

The Optimal Strategy for Combining the EFQM and SWOT Methods in Power Plants

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Abstract: The current research has selected the best course of action and assessed the performance in power production plants using a combined method of the Organizational Excellence Model and SWOT methodologies. The primary goal of this study is to evaluate the organization's current performance status, identify its issues, and propose appropriate implementation strategies to address negative circumstances. Components of the Organizational Excellence Model include leadership, policy and strategy, human resources (people), partnerships and resources, procedures, customer outcomes, human resource results, community results, and key performance results. Descriptive surveys constitute the current research methodology. The managers and specialists of the power plants within the firm under study comprise the statistical population of this research. The Organizational Excellence Model questionnaire was an integral part of the research instrument. SPSS software was utilized to analyze the collected data. The results analysis revealed that only the element of key performance results was rated as average, whereas other components, such as processes, customer results (clients), human resources results, and community results, all scored above average. Leadership, policy and strategy, partnerships, and resources also scored above average, along with the components of human resources (employees), processes, and customer results.

Keywords: EFQM; leadership; power plants; strategy; SWOT

1 INTRODUCTION

Energy has a significant impact on a society's ability to prosper economically, promote social welfare, enhance quality of life, and maintain security. Global studies have consistently demonstrated a clear correlation between a nation's level of development and its energy consumption, underscoring the importance of emerging nations gaining access to new energy sources to advance and bolster their economies. Given that electrical energy is a critical and fundamental component of industrial, economic, and social development and prosperity, it is reasonable to assert that a measure of a nation's evaluation and development lies in its capacity to produce and distribute electrical energy. Electricity is generated through various power facilities and technological advancements. A power plant comprises a set of commercial buildings where electrical energy is generated by harnessing various energy sources, including gravitational potential energy, chemical energy, renewable energy, fossil fuel energy, etc., and converting them into electrical energy using generators (these rotating machines convert mechanical energy into electrical energy) [1].

The organization seeks to identify its internal strengths and weaknesses, as well as external opportunities and threats, using the SWOT analysis approach. It's worth noting that there are several techniques available to assess an environment's strengths, weaknesses, opportunities, and threats. Therefore, it appears that combining this approach with another method is the most prudent approach for comprehensively understanding these components. Focusing on the company's current achievements can be beneficial in selecting a complementary approach. One of the most widely used performance measurement frameworks is the Organizational Excellence Model, often referred to as EFQM. Combining the EFQM approach with the SWOT method appears to address the shortcomings of both models effectively. This combination allows for a systematic examination of both the external and internal environments (identifying strengths and weaknesses, opportunities and

threats) and provides an accurate assessment of the organization and its stakeholders.

On the other hand, the SWOT technique addresses a fundamental shortcoming of the EFQM method, which lacks an appropriate and straightforward mechanism for translating enablers into strategies and executive orders. A targeted process should be followed when describing and transforming the selected criteria into a plan. Various methods exist for evaluating performance, each of which analyzes a specific aspect or stage of performance. As a result, their independent use may have limitations. Power plant performance indicators play a significant role in the analyzed firm, making it crucial to identify any weaknesses now in order to make improvements in the future. Consequently, the researcher in this study employed EFQM and SWOT approaches to analyze performance and identify the best plans for the researched organization.

2 THEORETICAL FOUNDATIONS AND A REVIEW OF BACKGROUND LITERATURE

2.1 Organizational Performance

An indicator of an organization's success is its ability to accomplish its objectives effectively. Evaluating organizational performance can be based on how efficiently the company achieves its goals. According to Kanter and Binkerhoff (1981), organizational performance is the disparity between an organization's actual results and its planned objectives or inputs [2]. In essence, an organization's performance measures how effectively it has met its goals, generated profit, and safeguarded its most valuable assets, including its employees, clients, and financial resources. Performance also directly influences an organization's efficiency [4].

2.2 Performance Evaluation

Performance evaluation involves the application of a set of performance indicators that encompass various aspects of

this issue, both in conceptual studies and within the executive offices of organizations. This comprehensive approach is referred to as multi-dimensional because it encompasses both financial and non-financial data, considering both the organization's internal and external environments. Furthermore, it must consider strategic objectives, review and assess acquired outcomes and outputs, and look ahead to the organization's future [22]. The primary objectives of performance evaluation are to enhance satisfaction, elevate performance levels, and ultimately improve the efficiency of an organization's operations. In other words, subjective judgment and hesitation have no place in the fundamental goals of conducting performance reviews, which should be geared towards growth and development, enhancing the performance of the organization and its personnel. These efforts pave the way for self-evaluation, the establishment of a scientifically sound system of rewards and penalties, steering the organization towards excellence, and ultimately achieving organizational goals more swiftly and effectively [3].

