variable is 65.17. The lowest score of the organizational efficiency variable belongs to unit 4, and the highest score belongs to unit 5. The radar chart (spider chart) of the efficiency variable is shown in Fig. 5.

Based on the findings of the study, the efficiency of Units 3, 6, and 8 were good, the efficiency of Unit 5 was excellent, and the efficiency of other units was moderate.

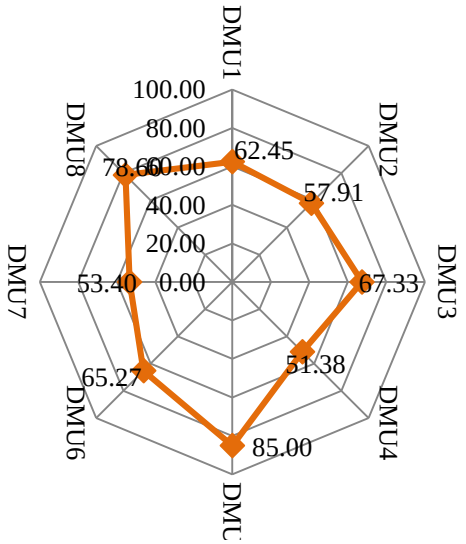

Fig. 5. The radar chart (spider chart) of the organizational efficiency variable.

- The quality variable has an average of 71.76. The lowest score of quality variable belongs to unit 4, and the highest score belongs to organizational unit 5. The radar chart (spider chart) of the quality variable is presented in Fig. 6. Based on the findings of Table 1, the quality of Unit 5 was excellent, and the quality of other units was moderate.

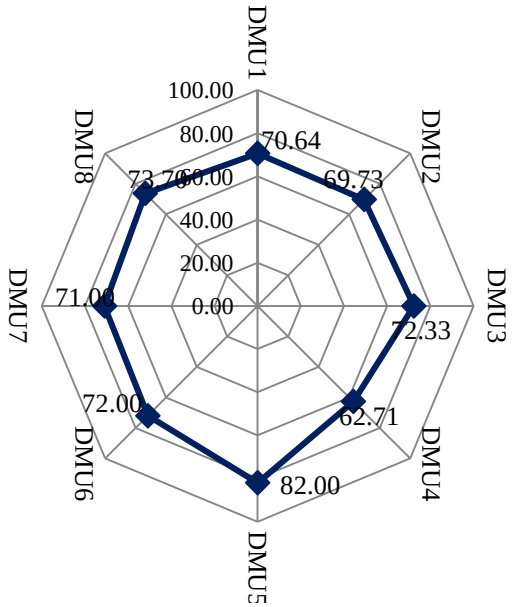

Fig. 6. The radar chart (spider chart) of the organizational quality variable.

- The organizational innovation variable has an average of 18.46. The lowest score of the organizational innovation variable belongs to unit 7, and the highest score belongs to organizational unit 5. The radar chart (spider chart) of the organizational innovation variable is presented in Fig. 7.

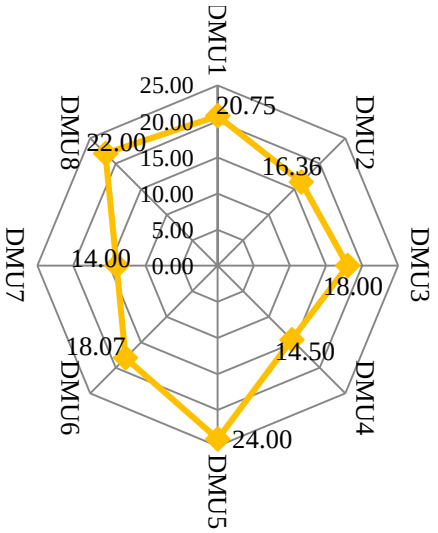

Fig. 7. The radar chart (spider chart) of the organizational innovation variable.

- The mean of the quality of working life variable is 68.43. The lowest score of the quality variable belongs to unit 8, and the highest score belongs to unit 5. The radar chart (spider chart) of the quality of working life variable is shown in Figure 8. Based on the findings of the study, the quality of working life of Unit 5 was excellent, and the quality of working life of other units was moderate.

