

Prioritizing Factors of Organizational Cultural Model in Electronic Enterprises

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ABSTRACT. This study aims to investigate the priority order of organizational cultural factors affecting the competitiveness of electronic enterprises. The methodology adopted for this research comprises the fuzzy analytical hierarchy process (FAHP) method. Data collection was sent to 15 experts, including university scientists, government regulators, and managers of electronic enterprises. The results revealed that the first ranking belongs to the involvement factor, the second-ranked factor is a mission, and the third position is consistency and adaptability. The results showed that experts' top three indicators of influential competitiveness ratings included core values, customer focus, and vision. Meanwhile, the three lowest-rated factors include agreement, organizational learning, coordination, and integration. This research's practical and theoretical implications are discussed, providing insights into how the results can be applied or influence practices in organizational culture in electronic enterprises.

1. Introduction

Culture has been present throughout history and is pivotal in promoting societal progress. According to [1], corporate culture refers to the attitudes, behaviors, values, and beliefs displayed by employees in a corporation. These characteristics increase efficiency, foster development, and lead to innovation and remarkable achievements within the company. [2] and [3] demonstrate the significant positive impact of culture on internal cohesion and the company's ability to

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respond to external circumstances. This not only enhances its efficiency but also instills a sense of optimism about the potential of organizational culture. [4] and [5] further reinforce this positive relationship between corporate culture and company performance. [6] address that corporate culture is critical for success and maintaining a competitive advantage. Despite extensive study and application in several disciplines, there is yet to be an all-encompassing framework available for assessing and evaluating corporate culture [7]. An essential feature of Denison's corporate culture model is its rigorous and systematic approach to evaluating and enhancing its culture [8]. Researchers have conducted numerous extensive studies over an extended period to examine the cultural aspects of corporate governance. To enhance the effectiveness of establishing organizational culture and, as a result, the competitiveness of companies, it is essential to assess the importance and hierarchy of organizational culture in relation to corporate competitiveness.

This study aims to evaluate the importance and ranking of organizational culture components concerning Denison's model of corporate competitiveness using the Fuzzy Analytic Hierarchy Process (FAHP) is a method developed by [9] to solve complex decision-making problems with many selection criteria and many people participating in the decision-making process. In the fuzzy AHP process, the pairwise comparisons in the matrix are fuzzy numbers. Therefore, the decision maker can specify priorities in the form of natural language expressions of the importance of each criterion [10]. [11] state that although fuzzy AHP requires tedious computations, it can capture a human's appraisal of ambiguity when complex multi-attribute decision-making problems are considered in knowledge management. There are many studies in various fields have used the FAHP method, [12] in software-defined networking for controller selection and controller placement; [13] in risk assessment using a new consulting process or determining the importance of the criteria of traffic accessibility. Related to organizational culture research, FAHP is also applied in [14], [15], and [16].

2. Literature review

2.1 Organization culture concept

Organizational culture refers to ideologies, traditions, and values that significantly influence the functioning and governance of companies, shaping the emotions, attitudes, and behaviors within these systems [17] and [18]. There are several perspectives on organizational culture. [19] defines an organization's culture as including its methodology for addressing

and resolving problems. [20] defined corporate culture as the collective mindset and operational practices within an organization that all employees universally embrace. New members require time to acclimate to the corporate culture and acquire the skills necessary to integrate successfully. [21] argue that every organization possesses distinct cultural characteristics that can impact the behavior of its members, even if they are not consciously aware of them. [22] show that gaining a comprehensive understanding of corporate culture significantly improves one's grasp of organizational behavior and organizational innovation. The concept of culture encompasses personal values and distinct groups within the corporation. This connection between personal values and corporate culture engages us in a deeper exploration of the topic [23]. As defined by [24] corporate culture refers to the collection of fundamental values, ideas, and principles that form the basis for a company's governance structure, as well as the managerial skills and behavior that uphold and exemplify these ideals.