2.3 Generalities of the EFQM Excellence Model

One of the performance evaluation methods introduced in 1999 is the Organizational Excellence Model [21]. The EFQM Business Excellence Model generally consists of nine criteria: five enabling criteria, including Leadership, Strategy and Policy, People, Partnerships and Resources, and Processes, and four results criteria, which are 1) Client Outcomes, 2) Employee Outcomes, 3) Community Outcomes, and 4) Key Performance Indicators [10]. The

enabling criteria describe what an organization accomplishes and represent the elements that contribute to achieving outstanding outcomes, effectively communicating the successes of correctly applying these enablers. The outcomes are achieved as a consequence of the application of these enablers. Implementing these enablers yields the desired benefits, and through learning from the outcomes, the enablers continue to evolve and improve [16].

2.4 SWOT Analysis

The primary strategy analysis technique known as SWOT analysis assesses an organization's external opportunities and threats, as well as its current strengths and weaknesses. In the SWOT matrix, the internal attributes and characteristics of the company are categorized as strengths and weaknesses, while the external environment's features and characteristics are classified as opportunities and threats to the business. Strengths encompass internal resources that a firm possesses and utilizes to capitalize on opportunities and mitigate external challenges, such as financial resources, technology, and motivation. Any internal deficiency hindering the organization from achieving its objectives is considered a weakness [24]. Opportunities refer to favorable occurrences in the organization's external environment, while threats denote adverse challenges emerging from the external environment [13]. The analysis of both the internal and external environments yields a vast amount of information for the management team, which can sometimes be overwhelming or disconcerting when viewed collectively [5].

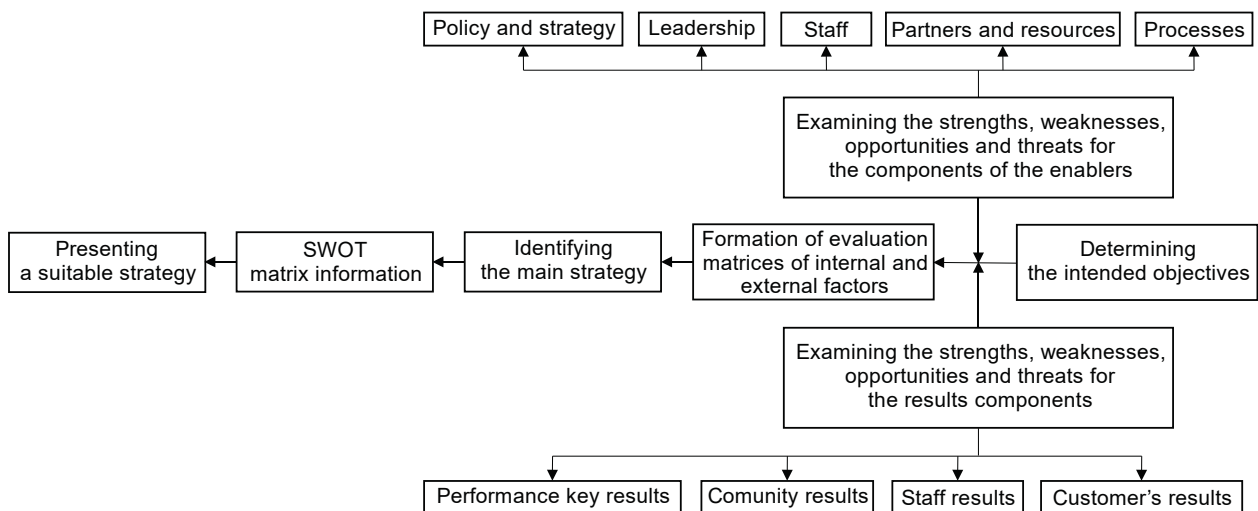


Figure 1 Research conceptual model

2.5 Explanation of the Reason for Using SWOT and EFQM Integrated Method in the Studied Company

It appears that the limitations of both models can be addressed by integrating the EFQM approach with the SWOT method. This combined approach allows for a systematic examination of both external and internal environments, enabling the identification of strengths,

