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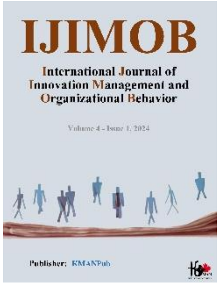

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Explaining the Reciprocal Relationships of Constructs Influencing the Technology Management System in the Ministry of Petroleum

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ABSTRACT

Objective: Given the importance of effective and efficient management of technology in the success and dynamism of the nation's vast oil industry, it is undoubtedly essential to pay adequate attention to the management and control of the components influencing the technology management system. The present article aims to identify and determine the reciprocal relationships and impacts of the factors within the technology management system in the subsidiary companies of the Ministry of Petroleum.

Methodology: The research is developmental and applied in nature, with a statistical population consisting of 450 senior managers and experts from five subsidiary companies of the Ministry of Petroleum. The required sample, based on the Krejcie-Morgan table, was determined to be 210 individuals and was selected using the purposive judgment technique. The data collection tools included a researcher-made questionnaire with 52 items based on a Likert scale for performing exploratory factor analysis, as well as a standard DEMATEL technique questionnaire. The validity of the first questionnaire was confirmed based on content and construct validity, and Cronbach's alpha coefficients and composite reliability indicated the reliability of the research instruments.

Findings: In this study, according to data analysis using Smart PLS software, 16 components affecting the technology management system were selected based on the eigenvalue criterion, explaining 60.8% of the variance of the studied variable. Additionally, by executing the steps of the DEMATEL scientific technique approach, the intensity of the reciprocal relationships among the research criteria was examined, and the factors were divided into two categories: influencing and influenced.

Conclusion: Therefore, it is hoped that by increasing effective links between academic and research communities and industrial environments, particularly the large oil industry of the country, and simultaneously improving the quality and practical applicability of scientific research outcomes, the belief in the significant and positive impact of applying study findings in improving and organizing the technological sector of the country's oil industries will be strengthened within the managerial framework of this large organization.

Keywords: *technology, technology management, exploratory factor analysis, DEMATEL technique*

1 Introduction

In today's competitive global environment, technology plays a crucial role in achieving competitive advantages for organizations. The rapid pace of technological advancements across various domains underscores the necessity for significant activities in this area. Technology is the systematic application of science and other organized knowledge for scientific and technical tasks and the process of transforming inputs into outputs. In recent years, technology has developed rapidly, and organizations have increasingly adopted new technologies. However, less attention has been given to technology management. One of the significant topics in today's world is technology management. Improving organizational performance is influenced by various factors, with technology management and research and development policies attracting considerable attention, particularly in current research. Technology management links engineering, science, and management disciplines to plan, develop, and implement technological capabilities to achieve an organization's strategic and operational goals, demonstrating effective collaboration of these knowledge reservoirs (Wu et al., 2020). Technology management drives strategies, and thus, effective use of technology can lead to efficient production and delivery of goods and services (Parnell & Brady, 2019). Today, the undeniable impact of being up-to-date and properly managing technology on an organization's continuous growth and improvement is widely accepted. Understanding the cause-and-effect relationship between performance and technology management activities and subsequent technological advancements is crucial for designing and evaluating effective technology management for an organization (Huang et al., 2021; Venter & Grobbelaar, 2021). Technology management aims to achieve high productivity and helps organizations effectively reach their expected goals. Focusing on technology and processes such as research and development, innovation, technology transfer, and technological cooperation, technology management determines and manages the deployment of new technologies and the deepening of existing technologies in various production and service enterprises. Organizations need technology management to increase process integration and standardization, accelerate globalization, and adapt to frequent restructuring and changes. Technology management is planned through status curve analysis, technological performance forecasting, and investment in research and development. The level and efficiency of a company's technology management determine its competitive position and performance. Therefore, some companies have included technology management objectives in their strategic plans, allocating part of their resources to integrating technology into their work processes and gaining competitive advantages (Kurokawa et al., 2005; Özer & Ay, 2022). Technology management, using new and modern tools, can generally enhance performance in various production and operational areas. On the other hand, technology significantly influences the management and administration of organizations today (Huang et al., 2021; Schuh & Kramer, 2016; Weiwei et al., 2021; Wu et al., 2020). However, there is no doubt that after addressing the main structure and topics of technology management, the importance of this subject, considering the different positions of various industries in each country due to diverse political, economic, and social parameters, can vary.

