

Improving Organizational Structure through Transformative Assessment Strategies: A Case Study of the Excellence Center of Space Technology and Research (ECSTAR)

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How to cite this paper: Munikanond, C., Kanchanarat, B., Akkathai, U., & Malisuwan, S. (2023). Improving Organizational Structure through Transformative Assessment Strategies: A Case Study of the Excellence Center of Space Technology and Research (ECSTAR). *American Journal of Industrial and Business Management*, 13, 107-117.

<https://doi.org/10.4236/ajibm.2023.133008>

Received: February 10, 2023

Accepted: March 6, 2023

Published: March 9, 2023

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Abstract

In order to remain competitive in both domestic and international markets, organizations must maintain a state-of-the-art operational system. This starts with a strong foundational structure in regards to decision-making processes, employee behavior management, and effective project management. As leaders work to establish the organization's cultural, social, technological, economic, political, and practical systems, along with values, goals, vision, and mission, the adoption of assessment tools is crucial. Although there are various types of assessment tools available, each focusing on different aspects of organizational leadership and development, the ones discussed in this paper aim to drive growth, change, and transformation. The ECSTAR case study highlights that organizations that invest time and resources into mastering strategic management skills and following the frameworks outlined in this paper will undergo a transformative process, leading to enhanced staff collaboration and increased organizational productivity. A strong organizational presence stems from a well-implemented framework at all levels, providing guidance, motivation, and setting standards of excellence and professionalism.

Keywords

Strategy, Organizational Structure, Space, Research, Assessment, Tool

1. Introduction

Many organizations struggle to show progress in developing change capability.

Factors enabling change include ethical leadership, access to resources, relevant knowledge and skills, and engagement with external stakeholders (Harvard Business Review, 2005). However, if company culture is not aligned with the desired new behaviors, it can become an obstacle to transformation (Raffaelli, 2017). There are various techniques, frameworks, and methodologies available to assist leaders in decision making. It's important to note that tools do not create strategies, but they provide insights into the information that can lead to new learning. Tools also help to simplify complex issues and serve as a means of effective analysis and communication. Understanding and adapting to the external environment is vital to any transformational or strategic change, as it affects an organization's adaptability and resilience (Raffaelli, 2017; Shimizu & Hitt, 2004). The external factors often serve as the catalyst for change or transformation (Raffaelli, 2017). This paper focuses primarily on the McKinsey 7-S framework, SWOT Analysis, and PESTLE as frameworks that can drive success and innovation.

Literature presents a multitude of management concepts to aid businesses in their operations. One such idea is McKinsey's 7S Strategic Management model, which views transformation as a framework that encompasses the crucial aspects of a business and their interconnections, with each element undergoing change as part of the transformation process (Peters & Waterman, 1982; Raffaelli, 2017). SWOT analysis, on the other hand, is a tool for analyzing the industry and market competition. Utilizing the SWOT framework to analyze an organization and its competitors can help formulate a robust strategy that sets the organization apart and propels them to become a market leader (Vlados, 2019). At a broader level, PESTLE factors—political, economic, social, technological, legal, and environmental—provide a comprehensive analysis of the problems (Thomas et al., 2021). PESTLE helps examine all significant factors that could impact the success or failure of a project (Vardopoulos et al., 2021).

The objective of this paper is to provide insight into the importance of adopting assessment tools in order to establish a state-of-the-art operational system, which is crucial for maintaining competitiveness in both domestic and international markets. The main contribution of this paper is to highlight the role of assessment tools in driving growth, change, and transformation within an organization, particularly in relation to strategic management skills and frameworks. The ECSTAR case study presented in this paper demonstrates that investment in mastering these skills can lead to a transformative process, resulting in enhanced staff collaboration and increased organizational productivity. This paper is important because it has real-world implications for organizational leaders. They can use the information here to build a strong organization by putting in place effective frameworks at all levels, which will set standards of excellence and professionalism.

