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Analysis and evaluation of the legislation performance of different periods of the Islamic Parliament based on Data Envelopment Analysis

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Abstract

Legislation constitutes one of the most critical responsibilities of the Islamic Parliament. Given its pivotal role in addressing the country's political, economic, and social issues, evaluating this institution and identifying factors that influence its performance takes on particular significance. This necessitates the development of a suitable model for assessing its performance. Therefore, the primary aim of this research is to provide an efficiency measurement model for evaluating the legislative performance of the Islamic Parliament. To achieve this goal, considering that the Islamic Parliament primarily operates as a service-oriented institution where the consumption of inputs is not of utmost importance, we have utilized the technique of Data Envelopment Analysis (DEA) without explicit input data. Additionally, in consideration of the existence of undesirable outputs, we have applied the assumption of managerial disposability. Based on these considerations, we have determined and compared the legislative performance of the Islamic Parliament over eight periods (from the third to the tenth period) using models assuming efficiency on both constant and variable scales.

Keywords:
Islamic Parliament
Data envelopment analysis
Efficiency
Undesirable output
Managerial disposability
Legislation

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INTRODUCTION

A parliament is regarded as one of the foundational components of governance and decision-making in countries worldwide. Different systems across the globe feature their own unique parliaments, each with varying degrees of influence based on their circumstances (Chiru, 2018) Consequently, the presence of capable individuals, sound decision-making processes, and the identification of factors contributing to organizational inefficiency, along with the documentation of strengths and weaknesses, can serve as valuable tools for enhancing the respective organization and attaining desired levels of performance. This can only be accomplished through a comprehensive evaluation. Evaluating an organization's performance is critical in today's competitive world and is deemed both important and necessary. Performance evaluation assists organizations in accomplishing their objectives, fostering sustainable growth, and ensuring ongoing improvement and development.

A review of the literature reveals that the methods used to evaluate and measure the performance of the Islamic Parliament are often limited, focusing primarily on identifying indicators that influence the Parliament's performance. For example, some studies have concentrated solely on assessing the performance of parliamentarians (Faqihi et al., 2014; Zarei et al., 2016; Fayyazi and Haghshenas, 2017; Abrishami Rad and Hamidnazarian, 2021). Others have also explored issues such as the transparency of parliamentary performance, good governance, and more (Mohghar and Amin Naseri, 2001; Morattab and Yavari, 2021). A comprehensive examination of both domestic and foreign scholarly sources demonstrates that the non-parametric technique of Data Envelopment Analysis (DEA) without explicit input has not been utilized in any prior research to evaluate the legislative performance of the Islamic Parliament from a legislative perspective (Guinn, 2014; Volden and Wiseman, 2018; Ordway, 2018; Obaidullah, 2019; Ramezani et al. 2022; Zeinaloo et al. 2022). Indeed, no study has quantitatively assessed the legislative performance across various periods of the Islamic Parliament while also examining strengths and weaknesses using diverse criteria. Consequently, there is a noticeable gap in terms of performance evaluation, particularly concerning legislation and quantitative analysis.

Data envelopment analysis is a non-parametric technique used to assess the relative efficiency of decision-making units (DMUs) with multiple inputs and outputs. It was initially introduced by Charnes et al. (1978) and later extended by Banker et al. (1984). DEA models are typically designed to evaluate units such as banks, factories, hospitals, universities, and others. The fundamental principle of DEA models is to minimize inputs while maximizing outputs. Please note that outputs can be either desirable or undesirable. Undesirable outputs are often produced alongside desired ones. In the basic models of DEA, increasing desired outputs also tends to result in the production of more undesirable outputs. To address this challenge, which plays a pivotal role in evaluating efficiency, we require a model that not only aligns with the concepts of production theory but also reduces undesirable outputs while increasing desirable ones concurrently. Over the past two decades, researchers have made significant strides in solving this problem, presenting several models (Färe and Grosskopf, 2003; Hailu and Veeman, 2001; Kuosmanen, 2005; Sueyoshi and Goto, 2012).

As we are aware, in the real world, there are cases where explicit inputs are absent or the role of inputs is relatively less significant compared to outputs. Consequently, the entire focus of the production process centers on outputs. In this context, there is a need for models capable of evaluating the performance of production processes. Notable contributions to this field include the works of Lovell and Pastor (1999), Liu et al. (2011), Yang et al. (2012), Masoumzadeh et al. (2016), Yang and Emrouznejad (2019).

