SCIENTIFIC OASIS

Journal of Soft Computing and Decision Analytics

Journal homepage: www.jscda-journal.org
ISSN: 3009-3481

Examining the Mediating Effect of Knowledge Management on the Relationship Between Organizational Culture and Organizational Performance

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ARTICLE INFO

Article history:
Received 11 August 2023
Received in revised form 22 August 2023
Accepted 25 August 2023
Available online 26 August 2023

Keywords: Organizational culture; Organizational Performance; Knowledge Management; PLS; SEM.

ABSTRACT

Nowadays, organizations with international dimensions are surrounded by fierce competition and extreme, unstable environments. With these hostile conditions, only those organizations that demonstrate better performances in comparison to their rivals can survive. They can outperform their rivals regarding financial, procedural, and internal operations. To this aim, two variables, organizational culture, and knowledge management, play crucial roles. On the one hand, organizational performance hinges on the in-depth storage of experience, creation, and classification of knowledge. On the other hand, they are under the impression of social and cultural variables of the organization. Among these items, knowledge management is also under the influence of organizational culture and is capable of taking a mediatory role in organizational culture performance. Thus, this research is aimed at exploring the mediatory role of knowledge management in the relationship between organizational culture and performance. Simultaneously exploring these two factors can give new insight into organizational performance under the social and knowledge variables and extend the literature in this area. To this end, each of the three factors was investigated through library study and defined as factorial constructs. Afterward, their relationship was modeled, and the model was under effect in Etehad Rah Engineering Advisory Company as the research's Statistical Society. A simple random method was used; 28 persons constitute the research's participants. A questionnaire and PLS software were used to collect and analyze the data. The results reveal a positive and significant relationship between organizational performance and culture directly and through knowledge management. Moreover, a positive and significant correlation exists between organizational performance and knowledge management and organizational culture and knowledge management.

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https://doi.org/10.31181/jscda1120235

1. Introduction

Considering the current global competition, organizational performance evaluation is an unavoidable prerequisite to organizational survival and also a starting point for organizational development. Any organization should evaluate, monitor, and analyze its performance. Organizational culture generally refers to organizational values communicated through man-made norms and manifested in behavioral patterns [1]. The intrinsic value of these norms lies in the fact that they serve as social principles or philosophies that guide behavior and provide a comprehensive framework for organizational procedures and practices [2]. The study of organizational culture from different aspects has helped researchers to propose different typologies to evaluate organizational culture. Although these typologies are conceptually different, they represent essentially similar models and theories [3].

Based on traditional views, organizational performance merely refers to the financial performance of organizations and deals with issues such as budget, asset, and market [4]. Lee and Choi [5] state that organizational performance is an important tool for gaining a sustainable competitive advantage. Organizational performance is also measured based on the level of employee participation in organizational success [6]. Ahmed and Shafiq [7] define organizational performance based on organizational culture, which includes the actual results of an organization measured according to its micro and macro goals. Elenkov [8] also defines organizational performance as the extent to which an organization achieves its business goals.

The effects of transformational leadership on employee creativity were studied by Shafi *et al*. [9]. They wanted to see how transformational leadership affects employee creativity, which can lead to organizational innovation, as well as what role internal motivation plays in the transformational leadership-creativity stimulation relationship. The findings revealed that mental stimulation and inspirational motivation had a significant impact on organizational innovation and employee creativity.

In order to investigate the mediating role of knowledge worker productivity in the relationship between KM processes and organizational performance, Sahibzada *et al*. [10] interpreted the effect of knowledge management (KM) processes on organizational performance in the Chinese higher education system. The implementation of KM processes is at the heart of HEI performance, HEI research productivity, student satisfaction, curriculum development, university ranking, academic effectiveness, quality development, and meeting environmental challenges, according to their findings.

Cheung *et al*. [11] investigated the relationship between culture and performance in construction organizations in order to test the hypothesis that organizational culture has a significant impact on performance. They looked at eight aspects of organizational culture (goal transparency, coordination and integration, dispute resolution, employee participation, innovation, performance emphasis, reward, and teamwork) as well as four aspects of organizational performance (internal processes, customer, innovation, and learning and finance). They obtained the required data by distributing a questionnaire between contractors of construction companies in Hong Kong and then analyzed them by structural equation modeling. The results revealed that there is a positive and significant relationship between organizational performance and organizational culture and innovation is the most important indicator of organizational culture affecting the performance of construction organizations.

Leithy [12] studied the relationship between organizational performance and culture in order to develop a theoretical framework for the relationship between organizational culture, work attitudes and work behavior, and organizational performance, the dependent variable. They did this by

sending 384 questionnaires to 14 Egyptian domestic and multinational companies, and then analyzing the data using structural equation modeling. The findings revealed a positive and significant relationship between work attitudes and behavior, organizational culture, work attitudes, and behavior, as well as a link between work behavior and organizational performance. Furthermore, there was a link between work attitudes and organizational performance that was negative. Organizational culture and performance, on the other hand, did not appear to have a positive and significant relationship.

Abbas [13] investigated the impact of total quality management (TQM) on organizational sustainability as mediated by knowledge management (KM) in order to examine the critical role of KM in the relationship between TQM and organizational sustainability. TQM had a significant and positive effect on organizational sustainability, according to the findings, and KM could partially mediate this relationship.

Abane and Brenya [14] investigated the relationship between predecessors in the organizational environment and performance management in local governments. Their findings revealed a strong relationship between two organizational environment variables, and "stakeholder participation," "political support," and "performance management" explained 31.8% of the variance in the dependent variable.

Based on the hypothesis that KM practices positively affect organizational performance, Gholami *et al*. [15] investigated the relationship between KM processes and organizational performance in small- and medium-sized organizations. According to the hypothetical model, they considered five processes for KM and six indicators for organizational performance. Then 380 questionnaires were distributed among the senior managers of 380 small- and medium-sized Iranian companies in the food, automobile, ceramic tile, pipe, electronics, and clothing industries. The data from 282 complete questionnaires were statistically analyzed by structural equation modeling. The results indicated that five KM processes had a significant factor loading on KM and the six organizational performance indicators had a significant factor loading on organizational performance. The study findings finally suggested that KM processes directly affect the performance of small- and medium-sized organizations.

Discussing the findings of several researchers, such as Kalling [16] and Lee and Choi [5], regarding the effect of KM on organizational performance, Zack *et al*. [17] argued that changes in KM practices do not necessarily lead to a change in financial results, rather, KM affects a series of intermediate indicators, which will ultimately affect the financial results in an organization.

Upadhyay and Kumar [18] investigated the role of organizational culture and internal analytical knowledge in mediating the relationship between big data analytics capability and firm performance. Their findings demonstrated that organizational culture can positively impact a firm's performance by acting as a complementary mediator between big data analytics capability and internal analytical knowledge.

