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Article

Srategic Competency Development Based on Scamper Technology

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Abstract: In today's dynamic environment, organizations and individuals must continuously enhance their strategic competence to remain competitive. Strategic competence involves integrating resources, knowledge, and skills to create long-term advantages. The demand for innovative methods to foster strategic thinking has highlighted the value of creative techniques in education, business, and management. Among these, the SCAMPER methodology—based on substitution, combination, adaptation, modification, elimination, and reapplication—has proven especially relevant. Despite its popularity in creative thinking, the SCAMPER technique's role in strategic competency development has not been sufficiently contextualized in academic and practical applications. This study aims to explore how SCAMPER contributes to building strategic competence by enhancing adaptability, innovative thinking, and efficient resource use across educational and organizational domains. The research demonstrates that SCAMPER facilitates systematic problem-solving, encourages multi-perspective analysis, and supports the generation of novel strategies. Practical applications in biology-based scenarios illustrate how SCAMPER can guide learners and professionals to rethink existing processes. The method aids in simplifying complexity, aligning decisions with goals, and responding effectively to environmental changes. By integrating SCAMPER into strategic planning frameworks, this study bridges a methodological gap between creativity and strategy, offering a structured yet flexible approach for innovation and long-term performance. The findings suggest that SCAMPER is a valuable tool for enhancing both individual learning and institutional development. Its incorporation into strategic processes can foster sustainability, adaptability, and competitive success in education and business contexts.

Keywords: SCAMPER technology, Strategic competency, Innovative thinking, Competitiveness, Efficient resource utilization, Adaptability, Strategic competency in education, Creative approach, Business strategy, Competency development

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1. Introduction

To succeed in the modern world, both individuals and organizations need to constantly improve their strategic competencies. The ability of a company or individual to combine the resources, expertise, and knowledge required to gain a competitive edge is known as strategic competence. Strategic competence is shaped in large part by innovations and creative approaches. In this regard, the SCAMPER technology is thought to be a useful instrument for encouraging originality and creativity. The significance and use of SCAMPER technology in fostering strategic competency are examined in this article[1].

The ability of a company or individual to bring together the assets, know-how, abilities, and skills required to establish and preserve a competitive advantage is known

as strategic competence. Although business, management, and strategy theories frequently employ this idea, it is also crucial for the education system and individual development[2].

2. Materials and Methods

The methodology for this study was based on a qualitative and instructional design approach to examine how SCAMPER technology contributes to the development of strategic competence. The SCAMPER method—an acronym for Substitute, Combine, Adapt, Modify, Put to another use, Eliminate, and Reverse—was used as the central framework for constructing exercises and analytical tasks. These were applied specifically to biological systems in an educational setting to simulate how creativity and critical thinking could enhance strategic skill-building. Each SCAMPER component was operationalized through guided exercises, instructions, and problem-based scenarios, allowing students or participants to explore innovative solutions, modify existing processes, and generate new strategic ideas. The study employed descriptive task-based activities to encourage learners to substitute elements in biological processes, integrate different systems, adapt strategies across conditions, and identify redundancies. Evaluation of results was based on participants' ability to analyze outcomes, generate alternatives, and articulate new approaches, reflecting increased strategic adaptability and competence. Additionally, the implementation phase involved integrating new solutions into broader decision-making frameworks, while the assessment phase focused on examining the efficacy of SCAMPER-based tasks in fostering innovation and strategic insight. This approach facilitated the development of critical competencies such as problem-solving, adaptability, and efficient resource utilization, aligning well with the goals of modern education and business strategy. The methodology thus highlights SCAMPER as a versatile, structured technique capable of promoting strategic thinking through experiential learning[3].

3. Results and Discussion

Main Content of Strategic Competence:

1. Integration of Knowledge and Resources: Strategic competence entails the efficient fusion of an organization's current experience, knowledge, and resources. This is thought to be essential for developing a competitive edge. When creating new products, for instance, a business should make good use of its scientific and technological expertise[4].
2. Human Resources: The abilities, backgrounds, and staff of an organization's or individual's employees are frequently linked to their strategic competency. An organization can be competitive if it has advanced knowledge and skills. For instance, the professional proficiency of teachers in the field of education.
3. Innovation and Adaptability: The capacity to create innovations and adjust to new developments is another aspect of strategic competence. To succeed in evolving situations, organizations must be quick to adopt and implement new ideas[5].
4. Competitiveness: Developing a competitive advantage actively involves strategic competence. Individuals or organizations must build their strategic competencies in line with the state of the market. For instance, employing cutting-edge technologies to increase production efficiency.
5. Desire and Goal Orientation: Clearly defined goals that direct an organization or individual toward ongoing success and growth are associated with strategic competence. The resources required to accomplish strategic objectives are provided by competencies[6].

