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Envisioning tomorrow: A survey study of the regional science parks in Thailand

PLENARY 4 – FUTURE TRENDS IN INNOVATION SPACES OVER THE NEXT 20 YEARS

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EXECUTIVE SUMMARY

In an era of rapid technological disruption and shifting global economic landscapes, science parks are no longer just innovation facilitators—they must become engines of transformation. This paper examines the future trajectory of science parks in Thailand over the next decade - analysing strategic importance, ecosystem dynamics, policy, key trends, and emerging technologies, as well as the challenges and uncertainties they face to provides actionable recommendations for their continued development. The results highlight three primary pillars that will drive the future of science parks in Thailand: innovation engines, collaborative hubs, and sustainability drivers. To fulfill these roles effectively, science parks must refine their operational models to align with evolving conditions. Key policy recommendations include establishing clear strategic vision, strengthening policy and funding frameworks, enhancing university-industry-government collaboration, investing in talent and leadership development, and strengthen branding and accessibility.

INTRODUCTION

The development of regional science parks[1] in Thailand began since the idea inception in 2002 and has evolved in terms of size, number, and function. A report by RTI international[2] highlights the significant economic and social benefits generated by these parks, showing that every 1 baht invested yields a return of 13 baht. Conceptualised by the development of science parks around the world, Thailand's regional science parks are currently transitioning from a growth stage to a mature stage.[3] Main challenges encountered in this stage are to maintain competitiveness. To stay relevant in the rapidly evolving innovation ecosystem, science parks must proactively adapt to support the future needs of their communities.

This paper employs a foresight approach to envision the future of regional science parks in Thailand over the next 10 years. We adopt foresight as it enables policymakers and managers to anticipate trends, assess their impact, and develop proactive strategies, ensuring resilience and adaptability in response to uncertainties. further, foresight supports long-term investment and policy decisions, providing a structured decision-making framework for sustainable growth.[4] This study focuses on a 10-year timeframe for two key reasons. First, a decade offers a realistic horizon for significant technological and societal changes to unfold. Second, for majority of practitioners unfamiliar with long-term future thinking, a 10-year outlook is more tangible and actionable than a 15- or 20-year projection. This study employs a foresight approach that integrates desk research, stakeholder consultations, and survey analysis. Specifically, desk research, including literature and report reviews, along with stakeholder consultations, informs the survey design and supports discussions and policy recommendations.

The purpose of this paper is to envision the future of Thailand’s regional science parks over the next decade and to stimulate awareness and discussion among the science park community about future trends and strategic directions. The paper is structured into four sections, beginning with the executive summary and introduction, followed by a discussion of the survey results and concluding with the conclusion and policy recommendations.

ENVISIONING TOMORROW: A SURVEY STUDY OF THE REGIONAL SCIENCE PARKS IN THAILAND

This analysis draws from survey responses from 35 stakeholders (70% response rate) representing science park executives, policymakers, funding agencies, university leaders, researchers, and entrepreneurs. Using descriptive statistics and thematic analysis, the survey explored six key dimensions shaping Thailand's science parks: strategic importance, ecosystem partnerships, policy frameworks, emerging trends and technologies, challenges, and future recommendations as shown Figure 1.