Mills and Smith [19] studied the effect of KM processes and knowledge infrastructure on organizational performance. They identified four processes of knowledge acquisition, knowledge conversion, knowledge application, and knowledge retention for KM, and then hypothesized that all these four processes have a positive relationship with organizational performance. To test this hypothesis, they distributed a questionnaire between senior and middle managers of service and construction companies. After statistical analysis of data from 164 questionnaires, they concluded that all KM processes, except knowledge conversion, had a positive relationship with organizational performance.

Akhavan *et al*. [20] investigated the relationship of ethics with knowledge creation and organizational performance and also the relationship between knowledge creation and

organizational performance. They discussed knowledge creation based on the SECI model of knowledge dimensions proposed by Nonaka and Takeuchi. After analyzing the collected data in LISREL, they found that there was no significant relationship between knowledge creation process and organizational performance. The finding, however, was not consistent with the results of many previous studies, including those mentioned above. This discrepancy can be attributed to the fact that the KM system had been recently established in the studied organization and there were no data available on its performance. Another reason for this discrepancy was the strong effect of ethics on organizational performance, which neutralizes the relationship between the knowledge creation process and organizational performance meaningless.

Gürlek and Çemberci [21] conducted a study to better understand the relationships between knowledge-oriented leadership, KM capacity, innovation performance, and organizational performance. They aimed to investigate the relationships between knowledge-oriented leadership, KM capacity, innovation performance, and organizational performance. They found that knowledge-oriented leadership had a positive effect on KM capacity and, consequently, KM capacity had a positive effect on innovation performance.

Pellegrini *et al*. [22] investigated the relationship between KM and leadership to provide an overview of the evolution of the research literature on the relationship between KM and leadership over the past 20 years.

Rasula *et al*. [23] conducted a study on 329 companies that were mainly operating in the construction industry in Slovenia and Croatia and reported that KM practices positively affected organizational performance through other knowledge management factors such as information technology (the ability of technology to acquire tacit and explicit knowledge and the use of information systems) and organizational factors (including employees, organizational environment and culture, and processes). The KM practices included in their model were continuous knowledge acquisition, knowledge application, knowledge sharing, and identification of knowledge ownership, whereas organizational performance was evaluated from six perspectives: financial, suppliers, learning and innovation, customer, internal processes, and reputation.

Noruzi *et al*. [24] conducted a study on senior managers, executive managers, and other directors of 106 companies operating in various industries, such as food and automotive industries, which had more than 50 employees. They showed that organizational innovation mediated the positive effects of KM processes on organizational performance, which involves profitability, sales growth, customer satisfaction, and overall performance.

In a study of 407 companies in various industries such as pharmaceuticals, cement, petrochemicals, and electronics, Nawaz *et al*. [25] found similar results. They discovered that through an intervening variable called innovation, KM processes (i.e. acquisition, sharing, and rapid response to knowledge) had a significant impact on an organization's financial performance.

Although many studies [26–32] have been conducted on organizational culture and performance, only a few have combined these two variables with KM in a framework. This emphasizes the importance of this research. This study aims to investigate the mediating role of KM in the relationship between organizational culture and organizational performance. Given the importance of organizational culture and KM in improving organizational performance, the goal of this research is to develop a structural model to measure the relationship between organizational culture and organizational performance as mediated by KM for the company under study.

2. Hypothesis and Development

The typology of "organizational culture" was discussed in this study, based on Quinn's model [33]. Clan culture, market culture, hierarchy culture, and adhocracy culture are the four dimensions used to evaluate organizational culture in this model. Knowledge management (KM) was evaluated in four dimensions after reviewing the research literature and expert achievements: knowledge production and acquisition, knowledge organizing and storage, knowledge dissemination and sharing, and knowledge application. Finally, “organizational performance” was measured using Mahdavi and Hesamamiri's model [34], which included financial, process, and internal performance. Based on the following research hypotheses, the structural model of the relationship between organizational performance, organizational culture, and KM was as follows:

Primary hypothesis:

There is a positive and significant relationship between organizational culture and organizational performance mediated by KM.

Secondary hypotheses:

- There is a positive and significant relationship between organizational culture and organizational performance.
- There is a positive and significant relationship between KM and organizational performance.
- There is a positive and significant relationship between organizational culture and KM.

Based on the arguments above, we develop a conceptual model (as presented in Fig.1) that demonstrates the relationships among different relevant factors in ASCI namely, II, SI, CI, PQ, and FP, and the associated hypotheses that describe the relationships among these factors.

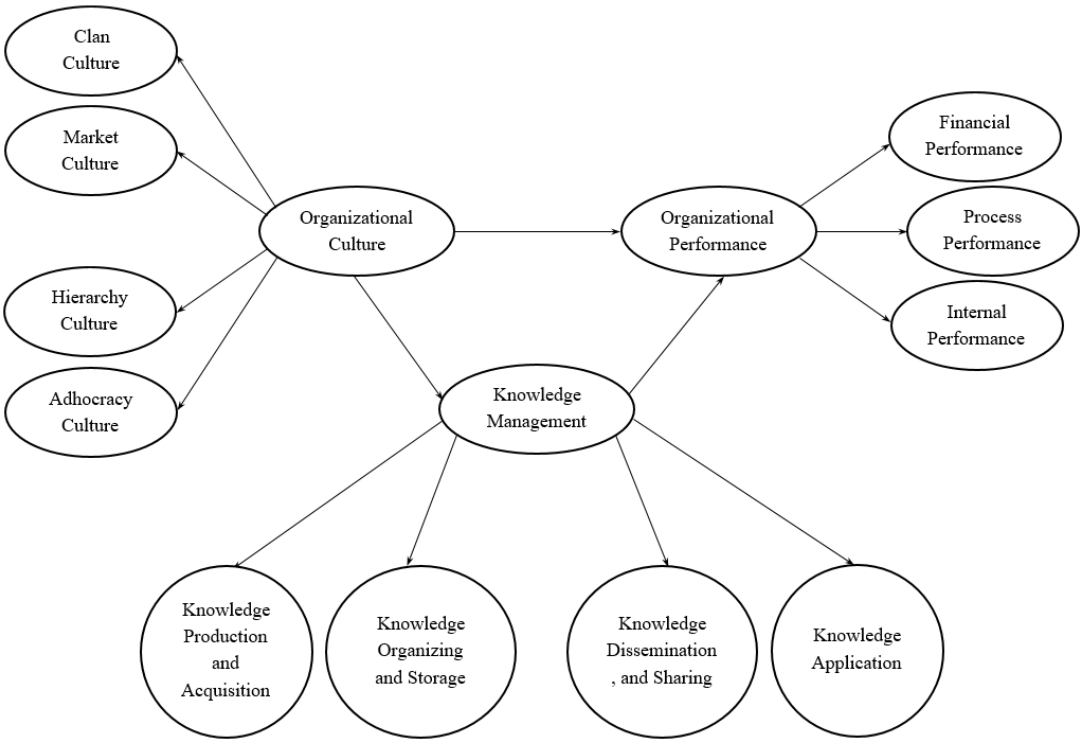

Fig. 1. The conceptual model of expected relations between KM, organizational culture, and organizational performance.