In education, strategic competence refers to the development of both teachers' and students' capacity to learn and apply knowledge. The following elements are included in the formation of these competencies in educational institutions:

a. Pedagogical Competence: The teaching methods and pedagogical skills of teachers.

b. Strategic Competence of Educational Institutions: Developing goal-oriented development strategies for educational institutions, efficient use of resources, implementation of innovative technologies[7].

Crucial Components of Strategic Competence:

1. Learning and Adaptability: A person or organization needs to be able to learn. This is crucial for preserving competitiveness and generating fresh opportunities.
2. Innovation Implementation: Strategic competence necessitates efficient work in putting creative concepts into action.
3. Personnel Development: Enhancing staff members' proficiency by continuously upgrading and enhancing their abilities.
4. High-Level Leadership: The organization's leaders must oversee the growth of strategic competency and disseminate it throughout the entire organization[8].

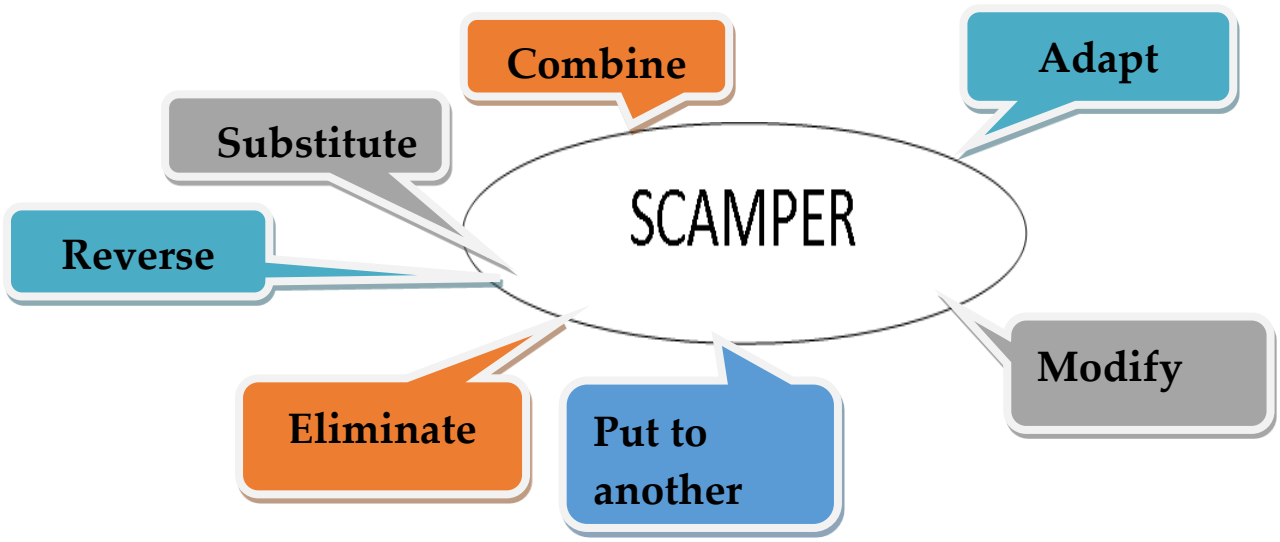
The Place and Role of Strategic Competency: Strategic competency is an important tool necessary for organizations and individuals to increase competitiveness and ensure long-term success. This concept holds a significant place in global business and education.

What SCAMPER Technology is…

SCAMPER is a methodology used in creative thinking and problem-solving, the name of which is formed from the initial letters of the following words:

Figure 1 illustrates the SCAMPER model, a structured technique used to stimulate creative thinking and innovation. The acronym stands for seven distinct strategies: Substitute, Combine, Adapt, Modify, Put to another use, Eliminate, and Reverse. Each action-oriented prompt encourages individuals to approach problems or products from new angles, generating fresh ideas or improvements. Widely used in design thinking, entrepreneurship, and education, the SCAMPER method helps promote divergent thinking and problem-solving by encouraging systematic exploration of alternatives[9].