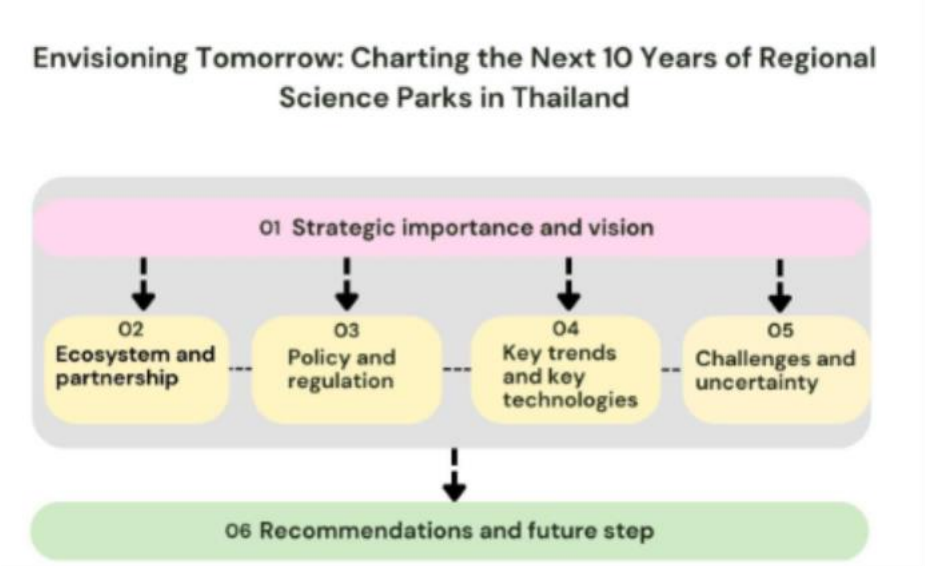

Figure 1: Survey framework to envision the next 10 years of science parks in Thailand

The first dimension we explore in the survey is the strategic importance and vision. Respondents envisioned future science parks while ranking their potential roles. Their responses revealed expectations for more advanced and impactful functions, particularly in unicorn startup incubation and deep-tech commercialisation. Three recurring themes emerged:

1. Innovation engines – Driving economic growth through startup support, research commercialisation, and high-impact technological advancements.
2. Collaboration hubs – Strengthening ties between academia, industry, government, investors, and international partners.
3. Sustainability driven – Addressing environmental challenges, social well-being, and regional economic disparities.

This next ten years vision drawn by respondents also aligns with the roles where they see importance. Figure 2 (to the left) shows the survey responses on top three potential roles of science parks in Thailand over the next decade. The result shows that the most highly valued roles for science parks in the next decade revolve around collaborative R&D,

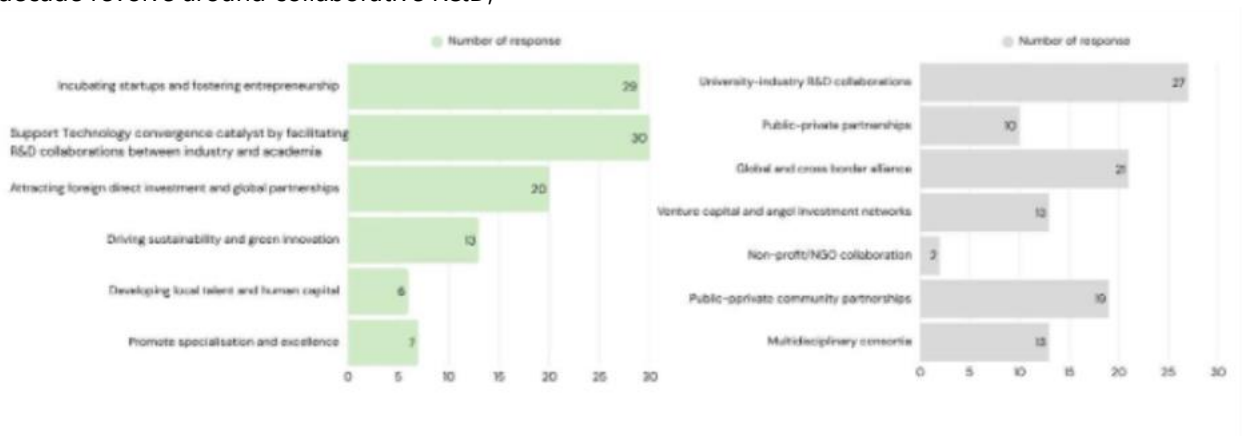

Figure 2. Left: The survey responses on top three potential roles of science parks in Thailand over the next decade. Right: The survey responses on types of partnerships for science parks to foster innovation and growth for the next 10 years.

fostering entrepreneurship and attracting foreign direct investment and global partnerships. Sustainability is also highlighted though to a lesser degree. Talent development and specialisation is the two least emphasised role. In short, respondents point to collaborative R&D and entrepreneurial support as the two major forces shaping the future of science parks, with international partnerships and sustainability also gaining importance in shaping long-term success.

In summary, the respondents envision science parks evolving into more advanced and impactful hubs, emphasising their roles in startup incubation, deep-tech commercialisation, and fostering innovation ecosystems.

