Identification and Prioritization of Factors Affecting Organizational Performance Evaluation Using Analytic Hierarchical Process and Balanced Scorecard

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Abstract: The purpose of this research is to identify and prioritize factors affecting organizational performance evaluation using analytic hierarchical process and balanced scorecard in Social Security Organization of Khuzestan Province. The methodology used in this research in terms of purpose is applied-developmental and in terms of nature is descriptive-survey. The statistical population of this research includes the senior managers, master experts and managers of branches of Social Security Organization of Khuzestan Province. The size of population is equal to 15. The tools used in this research include an author-made questionnaire, Delphi technique and analytic hierarchical process (AHP). Data analysis is done using expert choice software. According to the results, financial perspective with a weight of 0.412 was the first priority and customer perspective, internal processes, and growth and learning with weights of 0.383, 0.126 and 0.079, respectively, were the next priorities. To obtain the final weight of each of the sub-indicators, the perspective weight should be multiplied by its indicator. This way, the final weights are obtained, which reducing cost from a financial perspective, customer satisfaction and creating a positive image in the customer's mind from the customer perspective have, in order, the highest importance and priority from perspective of the experts of this research. On the other hand, the use of technology, the cost of R&D, and organizational climate change have the least priority. The important point is that all of these three sub-indicators are considered from the learning perspective.

Keywords: Organizational Performance, Analytic Hierarchical Process, Balanced Scorecard

INTRODUCTION

Performance measurement is one of the best ways to obtain information for decision making in organizations. Between 1850 and 1975, organizations could only by making decisions based on financial criteria guarantee their success, but with increased competition in the markets, managers in addition to being aware of the financial criteria also need to be aware of other aspects of the organization's performance (Kaplan, 1996). Many arguments about non-financial criteria are obtained from crises in the financial criteria. Each organization aims to raise awareness about the desirability and quality of its activities. Especially in the complex and dynamic environments, it highly needs to evaluation. On the other hand, the lack of a system of evaluation

and control in a system means the lack of communication with the inside and outside environment, whose consequences are aging and ultimately the death of organization (Abrovan, 2014). Determining the performance can be defined as a control system in any company that examines its daily operations and can evaluate to which extent the company has achieved its goals (Mahmoodi et al., 2012). Proposing a comprehensive and transparent evaluation system with two approaches of controlling and monitoring the organization's performance and evaluating performance of the Social Security Organization can have different economic and social impacts for countries. It because that the Social Security Organization is one of the most important economic entities and the most powerful supports for other economic, social and institutions and household (Pop, 1999). Given the large number of users of social security services and given the fact that so far the key indicators of social security performance are not determined, we can surely say that it is impossible to achieve the goals of this organizations, because without specifying the key performance indicators, you cannot identify the available vacuum and so you cannot achieve the goals. Therefore, a comprehensive research is required to reach the social security goals, which its ultimate goal is to provide welfare in the community. Therefore, the present study aims to evaluate performance using AHP and BSC methods in Social Security Organization of Khuzestan Province, making it possible to evaluate performance and thereby achieve the goals. In the extremely competitive and changing environment of today, organizations need to spend time, energy and significant organizational and financial resources to evaluate their performance to achieve their strategic goals (Niven, 2012). In general, the performance evaluation system can be defined as the process of measurement, evaluation and comparing the extent and the way to achieve the desired situation with certain criteria and attitudes in the intended domain by certain indicators in a specified period of time with the aim of continuous revision, modification and improvement (Rahimi, 2006). Therefore, the balanced scorecard as an effective and validated approach proposed in response to our need so that by transforming intangible assets to the real value for all stakeholders in an organization allow the organizations to successfully implement their distinctive strategies (Niven, 2012). Complexity of the business environment and the expectations of customers further reveals the need for identification of the strengths and weaknesses of organizations as well as the need for continuous improvement of processes. Hence, today's executives are looking to achieve a comprehensive, reliable and flexible solution to evaluate performance of organizations so as besides ensuring implementation of their strategies can obtain also accurate and enough information of their current position among competitors and by looking at the future promote their organization.

