Original Research Article

Optimizing the operational model of aerospace think tanks in state-owned central enterprises through a risk management framework

Pan Huang

China Aerospace Academy of Systems Science and Engineering, Beijing, 100037, China.

Abstract: As for the significant strategic importance of aerospace industry to China's development and security, SOI as the leaders of aerospace fields shall plan strategically with foresight on the aerospace industry. The aerospace think tanks attached to SOE's have huge influence over long term strategy, but they have a hard time shaking themselves out of their old ways in a world which is full of dangerous and tangled dangers. in the paper, it is solved through the proposal of a better aerospace think tank operation model, which essentially includes a comprehensive model of risk management. This implies that if a SOE think tank integrates risk identification, assessment and mitigation into the core structure and processes of the think tank, the think tank will significantly enhance the strategic decision making capability of SOEs. This study uses an established think tank function qualitative analysis method and adds a new cross-function collaboration, dynamic analysis, and direct linkage with corporate governance model based on existing methods. This framework organises criticality, running from tech to market, from geo to ops, against some think tank activity. Optimized Model: Making a think tank from a passive research subject into an active strategic partner. Improve Resilience, Innovation Capacity and Competitiveness of State-Owned Aerospace Enterprises in a High-Risk and Uncertain World.

Keywords: risk management; aerospace think tank; state-owned central enterprises; SOE(State-Owned CentralEnterprise); operational model simplification and optimization; strategic decision-making

1. Introduction

Global aerospace industry is technological front, massive amounts of resources spent, complicated geopolitical moves all at same time. If you're one of those countries trying to grab a top spot in this sphere, then SOEs play the main role for putting national strategy into practice, pushing innovation along with protecting your sovereign stuff. These entities will work on dual duties: achieving something commercially viable and at the same time doing something towards long term national security and growth. In order to make their way through this complicated landscape, aerospace SOEs are increasingly relying on specialized internal or affiliated think tanks for that vital intelligence and strategic foresight, as well as deeper policy analysis. They're to be the brain that reads trends and converts them into business tactics. but those think tanks' operations aren't effective, because such think tanks don't have the ability to handle the various kinds of risks associated with the aerospace business that keep changing all the time. Much work along conventional research frameworks which are bad at systematically noticing, checking out, and bringing risk thoughts into what they make, so there could be a gap between figuring things out and helping people run an enterprise. This paper claims that the primary optimization of these think tanks lies in fully embedding a thorough risk management system into their operating bloodline. They will need to reshape their architecture, process structures and talent pools in line with the tenets of proactive risk management so as to develop into necessary strategic allies for boosting the foresight, mobility and toughness of their parent SOEs.

2. The strategic mission and challenges of think tanks of aerospace soes

For state-owned aerospace enterprises operating in a certain setting, it requires a certain setting for its affiliated think tanks. Unlike commercial companies that operate on a much shorter time scale, the SOEs work on a longer one. Research can take decades. Development takes decades. They need lots and lots of money for this, but they can use it for a really long time. Their projects also make a country look strong and safe, so

people always watch them more than other jobs. In this environment, the role of an intellectual institution is different from that of an academic research team. It's gotta be like a strategic intelligence hub constantly doing environmental scans for new tech and any changes to the global supply chain and shifting geopolitical alliances. it does also do the sort of elaborate scenario planning, imagining and exploring a whole bunch of different potential future strategic responses to any number of possible scenarios – from markets flipping things around to other countries going to war with us. And as a link between the company and the policymakers, it writes the rules and makes the national standard for them to help the company grow better. But the problem is the risk complexity and interconnectiveness is simply too great to be overwhelmed by traditional analysis models. a think thank that just turns out some nice, but static, reports about single subjects does not give top leaders the kind of fast-integrated intelligence they have to make decisions in a never quiet and ever more complex world. Critical gap: There was no singular framework or framework that would enable the think tank to take in ALL of the different risk inputs and do something with them in a systematic way such as produce a coherent, prioritized, clear, and actionable form of strategic guidance which the SOE can do something with and be relevant to its core purpose.