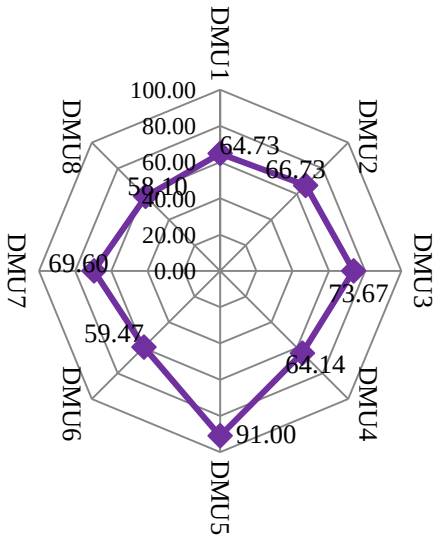

Fig. 8. The radar chart (spider chart) of the quality of working life variable.

- The mean of the financial performance variable is 55.13. The lowest score belongs to unit 4, and the highest score belongs to unit 5. The radar chart (spider chart) of the financial performance variable is shown in Fig. 9.

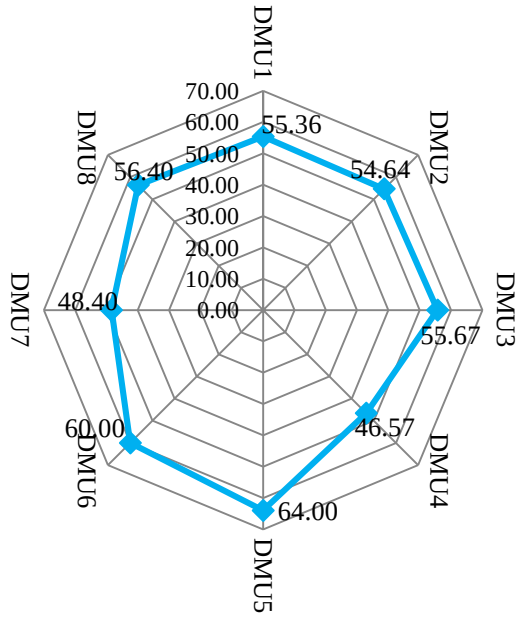

Fig. 9. The radar chart (spider chart) of the financial performance variable.

Model 1 was implemented in LINGO software, and the performance of decision-making units is given in Table 2. As shown in this table, Unit 5 is efficient and the other units are inefficient of the eight decision-making units.

Table 2: the efficiency calculated in LINGO according to model 1.

DMUs	Efficiency
DMU_1	0.707344
DMU_2	0.696869
DMU_3	0.737105
DMU_4	0.617394
DMU_5	1
DMU_6	0.735219
DMU_7	0.618636
DMU_8	0.804825

Thus, organizational unit number 5, with an excellent performance level, has 100% efficiency and is considered a reference for other organizational units. The rest of the studied units in this period have been operating below the efficiency level. Meanwhile, organizational units 4, 7 and 2 have performed very poorly. The results of evaluated performance indicate that the majority of organizational units have been inefficient in using resources. The low-efficiency level of organizational units shows the necessity of the optimal use of resources and capacities to improve performance.

CONCLUSION

Improving the performance of organizations needs an efficient platform for performance appraisal. An appropriate approach that is used in organizational units and covers all essential performance indicators and is relevant to the research topic, the "Sink-Tuttle" performance evaluation model in the form of complex relationships between seven performance indicators, including "effectiveness, efficiency, quality, productivity, "Quality of work-life, innovation and profitability." With the help of data envelopment analysis, it is possible to allocate a minimum of input resources and improve the current and future status of the organization. The present study evaluated the performance of NIPA's organizational units using the Sink-Tuttle model and data envelopment analysis. The BCC base model input-based was proposed to determine the highest efficiency ratio and involve the number of inputs and outputs of other decision-making units in determining the optimal weights for the unit under study.