Research background

Evaluation and enhancing the performance of organizations as the most important pillar of production and determinants of the development of societies is of great importance. Determining important criteria and prioritizing them to determine the current status, improving the quality level through identification and dealing with the weaknesses and trying to increase strengths are among responsibilities of the executive managers (Kooshkan, 2013). Performance evaluation is one of the main tasks of each organization and an aspect of performance management, which in the past has been implemented further through the use of financial indicators (Wong et al., 2016). In the last two decades, topics such as organizational learning, knowledge creation and capacity of innovation are considered as competitive advantage and this focus has been due to the emergence of globalization, intensified competition and unprecedented technological advancement, especially in the field of communications and information (Amy et al., 2016).
In the traditional view, the goal is to control the assessor and to find his illegal actions, and then employing imperative and trials style, while in the modern view, it aims at learning, growth and improvement of individuals and organization. The reason why most traditional performance evaluation systems today are static is that these systems do not dynamic and sensitive against changes inside the organization as well as changes outside the organization environment (Ghazanfari et al., 2014). History of performance evaluation in

Iran dates back to the seventh century AH. This issue was first raised by Khajeh Rashid al-din Fadlullah. Centuries later, in 1970, it was established in the country that management and the way things are done to be evaluated. To this end, the center for evaluation of governmental organizations was formed in the prime minister's office. In 1973, with the launch of the fifth development plan and according to article 8, clause 5, chapter three of the program and budget law of the country, the task of evaluating performance of executive agencies was delegated to the Plan and Budget Organization and so, the evaluation d assessor of governmental agencies was formed in this organization. In general, the prevailing view to the evaluations should have a consultant and facilitator role in the organization's operations, to focus on the growth, improvement and development of performance, to consider the growth, guidance and development of the evaluated capacity, to be based on dialogue and principles of self-assessment and self-standardization, and also to be focused on the future and to be based on futurism (Ibn Rasul et al., 2015).

Shoghli and Roshnas (2015) in his exanimation on AHP and BSC application in the evaluation of the scientific groups' performance ranked balanced scorecard dimensions. They said that according to the results of their research, in addition to providing and developing an appropriate combination of two techniques AHP and BSC for creation an image of the use of four balanced scorecard scenarios in educational settings, can also use in the planning and improvement of the performance of similar educational systems by improving the quality of performance evaluation and educational ranking.

Khatami (2015) examined evaluation and ranking of the performance evaluation indicators in Bank Melli using balanced scorecard model and fuzzy AHP with an emphasize on the financial indicators. He concluded that among four dimensions, the financial dimension ranked first, the customer dimension ranked second, dimension of growth and learning ranked third, and dimension of internal process ranked fourth. Varmazyar et al. (2016) in their review proposed a new comprehensive approach based on MCDM and BSC approaches to evaluate performance of the research centers of the research and technology organization. Kadarova et al. (2014) combined DEA and BSC in order to obtain comprehensive performance and the management systems of productivity for industrial companies and their processes. Fakhri et al. (2011) in their study in evaluating the Libyan banks' performance found that most banks consider the financial performance indicators as the most important and the first step of performance evaluation, but some others considered customer satisfaction indicator as the most important one.

Research methodology

The research method in terms of methodology is descriptive (non-experimental) or experimental, which the present research based on its nature falls into the category of descriptive research. The basic information needed in this method is usually collected through questionnaires, interviews and observations. This research is an exploratory research that uses Delphi method. Statistical population and sample include all the senior managers and the managers of the social security organization branches that because small size of the population (15 participants), all the managers were examined. In the first stage, the main indicators of performance evaluation were identified using a library method and deep interview, then, these indicators through an analytic in a hierarchical analysis questionnaire were given to participants and prioritized using the AHP technique.