3. Methodology

a. Data collection and sample description:

A statistical population is made up of all people and objects who share at least one characteristic. A limited statistical population is defined as a population with a small number of members. The statistical population in this study was made up of Consulting Engineers Co. employees (N= more than 50), 28 of whom were chosen as the sample to fill out the research questionnaires. Five questions about the respondents' age, gender, educational attainment, job title, and work experience were used to determine their demographic characteristics. Table 1 shows the frequency and frequency percentages of demographic characteristics.

Table 1
Describe demographic characteristics

Work Experience			Job Title			Age		
Years	Frequency	Frequency percentage		Frequency	Frequency percentage	Years	Frequency	Frequency percentage
5<<	12	42.85	Expert	23	82.14	30<<	11	39.28
5-10	3	10.72	Project Manager	3	10.72	30-35	9	32.14
10-15	10	10.72	Member board of directors	2	7.14	35-40	4	14.29
15>>	3	35.71				40>>	4	14.29

Education			Sex		
	Frequency	Frequency percentage		Frequency	Frequency percentage
AA.	1	3.57	Male	13	46.4
Bsc.	8	28.57			
Msc.	19	67.86	Female	15	53.6
Ph.D	0	0			

The questionnaire used in this study consisted of open- or close-ended items to assess the respondents' attitude toward any reality. This questionnaire included four parts: demographics (age, gender, educational attainment, job title, and work experience), organizational culture, KM, and organizational performance. Since "organizational culture" was discussed in this study based on the model proposed by Quinn [33], the questions used to measure this variable were extracted from the same model.

Structural equation modeling (SEM) was employed to analyze data and test hypotheses. SEM is one of the advanced statistical analysis techniques that has been commonly used in social sciences in recent decades. SEM is a multivariate technique that combines factor analysis and regression analysis to help researchers simultaneously examine the relationship between overt and covert variables as well as the relationship between latent variables [35], [36], [37]. SEM is also an analytical

tool for confirming hypotheses using data collected from a sample [38]. Assuming overt and covert variables and estimating multiple relationships simultaneously, SEM is known as an essential tool in academic and executive research.

The relationships were measured using partial least squares (PLS) in Smart-PLS, because it is a very suitable method for cases where the sample size is small and there is no information available about the normal distribution of data. In order to test hypotheses and determine the significance of research paths, measurement and structural models were used with the help of the software application and bootstrapping in the software application.

4. Results and Discussion

Reliability determines how much a measurement tool produces similar results under consistent conditions. The first step in evaluating a model's goodness of fit is to determine the appropriateness of the questionnaire items or, in other words, the reliability of the questionnaire. The reliability of the research questionnaire was assessed by factor loadings, Cronbach's alpha coefficient, and combined reliability. The factor loadings for the measurement model are shown in Fig. 2. These values exist on the path between the questions and the constructs. As it can be observed, factor loading for all items was greater than 0.4. Values greater than 0.4 for factor loading indicate that the variance between the construct and its parameters is greater than the variance of the measurement error of that construct, and the measurement tool is acceptably reliable. As the factor loadings show, the items of each construct well explained that construct.

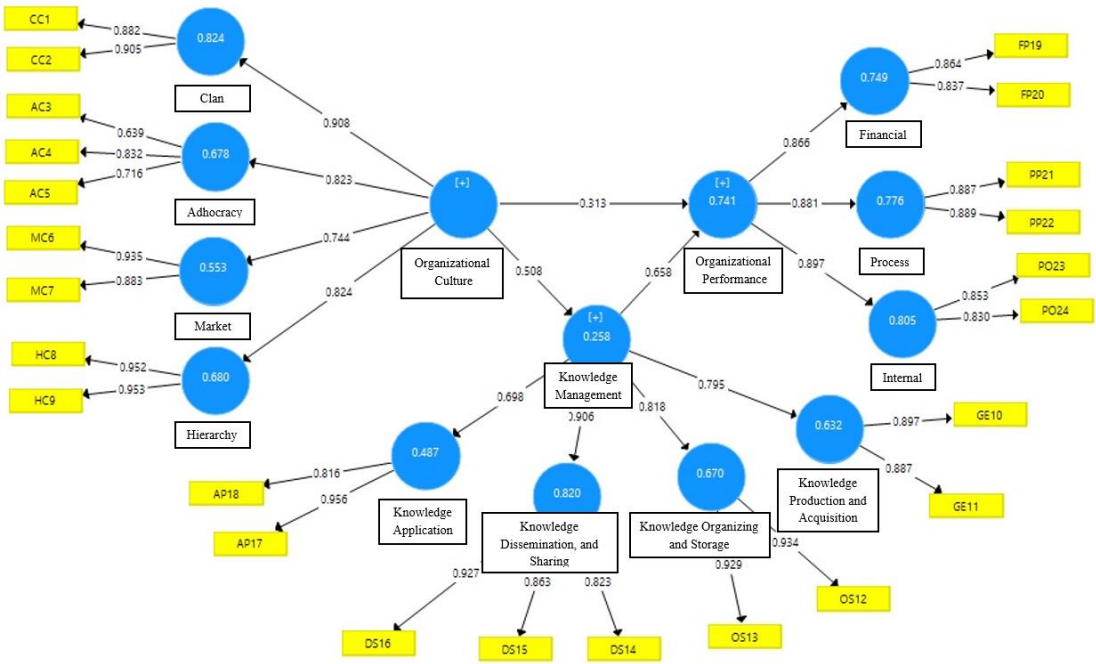

Fig. 2. Final SEM model (loadings for the measurement model).

Internal consistency indicates the degree of correlation between a construct and its parameters. Cronbach's alpha coefficient and combined reliability values must be greater than 0.7 to prove the correlation between the construct and its associated parameters. As shown in Table 2, these values were greater than 0.7 for all constructs. The most important criterion for assessing reliability is Cronbach's alpha coefficient. Considering the Cronbach's alpha coefficients obtained in this study, it

can be concluded that the research questionnaire was reliable and can be confidently used for testing the model.