3. Think tank risk management integrated framework

To push this along it is strategic for an aerospace think tank that it participates in an integrated risk management operation. It takes us off the path of treating risk as mere compliance issue, it makes it a primary ingredient in each analysis and forecast strategy. A good framework start risk classification, so the think tank can conduct its research and development of activities. Areas in **Table 1** all have risks, need knowledge for each different area, need different analysis skill for different areas. When these little pieces of info can go into the groups it has on the inside, the think tank will be able to cover every angle, not missing anything from the story.

Table 1. Key risk categories for aerospace SOE think tanks.

Risk Category	Description and Examples
Technological Risks	Risks related to the entire technology lifecycle, including R&D failure, unforeseen technical hurdles, rapid technological obsolescence, and the emergence of disruptive innovations from competitors.
Market Risks	Risks arising from market dynamics, including fluctuating commercial and defense demand, aggressive competitor pricing, critical supply chain disruptions, and shifting customer preferences.
Geopolitical Risks	Risks stemming from international relations and political instability, such as economic sanctions, export controls, failure of international collaborations, intellectual property theft, and regional conflicts.
Policy & Regulatory Risks	Risks associated with changes in the legal and political environment, including shifts in national industrial policy, new environmental regulations, changes in aviation standards, and evolving defense budgets.
Operational Risks	Internal risks related to the enterprise's ability to execute its strategy, including the loss of key talent, failures in knowledge management systems, cybersecurity breaches, and project management failures.

Following identification, the framework must have a process for risk assessment. Risk assessment is the evaluati on of the potential effects and probability of occurrence for each risk that has been identified. This is typically illustrated as a risk matrix similar to **Table 2** which gives the think tank the ability to prioritize the biggest danger and opportunity to SOEs leaders A thorough examination may result in the situation where analytical assets would go toward the need most. Finally in the Framework, we come to the strategic responses that are formulated. This is what the think tank does best, stepping out of the realm of analysis and into the world of tangible, doable recommendations. and they could consist of recommendations like diversify supply chains; fund alternative, create new international alliances, or develop comprehensive back-up plans and so on to keep business going through major disturbances. So, this order from front to back ensures that looking after dangers isn't just some far-off thing, but something that can really make tough and looking-forward plans in the business world.

Table 2. Example of a risk assessment matrix.

	Impact: Low	Impact: Medium	Impact: High	Impact: Critical
Likelihood: Very High	Medium Risk	High Risk	Critical Risk	Critical Risk
Likelihood: High	Medium Risk	Medium Risk	High Risk	Critical Risk
Likelihood: Medium	Low Risk	Medium Risk	High Risk	High Risk
Likelihood: Low	Low Risk	Low Risk	Medium Risk	Medium Risk

4. Optimizing the think tank's operational model

This risk framework integration will necessitate an overhaul of the think tank's operational model at the most basic level: it is about the reengineering of the think tank's structure, processes, talent, and its relationship with the parent SOE. The silo that tends to be arranged by academic subjects must be exchanged out for a much nimbler, collaborative structure. Comparison between the traditional model and the optimized model as shown in **Table 3** can point out that there is a definite departure from teams that have focused on functional or product lines, to teams organized around strategic missions or major risk areas. it would be like having a structure with a combined diverse perspective – Where an engineer perspective would come together with an economics perspective and political science perspective to look at a single complex question like what the geopolitical risk is to supply chains of a critical mine.

Table 3. Comparison of traditional vs. optimized think tank structures.

Feature	Traditional Operational Model	Optimized Risk-Integrated Model
Structure	Hierarchical and siloed by academic discipline (e.g., Economics Dept., Engineering Dept.).	Agile, cross-functional teams organized around strategic missions or key risk domains.
Process	Linear and reactive; produces static, in-depth reports on request.	Dynamic and proactive; involves continuous environmental scanning, scenario workshops, and real-time analysis.
Output	Lengthy academic-style reports and policy papers.	Interactive risk dashboards, strategic alerts, concise policy briefs, and actionable contingency plans.
Integration	Acts as an external advisor with a formal, often slow, reporting channel to management.	Deeply embedded in the strategic planning cycle with a direct reporting line to the SOE's executive committee.