To collect information about the finalized indicators, we used a specialized questionnaire for the second half of the year 2017 until the first half of the year 2018. In the questionnaire to collect information about the degree of importance of identified criteria and sub-criteria, indicators with respect to the four dimensions of the used model in the form of pairwise comparison worksheets and based on 9-point hours valuation were designed and were given to the statistical participants for evaluation purposes and answering the questions. To prioritize them and balanced scorecard perspectives as a benchmark, indicators extracted from four dimensions were considered as the subcategory of the model. Concerning the composition and overall scheme of the

questionnaire and how to design it, we used AHP. Weighing the indicators was carried out by entering information into the Expert Choice and step-by-step execution. Finally, weigh of the criteria and sub-criteria using AHP as well as their significance was determined. To validate these factors, we used the Delphi method to provide the experts with a questionnaire. Then, after confirming the questionnaire, in order to determine the importance and weight of each of the risks, AHP method is used. The AHP method is implemented in the Expert Choice. To perform a full evaluation of the performance of an organization, this function must be examined from four perspectives or angles:

- Financial perspective
- Customer perspective
- Internal process perspective
- Learning and growth perspective

BSC instead of focusing on financial control tools, which provides little guidance on long-term decision-makings, uses measurement as a new tool to describe the key elements for achievement to a strategy.

Research findings

Screening sub-indicators of BSC perspectives

Stage 1: Identification of performance indicators. In this stage, we first review the research background and performance evaluation criteria, then a questionnaire is prepared and given to the experts to make comments. Stage 2: prioritizing the performance evaluation indicators using the AHP technique. In this stage, the AHP model is used to prioritize the indicators. According to the hour model, in the first step, the hierarchical tree of the problem was drawn in accordance with the specified indices in three levels: goal, criteria and sub-criteria. Financial criteria had 6 sub-criteria, growth and learning had 7 sub-criteria, internal processes had 5 sub-criteria, and customer had 6 sub-criteria. In this method, all factors were distributed to the experts in a questionnaire at first in a meeting and then for the second and third times were sent to them and they were asked to comment on the appropriateness of the indicators for each section of the sub-indicators of the BSC perspective.

Factors with an average score of above the mean (3.5) verified and other factors were removed. If the experts' disagreement between the two stages is less than 0.2, the task of confirming or rejecting the factor is determined at the same stage and if the disagreement is more than 0.2, then the factor would again be reflected in the questionnaire and would be sent to the experts (Varmazyar et al., 2016). In the following, the results of the first stage of the Delphi questionnaire are presented. The average score of opinions is calculated using the geometric mean method.

Table 1. Results of the first stage of the Delphi method

Perspective	Identified sub-indicators	First stage average	Second stage average
Financial	Improving the financial structure	4.641	4.341
	Development of income opportunities	4.482	4.372
	Reduced costs	4.514	4.634
	Increase in receivables	3.845	3.914
	Optimal capital management	4.438	4.418
	Increased asset utilization	4.718	4.608
Learning	Organizational climate change	4.573	4.521
	Using technology	4.104	4.117
	Continuous education	4.129	4.236
	Employing skilled staff	4.366	4.452
	R&D cost	4.234	4.254

	Increased motivation	3.986	4.131
	Learning organization	4.216	4.114
Customer	Customer satisfaction	4,084	4.134
	Attracting insurers	4.362	4.282
	Creating a positive image in the minds of the customer	4.275	4.415
	Creating a strong customer relationships	4.093	4.053
	Increasing the value to be proposed to the customer	4.188	4.241
	Updating the organization's rules	4.361	4.265
	Good responding to the Customer	Transferring to internal processes	3.923
Internal processes	Public relations and advertising	3.723	4.519
	Enhancing the quality	4.509	4.242
	Reduced time for customer	4.382	3.951
	Interacting with other organizations	4.760	4.740

According to the results, list of factors along with the average results of the first stage were sent to the experts. In the following, we compare the results from the first and second stages to decide whether the factors are confirmed or rejected.

Table 2. The difference between the average of the views of the first and second stages

