



# Prioritizing Innovative Organizational Factors for State-Owned Enterprises (Case Study: Iraq)

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## Abstract

The aim of the present study is to prioritize the innovative organizational factors for state-owned enterprises (case study: Iraq). The research is applied in nature and uses a survey method. Data analysis was conducted using the DEMATEL technique. The statistical population consists of managers of state-owned companies in Iraq, as well as academic professors and experts. The sample size includes ten managers from state-owned companies, selected through random sampling. The research instrument is a researcher-developed pairwise comparison questionnaire. The validity of the questionnaire was confirmed through a review by a group of management professors. The results indicate that the criteria for net impact, in order of priority, are: 1) Strategic, 2) Legal, 3) Organizational, and 4) Technical. The criterion for the outcome (net effect) is also identified as the individual aspect. In the examination of the sub-criteria, determining and focusing on innovative strategies was identified as the most influential sub-criterion, while the development of strategic thinking in employees was identified as the most impactful factor.

**Keywords:** Innovative organization, state-owned enterprise, managerial skills, organizational culture, organizational innovation.

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## 1. Introduction

Managers are key decision-makers in important areas such as organizational culture and strategic decisions within innovation processes. Organizational innovation is of particular interest to managers due to its positive effects on the advancement of the companies they lead. Organizations seek managers who can lead teams and foster innovation through behavior, both in terms of actions and by collaborating in the pursuit of new ideas, processes, and methods. Additionally, possessing key skills that help enhance the capacity and effectiveness of the organization is another crucial trait of a manager. The problem with management methods that facilitate innovation development is often that new innovations must be accompanied by fundamental changes within the organization [1, 2]. For example, the attitude of organizational culture towards innovation in companies is the biggest challenge that organizations face. This problem is even more pronounced in many innovation systems that are less technologically advanced [3-6].

In innovation systems, explaining why companies do not have an efficient model of innovation or simply lack one is of great importance. When members (especially managers and staff) are not committed to adopting new behaviors to accelerate innovation and growth, the situation gets out of control, and the system loses its coordination and cohesion. For instance, this happens in specific industrial sectors or within the industrial context of innovation systems, characterized by the absence of industrial clusters of small and medium-sized companies with low absorptive capacity to convert knowledge into innovation [7].

Previously, researchers have suggested the managerial characteristics for innovation in terms of organizational learning, such as exploitation or exploration, concerning the role of transformational leadership versus transactional leadership in fostering innovation. In any case, many of these perspectives tend to define and understand management skills in the innovation process. Rosing et al. (2011) confirm that "each specific leadership style is related to innovation, but this relationship is highly variable and heterogeneous – meaning that the correlation between any given leadership style and innovation often varies from positive to negative." In fact, it can be said that in organizations with less innovation in their activities, managers try to cope by proposing solutions or revising the way scenarios are changed [8]. One way to approach this issue is by analyzing the impact of management skills in

managers and certain cultural elements to evaluate management strategies for companies situated in peripheral innovation systems [9].

In general, organizational strategy refers to management style, organizational structure, and information systems that are driven from the top of the power structure to support the execution of processes and technological advancements to encourage innovation. This occurs when an organization seeks to stay updated and innovative by utilizing new technologies and standard procedures, developing technological solutions, or engaging with information services, data, and market research [10]. Pedraza et al. (2023) identified a combination of seven exogenous-hidden variables as managerial innovation skills, such as the use of standardized work procedures as written procedures for managing, producing, or delivering core activities, conducting or concluding market research contracts, marketing activities, recording customer needs and satisfaction levels, technological and market monitoring performance, as well as the use of integrated management systems and information systems for managing production, and employing procedures to protect intellectual property (e.g., software, designs, patents, etc.) [6].

Culture shapes how individuals interpret, understand, and respond to events and information: what they pay attention to, what they ignore, how they define problems, and ultimately, how they respond to them. Researchers have examined various aspects of culture, including cultural content, cultural diversity, and cultural constraints, to explain why social groups with different cultures are different in their abilities to generate creative ideas as a collective and why different groups creatively evaluate ideas differently [11].