A review of the background and importance of different industries in the country highlights the special role and position of the oil industry and its extensive impact on various national systems. For its industrial and economic presence and role at national, regional, and international levels, the country's oil industry requires the application and development of technology domestically. Therefore, given the prominent position of the oil industry, it is necessary for managers related to the oil industry's technology domain to form specialized workgroups to continuously monitor and evaluate current and future technology needs of relevant organizations and to focus adequately on different approaches in identifying and selecting the desired technologies. Considerations such as the related organizations' documented strategies regarding technology, analysis of capabilities related to the absorption and development of desired technologies, and attention to technological capabilities to increase financial benefits and competitiveness of the organization also need to be addressed. Thus, the primary objective of this research is to identify and examine the various domains and parameters influencing the quality performance of the technology management system in the subsidiary organizations of the Ministry of Petroleum and to study the relationships between the discussed factors in the upstream and downstream sectors of the oil industry, determining the direction of priority actions for improving the current situation.

2 Methods and Materials

This research is developmental in terms of its aim and is considered descriptive-analytical with an inductive approach based on the nature and data collection method. The statistical population includes senior managers and experts from the oil companies studied in the northwest and southern oil regions of the country. The total statistical population in the five targeted companies is 450 individuals, and based on the Krejcie-Morgan table, a sample size of 210 individuals was selected using a purposive judgment technique for the factor identification phase, and 75 individuals for the DEMATEL technique implementation phase. To examine the relationships between components in the first phase, a researcher-made questionnaire containing 52 variables was designed and implemented for exploratory factor analysis (EFA) and factor extraction, based on literature review and semi-structured interviews with subject matter experts in the targeted companies and academic professors. In the second phase of the research, a standard comparison matrix questionnaire was applied to execute the DEMATEL technique steps to study and investigate the reciprocal relationships and impact intensity of the components. To assess the validity of the extracted factors, structural equation modeling and standard alpha and CR coefficient calculations were utilized.

3 Findings and Results

To ensure the optimal execution of this scientific method for identifying the desired factors in the first stage of the study, it is essential to confirm the adequacy of the sample size before data analysis. Sample size is a determining factor in the accuracy of clustering elements using exploratory factor analysis (EFA). One method to assess sample adequacy for factor analysis is to calculate the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. Additionally, to verify the correlation among variables for conducting factor analysis, the output of Bartlett's test of sphericity should be used to calculate the normalized chi-square. This test examines the null hypothesis that the observed correlation matrix is an identity matrix. For the correlation matrix to be non-identity, the significance level of Bartlett's test should be less than the alpha level of 0.05. Ideally, the KMO value should be above 0.7, although values between 0.5 and 0.7 are cautiously acceptable.

The results of the Kaiser-Meyer-Olkin (KMO) index and Bartlett's test show that the KMO index is 0.742, indicating sample adequacy for factor analysis. The chi-square value for Bartlett's test is 2620.062 with 1326 degrees of freedom, and the significance level is 0.000. These values confirm that the sample size is sufficient and the correlations among the variables are adequate for conducting exploratory factor analysis.

Given the adequacy of the sample size and the significance level of Bartlett's test, which rejects the null hypothesis, the sample is deemed adequate, and factor analysis is conducted. Based on the factor analysis approach and the Kaiser criterion, components with eigenvalues greater than one in the output tables represent a true principal factor. Consequently, 16 factors influencing the quality of the technology management system in the subsidiary companies of the Ministry of Petroleum were identified and extracted, accounting for 60.8% of the variance in the technology management system. The results are presented in Table 1.