Figure 1. SCAMPER Technique for Creative Thinking and Innovation



Using this method, existing processes, products, or strategies are examined from a creative point of view, and new opportunities and ways of improvement are identified.

Table 1 illustrates the application of the SCAMPER technique to biological systems, providing structured exercises, tasks, and goals that enhance creative and strategic thinking. Each SCAMPER element—Substitute, Combine, Adapt, Eliminate, Modify, Put to another use, and Reverse—is linked to a biological scenario. For example, substituting components in the photosynthesis process promotes exploration of alternative energy inputs, while combining biological systems like plant photosynthesis and animal respiration encourages integration thinking. Tasks such as adapting organisms to new environments, eliminating redundant elements, or creating new biological models are

designed to cultivate innovative solutions. The table serves as a practical tool for students and professionals to practice scenario-based thinking, improve adaptability, and develop strategic competence through biological contexts[10].

Table 1. SCAMPER-Based Exercises and Tasks for Strategic and Creative Thinking in Biology

1. Substitute:	Exercise:	Task:	Goal:
	Modifying biological processes	If you replace some components of the photosynthesis process in biology with other elements, how will the process change? For example, can another energy source be used instead of solar energy? Or what effect would using other pigments instead of chlorophyll have? Write your assumptions and discuss the results.	To develop new approaches and strategic thinking by changing the process.
2. Combine:	Exercise:	Task:	Goal:
	Integrating biological systems	Try to create a new system by combining two or more biological systems or processes. For example, how can the photosynthesis process of plants and the respiration process of animals be integrated? What advantages or problems can the new combined system create?	To teach how to solve complex problems by combining different systems and to improve strategic skills.
3. Adapt (Adaptation):	Exercise:	Task:	Goal:
	Adapting biological processes to new conditions	How do plants or animals in arid and hot regions adapt their organisms to environmental conditions? How can these adaptation methods be adapted to organisms in other conditions (e.g., cold climate)?	To adapt to a problem and develop new strategies to solve it. discuss how to apply them in practice.
4. Eliminate:	Exercise:	Task:	Goal:
	Removing redundant elements from biological systems	Identify redundant or unimportant elements in a specific biological process or system (e.g., intracellular signaling pathways) and predict how the process would change as a result of removing them. What positive or negative consequences might this lead to?	To enhance strategic thinking by teaching how to simplify problems and focus on essential elements.

Strategic competence is a set of knowledge and skills that an organization or individual needs to create a competitive advantage, and its development depends on an innovative approach and creative thinking[11].

The following areas are where the SCAMPER technique helps to build strategic competence:

1. A New Perspective on Issues Examining a situation or problem from several angles is encouraged by the SCAMPER methodology.

When making strategic decisions, this offers a more thorough analysis and better outcomes.

2. Introducing New Developments Innovations are a crucial component of strategic competence, and the SCAMPER technique is a useful tool for coming up with new concepts and streamlining current procedures[12].

Improving Adaptability: The company can update its strategies on a regular basis by using the SCAMPER method to quickly adjust to changes in the external environment and market.

Efficient Utilization of Resources: SCAMPER facilitates the review and application of current resources and opportunities to new goals, which expands strategic competence

The following steps are involved in the practical application of SCAMPER technology in the process of developing strategic competence:

The analysis stage involves examining current tactics and materials in light of each SCAMPER component (substitution, combination, adaptation, etc.).

Coming up with fresh concepts: Developing fresh tactics and methods based on the SCAMPER technique.

1. Testing and implementation: Putting recently suggested tactics to the test and incorporating them into organizational operations.
2. Results evaluation: Examining the growth and efficacy of strategic competency[13].

Table 2 provides detailed instructional strategies and biological examples for each SCAMPER element—**Substitute, Combine, Adapt, Eliminate**—within the context of developing strategic competence. Each row outlines specific educational instructions, tasks for students, and real-world examples from biology such as photosynthesis, respiration, adaptation to environmental changes, and metabolic efficiency. The table demonstrates how SCAMPER can be used to foster critical thinking, promote systems-level understanding, and enhance organizational decision-making. By linking biological phenomena with strategy-building exercises, it enables learners to creatively evaluate processes and develop innovative solutions, making it a practical framework for integrating scientific knowledge with strategic skills[14].