Average variance extracted (AVE) is an appropriate criterion for examining convergent validity. According to Fornell and Larcker criterion [39], an AVE greater than 0.4 and 0.5, respectively, indicate an acceptable level of convergent validity. Convergent validity measures the correlation between different dimensions of a variable and represents the mean variance shared between each construct and its own indicators. As shown in Table 2, AVE for all constructs was greater than 0.5, revealing the good correlation between constructs and their parameters. When the validity and reliability of a measurement tool are confirmed, the accuracy of that measurement tool can be ensured. As AVE results indicate, the measurement tool applied in this study had an acceptable level of convergent validity.

Table 2
AVE values for indicators of each construct

Constructs	**Ave Variance Extracted**
Clan Culture	0.799
Adhocracy Culture	0.538
Market Culture	0.827
Hierarchy Culture	0.907
Organizational Culture	0.505
Knowledge Production and Acquisition	0.795
Knowledge Organizing and Storage	0.868
Knowledge Dissemination, and Sharing	0.761
Knowledge Application	0.790
Knowledge Management	0.529
Financial Performance	0.724
Process Performance	0.789
Internal Performance	0.708
Organizational Performance	0.574

Divergent validity addresses two issues regarding the model's goodness of fit: Transverse loading of items (divergent validity): Divergent validity refers to the extent to which the indicators of a particular latent variable do not measure other latent variables. In this regard, the factor loading of each indicator on its construct must be at least 0.1 more than its factor loading on other constructs. Table 3 presents the cross-loadings of indicators. As the table shows, the factor loading of each indicator on its construct was more than its factor loading on other constructs. This suggests that indicators have measured their own corresponding constructs rather than other constructs. In fact, the results of cross-loadings of items indicated that the items of each construct are most relevant to their corresponding construct and are more likely to measure that construct rather than other constructs.

Table 3
Cross-loadings of indicators

	AC	DS	MC	AP	CC	GE	PO	OS	HC	HC	FP
AC3	0.639	0.586	0.225	0.373	0.497	0.401	0.522	0.505	0.386	0.573	0.568
AC4	0.832	0.281	0.444	0.36	0.611	0.233	0.306	0.342	0.406	0.128	0.351
AC5	0.716	0.126	0.452	0.077	0.339	0.175	0.198	0.368	0.408	0.148	0.316
AP17	0.455	0.579	0.21	0.956	0.29	0.637	0.522	0.443	0.333	0.487	0.578
AP18	0.112	0.366	0.044	0.816	-0.039	0.249	0.15	-0.021	-0.066	0.304	0.13
CC1	0.562	0.343	0.558	0.332	0.882	0.137	0.577	0.37	0.527	0.273	0.291
CC2	0.526	0.395	0.536	0.035	0.905	0.235	0.583	0.689	0.716	0.502	0.469
DS14	0.16	0.823	-0.191	0.359	0.088	0.433	0.526	0.513	0.093	0.47	0.464
DS15	0.509	0.863	0.177	0.551	0.558	0.409	0.577	0.539	0.2	0.497	0.508
DS16	0.458	0.927	0.201	0.537	0.41	0.615	0.562	0.725	0.283	0.613	0.697
FP19	0.509	0.65	0.294	0.47	0.424	0.611	0.593	0.667	0.562	0.568	0.864
FP20	0.426	0.443	0.268	0.324	0.303	0.41	0.571	0.599	0.306	0.474	0.837
GE10	0.323	0.534	0.32	0.328	0.216	0.897	0.402	0.607	0.219	0.538	0.597
GE11	0.321	0.472	0.238	0.673	0.16	0.887	0.261	0.362	0.211	0.432	0.479
HC8	0.498	0.22	0.486	0.259	0.603	0.338	0.601	0.534	0.952	0.539	0.601
HC9	0.537	0.215	0.311	0.158	0.731	0.123	0.51	0.512	0.953	0.454	0.384
MC6	0.483	0.107	0.935	0.064	0.659	0.269	0.41	0.333	0.497	0.317	0.338
MC7	0.453	0.046	0.883	0.275	0.423	0.309	0.257	0.223	0.229	0.237	0.255
OS12	0.564	0.678	0.292	0.312	0.598	0.488	0.658	0.934	0.562	0.645	0.788
OS13	0.444	0.602	0.29	0.275	0.522	0.531	0.564	0.929	0.459	0.648	0.597
PO23	0.331	0.631	0.13	0.48	0.407	0.313	0.853	0.524	0.392	0.683	0.531
PO24	0.444	0.431	0.517	0.247	0.694	0.316	0.83	0.584	0.596	0.482	0.624
PP21	0.315	0.543	0.272	0.622	0.378	0.486	0.624	0.553	0.491	0.887	0.531
PP22	0.335	0.538	0.278	0.21	0.403	0.482	0.612	0.679	0.434	0.889	0.56

Correlation between covert variables: In this section, the correlation between covert variables was assessed to confirm the accuracy of the validity between the constructs. Based on the method, a matrix was developed using correlation coefficients between constructs and AVE. To confirm the correlation between covert variables, the values on the diameter of the matrix should be greater than the correlation between that construct and other constructs. As shown in Table 4, this condition is established.

The Fornell and Larker criterion indicates that a construct has a stronger relationship with its indicators than with other constructs. In other words, a model has an acceptable level of divergent validity when a construct interacts more with its indicators than other constructs. The results demonstrated that the research constructs were more interacting with their corresponding indicators than other constructs (Table 5).

Table 4
Cross-loadings of indicators Based on Fornell larcker criterion

	AC	DS	MC	AP	CC	GE	PO	OS	HC	PP	FP
AC	0.734										
DS	0.441	0.872									
MC	0.515	0.088	0.91								
AP	0.373	0.558	0.17	0.889							
CC	0.666	0.414	0.611	0.197	0.894						
GE	0.361	0.565	0.314	0.557	0.211	0.892					
PO	0.458	0.635	0.377	0.436	0.649	0.374	0.841				
OS	0.542	0.688	0.313	0.315	0.601	0.546	0.657	0.931			
HC	0.543	0.228	0.418	0.218	0.7	0.242	0.583	0.549	0.952		
PP	0.366	0.609	0.31	0.468	0.44	0.545	0.696	0.694	0.521	0.888	
FP	0.551	0.647	0.331	0.47	0.43	0.605	0.684	0.746	0.516	0.615	0.851

Table 5
Cronbach's alpha coefficients and combined reliability

Constructs	**Cronbach-α coefficient**	**Combined reliability**
Clan Culture	0.74	0.88
Adhocracy Culture	0.76	0.77
Market Culture	0.79	0.90
Hierarchy Culture	0.89	0.95
Organizational Culture	0.87	0.90
Knowledge Production and Acquisition	0.74	0.88
Knowledge Organizing and Storage	0.84	0.92
Knowledge Dissemination, and Sharing	0.84	0.90
Knowledge Application	0.75	0.88
Knowledge Management	0.88	0.90
Financial Performance	0.71	0.84
Process Performance	0.73	0.88
Internal Performance	0.78	0.82
Organizational Performance	0.85	0.89

Unlike measurement models, the evaluation of the structural model's goodness of fit has nothing to do with the items and only requires investigating covert variables and the relationship between them. As it was observed, acceptable values were obtained from the model's goodness of fit criteria. It can be hence concluded that that the measurement tool was reliable. To check and ensure the accuracy of relationships in the model, it was necessary to examine the model's structural goodness of fit using some criteria such as T, Q^2, R^2, and Redundancy.