2.2 Denison DOC organization culture and its role in business competitiveness

The Denison Model of organizational culture highlights four essential characteristics a company must possess to function well [24]. These are the firmly held and frequently difficult-to-obtain facets of an organization's identity. The behaviors fueled by these presumptions and ideas that form an organization's culture are measured by the four features of the Denison model: mission, adaptability, involvement, and consistency. These qualities are arranged according to color and address essential company culture inquiries.

As shown by Denison's research, effective organizations have high culture scores across all four attributes. Influential companies, therefore, tend to have consistent, predictable, and adaptive cultures that encourage high levels of involvement within the framework of a common goal [8]. Additionally, this robust model divides into two hemispheres: Flexible/Stable and Internal/External. Two significant dynamic conflicts need to be resolved by a strong organization. As the Mission and Involvement attributes illustrate, businesses need to understand the conflict between Bottom-Up and Top-Down management. Establishing a link between an organization's mission, purpose, and goals is essential to its success because it encourages a sense of ownership, responsibility, and dedication among its staff [8], [25].

Culture plays a crucial role in both society and organizations. An organization's culture encompasses the values that its founders aimed to instill, strengthens its commercial objectives, and influences its strategy and decision-making [26], [7]. Multiple studies examining cultural elements and their impact on positive organizational results illustrate the significant effect of culture. Gorton et al. (2022) found a significant positive association between organizational commitment in marketing and corporate ethical standards, an essential element of corporate culture. [27], [22] studies reveal that the organizational culture of a business unit significantly impacts its success, with compelling evidence supporting a positive correlation between organizational performance and organizational culture.

3. Method

This study sets out to assess the significance and hierarchy of organizational culture components within Denison's model of corporate competitiveness. The unique aspect of this study lies in its use of the Fuzzy Analytic Hierarchy Process (FAHP) method, a technique that [28] have outlined in four sequential steps:

Step 1: Provide a concise overview of past research on organizational culture and its influence on business competitiveness.

Step 2: Construct an Analytic Hierarchy Process (AHP) survey and conduct interviews with experts who are academics, economists, and business executives employed by firms in the electronics industry.

Step 3 involves the pivotal task of constructing a fuzzy matrix system. This system is built using the outcomes derived from expert assessments, highlighting the crucial role of these assessments in ensuring the credibility and reliability of our research.

Step 4: Analyzing and evaluating the influence of organizational culture elements on firm competitiveness.

Based on a synthesis of existing studies on organizational culture models, [3] found that an organization's culture consists of four factors: mission, adaptability, involvement, and consistency. Table 1 below shows the indicators drawn from the theoretical basis, and Figure 3 presents the research framework.

Table 1. Summary of factors and indicators

Dimensions	Indicators	Encode	Source
Involvement	Empowerment	IN1	[3]
	Team orientation	IN2	
	Capability development	IN3	
Consistency	Core values	CO1	
	Agreement	CO2	
	Coordination & integration	CO3	
Adaptability	Creating change	AD1	
	Customer focus	AD2	
	Organizational learning	AD3	
Mission	Strategic direction & intent	MI1	
	Goals & objective	MI2	
	Vision	MI3	