Perspective	Identified sub-indicators	First stage	Second stage	Difference	Result
Financial	Improved financial structure	4.641	4.341	0.3	Next stage
	Development of income opportunities	4.482	4.372	0.11	Confirmation
	Reduced costs	4.514	4.634	0.12	Confirmation
	Increase in receivables	3.845	3.914	0.069	Confirmation
	Optimal capital management	4.438	4.418	0.02	Confirmation
	Increased utilization of assets	4.718	4.608	0.11	Confirmation
Learning	Organizational climate change	4.573	4.521	0.052	Confirmation
	Using technology	4.104	4.117	0.013	Confirmation
	Continuous education	4.129	4.236	0.107	Confirmation
	Employing skilled staff	4.366	4.452	0.086	Confirmation
	R&D cost	4.234	4.254	0.02	Confirmation
	Increased motivation	3.986	4.131	0.145	Confirmation
	Learning organization	4.216	4.114	0.102	Confirmation
Customer	Customer satisfaction	4,084	4.134	0.05	Confirmation
	Attracting insurers	4.362	4.282	0.08	Confirmation
	Creating a positive image in the minds of the customer	4.275	4.415	0.14	Confirmation
	Creating strong customer relationships	4.093	4.053	0.04	Confirmation
	Raise the value to be presented to the customer	4.188	4.241	0.053	Confirmation
	Updating the organization's rules	4.361	4.265	0.096	Confirmation
Internal processes	Public relations and advertising	3.723	3.925	0.202	next level
	Enhancing the quality	4.509	4.519	0.01	Confirmation
	Reduced time for customer	4.382	4.242	0.14	Confirmation
	Responding to the customer	----	3.951	----	next level
	Interacting with other organizations	4.760	4.742	0.018	Confirmation

According to the results, it clears that status of all the above indicators, except 3 of them, can be determined at this stage and indicators are confirmed by the experts. Two indicators had an average difference of more than 0.2 and one indicator due to the change from the customer perspective to the perspective of internal processes, in the first stage of poll had no average so that the next stage to be determined according to its status. In this way, a questionnaire containing three remaining indicators was sent to the experts and the results are shown in Table 3.

Table 3. Results of the third stage of Delphi

Below the index Remaining	Average
Improved financial structure	4.462
Public relations and advertising	4.105
Responding to the customer	3.989

In the following, the results obtained from the second and third stages of decision making about confirmation or rejection of the remaining sub-indicators are discussed.

Table 4. Investigating the difference between the average of opinions of the second and third stages

Identified factors	Second stage average	Third stage average	Difference of averages	Result
Improved financial structure	4.341	4.462	0.121	Confirmation
Public relations and advertising	3.925	4.105	0.180	Confirmation
Responding to the customer	3.951	3.989	0.038	Confirmation

In the third phase of Delphi, it was found that the three remaining sub-indicators are confirmed. Therefore, with an indicator change, all the indicators were confirmed by the experts and status of all the sub-indicators of the BSC model was determined.

Analytic hierarchy process

Based on the four main perspectives of BSC, sub-indicators were identified and screened. At this stage, each of the perspectives and sub-indicators are weighed and prioritized. For this purpose, AHP technique is used. To do this, first, pairwise comparison is made between BSC perspectives and importance of each one is determined. This is done by the questionnaire tool, which is provided in the appendix. This questionnaire determines importance of any perspective compared to other indicators. Experts' responses range from 1 to 9 and Table 5 shows a sample of pairwise comparisons.

Table 5. Pairwise comparison of between balanced scorecard scores

Perspective	Importance of indicators in comparison to each other in achieving the research goal																	The perspective
Learning	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Financial
Customer	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Financial
Internal processes	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Financial
Customer	9	8	7	6	5	4	3		2	1	2	3	4	5	6	7	8	9	Learning
Internal processes	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Learning
Internal processes	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customer

Using the paired comparisons, the matrix of pairwise comparison is formed. In other words, for each of the questionnaires completed by the experts, a paired comparison matrix is formed. Since in the AHP, the relative importance of indicators and sub-indicators is questioned, geometric average is used to aggregate experts'

opinions. Table 6 shows the average opinion matrix of experts in relation to the BSC perspectives. For each of the pairwise comparison tables, the incompatibility rate should be calculated, which the acceptable level of incompatibility should be less than 0.1. The compatibility coefficient of criteria in this model is less than 0.1, which indicates acceptable compatibility of system.

Table 6. Matrix of experts' average opinions in conjunction with balanced scorecard perspectives

Average	Financial	Learning	Customer	Internal processes
Financial	1.00	4.36	1.19	3.94
Learning	0.23	1.00	0.23	0.45
Customer	0.84	4.36	1.00	4.12
Internal processes	0.25	2.21	0.24	1.00
Inconsistency rate: 0.083				

Table 6 according to the AHP should be linearly normalized. To this purpose, each entry of matrix is divided by the maximum entry of the associated column. The result of this operation is shown in Table 7.