The second dimension explored in the survey is ecosystem and partnerships. Respondents were asked to: (1) choose the top three the types of partnerships that science parks should foster to drive innovation and growth over the next 10 years; (2) the role universities should play in science park development; and (3) the importance of international networks in shaping the future of science parks

The survey results on types of partnerships for science parks to foster innovation and growth over the next decade are presented in figure 2 (to the right). Respondents identified university and industry collaboration as key orchestrators of science park development, emphasising their role in bridging research utilisation and supporting entrepreneurship. This result also in line with literature suggest that science parks that have succesfully established strong collaborative ties to university scholars have higher levels of performance e.g., higher patent application and number of firms on park[5]. Global connectivity also emerged as a priority, reflecting a growing interest in expanding beyond local and national networks to maximise resources and scale impact. Additionally, public-private and community engagement, attracting diverse funding sources and multidisciplinary consortia were also highlighted. While non-profit collaborations were ranked as less common.

Deriving from literature, university is seen to play major roles for science parks development: a source of knowledge creation and knowledge network; skilled human labour provider; and a place to encourage innovation culture and activities.[6] However, practically like elsewhere the link between university in driving science parks development in Thailand still pose some gaps (e.g., university-industry research mismatch and less support to entrepreneur culture). In this survey, we zoom in to the role of university in shaping the future of science parks, particularly in promoting inclusive innovation and addressing societal challenges, three key themes emerged from the responses:

1. Aligning research with real-world needs – Moving beyond academic-driven inquiry to focus on demand-driven innovation that addresses industry and community challenges.
2. Leveraging ecosystems (encouraging collaborative platforms) – Utilising university labs, specialised knowledge, funding, and human capital while implementing governance models that facilitate technology transfer.
3. Emphasising societal impact – Steering research towards tackling social and environmental challenges, ensuring meaningful contributions at local, national, and international levels.

Overall, the responses call for a paradigm shift in which universities take an active role in positioning their science parks as drivers of inclusive, demand-driven, and transformative innovation for Thailand's future.

Take a further look on international partnership, international partnerships are essential for science parks in Thailand to thrive in the globalised economy. Survey results suggest that science parks should fostering global collaboration for five key reasons:

1. Global market expansion and investment – Opening doors for startups and businesses to scale internationally.
2. Enhanced technology transfer and R&D – Gaining access to advanced expertise, funding, and collaborative platforms.
3. Human capital development – Facilitating talent exchange programs, improving managerial and technical capabilities.
4. Ecosystem growth and reputation – Benchmarking against world-class innovation hubs, strengthening networks, and positioning Thailand as a potential regional innovation leader.
5. Global challenge alignment – Contributing to and benefiting from international collaborations on environmental, health, and societal issues.

In summary, in terms of ecosystem, respondents envision universities aligning research with real-world needs, leveraging collaborative ecosystems, and emphasising societal impact, thereby calling for a paradigm shift toward inclusive, demand-driven innovation. Meanwhile, international partnerships are seen as crucial to global competitiveness, offering benefits such as market expansion, technology transfer, talent development, enhanced ecosystem reputation, and alignment with global challenges.

The third dimension explored in the survey is policy and regulation. Respondents were asked which policy measures would most effectively support science park success in Thailand over the next 10 years. The survey results, presented in figure 3. The most frequently cited priority is streamlining the regulatory framework for emerging technologies. This is closely followed by increased public funding for collaborative research, and tax incentives for R&D and innovation, along with global engagement and market access. Workforce development is also seen as an important factor, reflecting the need for skilled talent to sustain long-term innovation. While promoting inclusive and sustainable innovation and improving infrastructure are also recognised, they are considered slightly less critical in comparison.

Overall, the survey highlights a strong focus on fostering innovation through regulatory improvements, expanding financial support for R&D, and strengthening global connectivity. While workforce development remains a key priority, traditional infrastructure investments and intellectual property protection appear to be lower on the policy agenda for respondents.