weaknesses, opportunities, and threats. It provides a means to accurately assess the organization's status and its impact on stakeholders. On the other hand, employing the SWOT method rectifies a primary shortcoming of the EFQM approach, which lacks a straightforward method for translating enablers into strategies and executive directives. To outline and convert the identified criteria into a strategy, specific steps are followed. In the new analytical model

created by merging these two methodologies, the strengths, weaknesses, opportunities, and threats of the organization are first evaluated in accordance with the nine EFQM criteria. Instead of using a simple Likert scale to assess the state of each component, the SWOT approach is applied during the self-evaluation phase. Following the principles of this methodology, each component is assigned a coefficient and score, and through the phases of the SWOT method, essential plans for the company's future are proposed. The research's analytical model is depicted in Fig. 1.

2.6 Literature Review

In this study, we focused on power plants within the researched organization to conduct a performance evaluation and determine relevant strategies using a combination of EFQM and SWOT approaches. Tabs. 1 and 2 indicate that there has been limited research in this area, primarily focused on internal and external factors.

Table 1 The domestic research conducted in the field of research

	Scholars	Year	Research title
1	Sadeghi et al. [23]	2018	Evaluating excellence in chain stores based on EFQM
2	Rahaii, [1]	2023	Performance evaluation of Al-Zahra University based on EFQM organization's excellence model
3	Akbarian, et al [8]	2022	Presenting an innovative model to evaluate and select the market based on fuzzy SWOT analysis and multi-criteria decision making
5	Kolarai [6]	2021	Identifying and evaluating the eco-tourism potential of desert areas using SWOT and AHP models
6	Murshidi [7]	2019	Measuring the organizational excellence of the Islamic Republic of Iran Airlines (Homa) based on the EFQM model
7	Oladi [9]	2017	Evaluation of the performance of the agricultural Jihad proposal system in Fars province using the EFQM model
8	Longbottom [18]	2008	How to implement a balanced scorecard of human resources in a service organization with SWOT and BSC

Table 2 International research conducted in the field of research

	Scholars	Year	Research title
1	Neir et al. [19]	2018	Performance evaluation of Shahid Beheshti Hospital in Qom based on EFQM organizational excellence model
2	Roghani, et al. [12]	2014	Application of EFQM model in measuring organizational performance
3	Fan et al. [14]	2015	Applying fuzzy quantified SWOT technique for environmental assessment of an international distribution center
4	Farhadi et al. [15]	2023	Self-evaluation of the European organizational excellence model using a questionnaire approach
5	Jose et al. [17]	2007	The use of enablers in the European organizational excellence model for the management of higher education institutions
6	Azar et al. [10]	2020	Implementation of organization excellence model in higher education institutions

3 METHOD

Based on the research's purpose, it falls under the category of applied research, while in terms of methodology, it is categorized as descriptive-survey research. The statistical population for this study comprises twelve managers and experts from the firm being investigated in power plants. Simple random sampling was employed since the statistical population was relatively small. The statistical population's sample consists of eleven managers and specialists from the organization under study, and due to the importance of the topic, interviews were conducted with all of them. The following are the key techniques used to gather data for this study:

1) Library study: This section involved researching theoretical underpinnings and research literature using library resources, journals, required texts, and the global information network (Internet).

2) Field research: When using the field technique, the researcher interacts with individuals, groups, and institutions to gather information. They complete their data collection by asking questions, conducting interviews, observing, photographing, and collecting data outdoors. In this study, EFQM questionnaires and interviews were employed as data collection strategies. The guiding professors and advisers of this study were provided with a copy of the research questionnaire to validate its content, and adjustments were made as needed. These individuals also confirmed the questionnaire's accuracy through the necessary revisions. The reliability of the questionnaire was determined using the Cronbach's alpha formula. The average Cronbach's alpha obtained from the study questionnaire is equal to 0.751, which is above the 0.7 threshold, confirming the questionnaire's reliability. SPSS software was used for data analysis in this study.

3.1 Research Questions

- 1) What opportunities and challenges, strengths and weaknesses, and enabling criteria does the company face?
- 2) What opportunities, risks, and weaknesses does the company confront in terms of the outcomes criteria?
- 3) Which phase is the organization in general (offensive, defensive, preventative, etc.) based on the appraisal of the situation?
- 4) What tactics should the firm employ to improve its circumstances in light of the SWOT method's guiding principles?
- 5) Analysis of results and suggestions.