This kind of structural change needs to have better processes that focus on being swift and important. The think tank shouldn't depend only on long-term research projects but use a workflow of steady gathering and analysis using data analytics and AI to track global trends constantly. It would go from being long, static reports into a collection of dynamic products, so interactive risk dashboards for execs, early warning signals about new threats popping up right there and getting them strategic alerts before they happen, and quick, clear briefs that tell people what they need to know and help make decisions. In the middle of this model is creating a specific kind of talented pool. The think tank would have to bring in, and make use of, professionals who have an understanding of a lot more than a certain subject field. As seen from **Table 4**, the ideal team member has both technical and technical thinking and data thinking. Finally, for this model to work, the think tank needs to be deeply embedded into the SOE's core loop of decision making. There will need to be a direct reporting line, influential and not superficial, to the most senior levels of executive leadership. to make sure that its risk-informed wisdom isn't just something that is regarded but rather central to the creation and carrying out of company strategy.

Table 4. Core competencies for optimized aerospace think tank personnel.

Competency Area	Specific Skills and Knowledge
Technical & Domain Expertise	Aerospace engineering, materials science, propulsion systems, satellite technology, defense systems, and relevant scientific fields.
Quantitative & Analytical Skills	Econometrics, statistical analysis, financial modeling, data science, machine learning, and data visualization.
Strategic & Systems Thinking	Scenario planning, competitive analysis, systems dynamics, game theory, and long-term strategic foresight.
Geopolitical & Policy Acumen	International relations, public policy analysis, international law, trade policy, and regional political expertise.
Communication & Influence	Clear and concise writing, effective presentation skills, stakeholder management, and the ability to translate complex analysis into actionable advice for senior leaders.

5. Conclusion

In an era of volatility and instability, how far forward state-owned aerospace enterprises can see will determine whether they can control danger. And that some of those thinktanks which serve those SOEs must transform into more dynamic places, places for integrating and managing and handling risk, not staying just as passive, inactive research institutes. The optimal operational model has a cross-functional form; The operation is ahead, there is a group of people with cross-teams, and it merges with the company, and we all have to see the path. Think tanks could get hard to obtain strategic benefit by putting all round risk management into their main

parts. Can give SOE leadership forward-looking thinking power to deal with the technology upheaval wave, flexible adaptability to changes in foreign relations, and survival ability to withstand market storms. In short, this sort of optimization is not just an internal arrangement, but something that calls for strategy. And make think tank into a party that's useful and necessary for the SOE to achieve its long run goal, ensuring in the future we remain competitive and that we're important to the very important aviation national strategic interest. As for these cornerstone companies whether they can succeed towards tomorrow, it's also perhaps very likely decided by this high-quality "risk-informed intelligence" which guides them forward.

About the author

Pan Huang, Female, Han nationality, October 1982,China Aerospace Academy of Systems Science and Engineering, Beijing, 100037, China, Management Science, Business Analysis and Finance, Comprehensive risk management, Master's degree, engineer.

References

[1] Xiao Y, Xiao L . The impact of artificial intelligence-driven ESG performance on sustainable development of central state-owned enterprises listed companies[J]. Scientific Reports, 2025, 15(1): 8548-8548.

[2] Cheng Y. An Empirical Study of Mergers and Acquisitions in China's Healthcare Industry: Strategies of State-Owned and Central Enterprises[J]. Journal of Applied Economics and Policy Studies, 2024,15(1):61-71.

[3] Li H ,Wang X, Chang Y , et al. Central government Ownership, geographic Distance, and firm Innovation: Evidence from Chinese State-owned enterprises[J]. Journal of Business Research, 2025, 186115033-115033.

[4] Dept. S F M I . Georgia, Technical Assistance Report-Report on Government Finance Statistics for State-Owned Enterprises Mission (April 26-May 24, 2021)[J]. Technical Assistance Reports, 2024,2024(045).

[5] Dept. S F M I . Georgia, Technical Assistance Report-Report on Government Finance Statistics for State-Owned Enterprises Mission (January 16-27, 2023)[J]. Technical Assistance Reports, 2024,2024(044).