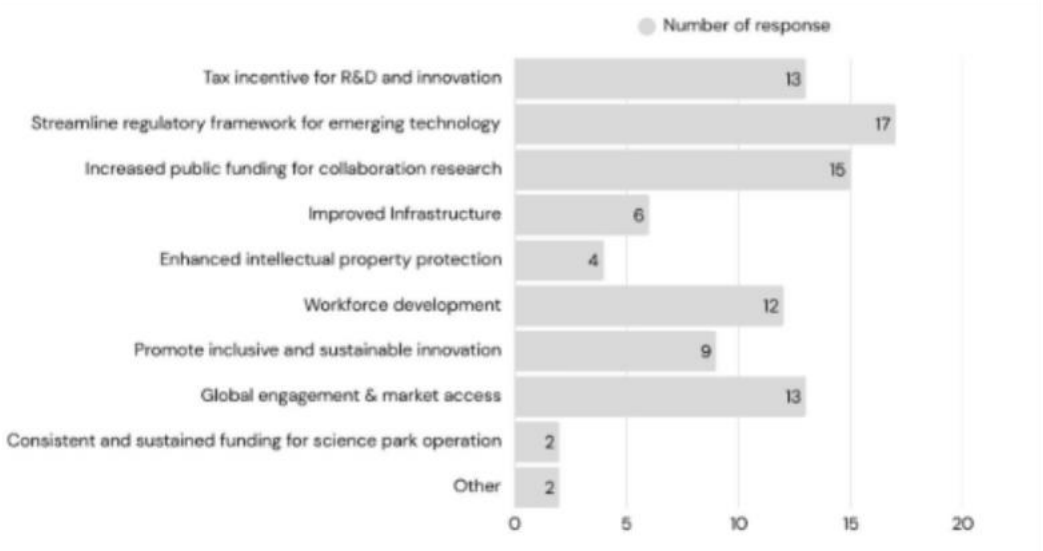

Figure 3: The survey response on policy measures that will most effectively support STP success in Thailand over the next 10 years

The fourth dimension explores in the survey is key trends and key technologies that anticipated to have the impact on science park development over the next decade. The survey responses on key trends that anticipate having the greatest impact on science parks development in the next 10 years is shown in Figure 4 (to the left). Respondents agree that technology advancement and sustainability will be the most influential factors, emphasising the need for innovation-driven growth and responsible development. Environmental and economic shifts follow closely, highlighting expected structural transformations driven by climate concerns and market realignments.

In terms of key technologies, the survey results, presented in Figure 4 (to the right), indicate that artificial intelligence, biotech/life sciences, and advanced healthcare will have the most significant impact on science park evolution. Followed by renewable energy and digital convergence (IoT/cloud technologies).

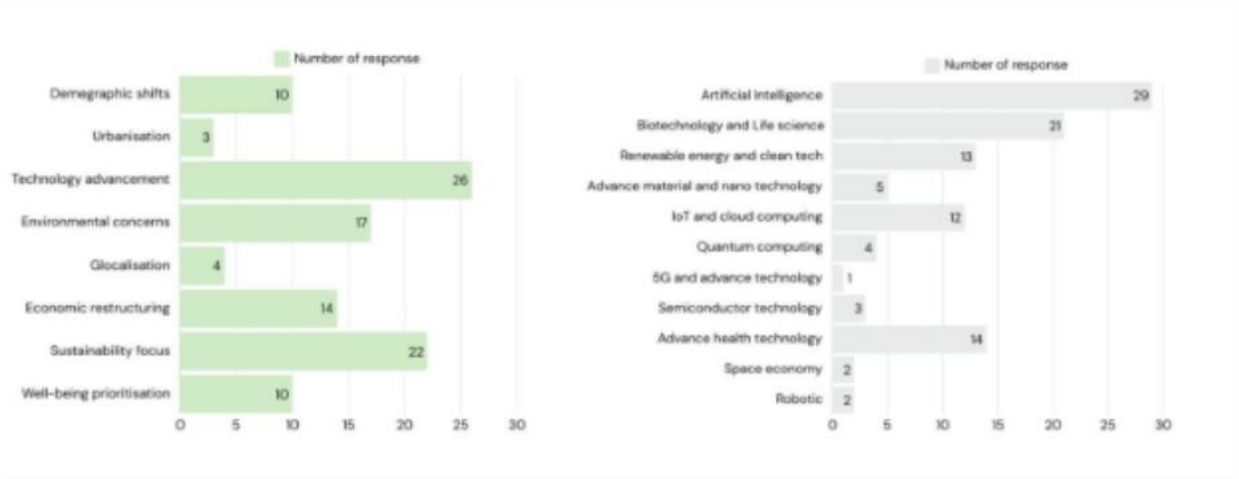

Figure 4 Left: The survey responses on key trends that anticipate having the greatest impact on science parks development in the next 10 years Right: The survey responses on key technology that anticipate having the greatest impact on science parks development in the next 10 years.