3.2 Characteristics of the Respondent Community

Tab. 3 provides a summary of the general characteristics of the respondent population.

Considering that only the dimension of critical performance results has a P-value higher than 0.05, while the P-values for the other components are all lower than 0.05, it can be concluded that all of the dimensions significantly

deviate from the mean level. Among these components, leadership, policy and strategy, relationships, and resources have all performed above average, indicating their positive state. In contrast, the components of human resources (employees), processes, customer outcomes, human resources results, and community results are all below average, while the component of key performance results is at the average level. To identify strengths, weaknesses, opportunities, and threats for all aspects of organizational performance from the EFQM perspective, the researcher gathered opinions from experts. Subsequently, using these expert opinions, weights were assigned to each of the strengths, weaknesses, opportunities, and threats within the nine dimensions. The top priorities from each of the strengths, weaknesses, opportunities, and threats identified in the first stage were chosen to construct the SWOT matrix. These tables will reveal how the organization can leverage its assets and environmental opportunities to strengthen its position, how it can mitigate environmental threats by utilizing its assets, how it can address weaknesses by

capitalizing on environmental opportunities, and ultimately, how it can overcome environmental threats and weaknesses.

Table 3 The general characteristics of the respondent population

Working background	Frequency percentage			
	Under 5 years	Between 5 and 10 years	Between 10 and 20 years	
	45.5 %	27.3 %	27.3 %	
Age	Between 20 and 30 years		Between 30 and 40 years	
	45.5 %		54.5 %	
Gender	Female		Male	
	9.1 %		90.9 %	
Education level	Diploma	Upper diploma	Undergraduate	Graduate
	18.2 %	9.1 %	45.5 %	27.3 %

During the determination of the connecting points in these tables, six interviewers were present at the meeting. The researcher employed the saturation approach to justify the selection of this number, avoiding additional labor and research once data gathering had reached its optimal level. Based on the discussion during this meeting, the company's core strategies were chosen to preserve and enhance the company's strategic position.

Table 4 General characteristics of the respondents

Variable	Number of specimens	Average (number of questions multiplied by 2/5)	T-value	Degree of freedom	P-value
Leadership	11	15	1 / 57	10	0 / 000
Policy and strategy	11	12 / 5	0 / 665	10	0 / 000
human resources (employees)	11	12 / 5	-1 / 78	10	0 / 000
Partnerships and resources	11	10	1 / 59	10	0 / 000
Processes	11	20	-0 / 19	10	0 / 000
Customer (client) results	11	15	-1 / 21	10	0 / 000
Results of human resources	11	12 / 5	-1 / 67	10	0 / 000
Community results	11	12 / 5	-2 / 54	10	0 / 000
Key performance results	11	15	0 / 000	10	1 / 000

Table 5 The relationship between the organization's strengths and environmental opportunities

Environmental opportunities		Strengths				
		o1	o2	o3	o4	o5
		Introduction of suppliers by the customer and his confirmation	Establishing the site at the customer's place	Very low rental fee on the site	Using facilities such as tax exemptions on the site	The possibility of using the MILK RUN transportation system to provide items for production
s1	Related education					
s2	Having a university degree					
s3	Compilation of the system and method of identification of suppliers	1				1
s4	Compilation of the system and process performance evaluation method					1
s5	Existence of appropriate and continuous and up-to-date information on the performance of suppliers	1				
s6	Familiarity of the organization with strategic management					
s7	Establishment of quality management system					

The relationship between environmental hazards and the organization's shortcomings is illustrated in Tab. 6. In this table, the number one denotes the presence of a connection, while the number zero signifies its absence. At the conclusion of this section, each expert completed a specially designed

questionnaire that required them to rank and assign weights to each of the significant internal strengths-weaknesses and external opportunities-threats variables. These coefficients were assessed on a relative scale, ranging from zero (unimportant) to one (extremely important). The coefficient

indicates the component's importance in relation to other factors concerning the organization's success. The coefficients should sum up to one. Subsequently, each component received a score ranging from one to four. These ratings, determined using an ordinal scale, reflect how effectively the firm's strategies responded to the relevant factor (for external variables) or the company's strengths and weaknesses (for internal factors).