Table 1

Number of Confirmed Factors and Total Variance Explained for Factors Affecting the Quality of Technology Management System

Factors	Initial Eigenvalues Total	Percentage of Variance from Initial Eigenvalues	Cumulative Percentage from Initial Eigenvalues	Unrotated Total	Percentage of Variance Unrotated	Cumulative Percentage Unrotated	Rotated Total	Percentage of Variance Rotated	Cumulative Percentage Rotated
1	7.1	13.8	13.7	7.1	13.8	13.7	7.1	13.8	13.7
2	2.5	4.9	18.7	2.5	4.9	18.7	2.5	4.9	18.7

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3	2.1	4.1	22.8	2.1	4.1	22.8	2.1	4.1	22.8
4	2.0	3.8	26.7	2.0	3.8	26.7	2.0	3.8	26.7
5	1.8	3.5	30.3	1.8	3.5	30.3	1.8	3.5	30.3
6	1.7	3.4	33.7	1.7	3.4	33.7	1.7	3.4	33.7
7	1.7	3.2	37.0	1.7	3.2	37.0	1.7	3.2	37.0
8	1.6	3.2	40.2	1.6	3.2	40.2	1.6	3.2	40.2
9	1.5	2.9	43.1	1.5	2.9	43.1	1.5	2.9	43.1
10	1.4	2.8	45.9	1.4	2.8	45.9	1.4	2.8	45.9
11	1.4	2.7	48.7	1.4	2.7	48.7	1.4	2.7	48.7
12	1.3	2.6	51.3	1.3	2.6	51.3	1.3	2.6	51.3
13	1.3	2.5	53.9	1.3	2.5	53.9	1.3	2.5	53.9
14	1.3	2.5	56.4	1.3	2.5	56.4	1.3	2.5	56.4
15	1.2	2.2	58.6	1.2	2.2	58.6	1.2	2.2	58.6
16	1.1	2.2	60.8	1.1	2.2	60.8	1.1	2.2	60.8

Since in the first stage of factor analysis, some variables are included in multiple factors, the Varimax rotation method was used to uniquely distribute variables among factors. The Varimax method is the most common orthogonal rotation method. This method minimizes the complexity of components by maximizing large loadings and minimizing small loadings within each column, ensuring each component belongs to one factor. The Varimax rotation output is used to calculate each variable's loading on each factor to examine the appropriate variable correlation in explaining the variance of the desired factor. According to the results, all factor loadings were above 0.3, indicating a suitable correlation of manifest variables with the factors in each category. Therefore, based on the results, technical structure and governing psychological principles were used to name the research components. The results, indicating 16 factors labeled C1 to C16, are presented in Table 2.

Table 2

Labeling of Extracted Research Factors in Factor Analysis

Factor	Factor Label	Factor	Factor Label
C1	Enhancement of Human Resource Capabilities	C9	Retention of Efficient Human Resources
C2	Improvement of Technological Competency	C10	Technological Research Activities
C3	Organizational Technology Strategy	C11	Adaptability to New Technology
C4	Technological Mastery	C12	Technology Integration Capability
C5	Impact of Political Factors	C13	Adequacy of Communication Structures
C6	Technology Commercialization Capability	C14	Legal Framework for Technology Preservation
C7	Technology Evaluation Competency	C15	Mechanisms for Updating Existing Technologies
C8	Technology Forecasting Capability	C16	Intercompany Collaborations

For the second stage of the research, to collect data regarding the comparison of the intensity of reciprocal impacts among the research factors, a second sample of 75 individuals (15 from each studied company) was selected as research experts to provide responses in the standard DEMATEL comparison matrix format. The average of the respondents' opinions was calculated as the corresponding entries in the average effect matrix.

The labeling of the extracted research factors in the factor analysis includes the following: C1 is labeled "Enhancement of Human Resource Capabilities," C2 is labeled "Improvement of Technological Competency," C3 is labeled "Organizational Technology Strategy," C4 is labeled "Technological Mastery," C5 is labeled "Impact of Political Factors," C6 is labeled "Technology Commercialization Capability," C7 is labeled "Technology Evaluation Competency," C8 is labeled "Technology Forecasting Capability," C9 is labeled "Retention of Efficient Human Resources," C10 is labeled "Technological Research Activities," C11 is labeled "Adaptability to New Technology," C12 is labeled "Technology Integration Capability," C13 is labeled "Adequacy of Communication Structures," C14 is labeled "Legal Framework for Technology Preservation," C15 is labeled "Mechanisms for Updating Existing Technologies," and C16 is labeled "Intercompany Collaborations."

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research experts to provide responses in the standard DEMATEL comparison matrix format. The average of the respondents' opinions was calculated as the corresponding entries in the average effect matrix.