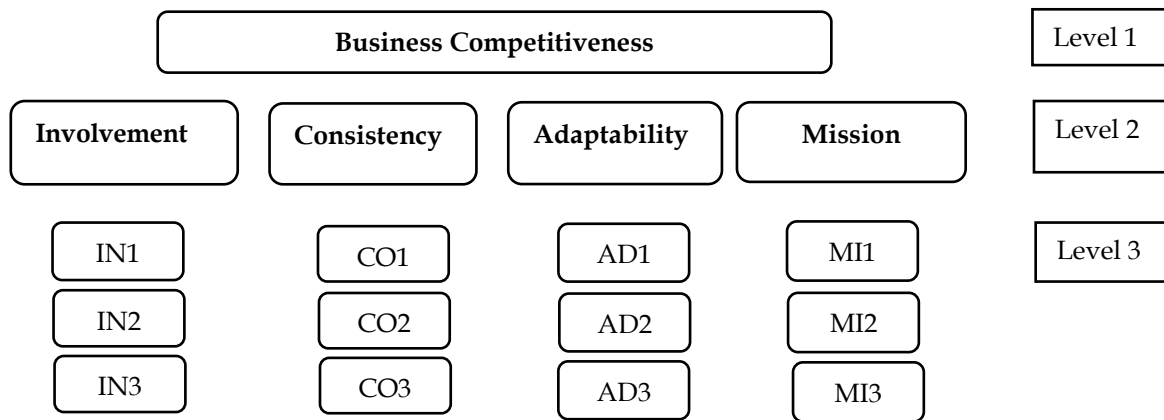


Figure 1. The research framework

This study employed the fuzzy geometry mean approach to determine the fuzzy multiplicative and fuzzy geometric mean values. The proposed method, widely used in the research community. The implementation steps of the FAHP method are as follows:

Step one: The FAHP model represents the expert's assessment as a triangular number, and the corresponding matrix:

(1)

$$\tilde{A} = (\tilde{a}_{ij})_{n \times n} = \begin{bmatrix} (1, 1, 1) & (l_{12}, m_{12}, u_{12}) & \dots & (l_{1n}, m_{1n}, u_{1n}) \\ (l_{21}, m_{21}, u_{21}) & (1, 1, 1) & \dots & (l_{2n}, m_{2n}, u_{2n}) \\ \vdots & \vdots & \ddots & \vdots \\ (l_{n1}, m_{n1}, u_{n1}) & (l_{n2}, m_{n2}, u_{n2}) & \dots & (1, 1, 1) \end{bmatrix}$$

In there $\tilde{a}_{ij} = (l_{ij}, m_{ij}, u_{ij})$ and $\tilde{a}_{ij}^{-1} = (1/u_{ij}, 1/m_{ij}, 1/l_{ij})$ with $i, j = 1, \dots, n$ and $i \neq j$.

Step 2: The next step involves determining the blurred multiplier and blurry weight averages for each specific criterion, as indicated in formulas (2) and (3).

$$\tilde{r}_i = (\tilde{a}_{i1} \otimes \dots \otimes \tilde{a}_{i2} \otimes \dots \otimes \tilde{a}_{in})^{1/n} \quad (2)$$

$$\tilde{w}_i = \tilde{r}_i \otimes [\tilde{r}_i \oplus \dots \oplus \tilde{r}_i \oplus \dots \oplus \tilde{r}_i]^{-1} \quad (3)$$

In this scenario, an ij represents the fuzzy comparison value between criterion i and criteria j . Consequently, (r) represents the multiplier average of the fuzzy comparison value between criterion i and each criterion, while w represents the fuzzy weight of the second criterion i . This weight can be expressed using a fuzzy triangle scale, the Triangular Fuzzy Number (TFN). $W_i = (l_{wi}, m_{wi}, u_{wi})$, where l_{wi} , m_{wi} , and u_{wi} represent the lower, middle, and upper values of the fuzzy weights of the second index i .

Step 3: Involves using the best performance indicator to optimally determine the weights of the criteria. (BNP: Best Nonfuzzy Performance):

$$BNP = \frac{[(U_{wi} - L_{wi}) + (M_{wi} - L_{wi})]}{3} + L_{wi} \quad (4)$$

Step four. Matrix consistency measurement: If the CR value < 0.1 is acceptable and < 0.1 , decision-makers must reduce the inconsistency by changing the critical value of the index pairs.

