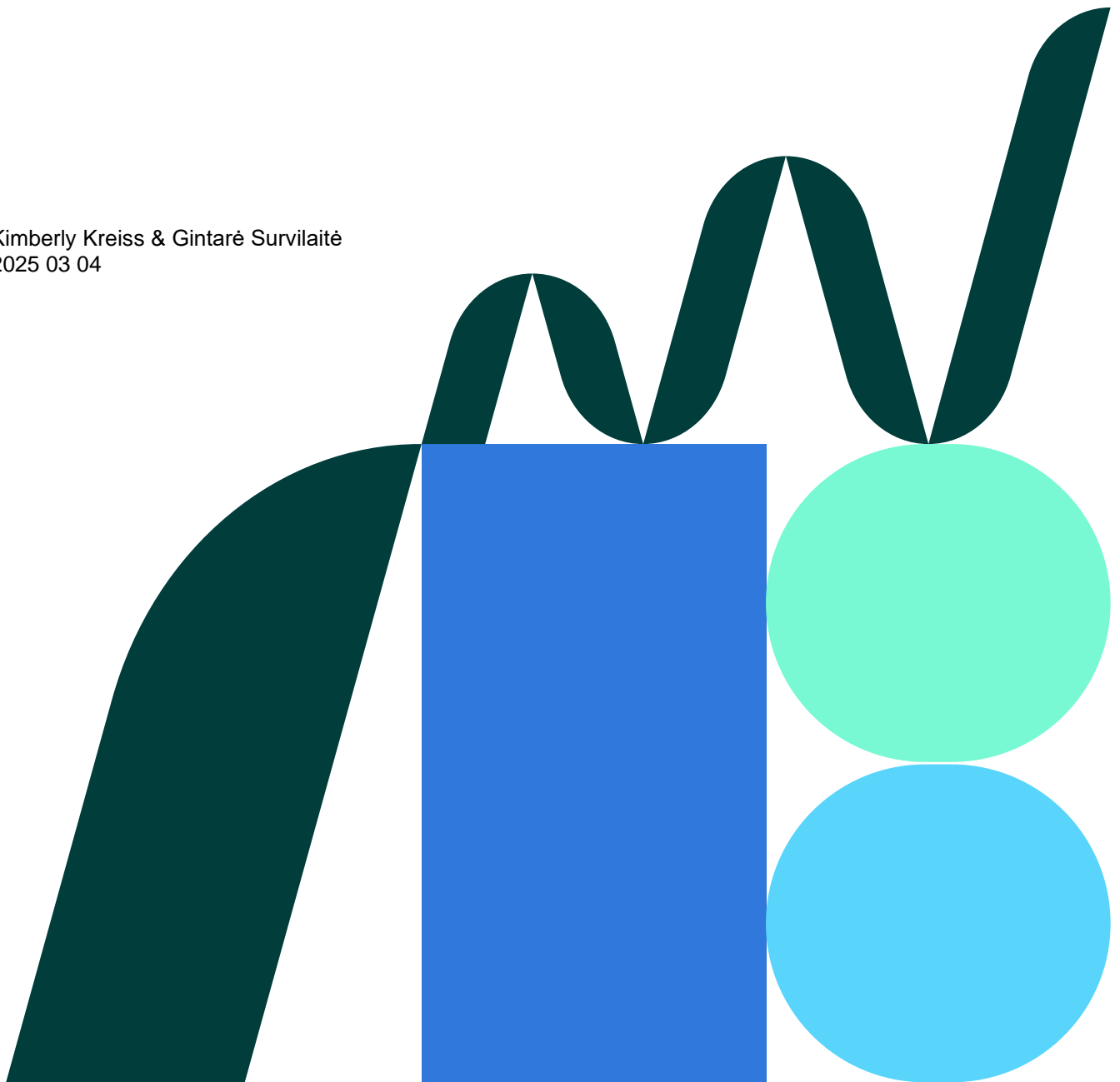# Applying and Institutionalizing Technology Foresight for Lithuania's Smart Specialisation Strategy

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Introduction

As part of the European Union's (EU) broader strategy to drive innovation-led economic growth, Lithuania adopted the Smart Specialisation Strategy (S3) framework in 2010. Since then, the country has made significant progress in developing its innovation ecosystem and leveraging regional strengths. While Lithuania has taken important steps in implementing S3, challenges remain in sustaining a forward-looking, dynamic strategy that can proactively respond to emerging technological, economic, and societal shifts. To ensure long-term adaptability, resilience, and competitiveness, Lithuania can formally integrate technology foresight methods[1] to further refine its S3 focus areas.