This study seeks to address this gap by providing a comprehensive analysis of the role of assessment tools in promoting organizational growth and transformation, drawing on a case study of ECSTAR. By utilizing various frameworks

such as the McKinsey 7S Model, SWOT analysis, and PESTLE analysis, the paper highlights how these tools can help organizations develop effective strategies and align their internal and external environments to achieve their objectives.

This research paper is structured as follows: First, it outlines the organizational structure of ECSTAR. Subsequently, the paper discusses how assessment tools can help enhance strategic thinking and improve organizational performance. The following section presents a detailed analysis of the subject matter, followed by recommendations to address the issues presented. Finally, the study concludes based on the findings presented.

2. The Organizational Structure of ECSTAR

The Excellence Center of Space Technology and Research (ECSTAR) is structured to serve as a hub for its stakeholders to fulfill their objectives. The ECSTAR aims to boost space technology research in the academic and industrial community by investing long-term in tech development critical for the country's future. ECSTAR will strengthen and broaden the university's science and technology programs, creating a talented pool of skilled engineers, scientists, and technologists to improve Thailand's tech and economic competitiveness. ECSTAR will focus on cutting-edge tech with the potential for revolutionizing space capabilities and expanding the country's research and development talent base.

ECSTAR is organized under the purview of the President of King Mongkut's Institute of Technology Ladkrabang (KMITL), Thailand, comprising of faculty, doctoral students, and support personnel. ECSTAR encourages interaction between researchers and doctoral students to promote research productivity and foster a productive environment for study through the exchange of ideas. The Center is led by a director who oversees its operations. Doctoral students and visiting scholars work together with faculty and researchers to drive the research initiatives at ECSTAR.

ECSTAR collaborates with and supports its spin-off startup company, TeroSpace, which was established in August 2022 in South-East Asia with a capital of 240 million Thai Baht. In November of the same year, TeroSpace received a Type 1 License for GPS tracking and IoT services from Thailand's regulatory agency, the NBTC (National Broadcasting and Telecommunications Commission). The company is now in the process of submitting its Type 3 license application to become an operator with its own network infrastructure. Since its inception, TeroSpace has focused on the satellite business, particularly LEO Broadband Satellite Service, but is currently in discussions with various potential partners to expand its space business.

The smooth functioning of ECSTAR is heavily dependent on support staff in three key categories. Firstly, a Center administrator is crucial for running the research center efficiently. This person handles the day-to-day operations, provides support to different departments such as finance, laboratory, budget, and fundraising, and manages the center's interactions with external organizations.

Secondly, a research coordinator is needed to manage and organize all research initiatives, including planning the project, determining research needs, and producing reports. Finally, a project coordinator (both domestic and international) is necessary to communicate with different organizations and act as a liaison for attracting potential investors and customers, participating in research meetings, generating research ideas, starting research projects, and compiling final reports for clients.

The financial stability of the research center is critical to its success as a safe and secure environment for conducting studies and acquiring knowledge. Funding sources for the center may include research funds, university grants, or self-funded consultancy projects. ECSTAR may also seek funding from research funds, such as the Broadcasting and Telecommunications Research and Development Fund for Public Interest (BTFP) of the National Broadcasting and Telecommunications Commission (NBTC). This has not only led to significant advancements in the field of space technology but also helped to establish KMITL's reputation as a research-focused learning environment.

3. Assessment of ECSTAR

Scientific organizations like ECSTAR are facing growing strategic challenges that require innovative solutions. By using various frameworks such as the McKinsey 7S Model, SWOT analysis, and PESTLE analysis, they can develop effective strategies. These tools help enhance strategic thinking and improve the performance of these research organizations.