Step five: Conduct a study to rank the indicators based on synthesizing the influence indicators. Assume that there are n triangles with fuzzy A_i , where i ranges 1- n . Calculating the total integer values for each fuzzy triangle, $A_i = (l_i, m_i, u_i)$.

$$S\alpha(A) = (1/2) [(u_i - l_i) \alpha + (l_i + m_i) - 2X_{min}] \quad (5)$$

There is $X_{min} = \inf_{n=1} \{x = \mu_{A_i}(x) > 0\} \alpha \in [0, 1]$ where α is the indicator of optimism in the assessment $\alpha = 0$ for the pessimistic decision-maker, $\alpha = 1$ for the optimistic decision-maker, and $\alpha = 0.5$ for the moderate decision-maker.

To perform the pairwise comparison between fuzzy parameters, the linguistic variables are defined corresponding to the assessment levels in Table 2.

Table 2. Linguistic variables

Fuzzy number	Linguistic variables	Triangular fuzzy number
1	Equal importance	(1,1,1)
2	Importance of levels 1 and 3	(1,2,3)
3	Medium importance	(2,3,4)
4	Importance of levels 3 and 5	(3,4,5)
5	General importance	(4,5,6)
6	Importance of levels 5 and 7	(5,6,7)
7	Very important	(6,7,8)
8	Important of levels 7 and 9	(7,8,9)
9	Absolutely important	(8,9,10)

The study selected 15 survey experts, including faculty teachers and researchers on organizational culture and competitiveness, economists at research institutes, and business managers in electromagnetism. Table 3 presents information on the experts.

Table 3. Information of experts

No.	Position	Year of experience	Organization
1	Vice-president	15	University
2	Dean of Business Administration Faculty	20	University
3	Dean of Business Administration Faculty	17	University
4	Dean of Human Resource management Faculty	12	University
5	Dean of Marketing management Faculty	13	University
6	Economics expert	25	Institute for Economic Management
7	Economics expert	10	Institute for Economic Management
8	Chairman of directors	18	Electronic business
9	Chairman of directors	21	Electronic business
10	CEO	16	Electronic business

No.	Position	Year of experience	Organization
11	CEO	19	Electronic business
12	Human Resource manager	08	Electronic business
13	Chief Strategy Officer	14	Electronic business
14	Chief Strategy Officer	15	Electronic business
15	Business director	11	Electronic business

4. Results and discussion

4.1 FAHP result

Through the steps of FAHP analysis, fuzzy mean (r), weight (\tilde{r}), and best nonfuzzy performance (BNP) values are obtained. The local index ranking of the organizational culture model affecting the competitiveness of the enterprise is shown in Table 4.

Table 4. The ranking of organizational cultural model factors that affect the competitiveness of enterprises is based on local indicators

	r	W^*	BNP	Ranking
Involvement	(1.37, 1.59, 1.81)	(0.28, 0.37, 0.49)	0.38	1
Empowerment	(1.33, 1.50, 1.67)	(0.37, 0.48, 0.61)	0.49	1
Team orientation	(0.61, 0.73, 0.84)	(0.17, 0.23, 0.29)	0.24	3
Capability development	(0.81, 0.92, 1.05)	(0.23, 0.29, 0.38)	0.30	2
Consistency	(0.57, 0.66, 0.78)	(0.12, 0.15, 0.21)	0.16	3
Core values	(2.94, 3.30, 3.64)	(0.60, 0.75, 0.94)	0.76	1
Agreement	(0.49, 0.60, 0.68)	(0.10, 0.14, 0.17)	0.14	2
Coordination & integration	(0.45, 0.51, 0.59)	(0.11, 0.15, 0.12)	0.12	3
Adaptability	(0.58, 0.68, 0.79)	(0.12, 0.16, 0.21)	0.16	3
Creating change	(0.67, 0.74, 0.83)	(0.16, 0.19, 0.25)	0.20	2
Customer focus	(2.15, 2.61, 2.87)	(0.50, 0.67, 0.87)	0.68	1
Organizational learning	(0.47, 0.52, 0.58)	(0.11, 0.13, 0.18)	0.14	3
Mission	(1.19, 1.37, 1.56)	(0.24, 0.32, 0.42)	0.33	2
Strategic direction & intent	(0.50, 0.56, 0.62)	(0.13, 0.16, 0.20)	0.17	3
Goals & objective	(0.85, 0.95, 1.05)	(0.22, 0.28, 0.34)	0.28	2
Vision	(1.68, 1.90, 2.13)	(0.44, 0.56, 0.70)	0.57	1

*CR < 0.1 indicates acceptable consistency, as proposed by Saaty (1980). Specifically, the values for *CR (involvement) = 0.01, *CR (consistency) = 0.01, *CR (adaptability) = 0.05, and *CR (mission) = 0.01.