While Lithuania has incorporated foresight elements into its S3 planning, these efforts have largely been *ad hoc* and informal, limiting their ability to systematically inform policy decisions in a continuous, iterative manner. Nevertheless, through the last two S3 cycles, Lithuania has steadily refined its implementation process, sharpened its focus areas, engaged a broad range of stakeholders, and expanded its use of data-driven analysis. These advancements, combined with a dynamic innovation ecosystem, provide a strong foundation for integrating foresight more formally into the S3 process. By building on these strengths and drawing from international best practices, Lithuania can enhance its strategic capacity and position itself for long-term success in an evolving global landscape.

Compared to countries like Finland, where foresight is deeply embedded in policy cycles, Lithuania still operates reactively, with limited institutional capacity to systematically monitor and interpret global trends. Without an integrated foresight framework, Lithuania risks allocating resources inefficiently, failing to capitalize on disruptive innovations, and struggling to align its economic policies with evolving market needs. Embedding technology foresight into the Smart Specialization Strategy (S3) would enable Lithuania to transition from a reactive to a proactive policy approach, ensuring resilience and sustained economic growth in an increasingly uncertain and fast-changing global landscape.

This report presents a structured roadmap for embedding foresight into Lithuania's S3 framework, outlining key recommendations across three phases. These recommendations are informed by analyses of the current implementation of S3 in Lithuania and foreign best practices, with a focus on Finland and Estonia.[2] The first phase emphasizes immediate actions that can be taken to institutionalize technology foresight in S3 planning. This phase builds on the review process of Lithuanian S3 2021-2027 that starts in 2025, ensuring that these foresight methodologies are embedded early on to enhance strategic decision-making and adaptability. The second and third phases focus on building in-house foresight capacity and encourage cross-sector collaboration, European policy integration, and the promotion of a foresight culture.

Lastly, increasing awareness and securing political buy-in will be crucial to the success of this initiative. As such, we consider this a necessary condition for these three phases to work. Demonstrating foresight's value through relevant foreign best practices and its successful application in the upcoming S3 cycle will not only reinforce its strategic importance but also position Lithuania as a forward-looking, innovation-driven economy within the European Union.

This report provides an in-depth analysis of each recommendation, detailing the steps required to ensure that foresight becomes a cornerstone of Lithuania's smart specialization efforts. It provides key recommendations across three phases, informed by an assessment of Lithuania's current S3 implementation and lessons from international best practices. Additionally, we discuss the conditions necessary for successful implementation. The report is structured as follows:

1. Three Phase Recommendations:

    1.1 Integration of foresight into shaping the Smart Specialisation Strategy (Phase 1)

    1.2 Building In-House Foresight Capability in Lithuania: Institutional Framework and Responsibilities (Phase 2)

    1.3 Strengthening cross-sector collaboration, European integration, and foresight culture (Phase 3)

2.Conditions for Success:

   2.1 Increasing Awareness and Political Buy-In for Foresight

3. Conclusion

1. Three Phase Recommendations

1.1 Integrating Foresight into shaping the Smart Specialization Strategy (Phase 1)

Lithuania's current approach to smart specialization faces several challenges, primarily due to the lack of a structured, long-term foresight mechanism to anticipate technological and economic shifts. Instead of a systematic and continuous process, foresight efforts are *ad hoc*, relying heavily on external consultants for key analyses and decision-making. This prevents institutional learning, making it difficult to apply insights from past experiences and build long-term strategic capabilities.

Furthermore, while Lithuania has made progress in identifying priority sectors, the selection process often leans on historical economic strengths rather than forward-looking intelligence. Without an embedded foresight mechanism, the country risks failing to identify and invest in emerging technologies that could drive future competitiveness and innovation-led growth. Addressing these structural gaps is essential for ensuring that smart specialization becomes a proactive, dynamic strategy rather than a retrospective assessment of past strengths.