Table 7. Standardized matrix of balanced scorecard perspectives

Normalize	Financial	Learning	Customer	Internal processes
Financial	1.00	1.00	1.00	0.96
Learning	0.23	0.23	0.19	0.11
Customer	0.84	1.00	0.84	1.00
Internal processes	0.25	0.51	0.20	0.24

After Scale Transformation of the matrix entries, average of each matrix rows was taken and weight of the perspectives obtained, which is shown in Table 8.

Table 8. The weights of balanced scorecard perspectives

Sights	Weights
Financial	0.412
Learning	0.079
Customer	0.383
Internal processes	0.126

Pairwise comparisons of the four perspectives, e.g. financial, customer, internal processes, and growth and learning, based on the opinions of the experts in accordance with Table 8 were determined. In other words, the weight and position of each criterion based on the governing relationships in the AHP are determined. As shown in Table 8, financial perspective with a weight of 0.412 is the first priority and customer perspective, internal processes and growth perspective, and learning perspective with weights of 0.383, 0.126 and 0.079 are in next priorities, in decreasing order.

- **The process of AHP for the financial perspective**

Similarly, Tables 9 and 10 show the stages of AHP for the financial perspective. Table 9 consistent with the AHP should be linearly normalized. To this purpose, each entry of the matrix is divided by the maximum entry of that column.

Table 9. The average matrix of pairwise comparisons in conjunction with sub-indicators of financial perspective

Average	Improved financial structure	Development of income opportunities	Reduced costs	Increase in receivables	Optimal capital management	Increased asset utilization
Improved financial structure	1.00	0.34	0.17	0.25	2.21	1.86
Development of income opportunities	2.91	1.00	0.33	0.50	3.22	3.94
Reduced costs	5.96	3.00	1.00	2.00	4.86	4.90
Increase in receivables	3.94	2.00	0.50	1.00	3.22	1.35
Optimal capital management	0.45	0.31	0.21	0.31	1.00	3.46
Increased asset utilization	0.54	0.25	0.20	0.74	0.29	1.00
Inconsistency rate: 0.026						

Table 10. Normalized matrix of sub-indicators of financial perspective

Normalized	Improved financial structure	Development of income opportunities	Reduced costs	Increase in receivables	Optimal capital management	Increased asset utilization
Improved financial structure	0.17	0.11	0.17	0.13	0.45	0.38
Development of income opportunities	0.49	0.33	0.33	0.25	0.66	0.80
Reduced costs	1.00	1.00	1.00	1.00	1.00	1.00
Increase in receivables	0.66	0.67	0.50	0.50	0.66	0.28
Optimal capital management	0.08	0.10	0.21	0.16	0.21	0.71
Increased asset utilization	0.09	0.08	0.20	0.37	0.06	0.20

In other words, the weight and position of each sub-criterion are determined based on the relationships governing in the AHP. As shown in Table 11, sub-indicators of financial perspective of reducing the cost by 1.00 is in the first priority and increase in receivables, development of income opportunities, improvement of financial structure, optimal management of capital, and increased asset utilization with weights of 1.00, 0.54, 0.48, 0.24, 0.24 and 0.17, in decreasing order, are the next priorities.

Table 11. Weights of financial perspective sub-indicators

Financial perspective sub-indicators	Weights
Improved financial structure	0.24
Development of income opportunities	0.48
Reduced costs	1.00
Increase in receivables	0.54
Optimal capital management	0.24
Increased asset utilization	0.17

Stages of AHP for the learning perspective

Tables 12, 13 and 14 shows steps of the AHP for the learning perspective. According to the AHP, Table 12 should be linearly normalized. To this purpose, each of the matrix entries is divided by the maximum entry of the corresponding column. The compatibility coefficient of the criteria in this model is less than 0.1, which indicates acceptable compatibility of the system.