In the evaluation, organizational unit number 5 has an excellent level of performance with the highest score, and organizational unit number 8 has a more appropriate level of performance than other organizational units based on the Sink and Tuttle model. The results of data envelopment analysis also showed the efficiency of

organizational unit number 5 and higher efficiency of organizational unit number 8 than other inefficient units. The overlap of the results in these two approaches is proof of the proposed model's validity. The proposed model, with more generalizability and realistic evaluation capability and high adaptability to be used in various performance appraisal issues, helps improve the performance appraisal system.

Among the eight organizational units studied here, one is an efficient organizational unit, and the other units are inefficient. Organizational performance should be improved and enhanced based on seven components of the sink and Tuttle model to reduce the potential effects of adverse organizational performance of other organizational units in weak stations:

- Coordination between strategies and creating a platform for organizational learning and knowledge management is recommended to improve organizational performance.
- Applying participatory management, proper employment of employees in jobs, clarification of reward system, appropriate training and development of job descriptions, and a clear organizational algorithm will increase organizational effectiveness.
- Productivity can be increased by paying attention to employee orientation training about the organization's goals, staff awareness of job knowledge and skills, job security, awareness and compliance with organizational rules and regulations, the existence of a rational system of rewards and punishments.
- Action should be taken to increase the organization's efficiency, improve performance, and improve and promote the mental health of the workplace as the most important aspect of human resource development. This will transform the workplace into a calm and acceptable environment and facilitate employees' growth, prosperity, and positive performance.
    - Senior management support, middle management attitude, productivity measurement standards effectively improve the quality of working life.
- Factors such as individual and organizational, educational, cultural, management style factors affect creativity and innovation.

Finally, it is suggested that:

• Data envelopment analysis model should be implemented periodically at different time intervals

• Investigate and analyze the impact of defined performance indicators on performance change.

REFERENCE

Adabavazeh, N., & Nikbakht, M. (2020). Organization's performance measurement model based on the critical success factors of the reverse supply chain in airline industry with a quality gap approach. Journal of Industrial Engineering and Management Studies. 7(1), 177-190. doi: 10.22116/jiems.2020.110016.

Adabavazeh, Nazila, & Nikbakht, Mehrdad (2020). Organizational Units Performance Assessment Model With TOPP Approach. 6th international conference of industrial engineering and systems, Mashhad Ferdowsi University.

Allahyarzadeh, Zahra (2014). Assessment of The Effect of Intellectual Capital As A Knowledge Management Tool On The Financial Performance of Banking Industry (A Case Study: Parsian Bank). Master thesis, Tehran Islamic Azad University, Tehran, South branch.

Behboodi, Omid, Rajouei, Morteza, Zaraei, Azim, & Shojaei Baghini, Golnar (2018). Designing a Model for Marketing Performance Evaluation Criteria in the Iranian Tourism Industry, Journal of Tourism and Development. Volume 7, Number 4, pp. 61-82.

Boostani, Nasim (2013). Comparison of Quality of Life And The Factors Affecting It Among Abused Children And Normal Children Aged 14-10 In Birjand In 2012. Master Thesis, Allameh Tabatabai University, Part-time Pardis.

Camisón,C.,Villar-López, A. (2014). Organizational innovation as an enabler of technological innovation capabilities and

firmperformance. Journal of Business Research 67, 2891–2902.

Changa, Yu, Wang, Xinchun, & Arnett, Dennis B.(2018). Enhancing firm performance: The role of brand orientation in business-to-business marketing. Industrial Marketing Management.

Farhad Hosseinzadeh Lotfi, Ali Ebrahimnejad, Mohsen Vaez-Ghasemi, & Zohreh Moghaddas (2020). Data envelopment analysis with R, Springer International Publishing.

Ghalayini, A.M., Noble, J.S. and Crowe, & T.J. (1997). An Integrated Dynamicperformance Measurement system for Improving Manufacturing competitiveness. International Journal of Production Economics, Vol.48, pp.25-207.

Hashemi, Seyed Ahmad, & Jafarpour, Mahboubeh (2019). The Relationship between Organizational Atmosphere and Mental Health with Organizational Efficiency of Primary School Teachers and Principals. Fourth International Conference on New Research Achievements in Social Sciences, Educational Sciences and Psychology.