Therefore, the main objective of this research is to introduce a model based on the non-parametric technique of DEA capable of evaluating the legislative performance of the respective organization using existing indicators. In pursuit of this goal, the initial step involves identifying and categorizing all accessible indicators through a comprehensive review of relevant literature. Subsequently, these indicators are refined based on expert opinions, and an efficiency measurement model is developed utilizing the DEA approach. With the assistance of this model, we proceed to analyze and assess the legislative performance of the Islamic Parliament across different periods.

Considering that the Islamic Parliament primarily functions as a service-oriented institution where the significance of input consumption is relatively minimal, we assess the legislative performance of various periods using DEA models that do not explicitly require input (Yang et al., 2014; Masoumzadeh et al., 2016). Another noteworthy aspect of our approach is the presence of undesirable factors among the indicators, which we address by

applying Sueyoshi and Goto's concept of managerial disposability (2012). The efficiency score obtained from the measurement model offers insights into the performance of each term, enabling us to identify the strengths and weaknesses of each period of the Islamic Parliament from a legislative perspective.

As a continuation of this, the second section of the paper will introduce the proposed method for evaluating the legislative performance of the Islamic Parliament. In the third section, the results of the evaluation of legislative performance across various periods of the Islamic Parliament will be presented, utilizing the DEA technique without explicit input. Lastly, the research findings will be presented in the fourth section.

METHODOLOGY

This section introduces a method for measuring the efficiency of different periods of the Islamic Parliament from a legislative perspective. First, we will introduce the indicators related to the legislative dimension, followed by an explanation of the efficiency measurement. It's important to note that in this study, each period of the Islamic Parliament is treated as a decision-making unit (DMU).

Indicators of Legislative Performance of the Islamic Parliament

Suppose the structure of each period of the Islamic Parliament is based on Fig. 1:

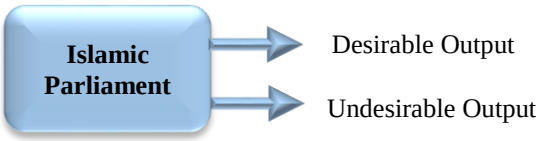

Fig. 1. The Structure of the Islamic Parliament

After reviewing and collecting indicators to evaluate the legislative performance of the Islamic Parliament, we conducted a thorough review of library studies and refined the indicators based on expert opinions. Subsequently, we determined the accessible indicators and, in some cases, combined them, assigning weights according to their importance. The final set of indicators for evaluating the legislative performance of the Islamic Parliament is as follows:

- **Desirable Outputs**
  - The ratio of Approved Plans to Submitted Plans,
  - The ratio of Approved Bills to Submitted Bills,
  - The Weighted Sum of Ratios:
    Ratio of Approved Plans to All Laws,
    Ratio of Approved Bills to All Submitted Laws,
  - The Ratio of Approved Laws Extracted from Parliamentary Plans to the Total Number of Presented Plans.

- **Undesirable outputs:**
  - Total Number of Approvals Referred to the Recognition Assembly.

Notably, considering the greater significance of the 'Ratio of Approved Plans to All Laws' compared to the 'Ratio of Approved Bills to All Submitted Laws,' weighting coefficients of $\frac{2}{3}$ and $\frac{1}{3}$ are assigned to them, respectively.

Proposed method

According to Fig. 1, to evaluate the legislative performance of the Islamic Parliament using the non-parametric DEA technique, the indices, variables, and parameters are listed in Table 1.