The degrees of reciprocal impact intensity among the research factors are defined as follows: an intensity level of 0 indicates "No Impact," 1 indicates "Low Impact," 2 indicates "Moderate Impact," 3 indicates "High Impact," and 4 indicates "Very High Impact." This scale is used to assess the impact of factor i on factor j, allowing for the measurement of how each factor influences another within the study.

To calculate the initial effect matrix, the average effect matrix was normalized. This matrix represents the initial effects of a factor, both affecting and being affected. For this purpose, the value obtained from dividing one by the largest sum of rows and columns was used. The information in the total effect matrix indicates the overall direct and indirect influence and the receptivity of each identified research factor concerning other factors. Two indices indicate the status of each factor: the row sum (Ri) representing the impact strength and the column sum (Dj) representing the receptivity. The index (Ri+Dj) indicates the overall impact intensity of each factor, while (Ri-Dj) indicates whether the factor is predominantly influencing or being influenced. A positive value of this index indicates an influencing factor, whereas a negative value indicates a factor being influenced. The calculated results are shown in Table 3.

Table 3

Impact and Receptivity Indices of Research Factors

Factor	Factor Label	Ri	Dj	Ri+Dj	Ri-Dj
C1	Enhancement of Human Resource Capabilities	4.2	3.47	7.67	0.73
C2	Improvement of Technological Competency	4.25	3.79	8.04	0.46
C3	Organizational Technology Strategy	4.44	3.87	8.31	0.57
C4	Technological Mastery	3.72	4.24	7.96	-0.52
C5	Impact of Political Factors	4.64	3.26	7.90	1.38
C6	Technology Commercialization Capability	3.69	4.89	8.58	-1.20
C7	Technology Evaluation Competency	3.37	4.06	7.43	-0.69
C8	Technology Forecasting Capability	3.58	4.05	7.63	-0.47
C9	Retention of Efficient Human Resources	4.47	3.32	7.79	1.15
C10	Technological Research Activities	4.48	4.06	8.54	0.42
C11	Adaptability to New Technology	3.32	4.76	8.08	-1.44
C12	Technology Integration Capability	3.87	4.32	8.19	-0.45
C13	Adequacy of Communication Structures	4.12	3.64	7.76	0.48
C14	Legal Framework for Technology Preservation	3.06	3.33	6.39	-0.27
C15	Mechanisms for Updating Existing Technologies	3.37	4.42	7.79	-1.05
C16	Intercompany Collaborations	4.89	3.87	8.76	1.02

The research factors are categorized into influencing and influenced factors:

- Influencing factors include C1 (Enhancement of Human Resource Capabilities), C2 (Improvement of Technological Competency), C3 (Organizational Technology Strategy), C5 (Impact of Political Factors), C9 (Retention of Efficient Human Resources), C10 (Technological Research Activities), C13 (Adequacy of Communication Structures), and C16 (Intercompany Collaborations).
- Influenced factors include C4 (Technological Mastery), C6 (Technology Commercialization Capability), C7 (Technology Evaluation Competency), C8 (Technology Forecasting Capability), C11 (Adaptability to New Technology), C12 (Technology Integration Capability), C14 (Legal Framework for Technology Preservation), and C15 (Mechanisms for Updating Existing Technologies).

To better understand the reciprocal impact of factors and filter relationships with minor effects, the threshold value needs to be determined. For this purpose, information from the total effect matrix was used to determine the threshold value. Elements in the total effect matrix with relationship intensity higher than the determined threshold are considered effective relationships between factors. The threshold value is obtained by calculating the mean of the total effect matrix (T). The calculated value (0.25) is derived from dividing the sum of matrix elements (63.47) by the

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number of elements (256). Consequently, effects in the total effect matrix exceeding the threshold are displayed and form the basis for drawing the relationships among the identified research factors. The results of applying the threshold value in the total effect matrix are shown in Table 4.