Table 4 presents the r , w , and BNP values of the indicators in the priority model that impact the competitiveness of enterprises. Regarding the involvement indicator, the empowerment factor has the highest ranking in terms of involvement, with a BNP = 0.49. The second factor is characterized by capability development, with a BNP value = 0.30. The final factor is team orientation, possessing a BNP value = 0.24. The results in Table 3 indicate that core values have the highest ranking in the consistency factor, with a BNP = 0.76. The second most important factor is the agreement with BNP valued = 0.14. The least important factors are coordination and integration with BNP value= 0.12.

According to the results in Table 4, the adaptability criterion ranks customer focus as the most critical factor, with a BNP = 0.68. The second most significant factor in this group of factors is the ability to initiate change, with a BNP = 0.20. The factor that ranks last in importance is the factor of organizational learning, with a BNP = 0.14. The mission indicator results indicate that the vision factor holds the highest rank among the mission factors, with a BNP value = 0.57. The second component is the goal and objective, which have a BNP = 0.28. The third component is the strategic direction and intent.

The results in Table 4 also indicate the priority of the critical elements of the organizational culture model affecting the enterprise's competitiveness. Involvement was ranked first in the model of the impact of organizational culture on business competitiveness, with a BNP = 0.38. The second-ranked factor is a mission, with a BNP = 0.33; the same two priority-rated factors in the third position are consistency and adaptability, with a BNP = 0.16.

The study continues to define a standard indicator for each indicator to assess the overall coefficient of these indicators. The overall index reflects each indicator's contribution to the enterprise's competitiveness. The overall index of each index in the structure is calculated by multiplying the segment index with the index of the main element; for example, the empowerment index is $(0.37, 0.48, 0.61) * (0.28, 0.37, 0.49) = (0.1034, 0.1764, 0.2969)$. Equation (4) is applied to rank blurred numbers with total integrated values. Consider the empowerment element as an example.

$S\alpha = (1/2) [(0.2969 - 0.1034) \alpha + (0.1034 + 0.1764) - 2 * 0.1034]$ And with $\alpha = 0.5$ for moderate decision-makers, $S\alpha = 0.085$.

Table 5. The global scores and indicators ranking

No	Indicator	Global scores	Final weight ($S\alpha$)	Ranking
1	Empowerment	(0.1034, 0.1764, 0.2969)	0.085	4
2	Team orientation	(0.0474, 0.0855, 0.1491)	0.044	7
3	Capability development	(0.0634, 0.1081, 0.1861)	0.053	5
4	Core values	(0.1659, 0.2773, 0.4599)	0.129	1
5	Agreement	(0.0274, 0.0501, 0.0852)	0.026	10
6	Coordination & integration	(0.0253, 0.0425, 0.0742)	0.021	12
7	Creating change	(0.04346, 0.0711, 0.1227)	0.034	8
8	Customer focus	(0.1394, 0.2495, 0.4268)	0.127	2
9	Organizational learning	(0.0302, 0.0494, 0.0859)	0.024	11
10	Strategic direction & intent	(0.0368, 0.0605, 0.0996)	0.028	9
11	Goals & objective	(0.0622, 0.1031, 0.1681)	0.047	6
12	Vision	(0.1229, 0.2063, 0.3421)	0.096	3