A t-value greater than 1.96 indicates a relationship between covert variables. In fact, t-values should be greater than 1.96 to confirm the relationship between covert variables at the 95% confidence level. The values of this statistic are shown on the path between the covert variables in the structural model. As it can be seen in Fig. 3, the t-value for the primary and secondary hypotheses of this study was greater than 1.96. It can be hence stated that there was a relationship between constructs of the model. After assessing the model's goodness of fit, the research hypotheses can be either confirmed or rejected based on these values.

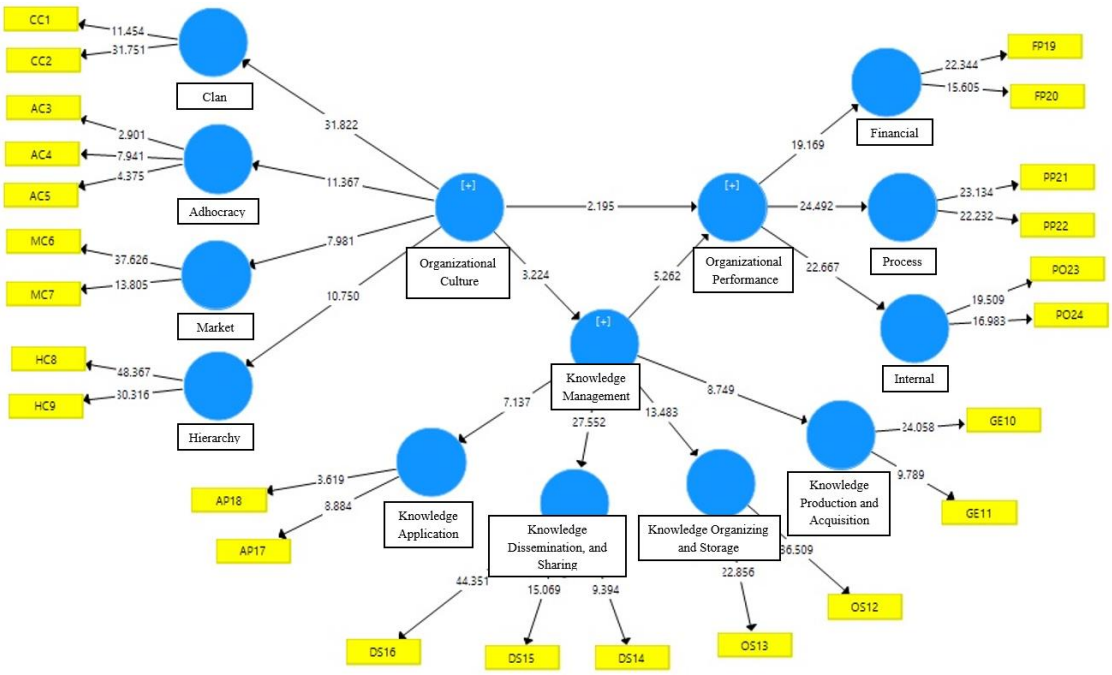

Fig. 3. SEM model.

The results showed that t-values of relationships between all constructs were greater than 1.96. Therefore, it can be concluded there was a relationship between constructs, and the independent construct affected the dependent construct.

Coefficient of determination (R^2) refers to the proportion of the variance in the dependent variable that is predictable from the independent variable(s). There are three critical values of R^2: 0.19 (weak), 0.33 (moderate), and 0.67 (strong). Values of R^2 are presented in Table 6. Higher values of R^2 indicate the higher level of the model's goodness of fit and the greater effect of the dependent variable on the independent variable. Coefficient of determination (R^2) is one of the most appropriate criteria for measuring the value of a model.

Table 6
Values of Coefficient of determination for constructs

Constructs	R Square Adjusted	R Square
Clan Culture	0.824	0.817
Adhocracy Culture	0.678	0.665
Market Culture	0.553	0.536
Hierarchy Culture	0.680	0.667
Organizational Culture	0.632	0.618
Knowledge Production and Acquisition	0.670	0.657
Knowledge Organizing and Storage	0.820	0.813
Knowledge Dissemination, and Sharing	0.487	0.468
Knowledge Application	0.749	0.740
Knowledge Management	0.749	0.740
Financial Performance	0.776	0.767
Process Performance	0.805	0.797
Internal Performance	0.358	0.330
Organizational Performance	0.741	0.720

As the value of R^2 shows, dependent variables were moderately to highly affected by independent variables. This criterion demonstrates the variability of the indicators of an endogenous construct under the influence of one or more exogenous constructs. This criterion is obtained by multiplying the common values by R^2. Although no specific value is provided to measure this criterion, the higher values of this criterion generally show the better goodness of fit of a model. This criterion is calculated by the following equation (Table 7).

$$Redundancy = Communality \times R^2 \quad (1)$$

Table 7
Values of Redundancy for constructs

Constructs	Community	R Square	Redundancy
Clan Culture	0.799	0.824	0.658
Adhocracy Culture	0.538	0.678	0.365
Market Culture	0.827	0.553	0.457
Hierarchy Culture	0.907	0.680	0.617
Knowledge Production and Acquisition	0.505	0.632	0.319
Knowledge Organizing and Storage	0.795	0.670	0.533
Knowledge Dissemination, and Sharing	0.868	0.820	0.712
Knowledge Application	0.761	0.487	0.371
Knowledge Management	0.789	0.358	0.282
Financial Performance	0.790	0.749	0.591
Process Performance	0.529	0.776	0.411
Internal Performance	0.724	0.805	0.583
Organizational Performance	0.708	0.741	0.525

This criterion determines the predictive power of a model; a value of 0.02, 0.15, and 0.35 represents the weak, moderate, and strong predictive power of the exogenous constructs of the model, respectively. As shown in Table 8, the results indicated that the exogenous constructs of the model had good predictive power.