3.1. The McKinsey 7S Model

The McKinsey 7S Model is a diagnostic tool that evaluates a company's organizational design by analyzing seven crucial internal elements. The first three elements, "strategy", "structure", and "systems" are considered "hard elements" as they affect the management of the firm. The remaining four elements, "shared values", "skills", "style", and "staff", are referred to as "soft elements" as they are more culture-based and abstract (Kaplan, 2005; Nejad et al., 2015). This framework is commonly used to support organizational change, implement new strategies, anticipate future developments in each area, and facilitate organizational mergers (Cox, Pinfield, & Rutter, 2019). The following explains each factor in relation to ECSTAR's implementation and impact:

- **Strategy:** ECSTAR's main strategy is to enhance its involvement in worldwide initiatives for the peaceful advancement of space technology and its applications for improving life on Earth. It has a responsibility to maintain and expand Thailand's space capabilities and expertise, enabling it to conduct leading-edge basic scientific research. ECSTAR coordinates, consolidates, and facilitates KMITL's space technology research activities and serves as a hub for the faculty members involved in space-related research, unifying the extensive space research community within KMITL. Furthermore, ECSTAR

is poised to drive the growth of Thailand's space sector.

- **Structure:** A flat organizational structure minimizes the number of middle management positions at ECSTAR. This design aims to foster open communication and minimize hierarchical barriers between management and researchers. The benefits of this structure for ECSTAR include better communication and relationships between different roles, a stronger research team dynamic, faster decision-making with a shorter chain of command, and increased adaptability for the Center.
- **Systems:** The research, development, and innovation management systems at ECSTAR are strongly interlinked. Equipping the research teams with tools and methods for innovation management accelerates existing processes and opens up new opportunities for improvement. This enhances the value of the R&D process by promoting open information flow and making the innovation process smoother and more transparent.
- **Shared values:** The core values of science form the foundation of integrity in research. Without these shared values, the research system cannot function and shape the behavior of all participants (Kaplan, 2005). ECSTAR's Shared Principles Initiative serves as a reminder to staff of their commitment to the values upheld by the university community. The Center strives to foster a strong ethical culture and embody these shared values in pursuit of its mission for teaching, learning, research, and service. This ongoing effort encompasses various components, from reinforcing the institution's values to promoting ethical education and programming.
- **Skills:** At ECSTAR, both soft skills and technical abilities are essential to create a supportive and productive work environment. Soft skills are often undervalued, but this perception is rapidly changing (Kaplan, 2005). Research and development teams must be innovative to generate novel solutions and have a creative mindset. At the same time, they must have a strong focus on industry to provide practical solutions to real-world challenges. High-performing R&D teams are aligned with the organization's objectives and goals.
- **Style:** At ECSTAR, team members are motivated to drive positive change within the organization. This leadership and management style elevates team morale, promotes swift innovation, facilitates conflict resolution, reduces staff turnover, and fosters a sense of ownership among the team. It is the duty of the research lab managers to provide the necessary conditions that support the achievement of both collective and individual research goals, such as high research performance.
- **Staff:** ECSTAR personnel pushes the boundaries of telecommunications, earth science, data science, robotics, space policy, space technology, and space systems engineering. ECSTAR offers collaboration opportunities with top professionals to implement talent retention strategies, coach staff and managers on HR policies and guidelines, and maintain ECSTAR's mission as

a sustained reality for government and industry. In a rapidly changing and fast-paced organization, each ECSTAR member serves as a knowledgeable expert, providing valuable insights and advice to clients while promoting efficiency and best practices.

3.2. SWOT Analysis

The SWOT analysis is a valuable tool for companies looking to evaluate their strengths, weaknesses, opportunities, and threats (Taherdoost & Madanchian, 2021). This analysis allows businesses to identify their internal and external factors, providing insight into both internal operations and external market conditions. By conducting a SWOT analysis, a company can identify areas for improvement and address potential risks before they are exploited by competitors.