Table 4

Applying Threshold Value in the Total Effect Matrix

	C	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
C	0.19	0.27	0.28	0.23	0.23	0.30	0.33	0.26	0.22	0.27	0.28	0.33	0.22	0.27	0.25	0.27	0.27
C1	0.24	0.25	0.32	0.22	0.24	0.31	0.34	0.26	0.23	0.27	0.26	0.33	0.22	0.30	0.25	0.21	0.25
C2	0.24	0.29	0.33	0.23	0.29	0.28	0.35	0.27	0.23	0.26	0.28	0.35	0.22	0.31	0.22	0.29	0.29
C3	0.22	0.23	0.25	0.20	0.22	0.25	0.28	0.24	0.19	0.26	0.23	0.27	0.20	0.20	0.26	0.22	0.23
C4	0.25	0.30	0.31	0.24	0.30	0.30	0.32	0.32	0.27	0.29	0.28	0.37	0.19	0.32	0.31	0.27	0.30
C5	0.21	0.22	0.26	0.21	0.21	0.25	0.27	0.24	0.19	0.23	0.24	0.23	0.21	0.23	0.26	0.23	0.22
C6	0.19	0.20	0.23	0.18	0.21	0.24	0.25	0.24	0.18	0.21	0.18	0.25	0.18	0.22	0.21	0.20	0.20
C7	0.20	0.22	0.24	0.19	0.21	0.23	0.29	0.25	0.19	0.18	0.22	0.30	0.19	0.24	0.22	0.21	0.22
C8	0.24	0.27	0.33	0.23	0.24	0.32	0.34	0.30	0.19	0.30	0.30	0.36	0.23	0.28	0.25	0.29	0.27
C9	0.24	0.26	0.29	0.23	0.25	0.32	0.34	0.23	0.23	0.30	0.31	0.35	0.23	0.32	0.30	0.28	0.26
C10	0.20	0.21	0.23	0.19	0.20	0.23	0.20	0.22	0.18	0.21	0.21	0.24	0.17	0.22	0.20	0.21	0.21
C11	0.21	0.27	0.29	0.21	0.22	0.21	0.28	0.24	0.21	0.25	0.25	0.32	0.20	0.25	0.23	0.23	0.27
C12	0.22	0.24	0.31	0.21	0.19	0.30	0.33	0.26	0.21	0.28	0.28	0.30	0.21	0.30	0.24	0.24	0.24
C13	0.17	0.19	0.21	0.13	0.17	0.21	0.22	0.20	0.17	0.20	0.20	0.23	0.17	0.21	0.19	0.19	0.19
C14	0.19	0.21	0.19	0.18	0.19	0.23	0.25	0.21	0.18	0.22	0.22	0.28	0.18	0.23	0.20	0.21	0.21
C15	0.26	0.24	0.35	0.25	0.27	0.34	0.37	0.32	0.25	0.32	0.32	0.38	0.24	0.34	0.28	0.31	0.24
C16	0.19	0.27	0.28	0.23	0.23	0.30	0.33	0.26	0.22	0.27	0.28	0.33	0.22	0.27	0.25	0.27	0.27

Given the number of research factors and the complexity of the interrelationships and mutual influences among the factors, the cause-effect diagram also reflects these intricate relationships. This necessitates effective and targeted management to optimize conditions through appropriate policymaking and decision-making.

At this stage, the validity and reliability of the extracted research factors were examined. For this purpose, structural equation modeling was used to analyze the relationships between the research indicators and latent variables. Accordingly, the bootstrapping command was executed with the initial sample size and a determined degree of freedom of 39, with an acceptable t-value of 2.02. Factor loadings and t-values for the observed variables were calculated. The results showed that all factor loadings were above 0.4 and the t-values were greater than 2.02, confirming the validity of the research questionnaire and the appropriate correlation between each factor and its associated variables.

To assess the correlation between the constructs and their corresponding variables, the Average Variance Extracted (AVE) index was calculated. Internal consistency of the components was evaluated using Cronbach's alpha and Composite Reliability (CR) as modern PLS method criteria. Additionally, one of the primary model fit criteria in the partial least squares method, the coefficient of determination (R2), was calculated to explain the variance in each latent variable by the research indicators. The results of these indices are presented in Table 5.