Table 8
Values of Q^2 for constructs

Constructs	Q^2(=1-SSE/SSO)
Clan Culture	0.628
Adhocracy Culture	0.326
Market Culture	0.415
Hierarchy Culture	0.592
Knowledge Production and Acquisition	0.468
Knowledge Organizing and Storage	0.559
Knowledge Dissemination, and Sharing	0.599
Knowledge Application	0.291
Financial Performance	0.504
Process Performance	0.574
Internal Performance	0.216
Organizational Performance	0.369

The general model included measurement and structural parts; the goodness of fit of both should be confirmed to measure the overall goodness of fit of the model. The goodness of fit index (GFI), which is calculated by Eq. (1)., was used for this purpose. "Communalities" denotes the mean common values of each construct or, in other words, AVE. This index examines the overall predictive power of the model and answers the question of whether or the overall model has been well fitted. According to Wetzels *et al*. [40], a GFI of 0.01, 0.25, and 0.36 indicates weak, moderate, and strong predictive power, respectively.

$$GoF = \sqrt{\overline{Communalities} \times \overline{R^2}} = \sqrt{0.734 \times 0.674} = \sqrt{0.4947} = 0.703 \quad (2)$$

The results of GFI indicated that the model was well fitted and had a strong predictive power. Considering this criterion and other criteria employed to examine the goodness of fit of the structural and measurement models, it can be concluded that the proposed model can be reliably applied for data analysis and interpretation.

5. Hypothesis Test

The research hypotheses were tested based on factor loadings and t-values. Considering the model and secondary hypotheses, this study aimed to investigate the relationship between organizational culture and organizational performance, organizational culture and KM, and KM and organizational performance. Based on significance values presented in Table 9, t-values for all variables are greater than 1.96. It can be hence stated that there was a positive and significant relationship between organizational culture and organizational performance, organizational culture and KM, and KM and organizational performance at the 95% confidence level (Fig. 4).

Table 9
Relationship between organizational culture and organizational performance, organizational culture and KM, and KM and organizational performance

	T Statistics (|O/STDEV|)	P Values	Result
Organizational Performance | Internal Performance	22.667	0.000	Accepted
Organizational Performance | Process Performance	24.492	0.000	Accepted
Organizational Performance | Financial Performance	19.169	0.000	Accepted
Organizational Performance | Adhocracy Culture	11.367	0.000	Accepted
Organizational Culture | Market Culture	7.981	0.000	Accepted
Organizational Culture | Clan Culture	31.822	0.000	Accepted
Organizational Culture | Hierarchy Culture	10.750	0.000	Accepted
Organizational Culture | Organizational Performance	2.195	0.013	Accepted
Knowledge Management | Organizational Culture	3.224	0.001	Accepted
Knowledge Management | Knowledge Dissemination, and Sharing	27.552	0.000	Accepted
Knowledge Management | Knowledge Application	7.137	0.000	Accepted
Knowledge Management | Knowledge Production and Acquisition	8.749	0.000	Accepted
Knowledge Management | Knowledge Organizing and Storage	13.483	0.000	Accepted
Knowledge Management | Organizational Performance	5.262	0.000	Accepted

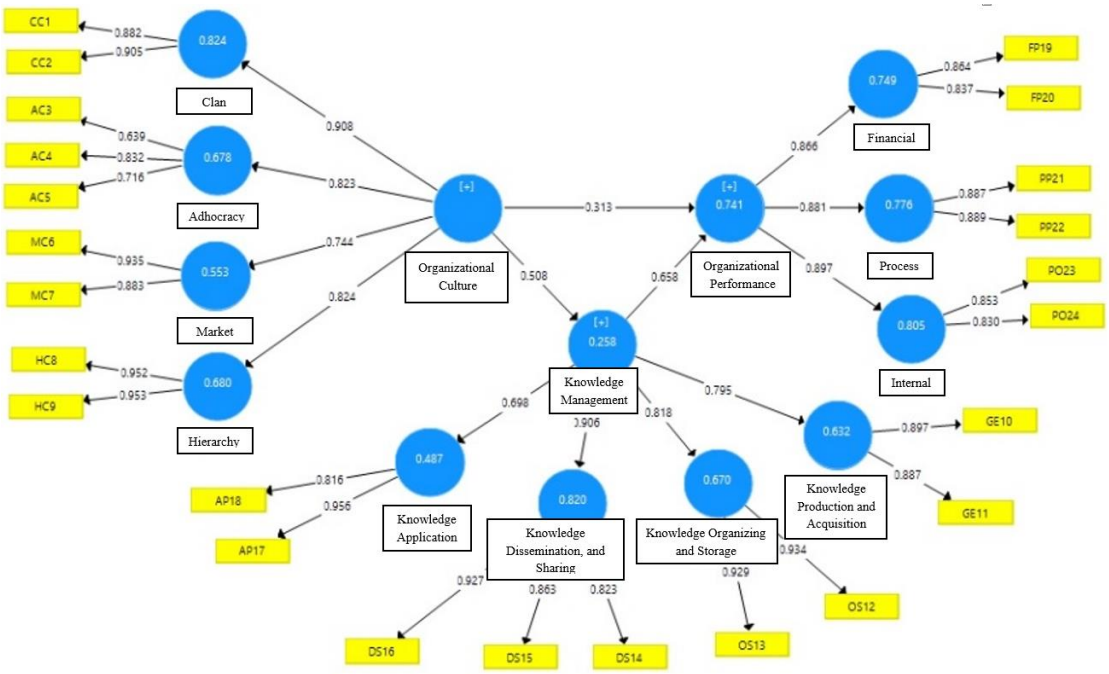

Fig. 4. Final SEM model.

Considering the model and the primary hypothesis, indicating the mediating role of KM in the relationship between organizational culture and organizational performance, and since all the three secondary hypotheses were confirmed, the extent of the indirect effect of organizational culture on organizational performance and its significance can be calculated by Eq. (3). In this equation, *a* represents the effect of the independent variable on the mediator variable (path coefficient between organizational culture and KM) and *b* denotes the effect of the mediator variable on the dependent variable (path coefficient between KM and organizational performance).

$$\beta_{Indirect} = a \times b \tag{3}$$

In addition to measuring the indirect effect, it is also possible to measure the significance of the indirect effect by the Sobel test. It is noteworthy that all statistical software applications calculate the significance of direct effects between variables and present it in their outputs, but they do not provide the significance of the indirect effect or present it as the equation mentioned above. Therefore, the significance of the indirect effect should be calculated by the following equation based on the Sobel test.

$$t - value = \frac{a \times b}{\sqrt{b^2 \times s_a^2 + a^2 \times s_b^2}} \tag{5}$$

Where a, S_a, b, and S_b denote the effect size of the independent variable on the mediator variable, standard error of the effect of the independent variable on the mediator variable, the effect size of the mediator variable on the dependent variable, and standard error of the effect of the mediator variable on the dependent variable, respectively.