- A score of 4 indicates that the factor was exceptionally influential (for internal factors) or the response was excellent (for external influences).
- A score of 3 suggests that the response was above average due to external or internal factors, respectively.
- A score of 2 indicates a moderate response (for external factors) or a slight weakening (for internal factors).
- A score of 1 suggests that the component has a fundamental weakness or that the response is weak due to external circumstances (for internal factors).

Table 6 The relationship between weaknesses and environmental threats of the organization

Environmental opportunities		Strengths				
		T6	T7	T8	T9	T10
		The existence of competing companies that have the ability to attract the organization's personnel	Lack of commitment of personnel to improve the system situation in the long term	The existence of competitors and the provision of the organization's products in the event that the customer's needs and satisfaction are not met	The lack of support of the board members from the ideas of executive management	Failure of managers to welcome innovation in technology
w1	Lack of proper appreciation of the employees' activities		1		1	1
w2	Absence of a suitable software system to evaluate suppliers		1		1	1
w3	The slowness of the organization in changing strategies					
w4	Lack of incentive and punishment system				1	
w5	Lack of cost management		1			
w6	Poor communication with customers		1			
w7	The low scores related to welfare facilities and employee satisfaction		1			
w8	Decrease in employee satisfaction		1			
w9	The inability of the organization to properly identify changes		1			
w10	The lack of specialization in the process of recruiting and hiring personnel		1	1		

3.3 Examining the Internal and External Matrix (IE)

The internal-external matrix (IE) in the SWOT analysis divides various organizational departments into 9 categories or houses. This matrix considers two primary dimensions. The x-axis represents the sum of the final scores from the assessment matrix of internal factors, while the y-axis represents the sum of the final scores from the evaluation matrix of external factors. We assess these axes using the following scale, as previously mentioned, since the sum of these numerical ratings falls between one and four (1-4). The nine newly established categories are numbered from 1 to 9, starting in the upper left corner. Organizations positioned in the first, second, or fourth category should adopt growth and expansion-oriented strategies. These units should consider targeted strategies such as market penetration, product and market development, as well as vertical-up, vertical-down, and horizontal-integration-based strategies. Organizations in the third, fifth, or seventh category should opt for strategies that maintain the status quo. These entities should consider plans related to product development and market penetration.

The various organizational departments are divided into 9 houses by the internal-external matrix (IE) in the SWOT analysis. Two primary dimensions are taken into account in this matrix. The x-axis represents the sum of the final scores for the assessment matrix of internal factors, and the y-axis represents the sum of the final scores for the evaluation matrix of external factors. We evaluate these axes using the scale below because, as we previously said, the sum of these

numerical ratings falls between one and four (1-4). The nine newly built residences are numbered from 1 to 9 starting in the upper left corner. Organizations that are positioned in the first, second, or fourth house should select growth and construction-oriented strategies. These units must think about targeted strategies, market penetration, product and market development, or vertical-up, vertical-down, and horizontal-integration-based strategies. Organizations in the third, fifth, or seventh house should opt for methods that preserve the status quo. Product development and market penetration plans should be taken into account by these entities.

Table 7 Internal and external matrix (IE) of the studied company in power plants

The final score of the internal factor evaluation matrix (IFE)					The final score of the External Factors Evaluation Matrix (EFE)
1	2	2.5	3	4	
		4		3.25	
3		2			
6		5		4	
9		8		7	
		1		2	
		1		1	

Organizations placed in the sixth, eighth, or ninth categories must adhere to harvest-or-drop policies. These units need to consider targeted strategies such as market penetration, product development, or vertical, horizontal, and/or vertically integrated strategies. In the figure above, the organization being investigated is located in house number 2. According to the guidelines for formulating a strategy using the SWOT analysis, a focused expansion and development

plan should be adopted for house number 2. The most suitable strategies include market penetration, product development, or strategies based on vertical-up integration, vertical-down integration, and horizontal integration. If the company succeeds in implementing its vertical integration methods, it should aim to expand its market dominance through smaller divisions, either within or outside the company. The organization's structure should focus more on its subsidiaries and any potential competitive actions related to them. Suppliers of raw materials are regulated in line with the application of downward vertical integration methods in manufacturing and commercial businesses to achieve control objectives [20].