Table 2. Application of SCAMPER Elements to Strategic Competence Development

	Exercise:	Instructions:	Example:
1.Substitute (replace, alternate)	Substituting elements in the photosynthesis process	- Students should review the main components of the photosynthesis process (light energy, chlorophyll, carbon dioxide). - Consider what other element or condition can be applied in place of each component. - For example, speculate whether another energy source (artificial light or chemical energy) can be	Can photosynthesis be done with LED lamps instead of sunlight? What wavelengths should the LED lamps be? How will the growth of plants change in this condition?

		used instead of solar energy. - Research how other pigments (e.g., phycobilins) work instead of chlorophyll. - Analyze how each substitution can affect the efficiency of the photosynthesis process.	
2. Combine	Exercise:	Instructions:	Example:
	Combining the processes of photosynthesis and respiration	-Students analyze the processes of photosynthesis in plants and respiration in animals. -Consider combining the two processes as one system: how do these processes complement each other? -Write down the advantages and disadvantages of the new system. -Discuss how strategic advantages can be created in ecological systems through this combination.	Plants release oxygen through photosynthesis, while animals consume oxygen during respiration. How can combining these processes contribute to ecological sustainability?
3. Adapt (Adaptation)	Exercise:	Instructions:	Example:
	Applying organism adaptations to new conditions	- Students will study the adaptation strategies of plants and animals in arid and hot regions. - Then, they will analyze how these adaptation methods can be adapted to cold or humid environments. - They will write their ideas and suggest what strategies can be developed to improve adaptation in the new environment.	The thick and thin leaves of sand dune plants to conserve water, as well as the presence of a waxy layer, adapt them to a hot climate. How can these features be modified in Arctic conditions?
4. Eliminate	Exercise:	Instructions:	Example:
	Removing unnecessary elements from a biological process	students must recognize repetitive or less significant components in metabolic or cell signaling processes.	"In a cell, signal transmission involves a number of intermediate molecules. Would the speed at which the signal is transmitted

		Estimate the potential impact of eliminating these components on process effectiveness. - Explain how the removal of these components might affect processes.	increase or decrease if certain intermediate molecules were removed?

Summary. The SCAMPER technique is a highly effective and structured tool designed to stimulate creative thinking and drive innovation, particularly in the context of developing strategic competence. By encouraging systematic exploration through seven distinct prompts—Substitute, Combine, Adapt, Modify, Put to another use, Eliminate, and Rearrange—SCAMPER enables individuals and organizations to critically reassess existing resources, processes, and strategies. This method facilitates the generation of novel ideas and solutions, helping to uncover new opportunities that might otherwise remain overlooked[15].

As a result, the application of the SCAMPER technique not only enhances problem-solving capabilities but also plays a pivotal role in strengthening organizational adaptability and innovation potential. Its integration into strategic planning and decision-making processes can significantly improve an organization's ability to remain competitive in dynamic environments. Therefore, the SCAMPER approach is of considerable importance for fostering long-term sustainability, improving performance, and achieving sustained success in both individual and organizational contexts.

4. Conclusion

The SCAMPER technique proves to be a highly effective and versatile tool for fostering strategic competency in both individuals and organizations. By leveraging its structured prompts—Substitute, Combine, Adapt, Modify, Put to another use, Eliminate, and Reverse—users are encouraged to explore innovative approaches to problem-solving and resource optimization. This methodology enables the reevaluation of existing processes, promotes creative thinking, and contributes to the development of critical skills needed for maintaining a competitive advantage in dynamic environments. As demonstrated through biological exercises and strategic applications, SCAMPER nurtures adaptability, facilitates the integration of new knowledge, and supports the continuous improvement of organizational strategies. Its role in enhancing educational outcomes, particularly in promoting student engagement and critical thinking, further confirms its value across different sectors. Moreover, SCAMPER aligns with the key pillars of strategic competence such as innovation, goal orientation, efficient resource use, and personnel development. Its systematic approach to ideation and decision-making enables organizations to respond effectively to change and uncertainty. Therefore, incorporating SCAMPER into educational and professional development practices is a forward-thinking strategy that equips learners and professionals alike with the tools needed for long-term success and sustainable growth. The integration of SCAMPER into strategic planning processes not only boosts creativity but also ensures that strategic competence is continuously developed and applied in meaningful, results-driven ways.

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