Current institutional framework for the development and implementation of the concept (S3)
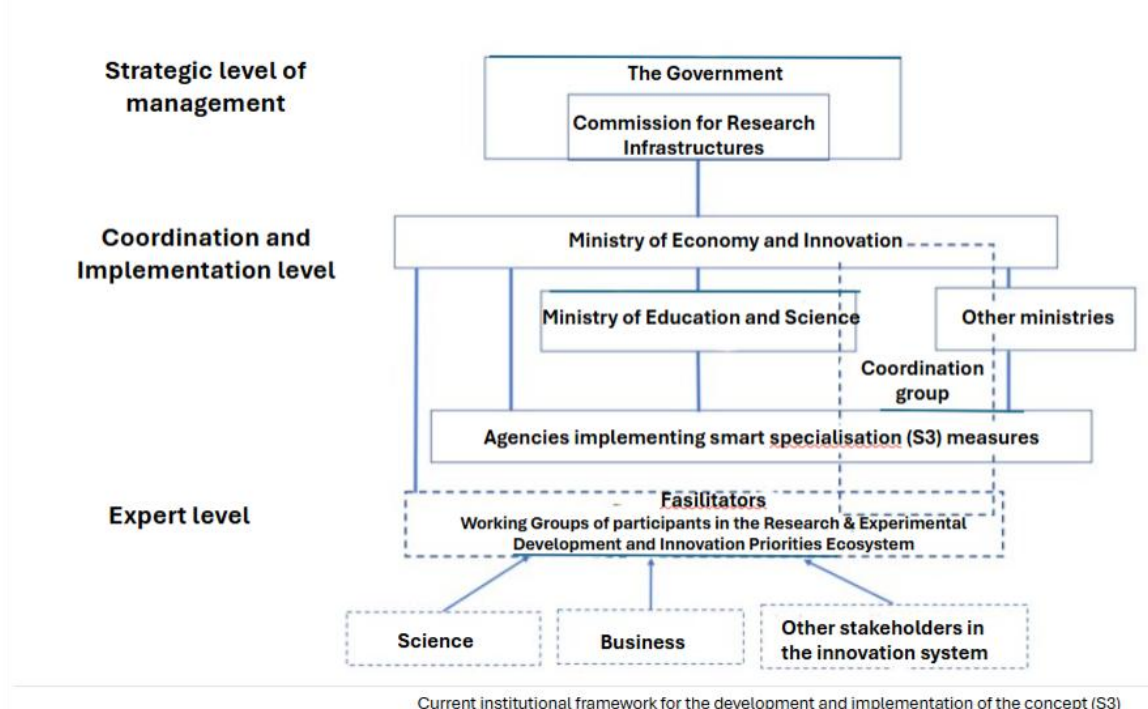
Demonstrating Foresight's Value Through Early Wins

A "proof of concept" approach—where foresight is first integrated into the upcoming revision of the S3 cycle—can provide a tangible example of its value. By demonstrating how technology foresight methods improve funding allocation and specialization choices, the Lithuanian government can build momentum for broader institutionalization. The upcoming revision process of S3 should include:

- Pilot foresight applications that showcase immediate, measurable impact, such as identifying emerging sectors for investment or predicting technological shifts affecting Lithuania's industries.
- Success stories from aspirational or peer countries, for example, emphasizing how Finland and Estonia overcame initial challenges to create more robust foresight-driven innovation strategies.
- Data-driven storytelling, where insights from foresight exercises are translated into clear, actionable narratives for policymakers, industry leaders, and the public.