3.4 Suggestions

- **Suggestions for the Leadership Dimension:** Based on the results obtained from successive interviews with organizational experts, it is recommended that senior managers of the studied company first prioritize efforts in addressing the weaknesses related to utilizing the organization's facilities optimally, becoming familiar with the capabilities of personnel, granting necessary authority, closely monitoring relevant managers, informing managers about the organization's values, mission, and vision, involving other managers in formulating the mission, and appropriately recognizing efforts and achievements. In the second stage, it is essential to emphasize the advantages of having a university degree, relevant training, the right work experience, and appropriate education. Providing opportunities for professional development for both managers and employees, welcoming fresh perspectives, and increasing their experience in power generation plant-related work are also important.

- **Suggestions for the Human Resources (Employees) Dimension:** Based on the results obtained from successive interviews with organizational experts, it is recommended that senior managers of the studied company pay more attention to addressing weaknesses such as hiring personnel without work experience, employing non-specialized personnel, inadequate recognition of employee activities, absence of a continuous personnel performance evaluation process, lack of specialization in the personnel recruitment process, recruitment based on relationships, managers' lack of commitment to promote deserving personnel, and a misalignment between the organization's strategic plan and personnel-related plans. Additionally, it is important to emphasize opportunities such as attracting job seekers with reasonable income expectations, offering cost-effective training courses, utilizing workers' houses and their facilities, tapping into the pool of university-educated job seekers, leveraging the organization's strong bargaining power in hiring, considering the abundance of job seekers with diverse backgrounds, and engaging educated individuals looking for opportunities to work on projects and theses.

- **Suggestions for the Processes Dimension:** Based on the results obtained from successive interviews with organizational experts, it is suggested that senior managers of the studied company place more emphasis on addressing weaknesses such as recruiting new personnel unfamiliar with quality management systems, implementing partial solutions

in the systematic improvement of processes, and the lack of integrated quality management system software provided by the organization. Furthermore, it is important to highlight opportunities such as setting up on-site locations at the customer's site for quick identification and resolution of quality problems, resolving numerous quality issues at the customer's site, maintaining a favorable rating among suppliers, considering the limited number of suppliers with this rating, conducting regular audits of the quality system by certification bodies, and implementing a customer program and strategy for suppliers to align with ISO/TS standards and EFQM implementation.

- **Suggestions for the Key Results Dimension:** Based on the results obtained from successive interviews with organizational experts, it is recommended that senior managers of the studied company address weaknesses such as not measuring the performance of processes and activities, lack of cost management, and failure to differentiate the results of various parts of activities and services to illustrate performance variations. In the second stage, it is important to capitalize on opportunities, including the establishment and implementation of specific requirements from senior customers through method development and continuous employee training, the organization's minimal budget requirements based on its activity type, and enhanced quality assurance due to performance improvements.

- **Suggestions for the Customer Results Dimension:** According to the results obtained from successive interviews with organizational experts, it is suggested that senior managers of the studied company first address weaknesses related to poor communication with customers and the inability to leverage bargaining power regarding product prices. In the second stage, it is crucial to emphasize opportunities such as implementing the organization's quality performance monitoring system at the customer's site and the organization's on-time delivery performance monitoring system at the customer's site to further enhance these aspects.

4 CONCLUSIONS

The purpose of this study was to assess performance and select the best course of action for the electricity and energy sector's power plants by integrating SWOT strategies with the Organizational Excellence Model (EFQM). According to the study's findings, among the EFQM variable aspects, leadership, policy, and strategy, as well as partnerships and resources, were rated above average and in good shape. It is essential for every organization to promptly evaluate the value and quality of its operations, especially in complex and evolving contexts. Conversely, the absence of an assessment and control system within an organization indicates a disconnection from its internal and external environments, leading to organizational aging and eventual decline. It is recommended that researchers in the fields of evaluation, diagnosis of complications, prioritization of improvement projects, and comparison of superior organizations conduct further research using the EFQM model in comparison to other performance evaluation models. This is crucial as there has been limited research in the field of performance evaluation. Exploring how this paradigm influences other management categories is another avenue for research.

Additionally, by conducting further research on the EFQM and SWOT models and assessing the effectiveness of governmental organizations using these methodologies, it lays the groundwork for their adoption and implementation across the nation. This can enhance organizational competitiveness, improve performance, and drive progress toward excellence. However, this study has some limitations. Due to the nature of the EFQM model and its established criteria and domains, obtaining certain information related to specific criteria has been challenging. Additionally, the lack of simultaneous examination of the Balanced Scorecard (BSC), SWOT, and EFQM methods, limited sharing with relevant platforms, and restricted access to articles in electronic journals have also posed limitations.

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