- **Strengths:** ECSTAR enables KMITL to be agile and seize new opportunities in the competitive field of space technology research, something that traditional academic structures are not equipped to handle. By bringing together experts from various disciplines to tackle complex challenges, ECSTAR surpasses the limitations of typical academic structures. ECSTAR's highly skilled and specialized personnel allow the institution to make remarkable advancements in areas such as telecommunications, earth science, data science, robotics, space policy, space technology, and space systems engineering. ECSTAR is one of the rare organizations in Thailand to collaborate with both the NBTC and GISTDA, providing access to high-resolution satellite data, research funding, and the ability to conduct accelerated research studies.
- **Weaknesses:** A hierarchical structure, such as ECSTAR's, has a clear chain of command with leaders and subordinates. However, this formal reporting structure may not be flexible enough to accommodate quick changes. Declining funding from educational institutions has put pressure on ECSTAR to find alternative sources of income. This is because institutions are prioritizing activities that directly support research initiatives. ECSTAR faces challenges in obtaining sponsorships or grants due to a lack of a dedicated fundraising unit and experienced professionals. The process of securing funding from the government or private sector requires expertise in navigating regulations and procedures. Without this, ECSTAR may struggle to achieve success in international fundraising.
- **Opportunities:** Thailand's 2020-2037 Master Plan calls for a National Space Agency to oversee all space activities and establish laws related to outer space. This plan includes the manufacturing of satellites and spacecraft, as well as funding for space-related research, including areas such as space tourism and mining. ECSTAR offers more funding opportunities and opens up new areas for research. According to Morgan Stanley (2020), the space economy, including Low Earth Orbit (LEO) satellites, could surpass 1 trillion USD by 2040. The majority of commercial revenue in space comes from commercial space products and services, mainly broadcasting, navigation, communica-

tions, and earth observation satellites. ECSTAR's research is focused on LEO satellites and its applications, expanding business and research prospects. ECSTAR has the potential to grow and become a key producer of space professionals.

- **Threats:** Despite numerous successful international collaborations, barriers still exist in cross-border partnerships, particularly between nations that are in competition politically and economically. Addressing policies that hinder international cooperation in the space industry is a difficult task and requires careful consideration.

3.3. PESTLE Analysis

The PESTLE analysis is a tool used by senior managers and HR professionals to examine the external factors (Political, Economic, Sociological, Technological, Legal, and Environmental) that impact an organization. This analysis helps provide a comprehensive understanding of the broader forces of change, allowing executives to make more informed strategic decisions and tackle present and future challenges (Gupta, 2013; Rastogi & Trivedi, 2016).

- **Political:** The Thai government and its institutions support the growth and development of the space industry. Research institutes like ECSTAR have the potential to expand both regionally and internationally with a stable government. However, the current regulatory policies on the space economy do not attract new investment, hindering the growth of infrastructure and potentially damaging the country's reputation on the international stage.
- **Economic:** The rate of inflation in Thailand is considered to be modest, helping the firm grow and contributing favorably to efforts aimed at boosting both customer confidence and trends in consumer spending. The way people spend their money is crucial for the space economy. After Indonesia, Thailand has the second-largest digital economy in Southeast Asia. This can help predict that consumer spending will be driven more and more by space applications in the digital market. In the near future, the LEO satellite business will offer high-speed internet and communication services, which can improve connectivity in remote and rural areas, boosting economic activity and bridging the digital divide.
- **Social:** Space enterprises benefit from having a higher proportion of younger individuals with talent, skills, and knowledge in their population as it leads to a larger consumer market and access to a greater pool of skilled and educated workers.
- **Technological:** The country boasts a robust technology infrastructure, characterized by continuous progress and advancement. Space businesses are leveraging these technological advancements and innovative concepts to enhance their efficiency and effectiveness. The high influx of new ideas across all industries fosters competitiveness and forward-thinking within the space sector. The strong technology infrastructure also attracts foreign investment,

driving growth and further development in space technology and research.

- **Environmental:** Thailand is placing greater emphasis on environmental protection. To align with customer preferences and reduce their impact on the environment, businesses are using their carbon footprint as a guide in their operations. This has led to the initiation of a space program, specifically the ECSTAR program, to promote the utilization of space technologies. The integration of these technologies with digital and green transformation initiatives will facilitate the development of more effective solutions for society. The combination of space technology and Earth Observation satellite data has numerous potential applications, particularly in industries such as raw materials, agriculture, and construction where the benefits are already evident. However, these industries require special attention due to their significant carbon footprints and the challenge of transitioning to carbon-neutral production processes.

3.4. Analysis

Many professional institutions use the McKinsey 7s model, SWOT Analysis, and PESTLE to assess their performance. In this study, these tools were applied to evaluate ECSTAR's situation. Focusing on organizational culture while using these tools will drive success, growth, and development, as the purpose of the assessment is to identify the organization's performance and standards (Issah, 2018). This aligns with the definition of attaining organizational goals and cannot be achieved without critically evaluating the organization's culture and systems (Okyere et al., 2020).