In today's highly competitive and dynamic world, the presence of great managers is essential for any company. The managerial skills used in a model with an innovation approach, presented in this study, are based on interviews with experts who have many years of experience. Additionally, theories identified from the business perspective are examined, which can serve as a strategic model to advance the organization's managerial objectives. The participation of experts, in theory, is intended to study effective managerial behavior based on the description of various management skills. By considering the extent of achieving a company's goals, these researchers can offer valid assessments of managerial skills within the structure and internal operations of any organization. Recent studies have examined the various impacts of organizational culture,

innovation, and management skills on organizational performance and competitive advantage. Murati-Leka et al. (2023) found that the government has a positive impact on introducing new products and services, although its effect on financial performance is minimal [12]. Similarly, Noor et al. (2023) emphasized the heavy reliance of business and academic actors on regional leadership in formulating innovative policies [13]. Research by Pedraza et al. (2023) highlighted the importance of organizational culture and management skills in fostering innovation in peripheral regions and improving innovation performance [6]. Furthermore, Lee et al. (2023) and Tran (2023) showed that organizational culture and leadership can significantly influence both administrative and technological innovation [14, 15]. Studies by Niazi et al. (2023) and Chioai (2023) confirmed the mediating role of organizational culture and innovation in enhancing competitive advantage in agricultural cooperatives and universities [16, 17]. Overall, these studies underscore the critical role of organizational culture, knowledge sharing, and management skills in facilitating innovation and achieving competitive advantage.

The identified research gap calls for testing and prioritizing the factors of an innovative organizational model specifically designed for state-owned enterprises. This model should address the unique challenges and opportunities that state-owned enterprises face. Existing organizational models in the literature may not fully meet the needs of state-owned companies, which operate in a complex and dynamic environment with diverse stakeholders and regulatory requirements. Therefore, by developing and testing an innovative organizational model suited to the needs of state-owned enterprises, researchers can provide valuable insights into organizational theory and practice, as well as practical guidance for managers of state-owned enterprises. This study, therefore, aims to fill the identified research gap.

The actual goal of this study is to examine the identified gap and assess the skills of managers in the innovation process, as well as certain organizational factors that distinguish companies with an innovative culture. This is especially important given that many companies and employees are hesitant to implement organizational changes to quickly adapt to environmental transformations and new technological advancements. Therefore, this paper addresses the following question:

How are the innovative organizational factors prioritized in state-owned enterprises in Iraq?

## 2. Methodology

Given that the objective of this study is to test the innovative organizational model for public companies (Case Study: Iraq), the research method is applied according to its purpose and survey-based in terms of methodology. Data analysis was conducted using the DEMATEL technique. The study's population consists of managers from public companies in Iraq and academic experts. A sample size of 10 participants was selected using a random and snowball sampling method. The research tool used was a researcher-designed pairwise comparison questionnaire. The validity of the questionnaire was confirmed through a group review by professors in the field of management.

## 3. Findings and Results

The average age of the experts surveyed revealed that public company managers had an average age of 45.33 years, representing the highest age group, while university professors and experts had an average age of 42.33 years, representing the lowest age group. Among the participants in the study, 5 held a Ph.D., and 5 had a master's degree.

The final dimensions and components are listed in [Table 1](#). The components are marked with specific symbols for tracking purposes.

**Table 1.** Dimensions and Components of the Study

Row	Symbol	Main Dimensions	Components
1	C1	Organizational	Development of an innovation culture among organizational employees
2			Creation of a flexible organizational structure
3			Introduction of new management methods for innovation in the organization
4			Organizational innovation agility
5	C2	Individual	Development of individual creativity among employees
6			Development of strategic thinking in employees
7			Employees' adaptability to innovative changes
8			Continuous enhancement of employee skills and knowledge
9	C3	Technical	Mastery of new technologies
10			Development of IT infrastructure

11			Development of Artificial Intelligence usage
12			Enhancement of scalable innovative capabilities of the organization
13	C4	Strategic	Determination and focus on innovative strategies
14			Investment in research and development
15			Development of knowledge management within the organization
16			Management of technological risks within the organization
17	C5	Legal	Updating intellectual property legal regulations
18			Development and formulation of up-to-date e-commerce laws
19			Formulation of cybersecurity laws within the organization
20			Development of legal frameworks for financial support of innovative organizations

When using multiple experts, the arithmetic mean of their opinions is employed to form the direct relationship matrix (M). The direct relationship matrix is presented in Table 2.