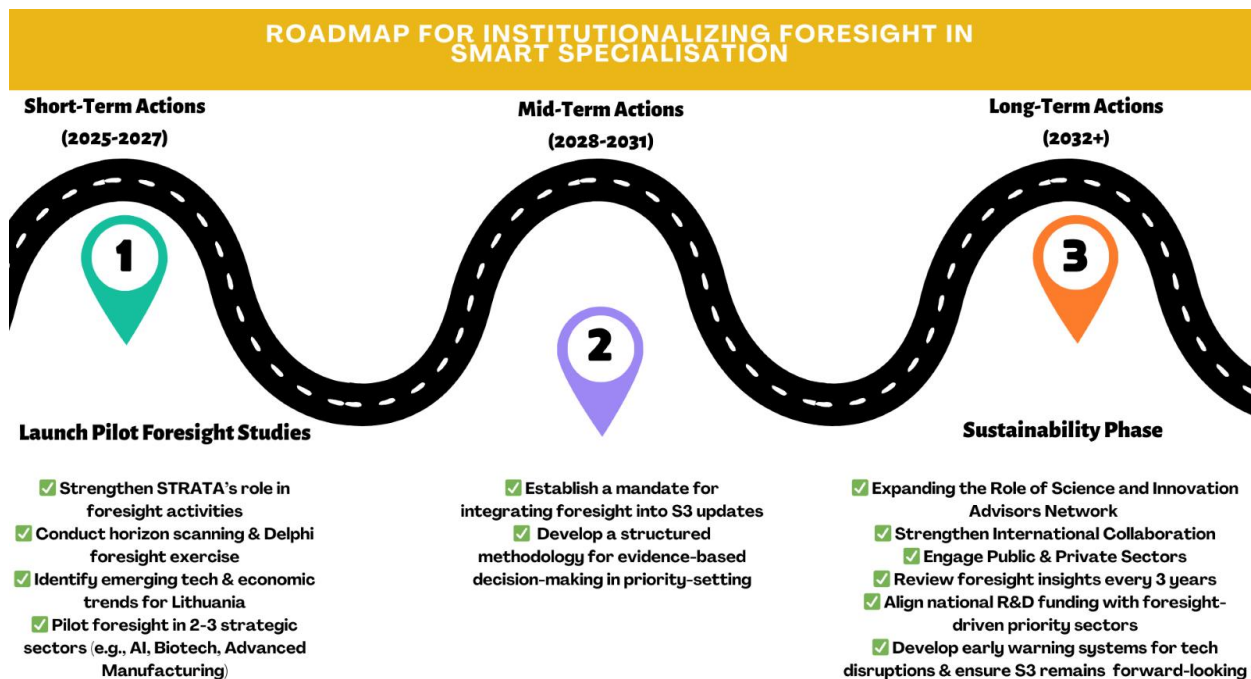*Developing a Foresight Roadmap for S3*

To ensure Lithuania's Smart Specialization Strategy (S3) remains future-proof, a structured foresight roadmap is essential. This roadmap follows a phased approach to institutionalizing foresight in decision-making, ensuring continuous adaptation to emerging technological, economic, and societal changes.

In the short term (2025–2027), the focus is on launching pilot foresight studies to explore key trends, strengthen institutional foresight capabilities, and identify strategic sectors for innovation. These initial steps will lay the foundation for integrating foresight into policy planning.

During the mid-term phase (2028–2031), foresight activities will be embedded into the S3 framework through structured methodologies for evidence-based decision-making. This phase ensures that foresight insights inform national priorities in a systematic and strategic manner.

In the long term (2032 and beyond), the sustainability phase will focus on expanding advisory networks, strengthening international collaboration, and aligning national R&D funding with foresight-driven priorities. Regular foresight reviews and early warning systems will be established to anticipate disruptions and ensure Lithuania remains at the forefront of innovation.

By integrating foresight into S3 as an ongoing process rather than a one-time exercise, Lithuania can proactively shape its innovation landscape, strengthen competitiveness, and build resilience in a rapidly evolving global economy.

ROADMAP FOR INSTITUTIONALIZING FORESIGHT IN SMART SPECIALISATION

Short-Term Actions
(2025-2027)

Mid-Term Actions
(2028-2031)

Long-Term Actions
(2032+)

Launch Pilot Foresight Studies

✅ Strengthen STRATA's role in foresight activities
✅ Conduct horizon scanning & Delphi foresight exercise
✅ Identify emerging tech & economic trends for Lithuania
✅ Pilot foresight in 2-3 strategic sectors (e.g., AI, Biotech, Advanced Manufacturing)

✅ Establish a mandate for integrating foresight into S3 updates
✅ Develop a structured methodology for evidence-based decision-making in priority-setting