The data in Table 5 clearly show how the 12 indicators of the organizational culture model impact the competitiveness of enterprises in the electronics sector. The Core values factor stands out as the top influencer, with a significant $S\alpha$ value of 0.129. It is followed closely by the Customer focus factor, ranked second with $S\alpha = 0,127$. The Vision factor takes the third spot with $S\alpha = 0.096$, and the empowerment factor is in the fourth position with $S\alpha = 0.085$. The fifth is the Capability development factor with $S\alpha = 0.053$, the Goals & objective factor is in the sixth place with $S\alpha = 0,0847$, the Team orientation factor is seventh with $S\alpha = 0.044$, the eighth is Creating change factor with $S\alpha = 0,034$, the ninth is Strategic direction & intent $S\alpha = 0.028$, the tenth is Agreement element with $S\alpha = 0.026$, the eleventh is Organizational learning element with $S\alpha = 0.024$, and the coordination factor and $S\alpha$ integration factor are on the twelfth place with $S\alpha = 0.021$.

4.2 Discussions

The critical elements of a functional culture model that affect the competitiveness of a business are developed based on Denison's organizational culture model, which consists of four elements: involvement, mission, consistency, and adaptability. The study results showed that for the group of critical elements, the priority order of the four factors is as follows: 1) The involvement factor, 2) The mission factor, and 3) The consistency and adaptability factors.

The results of this study are consistent with the results of previous studies that have indicated the level of impact ratings of factors such as [26], [14], [15], [29], and [30]. However, the results also show differences in priority ranking for the adaptability factor. While the study results indicate that the priority of this factor is ranked third with the consistency factor, the study by [30] and [29] assessed that this factor's priority was ranked second among the four main factors of the organizational culture model that affect competitiveness. This difference may be attributed to the specificity of the study's context and the specificity of the chosen discipline and field of study.

The study's overall evaluation of the indicators reveals the significance of the organizational culture model elements in influencing the enterprise's competitiveness. Three key factors affecting the competitiveness of enterprises operating in the electronics sector are core values, customer focus, and vision. Meanwhile, the three factors considered to have the lowest score are agreement, organization, and coordination and integration.

5. Conclusions

The results show that Denison's organizational culture model can be applied to evaluate management approaches and might serve as a measure of business competitiveness. It also demonstrates a solid ability to align internal factors, as evidenced by its capacity to enhance employee empowerment, foster capacity development, entrench organizational culture values, foster teamwork, and foster shared understanding among employees. Management needs to take account of increased organizational learning capability, coordination, and integration. The results obtained revealed the involvement factor was ranked first in the model of the impact of organizational culture on the enterprise's competitiveness, the second-ranked factor is mission, and the third position is consistency and adaptability. In the discussion section, these results are contextualized in light of the theoretical framework, highlighting the implications and relationships identified. Possible discrepancies and limitations of the study are also considered in this section. The results showed that the top three and most influential competitiveness ratings by experts included the core values, ranked as the first factor of the organizational culture; the second factor was customer focus; and the third was vision. Meanwhile, the three lowest-rated factors include agreement, organizational learning, coordination, and integration.

The present study demonstrates that Denison's organizational culture model can be applied to measure organizational culture in the electronics business. This study contributes to the literature by applying the FAHP method in organizational cultural study showing the priority order of organizational cultural factor affecting the competitiveness of electronic enterprise. The organizational culture model includes participation, mission, consistency, and adaptability. According to the international management chain, this result shows the importance of cultural organizations in improving the competitiveness of businesses, especially those in the electronics sector. The management team of electronics businesses needs to integrate the internal and external elements of organizational culture as a strategy to increase the long-term competitiveness of the business. The relevance and value of this research are evidenced by providing the practical insights for enhancing competitiveness in the electronics sector.

Although this study has implications in both academic and managerial areas, it has limitations. The model applied in this search excludes other variables that are antecedents and consequences of organizational culture. Future research on organizational culture should consider antecedents and consequences, such as leadership, satisfaction, performance, or returns.

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