Table 1: Introducing Indicators, Variables, and Parameters for Evaluation

Indices, Variables, Parameters	Description
J	Number of DMUs
R	Number of desirable output
S	Number of undesirable output
y_{rj}	r th desirable output of $DMU_j : j = 1,...,J$
w_{sj}	s th undesirable output of $DMU_j : j = 1,...,J$
μ_j	Intensity variables of $DMU_j : j = 1,...,J$
φ_o	Desirable output increase factor
β_o	Desirable output increase factor

Based on Table 1, the efficiency measurement models for evaluating the legislative performance of various periods of the Islamic Parliament under the managerial disposability assumption are presented as follows:

- Model 1

$$\begin{aligned} &\varphi_o^* = Max\ \varphi_o \\ &s.t.\ \sum_{j=1}^{J} \mu_j y_{rj} \geq \varphi_o y_{ro},\ r=1,...,R, \\ &\sum_{j=1}^{J} \mu_j w_{sj} \leq w_{so},\ s=1,...,S, \\ &\varphi_o \geq 1, \mu_j \geq 0,\ \forall j. \end{aligned} \tag{1}$$

Model 1 is a linear and feasible model assuming constant returns to scale, designed to enhance desirable output levels.

Definition 1: The unit under evaluation, DMU_o, is efficient if and only if the optimal solution, φ_o^*, is equal to one. Furthermore, if the objective function's optimal value exceeds one, the unit is considered inefficient.

- Model 2

$$\begin{aligned} &\beta_o^* = Max\ \beta_o \\ &s.t.\ \sum_{j=1}^{J} \mu_j y_{rj} \geq \beta_o y_{ro},\ r=1,...,R, \\ &\sum_{j=1}^{J} \mu_j w_{sj} \leq w_{so},\ s=1,...,S, \\ &\sum_{j=1}^{J} \mu_j = 1, \\ &\beta_o \geq 1, \mu_j \geq 0,\ \forall j. \end{aligned} \tag{2}$$

Model 2 is a linear and feasible model assuming variable returns to scale, intended to improve the levels of desirable outputs.

Definition 2: The unit under evaluation, DMU_o, is efficient if and only if the optimal solution, β_o^*, is equal to one. Additionally, the unit is classified as inefficient when the optimal value of the objective function surpasses one.

Assuming $\mu_j^* : j=1,...,J$ represents the optimal solution for Model 1 or 2, and $E_o = \left\{ j \middle| \mu_j^* \geq 0, j \in \{1,...,J\} \right\}$ is the reference set for DMU_o, the optimal value for an inefficient unit is determined as follows:

$$\begin{cases} v_{ro}^* = \sum_{j \in E_o} \mu_k^* v_{rj} \\ w_{so}^* = \sum_{j \in E_o} \mu_j^* w_{sj} \end{cases} \tag{3}$$

Eq. 3 specifies the required increase in desirable outputs and decrease in undesirable outputs for each unit to reach the desired level.

EVALUATING LEGISLATIVE PERFORMANCE OF THE ISLAMIC PARLIAMENT

In this section, we will evaluate the legislative performance of the eight periods of the Islamic Parliament (the third to the tenth periods) using the proposed method. The legislative dimension variables' values are presented in Table 2. Notably, to maintain the confidentiality of information from various periods of the Islamic Parliament, each period is denoted by letters A to H without regard to the chronological order.

Table 2: Desirable and undesirable outputs

Period	v_1	v_2	v_3	v_4	v_5
A	0.43	0.85	0.46	0.47	4
B	0.31	0.95	0.44	0.55	5
C	0.25	0.93	0.43	0.50	5
D	0.16	0.95	0.40	0.41	26
E	0.17	0.87	0.43	0.51	11
F	0.21	0.91	0.45	0.45	4
G	0.43	0.34	0.52	0.48	1
H	0.13	0.46	0.46	0.76	4

Based on the values in Table 2 and utilizing Models 1 and 2, we evaluated various periods of the Islamic Parliament with regard to legislation, and the results are presented in Table 3. The second and third columns display the efficiency results for Models 1 and 2, respectively. The fourth column, known as scale efficiency, is calculated by dividing the efficiency values in columns 2 and 3. This value facilitates comparisons across different periods.

Table 3: The efficiency results

Period	φ_o^*	β_o^*	**Scale efficiency**
A	1.6000	1.0000	0.6250 (3)
B	1.7895	1.0000	0.5588 (5)
C	1.8280	1.0215	0.5589 (4)

D	9.3053	1.0000	0.1075 (8)
E	4.2989	1.0352	0.2408 (7)
F	1.4945	1.0000	0.6691 (2)
G	1.0000	1.0000	1.0000 (1)
H	2.4968	1.0000	0.4005 (6)

The results show that when Model 1 was used to estimate the efficiency value, only one period was efficient. While the results of Model 2 show the efficiency of six periods. The noteworthy point is that period G is efficient in both models. The weakest performance in the two models belonged to the D and E periods, respectively. Also, period D, which was an efficient period in Model 2, had the weakest performance in Model 1. The scale efficiency results highlight period G as the best performer, being efficient in both models, while period D exhibited the weakest performance, followed by period E. The fluctuation in efficiency values obtained from Models 1 and 2 is evident in Fig. 2.