Sustainability Phase

✅ Expanding the Role of Science and Innovation Advisors Network
✅ Strengthen International Collaboration
✅ Engage Public & Private Sectors
✅ Review foresight insights every 3 years
✅ Align national R&D funding with foresight-driven priority sectors
✅ Develop early warning systems for tech disruptions & ensure S3 remains forward-looking

Image source: created by authors

1.2 Building In-House Foresight Capability in Lithuania: Institutional Framework and Responsibilities (Phase 2)

Strengthening STRATA's role in foresight

Lithuania has the opportunity to enhance its foresight capabilities by expanding STRATA's role in developing future-oriented methodologies, fostering international collaboration, and embedding foresight into policy processes. Given its experience in applying strategic foresight for LT2050, STRATA is well-positioned to serve as a central institution for foresight in Lithuania.

To fully realize this potential, STRATA could take on additional responsibilities that strengthen its internal foresight expertise, enable it to support other institutions, and ensure a forward-looking approach in key policy areas. Specifically, STRATA should:

- Build and strengthen internal foresight competence by further developing expertise in methodologies such as horizon scanning, scenario planning, and road mapping.
- Consult and train other institutions on foresight, equipping policymakers with the tools to anticipate and navigate future challenges.
- Play an active role in shaping the S3 process, ensuring that strategic foresight methods guide specialization choices and funding allocation.
- Integrate into European and global foresight networks, facilitating knowledge exchange and positioning Lithuania within the international foresight community.

STRATA's position as an impartial institution allows it to bridge the needs of different ministries, aligning their priorities through evidence-based foresight. By expanding its role, STRATA can drive a more adaptive and future-ready governance approach in Lithuania. Additionally, STRATA should take the lead on integration into European and global foresight networks.

Building in-house capacity within institutions

For Lithuania to prepare for the future and make better long-term decisions, it needs a strong in-house foresight system—a way to regularly analyze trends, anticipate challenges, and prepare for opportunities. Right now, different government institutions occasionally use foresight, but there is no centralized system to make sure it's done consistently and effectively.

A strong in-house foresight culture requires the integration of foresight capabilities within each ministry, particularly those responsible for innovation, economy, security, and social policies. The Ministry of Economy and Innovation, Ministry of Energy, Ministry of National Defense, and Ministry of Education, Science & Sport should each establish dedicated foresight teams within their strategic planning units. These teams would:

- Conduct sector-specific foresight studies (e.g., AI and industry transformation, energy transitions, defense and security foresight).
- Work in coordination with STRATA to ensure national and sectoral foresight efforts align.
- Provide foresight-informed recommendations for policy planning and investment decisions.

By embedding foresight across government institutions, Lithuania can move beyond one-off foresight exercises toward a sustained, knowledge-driven governance model, ultimately strengthening its resilience and strategic agility in an evolving global landscape.

Integrating into European Foresight and Innovation Policy Networks

Lithuania's foresight efforts must also be embedded within broader European foresight and innovation networks. This responsibility could fall under STRATA's increased foresight capacity. Through conversations with international stakeholders, we can point to several resources that Lithuania can further leverage.

First, the European Innovation Council releases its annual *EIC Tech Report* which identifies emerging technologies to boost European competitiveness.[3] While these reports focus on Europe as a whole rather than Lithuania, they can provide valuable insight into emerging technological trends and developments. The report is part of broader initiatives by the EIC and the European Commission to build a stronger, more connected European innovation ecosystem. Additionally, the Joint Research Centre's Competence Centre on Foresight[4] and its Technology Foresight[5] initiatives provide relevant information for EU innovation policy. Finally, the OECD houses its Strategic Foresight Unit[6], offering recommendations and best practices for implementing foresight. Greater engagement with these outputs and networks would enable Lithuania to access cutting-edge foresight methodologies, share best practices, and align its specialization priorities with broader EU innovation trends.

Participation in European foresight initiatives would also strengthen Lithuania's ability to anticipate technological and market shifts that could impact its specialization areas. Collaboration with other EU member states, particularly those with advanced foresight frameworks could provide valuable insights into emerging risks and opportunities. Additionally, Lithuania can learn about cutting edge foresight methods and frameworks. Lithuania should continue to actively seek membership in European foresight working groups and policy discussions to ensure that its S3 priorities remain competitive within the EU innovation landscape.