**Table 2.** Direct Relationship Matrix (M) for the Main Criteria

	C1	C2	C3	C4	C5
C1	0	1.5	1.9	1.5	1.9
C2	1.6	0	1.3	1.8	1.5
C3	2.2	1.9	0	1.8	1.2
C4	1.6	2.8	2.0	0	2.2
C5	2.3	2.0	1.9	1.4	0

In this study, a threshold value of 1.11 was obtained. Therefore, the pattern of significant relationships is shown in Table 3.

**Table 3.** Pattern of Significant Relationships for the Main Criteria of the Model

	C1	C2	C3	C4	C5
C1	*	1.378	1.162	1.190	1.134
C2	*	*	*	*	*
C3	1.155	1.252	*	*	*
C4	1.261	1.488	1.217	*	1.203
C5	1.216	1.313	*	*	*

Based on the relationship pattern, a causal diagram can be plotted:

**Table 4.** Causal Relationship Pattern for the Main Criteria of the Model

	D	R	D+R	D-R
Organizational	5.918	5.696	11.614	0.222
Individual	4.808	6.395	11.202	-1.587
Technical	5.366	5.320	10.686	0.046
Strategic	6.215	5.384	11.599	0.832
Legal	5.651	5.164	10.815	0.487

Therefore, the priority of the criteria based on their influence is as follows:

1. Individual
2. Organizational
3. Strategic
4. Technical
5. Legal

According to the impact of the criteria, the order of priority is as follows:

1. Strategic
2. Organizational
3. Legal
4. Technical
5. Individual

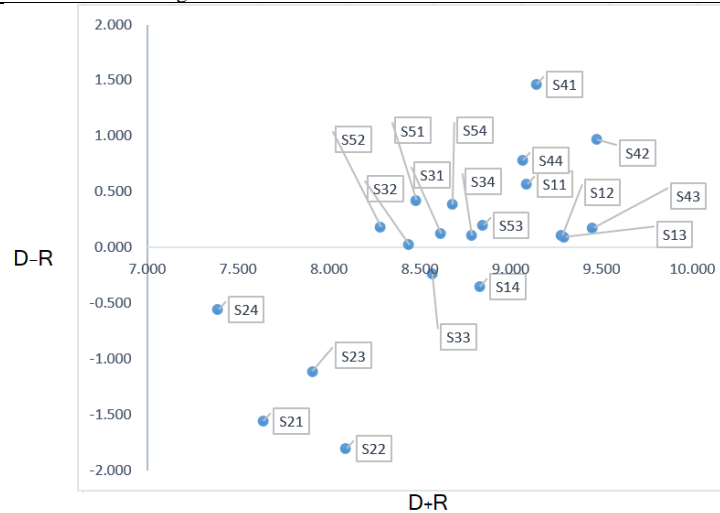
The resulting dependent criterion (net effect) is the "Individual" dimension.

When using the views of multiple experts, the arithmetic mean of their opinions is used to form the direct relationship matrix (M). Then, to determine the Network Relationship

Map (NRM), the threshold value must be calculated. In this study, the threshold value obtained is 0.217, and the pattern of significant relationships was calculated accordingly. Finally, based on the relationship pattern, the causal diagram can be drawn.