The analysis results indicate that ECSTAR needs to revamp its organizational design, specifically in staffing and financial management. Currently, ECSTAR relies heavily on formal reporting methods, making it less flexible in fast-paced situations (as noted in the previous SWOT Analysis). On the other hand, organizations with a team-based structure have a less rigid structure, allowing them to better adapt to changes (Issah, 2018). This type of performance evaluation would benefit ECSTAR, as it allows for faster identification of performance gaps. However, transitioning to a team-based structure is a challenging professional task (Raffaelli, 2017; West et al., 2008).

To improve financial management, ECSTAR needs a fundraising strategy as lack of one may lead to unsuccessful fundraising attempts. Currently, ECSTAR lacks a dedicated fundraising staff and hasn't sought the help of fundraising consultants. It is advised that ECSTAR establish a fundraising unit within its structure, cultivate a proactive culture, and establish clear strategies, methods, and communication channels with stakeholders to boost the organization's promotion and maintain strong relationships. Creative fundraising events can be a valuable aspect of the fundraising process and help achieve organizational goals (Webber, 2004).

ECSTAR may struggle to secure funding for its research and development due

to lack of expertise or mismanagement of resources. The success of fundraising depends on the commitment of individuals to carry out the fundraising function. The organization's ability to reach its fundraising goal is dependent on its fundraising capacities, such as available personnel, resources, and management. Including fundraising in ECSTAR's strategic planning and making it a cultural priority is crucial for the organization's survival.

4. Recommendations

Based on the analysis, the following recommendations are proposed for ECSTAR's improvement:

1) Revamping internal business processes and staffing functions will improve talent attraction, training and development, and retention in space technology and financial management.

2) ECSTAR should establish a comprehensive fundraising plan with clear objectives, defined roles, and a defined approach. It is crucial for ECSTAR to set up a fundraising unit in its organizational structure.

3) Alongside restructuring the organization, addressing negative attitudes and changing how individuals view the organization's functioning is important. This may include training, compelling reasoning for the change, modeling new attitudes, implementing reinforcement mechanisms, and developing new staff skills and competencies.

4) Restructuring will impact staff deeply and personally, affecting their reporting, work relationships, work processes, and work locations. Communication between leaders and employees should be encouraged to allow questions and explain the reasons and effects of the changes.

5) Before restructuring, ECSTAR should weigh the benefits and risks, such as personnel departure. If the problem cannot be resolved through restructuring, it should not be attempted to avoid wasting time and potential loss for the company.

6) ECSTAR must engage and collaborate with domestic and international research institutes such as the National Broadcasting and Telecommunications Commission (NBTC), the Geo-Informatics and Space Technology Development Agency (GISTDA), the Japan Aerospace Exploration Agency (JAXA), the National Aeronautics and Space Administration (NASA), and European Space Agency (ESA).

7) ECSTAR should implement a team-based initiative program, but this will only be successful with a cultural transformation. This process requires strong leadership and decision-making skills. If feasible for the organization, a careful, planned and collaborative strategy for ECSTAR's future transformation into a team-based structure should be prepared.

5. Conclusion

The link between strategic assessment tools and dynamic business outcomes is demonstrated in this paper using ECSTAR in Thailand as an example. Imple-

menting relevant assessment tools can determine the difference between success and exceeding goals through innovative research and ideas. This paper examined the practical application of McKinsey 7s model, SWOT Analysis, and PESTLE in ECSTAR, highlighting both strengths and areas for improvement. Without these assessment tools, ECSTAR's current success would not have been possible. Collaborating with other institutions has also contributed to ECSTAR's success by combining expertise, resources, and funding. The paper suggests future development for ECSTAR through creating a fundraising plan and improving internal business processes. The benefits of incorporating assessment tools into an organizational design include profitability, growth, and sustainability. This is not just a good practice in business management but a crucial factor for long-term success.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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