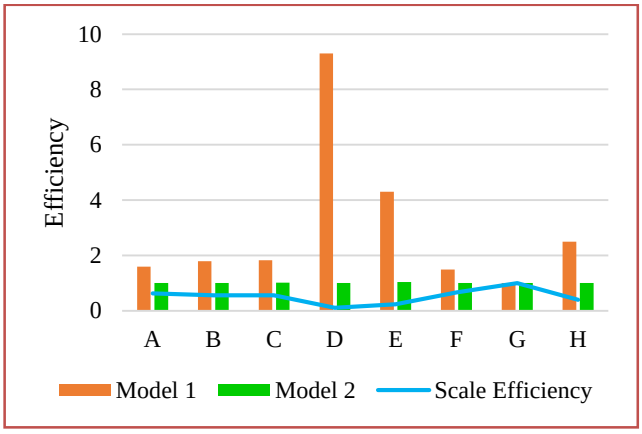

Fig. 2. Comparison of efficiencies

As mentioned in the previous section, Eq. 3 allows us to calculate the optimal values for both desirable and undesirable outputs of the inefficient units. Tables 4 and 5 display the optimal values for each of the inefficient periods.

Table 4: Optimal values of Model 1

Period	v_1	v_2	v_3	v_4	w
A	1.7000	1.3600	2.0933	1.9029	4
B	2.1250	1.7000	2.6167	2.3786	5
C	2.1250	1.7000	2.6167	2.3786	5
D	11.0500	8.8400	13.6067	12.3689	26
E	4.6750	3.7400	5.7567	5.2330	11
F	1.7000	1.3600	2.0933	1.9029	4
G	0.4250	0.3400	0.5233	0.4757	1
H	1.7000	1.3600	2.0933	1.9029	4

Table 5: Optimal values of Model 2

Period	v_1	v_2	v_3	v_4	w
A	0.4263	0.8500	0.4633	0.4660	4
B	0.3148	0.9500	0.4400	0.5534	5
C	0.3148	0.9500	0.4400	0.5534	5
D	0.3148	0.9500	0.4400	0.5534	5
E	0.3417	0.9007	0.4486	0.5327	4.61
F	0.2149	0.9100	0.4467	0.4466	4
G	0.425	0.3400	0.5233	0.4757	1
H	0.1335	0.4600	0.4633	0.7621	4

Based on the information presented in Tables 4 and 5, it is evident that the variable values for the efficient units have remained unchanged.

CONCLUSION

In this study, we conducted an analysis of the legislative performance of the Islamic Parliament during the 3rd to 10th periods, employing the DEA approach. Given the Parliament's primary focus on output generation, with less emphasis on input factors, we evaluated the performance of these periods using DEA models without explicit inputs. Additionally, we categorized the outputs into two groups: desirable and undesirable outputs, and conducted performance evaluations based on the assumption of managerial disposability. As a result of our analysis, we determined and compared the legislative performance of the Islamic Parliament during the third to tenth periods. Our objective was to enhance the levels of desirable outputs using two models under the assumptions of constant and variable returns to scale. In summary, the findings suggest that, from a legislative perspective, the performance of these periods was generally satisfactory.

RESEARCH LIMITATIONS

As is well-known, the presence of valid data holds particular importance in the analysis of the proposed approach. Consequently, one limitation of this research lies in the unavailability of certain indicators relevant to the study. Another limitation stems from the absence of information related to the first and second periods of the Islamic Parliament, which has necessitated the focus of our research on the third through tenth periods. Additionally, owing to the

confidentiality of the information, we have refrained from disclosing the names of these periods.

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Yang, G., Shen, W., Zhang, D., & Liu, W. (2014). Extended utility and DEA models without Analysis and evaluation of the legislation performance of different periods of the Islamic Parliament based on Data Envelopment Analysis

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