**Table 5.** Causal Relationship Pattern of the Main Model Criteria

Component	Symbol	D	R	D+R	D-R
Development of an innovation culture among organizational staff	S11	4.831	4.259	9.091	0.572
Creation of a flexible organizational structure	S12	4.696	4.585	9.282	0.111
Establishment of innovative management methods in the organization	S13	4.697	4.601	9.298	0.096
Agile innovation in the organization	S14	4.241	4.591	8.832	-0.350
Development of individual creativity in staff	S21	3.043	4.599	7.642	-1.555
Development of strategic thinking in staff	S22	3.147	4.948	8.095	-1.801
Adaptability of employees to innovative changes	S23	3.401	4.512	7.913	-1.111
Continuous improvement of employee skills and knowledge	S24	3.419	3.974	7.393	-0.555
Development of proficiency in new technologies	S31	4.371	4.246	8.617	0.125
Development of IT infrastructure	S32	4.231	4.209	8.440	0.023
Development of artificial intelligence usage	S33	4.166	4.406	8.571	-0.240
Development of the organization's innovative scalability capabilities	S34	4.448	4.339	8.787	0.109
Identification and focus on innovative strategies	S41	5.305	3.840	9.146	1.465
Development of investment in research and development	S42	5.222	4.255	9.477	0.967
Development of knowledge management in the organization	S43	4.815	4.639	9.454	0.177
Management of technological risks in the organization	S44	4.924	4.145	9.070	0.779
Updating legal intellectual property laws	S51	4.451	4.029	8.480	0.422
Development and formulation of updated e-commerce laws	S52	4.233	4.051	8.284	0.182
Formulation of cybersecurity laws in the organization	S53	4.524	4.327	8.851	0.198
Development of financial support laws for innovative organizations	S54	4.535	4.148	8.682	0.387



**Figure 1.** Cartesian Coordinate Diagram of DEMATEL Output for Subcriteria

Based on above figure, the most influential criteria, in order of priority, are as follows:

1. Identification and focus on innovative strategies
2. Development of investment in research and development
3. Management of technological risks in the organization
4. Development of an innovation culture among organizational staff
5. Updating legal intellectual property laws
6. Development of financial support laws for innovative organizations
7. Formulation of cybersecurity laws in the organization

8. Development and formulation of updated e-commerce laws
9. Development of knowledge management in the organization
10. Development of proficiency in new technologies
11. Creation of a flexible organizational structure
12. Development of the organization's innovative scalability capabilities
13. Establishment of innovative management methods in the organization
14. Development of IT infrastructure

The most affected criteria, in order of priority, are as follows:

1. Development of strategic thinking in staff
2. Development of individual creativity in staff
3. Adaptability of employees to innovative changes
4. Continuous improvement of employee skills and knowledge
5. Agile innovation in the organization
6. Development of artificial intelligence usage

#### 4. Discussion and Conclusion

This study was conducted with the aim of prioritizing the factors of an innovative organization for state-owned companies (case study: Iraq). In this research, the DEMATEL method was used to answer the following question:

The criterion "determining and focusing on innovative strategies" was identified as the most influential factor across all the identified criteria. Determining and focusing on innovative strategies was recognized as a strategic criterion in this study. According to the calculations, "determining and focusing on innovative strategies" had the greatest impact on the criterion "developing strategic thinking in employees." Therefore, focusing on innovative strategies strengthens the strategic thinking of employees. In explaining the results, it can be stated that the innovation capacity and innovative performance of knowledge workers in state-owned companies are crucial for building an "innovative country." Government offices at all levels, including state-owned companies, are encouraged by policies that promote innovation. Therefore, knowledge workers are of significant importance for enhancing overall innovation capacity and achieving the goal of building an "innovative country" [18]. Organizational innovations in business practices involve implementing innovative processes to enhance learning and knowledge exchange

within the organization, which includes deploying innovative strategies to organize workflows, procedures, and develop supply chain management practices [7]. Organizational changes, as part of the innovation process, lead to technological innovations that may require redesigning processes and reallocating responsibilities within a company to improve its environmental performance. The extent to which innovative ideas are promoted and accepted by an organization depends on the organization's efficiency, and the impact of organizational culture, management support, trust in relationships, workplace environment, and customer orientation influences employees' creative behavior, ultimately leading to organizational innovation [19].

Developing strategic thinking among employees plays a crucial role in innovative organizations. Strategic thinking refers to the ability to analyze and assess both the internal and external environment of the organization, recognizing opportunities and challenges, and making strategic decisions to achieve long-term goals. Strategic thinking enables employees to better understand innovative opportunities in the internal and external environment of the organization. They can predict changes, analyze trends, and propose innovative ideas to exploit opportunities. Strategic thinking enables employees to analyze competition in the industry or market and assess how to compete with them. They can identify competitors' key success factors and develop innovative strategies to compete with them. Strategic thinking enables employees to participate in the organization's strategic decision-making process. By thoroughly analyzing the environment and strategic issues, they can make decisions that support the organization's innovation and growth objectives. Developing strategic thinking in employees allows them to apply their creativity and initiative to the organization's innovation and transformation process. They can dynamically propose innovative ideas and participate in decision-making and implementation. Strategic thinking enables employees to implement innovative strategies within the organization.