1.3 Strengthening Cross-Institution Collaboration, European Integration, and Foresight Culture (Phase 3)

A well-functioning public sector foresight system requires strong collaboration across government institutions. This ensures efficient functioning and prevents unnecessary siloes. However, experiences from Finland reveal that foresight integration was initially fragmented, conducted as isolated exercises rather than systematically embedded in policymaking. Initially, Finland relied heavily on external experts and expert-driven foresight, limiting internal knowledge and participation from government, industry, and civil society.

Estonia's institutional set up faces similar problems. Estonia created the Foresight Centre, an independent think tank in the parliament responsible for foresight. In practice, however, this institutional setup initially led to weak cross-institution collaboration and differing levels of foresight

integration within ministries. Additionally, because the Foresight Centre is a new institution in Estonia, many policymakers and high-level decisionmakers lack familiarity with foresight methods, limiting their implementation.

Lithuania can learn from Finland and Estonia to anticipate and get ahead of these challenges early. Lithuania can establish mechanisms that promote sustained interministerial cooperation, deeper engagement with the private sector and academia, and integration into European foresight and innovation networks.

Strengthening Foresight Coordination: Expanding the Role of Science and Innovation Advisors Network

Effective foresight requires a coordinated approach across sectors, yet in Lithuania, efforts remain fragmented, limiting their impact on long-term strategic decision-making. To address this, the Science and Innovation Advisors Network *(liet. Mokslo ir Inovacijų Patarėjų Tinklas)* could take on a stronger role in foresight coordination.

To achieve this, we propose expanding the network's responsibilities to include:

1. Cross-sectoral foresight coordination – facilitating collaboration between ministries (e.g Ministry of Economy and Innovation, Ministry of Education, Science) and other, agencies, and industry stakeholders to create shared foresight-driven roadmaps for key strategic areas.
2. Developing foresight capacities within government institutions – providing training and knowledge-sharing mechanisms to equip policymakers with foresight methodologies and tools.
3. Strengthening Lithuania's positioning in global technology foresight initiatives, ensuring alignment with emerging trends in European and international policy frameworks.
4. Embedding foresight into evaluation and monitoring processes – using foresight insights to guide mid-term policy reviews, helping adjust strategies based on anticipated technological and economic shifts.

Networking with Local and International Partners

For Lithuania to strengthen its foresight capabilities, it is essential that STRATA as a foresight competence center would engage in structured and sustained collaboration with key international organizations and foresight institutions. Establishing partnerships with the European Commission (EC), the Organisation for Economic Co-operation and Development (OECD), and similar foresight centers in other countries would provide access to cutting-edge methodologies, global trend analyses, and best practices in anticipatory governance.

By actively participating in initiatives such as the EC's Joint Research Centre (JRC) Foresight Network or the OECD Government Foresight Community, Lithuania can not only benefit from international expertise but also contribute to global foresight discussions, ensuring that its national foresight strategies align with broader European and global trends. Additionally, partnerships with established foresight institutions in countries with strong foresight cultures, such as Finland's SITRA, could offer valuable models for institutionalizing foresight practices within Lithuania's governance framework.

Locally, fostering collaboration between STRATA, universities, research institutions, and S3 implementing agencies can help consolidate foresight efforts and create a more cohesive ecosystem for future-oriented policymaking. Encouraging cross-sector cooperation between government, academia, and industry will also ensure that foresight insights are effectively translated into actionable policies and strategies.

By building these networks and ensuring ongoing knowledge exchange, Lithuania can enhance its strategic foresight capacity, making its governance more resilient, adaptive, and capable of addressing long-term societal and economic challenges.

Fostering a National Foresight Culture

Beyond institutional structures, it is critical to promote a foresight culture within Lithuania's public sector. This requires increasing awareness of foresight's value in policymaking, equipping decision-makers with the necessary skills, and embedding foresight practices into existing strategic planning processes. Steps to achieve this include:

- Training and capacity building: Providing foresight training for policymakers and public sector workers to ensure they can effectively participate in foresight-driven decision-making.
- Public engagement and awareness: Showcasing successful foresight applications through case studies and public forums to build political and societal buy-in.
- Embedding foresight in funding mechanisms: Requiring foresight-informed decision-making in research and innovation funding to reinforce its importance in shaping national priorities.