As seen in Fig. 4, the path coefficient was equal to 0.508 for the relationship between organizational culture and organizational performance (based on the software application output, the standard error was 0.143) and 0.658 for the relationship between KM and organizational

performance (based on the software application output, the standard error was 0.129). As calculated below, the size of the indirect effect of organizational culture on organizational performance was equal to 0.355.

Then the significance of the indirect effect was evaluated. Since the t-value was obtained greater than 1.96, it can be concluded that the indirect effect of organizational culture on organizational performance was positive and significant at the 95% confidence level. As a result, the primary hypothesis of this study was confirmed.

$$t - value = \frac{a \times b}{\sqrt{b^2 \times s_a^2 + a^2 \times s_b^2}} = \frac{0.508 \times 0.658}{\sqrt{0.658^2 \times 0.145^2 + 0.508^2 \times 0.129^2}} = 2.888 \quad (6)$$

6. Conclusion

This study aimed to propose a model that explains the mediating role of KM in the relationship between organizational culture and organizational performance. The statistical population consisted of the personnel of Consulting Engineers Co. (N= more than 50), 28 of whom were selected as the sample to fill out the research questionnaires. The data obtained from questionnaires were statistically analyzed.

The model proposed in this study consisted of variables related to organizational performance, organizational culture, and KM. Based on previous studies, the questionnaire was used to measure organizational performance in three dimensions and six variables, the questionnaire was used to measure organizational culture in four dimensions and nine variables, and the questionnaires were employed to measure KM in four dimensions and nine variables. Therefore, the research questionnaire consisted of 24 items on main variables and 5 items on demographics. The items were scored based on a 5-point Likert scale. The validity of this questionnaire was assessed by content, convergent, and divergent validity. To confirm the content validity of the questionnaire, the opinions of some university professors and KM experts of the studied company were elicited and applied to corrections and revisions of the questionnaire. The convergent and divergent validity of the questionnaire were also assessed and confirmed in Smart-PLS-3. The reliability of the questionnaire was assessed by Cronbach's alpha coefficient and combined reliability. The results showed that both coefficients confirmed the reliability of the research questionnaire. Demographic results indicated that 46.4% of the participants were male and 53.6% of them were female. In terms of educational attainment, 3.57%, 28.57%, 67.86%of the participants had an associate's degree, a bachelor's degree, and a master's degree, respectively. The data showed that 39.28%, 32.14%, 14.29%, and 14.29% of participants aged under 30, 30-35, 35-40, and over years, respectively. When it comes to job title, 82.14%, 10.72%, and 7.14% of participants were an expert, a project manager, and a member of the board of directors, respectively. Finally, 42.85%, 10.72%, 10.72%, and 35.71% of participants had a work experience of under 5, 5-10, 10-15, and over 15 years, respectively .

Based on the research model of the hypotheses, KM mediated the positive and significant effects of organizational culture on organizational performance, with a path coefficient of 0.335. The study findings also suggested that there was a positive and significant relationship between organizational culture and organizational performance, organizational culture and KM, and KM and organizational performance, with a path coefficient of 0.313, 0.508, and 0.658, respectively.

Acknowledgement
This research was not funded by any grant.

Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] Homburg, C., & Pflesser, C. (2000). A multiple-layer model of market-oriented organizational culture: Measurement issues and performance outcomes. *Journal of marketing research*, *37*(4), 449-462. https://doi.org/10.1509/jmkr.37.4.449.18786.

[2] O'Reilly III, C. A., Chatman, J., & Caldwell, D. F. (1991). People and organizational culture: A profile comparison approach to assessing person-organization fit. *Academy of management journal*, *34*(3), 487-516. https://doi.org/10.5465/256404

[3] Huey Yiing, L., & Zaman Bin Ahmad, K. (2009). The moderating effects of organizational culture on the relationships between leadership behaviour and organizational commitment and between organizational commitment and job satisfaction and performance. *Leadership & Organization Development Journal*, *30*(1), 53-86. https://doi.org/10.1108/01437730910927106

[4] Haseli, G., Ranjbarzadeh, R., Hajiaghaei-Keshteli, M., Ghoushchi, S. J., Hasani, A., Deveci, M., & Ding, W. (2023). HECON: Weight assessment of the product loyalty criteria considering the customer decision's halo effect using the convolutional neural networks. *Information Sciences*, *623*, 184-205. https://doi.org/10.1016/j.ins.2022.12.027.

[5] Lee, H., & Choi, B. (2003). Knowledge management enablers, processes, and organizational performance: An integrative view and empirical examination. *Journal of management information systems*, *20*(1), 179-228. https://doi.org/10.1080/07421222.2003.11045756.

[6] Acar, A. Z., & Acar, P. (2014). Organizational culture types and their effects on organizational performance in Turkish hospitals. *EMAJ: Emerging Markets Journal*, *3*(3), 18-31. https://doi.org/10.5195/emaj.2014.47.

[7] Ahmed, M., & Shafiq, S. (2014). The impact of organizational culture on organizational performance: A case study of telecom sector. *Global journal of management and business research*, *14*(3), 21-30

[8] Elenkov, D. S. (2002). Effects of leadership on organizational performance in Russian companies. *Journal of business research*, *55*(6), 467-480. https://doi.org/10.1016/S0148-2963(00)00174-0

[9] Shafi, M., Lei, Z., Song, X., & Sarker, M. N. I. (2020). The effects of transformational leadership on employee creativity: Moderating role of intrinsic motivation. *Asia Pacific Management Review*, *25*(3), 166-176. https://doi.org/10.1016/j.apmrv.2019.12.002

[10] Sahibzada, U. F., Jianfeng, C., Latif, K. F., Shafait, Z., & Sahibzada, H. F. (2022). Interpreting the impact of knowledge management processes on organizational performance in Chinese higher education: mediating role of knowledge worker productivity. *Studies in Higher Education*, *47*(4), 713-730. https://doi.org/10.1080/03075079.2020.1793930.

[11] Cheung, S. O., Wong, P. S., & Lam, A. L. (2012). An investigation of the relationship between organizational culture and the performance of construction organizations. *Journal of Business Economics and Management*, *13*(4), 688-704. https://doi.org/10.3846/16111699.2011.620157.

[12] Leithy, W. E. (2017). Organizational culture and organizational performance. *International Journal of Economics & Management Sciences*, *6*(42), 1-10. http://dx.doi.org/10.4172/2162-6359.1000442.

[13] Abbas, J. (2020). Impact of total quality management on corporate sustainability through the mediating effect of knowledge management. *Journal of Cleaner Production*, *244*, 118806. https://doi.org/10.1016/j.jclepro.2019.118806.