Jafarnejad, Ahmad, Morovati Sharifabadi, Ali, & Asadian Ardakani, Faezeh (2013). Selected Topics in Supply Chain Management. Mehraban Publishing Institute, Tehran.

Keegan, D. P., Eiler, R. G., & Jones, C. R. (1989). Are yor performance measures obsolete. Management Accounting, June, 45-50.

Liaqatvarz, Kianoosh (2014). The Relationship Between Comprehensive Quality Management And Market Orientation Of Organizational Performance With Respect To The Moderating Role Of External Environmental Factors (In The Branches Of Insurance Companies In Guilan Province). Master Thesis. Rasht Islamic Azad University.

Mahmoudi, Omar, & Derakhshani, Omid (2017). The Effect of Organizational Structure on Organizational Effectiveness in Islamic Azad University. Quarterly Journal of New Research in Management and Accounting, Volume 3, Number 18, pp. 15-48.

Moghaddas, Zohreh, Vaez-Ghasemi, Mohsen, & Hosseinzadeh Lotfi, Farhad (2021). A Novel DEA approach for evaluating sustainable supply chains with undesirable factors. Economic Computation & Economic Cybernetics Studies & Research. 55, 2.

Nanni, A. J., Dixon, J. R. & Vollmann, T. E. (1992). Integrated performance measurment: management accounting to support the new realities. Journal of Managment Accounting Research, fall, 1-19.

Nayeri, Amir Reza (2014). Assessment of The Level of Satisfaction With Virtual In-Service Training And Its Impact On The Productivity of The Radio And Television Organization. Master Thesis. Islamic Azad University. Central Tehran Branch.

Nguyen, NP (2018). Performance implication of market orientation and use of management accounting systems: The moderating role of accountants' participation in strategic decision making. Journal of Asian Business and Economic Studies.

Sakhaei, Ayub (2018). Meta-analysis of Satisfaction Surveys and Performance Evaluation of Social Security Organization. Social Security Quarterly, Volume 14, Number 4, pp. 55-90.

Salimi, Masoumeh, (2015). The Role Of Human Resource Productivity And Knowledge Management. Social, Economic, Scientific and Cultural Monthly of Work and Society, No. 188, pp. 49-63.

Tajik Yabr, Abdol Hossein, Najafi , Seyed Esmail, Moghaddas, Zohreh, & Shahnazari Shahrezaei, Parisa (2022). Interval Cross Efficiency Measurement for General Two-Stage Systems. Mathematical Problems in Engineering, Hindawi.

Tangen, S (2004). Evaluation and revision of performance measurement systems, PHD thesis, Stockholm, Sweden.

Tavakoli Golpayegani, Maryam, Alem Tabriz, Akbar, Amiri, Maghsoud, & Motameni, Alireza (2016). Explaining the Integrated Strategic Model of Insurance Industry Performance Evaluation. Strategic Management Studies, No. 25, pp. 151-171.

Tavallaei, Ruhollah (2007). Modern Approaches to Performance Evaluation of Organizations, Police Human Development Bi-Quarterly. No. 12, pp. 9-30.

Uygun, Özer & Dede, Aysße (2016). Performance evaluation of green supply chain management usingintegrated fuzzy multi-criteria decision making techniques. Computer & Industrial Engineering, Vo.102, 502-511.

Vaez-Ghasemi, Mohsen, Moghaddas, Zohreh, & Farzipoor Saen, Reza. (2021). Cost efficiency evaluation in sustainable supply chains with marginal surcharge values for harmful environmental factors: a case study in a food industry. Operational Research. 1-16. Springer Berlin Heidelberg.

Youseliani, Gholam Ali, Behrangi, Mohammad Reza, Arasteh, Hamidreza, & Abdollahi, Bijan (2016). Designing a Model for Evaluating the Performance of the Research System in Education (Case Study: Research Departments of the General Departments of Education of the Provinces)., Quarterly Journal of Education, No. 134, pp. 31-51.

Zhao, Huiru, & Li, Nana (2015). Evaluating the performance of thermal power enterprises using sustainability balanced scorecard, fuzzy Delphic and hybrid multi-criteria decision making approaches for sustainability. Journal of Cleaner Production, Vol.108, Part A,569-582.