By establishing a government foresight network, integrating into European foresight ecosystems, and fostering a national foresight culture, Lithuania can ensure that its S3 strategy remains dynamic, forward-looking, and competitive on the global stage.

2. Conditions for Success

2.1 Increasing Awareness and Political Buy-In for Foresight

Securing political and institutional commitment is essential for successfully institutionalizing foresight into Lithuania's Smart Specialization Strategy (S3). Without strong awareness and buy-in from policymakers, foresight risks being sidelined as a secondary concern rather than recognized as a core strategic function.

Foresight as a Strategic Investment in Policy Resilience

OECD research highlights a number of crosscutting lessons for successful institutionalisation of foresight[7] and points to the need for buy-in among high-level decisionmakers. Indeed, successful foresight ecosystems have support or champions among senior policymakers and proximity to key decisionmakers (OECD, p.10). Moreover, independence from political influence is crucial.

At the same time, institutional and political context matters. Finland has been building a foresight system for over half a century, while the political context of Lithuania during the same time period made this impossible. As such, Finland can act as a long-term model, but it is not realistic to expect similar foresight capacity to emerge in the short-term. To secure the necessary buy-in for foresight, Lithuania must emphasize this long-term value proposition when engaging policymakers and actively engage high-level decisionmakers.

Additionally, as noted in the OECD's foresight policy recommendations, integrating foresight into public administration training, budget planning, and strategic decision-making increases its perceived legitimacy. Lithuania can take proactive steps by ensuring that:

- Foresight is explicitly referenced in national policy frameworks and budget allocations.
- Government agencies assign dedicated foresight personnel, rather than relying solely on ad-hoc consultant-led projects (as discussed above).
- Policymakers and public officials are exposed to foresight's success, both in Lithuania and internationally, and receive capacity-building training on foresight methodologies to improve institutional understanding.

Building Public and Private Sector Engagement

Beyond political buy-in, Lithuania must cultivate a broader foresight culture that includes businesses, academia, and civil society. This ensures that foresight is not perceived solely as a government function but rather as a national capability that informs long-term economic and innovation strategy.

Key steps include:

- Engagement with high-level decisionmakers and policymakers to explicitly show the value of foresight, with a focus on national and international success cases.
- Engaging industry associations in regular foresight discussions, ensuring businesses see the value of foresight in predicting market trends and technological disruptions.
- Public communication campaigns that highlight how foresight benefits society by anticipating labor market changes, technological advancements, and economic shifts. Estonia's Foresight Centre has excellent reports that can serve as a template for these communications.

STRATA emerges as the natural leader for ensuring engagement. By increasing awareness and securing political commitment, Lithuania can ensure that foresight moves beyond an optional analytical tool to a core pillar of strategic policymaking, reinforcing the country's position as an innovation-driven economy within the European Union.

3. Conclusion

Integrating foresight into Lithuania's Smart Specialisation Strategy (S3) is a critical step toward strengthening the country's innovation ecosystem and ensuring long-term economic resilience. While Lithuania has made significant progress in refining its S3 approach, a more systematic and institutionalized foresight framework will enable policymakers to anticipate emerging trends, allocate resources more effectively, and align national priorities with global technological shifts.

The recommendations outlined in this report provide a structured roadmap for embedding foresight into the S3 process, moving from immediate integration in the upcoming review cycle to long-term capacity-building and cross-sector collaboration. By drawing on international best practices, strengthening foresight coordination, and fostering a forward-looking policy culture, Lithuania can transition from a reactive to a proactive innovation strategy.

Ultimately, securing political buy-in and demonstrating the tangible benefits of foresight will be essential for success. By showcasing early wins and leveraging foresight-driven decision-making, Lithuania can position itself as a leader in strategic innovation planning within the EU, ensuring that its economy remains competitive, adaptive, and prepared for future challenges.

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Thank you!

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