Additionally, the results of the present research are consistent with the study of Azeem et al. (2021) titled "Expanding Competitive Advantage Through Organizational Culture, Knowledge Sharing, and Organizational Innovation." They found that organizational culture, knowledge sharing, and organizational innovation have a positive impact on competitive advantage. Specifically, organizational culture strengthens knowledge-sharing and innovation activities among the workforce and



connects them with high-level business processes, which can be useful for achieving advanced production capabilities [20].

Based on the calculations, "investment in research and development" emerged as the second most influential factor across all components of the research and had the greatest impact on the components of "developing strategic thinking in employees" and "creating a flexible organizational structure." In explaining this result, it can be stated that due to the unpredictable and complex nature of innovation, various methods have been proposed to measure organizational innovation, many of which focus solely on research and development indicators such as the number of research papers, R&D costs, etc. However, a review of the theoretical foundations in the field of innovation shows that evaluating innovation is a multi-dimensional issue, and organizational innovation should not be measured based on a single indicator [21]. Karimzadeh et al. (2023) argue that innovation capacity is divided into three dimensions: input, process, and output. In the input dimension, the components include "innovation culture, transformational leadership, innovation as part of strategy, mission and vision, teamwork." In the process dimension, the components are "research and development capacity, open innovation, idea management, and research collaboration with other organizations." In the output dimension, the components include "efficiency and effectiveness of innovative products and investment in the production of innovative products" [21]. An innovative organization often arises from the need to address R&D challenges, meet customer demands, or capitalize on market opportunities. The most capable R&D units must also actively seek external opportunities and pay special attention to identifying, establishing connections, and utilizing external knowledge resources.

Moreover, a flexible organizational structure enables an organization to adapt to a dynamic and changing environment and perform optimally when facing innovation challenges and opportunities. A flexible organizational structure can promote collaboration and interaction among team members. It can also provide flexibility within the hierarchical structure, allowing the organization to rely on a more cohesive structure based on self-organizing teams and projects rather than a traditional hierarchical structure. This enables employees to operate more independently and make faster decisions. A flexible organizational structure facilitates the movement and exchange of knowledge between organizational members.

The results of the present study are in line with the study of Pedraza et al. (2023) titled "Management Skills and Organizational Culture as Innovation Resources for Firms in Peripheral Areas." [6].

In this context, the study offers practical recommendations:

1. **Develop Strategic Thinking:** This culture involves encouraging the presentation of innovative ideas, appreciating creativity and risk-taking, tolerating failure and learning from it, collaboration, knowledge sharing, and continuous transformation. In general, developing strategic thinking among employees in innovative organizations makes the organization stronger in facing changes and challenges, capitalizes on innovative opportunities, manages competition, and implements innovative improvements.
2. **Encourage Out-of-Organization Thinking:** Create an environment where employees feel free to propose new and creative ideas.
3. **Create Cross-Functional Teams:** Form teams composed of individuals with diverse expertise and experiences to encourage diversity and creativity.
4. **Facilitate Collaboration and Knowledge Sharing Processes:** Use modern technologies to establish communication and collaboration among team members and share knowledge.
5. **Provide Facilities for Testing Ideas:** Create spaces for quickly and efficiently testing and evaluating ideas.
6. **Create a Culture that Encourages Employees to Engage in Training and Research:** Encourage employees to stay updated and propose new ideas.
7. **Define Clear Organizational Goals and Priorities in Research and Development and Allocation of Resources:** Set clear goals and allocate appropriate resources to support R&D initiatives.

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Authors equally contributed to this article.

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#### Declaration of Interest

The authors report no conflict of interest.

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### Ethical Considerations

All procedures performed in this study were under the ethical standards.

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