Table 5

Results of the Parameters for Validity Assessment of the Research Components

Factor	AVE	Cronbach's Alpha (α)	CR	R2	Factor	AVE	Cronbach's Alpha (α)	CR	R2
C1	0.51	0.71	0.67	0.33	C9	0.62	0.81	0.68	0.62
C2	0.58	0.79	0.64	0.58	C10	0.07	0.73	0.72	0.70
C3	0.62	0.74	0.66	0.62	C11	0.66	0.72	0.62	0.66
C4	0.56	0.71	0.68	0.56	C12	0.53	0.74	0.69	0.53
C5	0.54	0.88	0.70	0.54	C13	0.54	0.75	0.67	0.54
C6	0.53	0.82	0.69	0.53	C14	0.63	0.72	0.65	0.63
C7	0.58	0.76	0.73	0.58	C15	0.54	0.77	0.70	0.54
C8	0.66	0.76	0.60	0.66	C16	0.57	0.84	0.73	0.57

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Based on the obtained results, the calculated values for the indices are above the acceptable ranges. Furthermore, to examine the significance of the relationships between the research constructs and the quality of the technology management system, as well as the nature of the reciprocal relationships among the factors, t-values and path coefficients were calculated. Positive path coefficients indicate a direct relationship between variables, while negative coefficients indicate an inverse relationship. If the absolute value of the coefficient is less than 0.5, the relationship between the two variables is weak; values between 0.5 and 0.7 indicate a moderate relationship; and values above 0.7 indicate a strong relationship.

According to the results, the t-values for all relationships are above the acceptable threshold, indicating the significance of the relationships. The path coefficients for these relationships are positive, and for factors with indicators C4, C11, and C16, which have coefficients less than 0.5, the impact is weak. In contrast, the factor with indicator C10 shows a strong impact on the quality of the organization's technology management system. The remaining research factors have moderate impacts within the defined range based on their path coefficients.

4 Discussion and Conclusion

This study was conducted to identify and extract the components affecting the quality of the technology management system in the Ministry of Petroleum, aiming to examine reciprocal relationships and make necessary policy decisions to improve the technological sector. Based on the results from data analysis using the exploratory factor analysis approach, 16 factors were identified based on the eigenvalue criterion. Following this stage, the DEMATEL technique was employed to analyze the reciprocal influence of these factors. After completing the necessary steps and applying the threshold filter, significant and effective relationships among the research constructs were identified, leading to the creation of a cause-and-effect diagram.

Undoubtedly, one of the reliable paths to achieving the lofty goal of enhancing competitiveness and transforming into a dynamic, creative, and pioneering organization is leveraging research and development projects to gain and increase knowledge in growth areas based on technological capabilities. Understanding and identifying critical factors is essential for taking necessary actions. The complexities of operating in the current business environment compel industries and companies to identify and adopt new management, planning, and performance methods to survive and sustain their activities.

Continuous advancements in technology across various aspects of human life, coupled with the need to keep pace with these changes to effectively respond to market demands and maintain competitiveness locally and globally, highlight the importance of focusing on research and development activities. The outcomes of such research are vital for implementing effective management and making decisions based on scientific findings for growth.

Given the importance of technology and the need for effective management in this critical area, it is crucial to anticipate and take all necessary actions to ensure the appropriate and correct progression of technological initiatives. Considering the prominent position and evident importance of the oil industry in the country, as well as the need for comprehensive and effective attention to the technological issues in this upstream and strategic industry, this research was designed and executed to study the reciprocal relationships among factors affecting the quality performance of the technology management system in the subsidiary companies of the Ministry of Petroleum.

The oil industry is one of the most influential and largest industries globally, particularly in Iran. The significant impact of this industry on essential economic, social, political, and other indicators is notable and considerable. Therefore, studying and examining all factors related to the comprehensive development of this crucial and strategic industry should be a primary concern for senior management. Detailed and continuous planning should be designed and implemented to achieve this critical goal.

A review of the nature of activities and processes in the oil industry shows that one of the main guidelines for enhancing and empowering this industry is focusing on the development of technological capabilities. This development is influenced by a robust, comprehensive, and dynamic structure in managing all aspects related to the oil industry's technology. Considering all the necessary efforts and planning within the policy framework of the oil industry to enhance technological indicators, the role of applying scientific research results as a driving force in accelerating development and achieving self-sufficiency in required technologies is undoubtedly essential and crucial.

Therefore, it is hoped that by increasing effective links between academic and research communities and industrial environments, particularly the large oil industry of the country, and simultaneously improving the quality and practical applicability of scientific research outcomes, the

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belief in the significant and positive impact of applying study findings in improving and organizing the technological sector of the country's oil industries will be strengthened within the managerial framework of this large organization.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were observed.

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