[14] Abane, J. A., & Brenya, E. (2021). The relationship between organizational environment antecedents and performance management in local government: evidence from Ghana. *Future Business Journal*, *7*, 1-17. https://doi.org/10.1186/s43093-020-00049-2.

[15] Gholami, M. H., Asli, M. N., Nazari-Shirkouhi, S., & Noruzy, A. (2013). Investigating the influence of knowledge management practices on organizational performance: an empirical study. *Acta Polytechnica Hungarica*, *10*(2), 205-216. http://dx.doi.org/10.12700/APH.10.02.2013.2.14.

[16] Kalling, T. (2003). Knowledge management and the occasional links with performance. *Journal of knowledge management*, *7*(3), 67-81. https://doi.org/10.1108/13673270310485631.

[17] Zack, M., McKeen, J., & Singh, S. (2009). Knowledge management and organizational performance: an exploratory analysis. *Journal of knowledge management*, *13*(6), 392-409. https://doi.org/10.1108/13673270910997088.

[18] Upadhyay, P., & Kumar, A. (2020). The intermediating role of organizational culture and internal analytical knowledge between the capability of big data analytics and a firm's performance. *International Journal of Information Management*, *52*, 102100. https://doi.org/10.1016/j.ijinfomgt.2020.102100.

[19] Mills, A. M., & Smith, T. A. (2011). Knowledge management and organizational performance: a decomposed view. *Journal of knowledge management*, *15*(1), 156-171. https://doi.org/10.1108/13673271111108756.

[20] Akhavan, P., Ramezan, M., Yazdi Moghaddam, J., & Mehralian, G. (2014). Exploring the relationship between ethics, knowledge creation and organizational performance: Case study of a knowledge-based organization. *VINE: The journal of information and knowledge management systems*, *44*(1), 42-58. https://doi.org/10.1108/VINE-02-2013-0009.

[21] Gürlek, M., & Cemberci, M. (2020). Understanding the relationships among knowledge-oriented leadership, knowledge management capacity, innovation performance and organizational performance: A serial mediation analysis. *Kybernetes*, *49*(11), 2819-2846. https://doi.org/10.1108/K-09-2019-0632.

[22] Pellegrini, M. M., Ciampi, F., Marzi, G., & Orlando, B. (2020). The relationship between knowledge management and leadership: mapping the field and providing future research avenues. *Journal of Knowledge Management*, *24*(6), 1445-1492. https://doi.org/10.1108/JKM-01-2020-0034.

[23] Rašula, J., Bosilj Vukšić, V., & Indihar Štemberger, M. (2012). The impact of knowledge management on organisational performance. *Economic and business review*, *14*(2), 3. https://doi.org/10.15458/2335-4216.1207.

[24] Noruzy, A., Dalfard, V. M., Azhdari, B., Nazari-Shirkouhi, S., & Rezazadeh, A. (2013). Relations between transformational leadership, organizational learning, knowledge management, organizational innovation, and organizational performance: an empirical investigation of manufacturing firms. *The International Journal of Advanced Manufacturing Technology*, *64*, 1073-1085. https://doi.org/10.1007/s00170-012-4038-y.

[25] Nawaz, M. S., & Shaukat, S. (2014). Impact of knowledge management practices on firm performance: Testing the mediation role of innovation in the manufacturing sector of Pakistan. *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, *8*(1), 99-111.

[26] Chen, L., Li, T., & Zhang, T. (2021). Supply chain leadership and firm performance: A meta-analysis. *International Journal of Production Economics*, *235*, 108082. https://doi.org/10.1016/j.ijpe.2021.108082.

[27] Shahzad, M., Qu, Y., Zafar, A. U., Rehman, S. U., & Islam, T. (2020). Exploring the influence of knowledge management process on corporate sustainable performance through green innovation. *Journal of Knowledge Management*, *24*(9), 2079-2106. https://doi.org/10.1108/JKM-11-2019-0624.

[28] Obeso, M., Hernández-Linares, R., López-Fernández, M. C., & Serrano-Bedia, A. M. (2020). Knowledge management processes and organizational performance: the mediating role of organizational learning. *Journal of Knowledge Management*, *24*(8), 1859-1880. https://doi.org/10.1108/JKM-10-2019-0553.

[29] Dos-Santos, S. M. (2021). Relationship between innovativeness and competitiveness in networked organizations: A perspective from the electric and electronic industry in Brazil. *Creativity and Innovation Management*, *30*(2), 248-267. https://doi.org/10.1111/caim.12433.

[30] Hughes, D. J., Lee, A., Tian, A. W., Newman, A., & Legood, A. (2018). Leadership, creativity, and innovation: A critical review and practical recommendations. *The Leadership Quarterly*, *29*(5), 549-569. https://doi.org/10.1016/j.leaqua.2018.03.001.

[31] Attia, A., & Essam Eldin, I. (2018). Organizational learning, knowledge management capability and supply chain management practices in the Saudi food industry. *Journal of Knowledge Management*, *22*(6), 1217-1242. https://doi.org/10.1108/JKM-09-2017-0409.

[32] Nazarian-Jashnabadi, J., Bonab, S. R., Haseli, G., Tomaskova, H., & Hajiaghaei-Keshteli, M. (2023). A dynamic expert system to increase patient satisfaction with an integrated approach of system dynamics, ISM, and ANP methods. *Expert Systems with Applications*, *234*, 121010. https://doi.org/10.1016/j.eswa.2023.121010.

[33] Quinn, R. E. (2011). *Diagnosing and changing organizational culture: Based on the competing values framework*. Jossey-Bass.

[34] Mahdavi Mazdeh, M., & Hesamamiri, R. (2014). Knowledge management reliability and its impact on organizational performance: An empirical study. *Program*, *48*(2), 102-126. https://doi.org/10.1108/PROG-01-2013-0001.

[35] Hair Jr, J., Hair Jr, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage publications.

[36] Haseli, G., & Sheikh, R. (2022). Base-criterion method (BCM). Multiple criteria decision making: techniques, analysis and applications. *Springer. https://doi. org/10*, *1007*, 978-981.

[37] Haseli, G., Sheikh, R., & Sana, S. S. (2020). Base-criterion on multi-criteria decision-making method and its applications. *International journal of management science and engineering management*, *15*(2), 79-88. https://doi.org/10.1080/17509653.2019.1633964.

[38] Whittaker, T. A., & Schumacker, R. E. (2022). *A beginner's guide to structural equation modeling*. Routledge.

[39] Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, *18*(1), 39-50. https://doi.org/10.1177/002224378101800104.

[40] Wetzels, M., Odekerken-Schröder, G., & Van Oppen, C. (2009). Using PLS path modeling for assessing hierarchical construct models: Guidelines and empirical illustration. *MIS quarterly*, 177-195. https://doi.org/10.2307/20650284.