Table 12. The average matrix of pairwise comparisons in conjunction with sub-indicators of learning perspective

Average	Organizational climate change	Using technology	Continuous education	Employing skilled staff	Cost of R&D	Increased motivation	Learning organization
Organizational climate change	1.00	2.21	0.27	0.30	1.86	0.23	0.17
Using technology	0.45	1.00	0.32	2.59	2.63	0.37	0.25
Continuous education	3.66	3.13	1.00	2.63	3.94	2.06	0.36
Employing skilled staff	3.31	0.39	0.38	1.00	5.38	1.86	2.45
Cost of R&D	0.54	0.38	0.25	0.19	1.00	6.70	0.30
Increased motivation	4.36	2.71	0.49	0.54	0.15	1.00	3.08
Learning organization	5.79	3.94	2.78	0.41	3.31	0.32	1.00
Inconsistency rate: 0.076							

Table 13. Normalized matrix of sub-indicators of the learning perspective

Normalized	Organizational climate change	Using technology	Continuous education	Employing skilled staff	Cost of R&D	Increased motivation	Learning organization
Organizational climate change	0.17	0.56	0.10	0.11	0.35	0.03	0.06
Using technology	0.08	0.25	0.11	0.98	0.49	0.06	0.08
Continuous education	0.63	0.80	0.36	1.00	0.73	0.31	0.12
Employing skilled staff	0.57	0.10	0.14	0.38	1.00	0.28	0.80
Cost of R&D	0.09	0.10	0.09	0.07	0.19	1.00	0.10
Increased motivation	0.75	0.69	0.17	0.20	0.03	0.15	1.00
Learning organization	1.00	1.00	1.00	0.16	0.61	0.05	0.32

In other words, the weight and position of each sub-criterion are determined based on the relationships governing the AHP. As shown in Table 14, sub-indicators of the learning perspective with weigh of 0.59 is in the first priority, and continuous education, employing skilled staff, increasing motivation, using technology, cost of R&D, and organizational climate change with weights of 0.56, 0.47, 0.43, 0.29.0.23 and 0.20 are in the next priorities, in decreasing order.

Table 14. Weights of sub-indicators of the learning perspective

Sub-indicators of the learning perspective	Weights
Organizational climate change	0.20

Using technology	0.29
Continuous education	0.56
Employing skilled staff	0.47
Cost of R&D	0.23
Increased motivation	0.43
Learning organization	0.59

Final ranking of the sub-criteria with respect to the target

The weights obtained from sub-criteria of each perspective are independent of other perspectives and so to get the final weight of each of the sub-indicators, the weight of sub-indicators should be multiplied by its sub-indicators and this way, their final weights as shown in Table 15 are obtained.

Table 15. The final weights of sub-indicators of the learning perspective the index Balanced Scorecard Landscapes

Perspective	Perspective weight		Sub-indicators	Sub-indicators weight
Financial	0.412	1	Improved financial structure	0.097
		2	Development of income opportunities	0.197
		3	Reduced costs	0.412
		4	Increase in receivables	0.224
		5	Optimal capital management	0.100
		6	Increased asset utilization	0.069
Learning	0.079	1	Organizational climate change	0.016
		2	Using technology	0.023
		3	Continuous education	0.045
		4	Employing skilled staff	0.037
		5	Cost of R&D	0.019
		6	Increased motivation	0.034
		7	Learning organization	0.047
Customer	0.383	1	Customer satisfaction	0.371
		2	Attracting insurers	0.194
		3	Creating a positive image in minds of customers	0.269
		4	Creating strong customer relationships	0.094
		5	Raising the value to be presented to the customer	0.109
		6	Updating the organization's rules	0.055
Internal processes	0.126	1	Public relations and advertising	0.034
		2	Improving quality	0.097
		3	Reduced time for customer	0.082
		4	Responding to customer	0.081
		5	Interaction with other organizations	0.036

As shown in Table 15, cost reduction from the financial perspective and customer satisfaction and positive image creation in the minds of the customer from the customer perspective are the most important priority from perspective of the experts in this research. On the other hand, the use of technology, R&D costs and

organizational climate change have the least priority. The important point is that all of these three sub-criteria are from the learning perspective.

Conclusions

In the current study, the research findings are based on the methodology of the research. First, descriptive tables relating to structure of the research experts was presented in the form of several charts. Then, Delphi method was used to specify sub-criteria for the following four perspectives: financial, learning, customer, and internal processes of BSC. Finally, we used AHP method to weigh and prioritize sub-indicators of the following perspectives: financial, learning, customer, and internal processes.

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