The fifth dimension explores in the survey is challenges and external uncertainties that limit the growth and impact of science parks in Thailand: In terms of challenges affecting science parks development, survey responses identify several critical internal challenges that may hinder the growth and impact of science parks over the next decade:

1. Talent and leadership – A shortage of specialised professionals, lack of strategic management skills, and uncompetitive HR policies weaken the leadership capacity of science parks.
2. Governance and policy – Conflicting missions, bureaucratic inefficiencies, and the absence of clear long-term roadmaps.
3. Funding and resources – Heavy reliance on government grants, limited private sector investment.
4. Collaboration gaps – Weak linkages among universities, industry, and communities lead to fragmented innovation ecosystems and missed opportunities for synergy.
5. Cultural and mindset barriers – A predominantly academic-driven focus, rather than an entrepreneurial and market-oriented approach, limits commercialisation and industry engagement.

Beyond internal challenges, respondents highlight three external uncertainties that will influence the trajectory of science parks in Thailand:

1. Technological disruption – Balancing the adoption of emerging technologies such as AI, quantum computing, and biotech while managing resource constraints.
2. Global economic and trade volatility – Navigating market fluctuations, trade barriers, and geopolitical risks that could impact foreign investment and collaboration.
3. Climate and environmental pressures – Integrating sustainability and resilience into science park strategies to address climate-related challenges.

In summary, the response shows that science parks face significant internal hurdles, including talent gaps, funding limitations, and a predominantly academic mindset, hindering their growth and impact. Coupled with external uncertainties like technological disruption, economic volatility, and climate pressures. These results align with other dimensions posed in the previous section.

The final dimension explores in the survey is key recommendations and future steps for enhancing the success and global competitiveness of science parks in Thailand over the next 10 years. Survey respondents were asked to (1) identify the most critical success factors (2) indicators for measuring impact, and (3) provide final recommendations for strengthening science park development. On critical success factors, survey responses highlight five key success factors that will shape the future trajectory of science parks in Thailand:

1. Talent & management expertise – Investing in capable teams at all levels to drive innovation and growth.
2. Policy alignment, agile governance and funding consistency – Ensuring stable policies, regulatory clarity, and sustained financial support.
3. Measurable impact – Demonstrating tangible economic, societal, and technological contributions.
4. Integrated ecosystem & collaboration – Strengthening partnerships between universities, industry, government, and global networks.
5. Branding & global positioning – Showcasing successes to attract international partners, talent, and investors.

Further, we have a look on indicators that would measure the impact of science park in the next decade, respondents identified the following five key indicators of science park success:

1. Economic and social impact – Measured by startup creation, investment levels, and GDP contribution including community engagement and sustainability initiatives.
2. Innovation related outputs – Including intellectual property (IP), R&D commercialisation, and number of deep-tech developments.
3. Entrepreneurial ecosystem – Evaluating incubation success, spin-offs, and global reach.
4. Human capital and service quality – Assessing skill development, talent retention, and operational efficiency.
5. Network strength – Tracking domestic and international partnerships that enhance global connectivity.

Finally, we look for key recommendations, survey respondents identified four key recommendations to strengthen science park development:

1. Define clear strategy and goals – Establish well-defined missions and measurable targets to guide long-term growth.
2. Maintain policy consistency & flexibility – Reduce policy instability, streamline regulations, and ensure sustained funding cycles.
3. Strengthen cross-sector collaboration – Enhance alignment between stakeholders, break down silos, and establish shared KPIs for impact measurement.
4. Invest in talent and organisational skills – Foster a future-oriented mindset, develop human capital, and cultivate a service-driven culture.

Although promoting specialised science parks was also suggested, these core recommendations emphasise strategic alignment, collaboration, human capital, and policy stability as essential for the continued success of Thailand's science parks

CONCLUSION AND POLICY RECOMMENDATIONS

When conducting foresight exercises, we often focus on what will change over time, but equally important is identifying what remains constant. Our survey results confirm that the fundamental value of science parks as intermediaries driving innovation will endure, though stakeholder expectations for outcomes and impact will significantly intensify. As Etzkowitz and Leydesdorff analogy[7], science parks function like a "black box" - their underlying mechanisms can be redesigned and adjusted to fit specific contexts, varying by place and time, while maintaining their essential purpose. Drawing together insights from the survey, this study reveals that future science parks in Thailand will revolve around three core pillars: innovation engines, collaborative hubs, and drivers of sustainability. These institutions will evolve into powerhouses of deep-tech commercialisation, global partnerships, and solution-oriented ecosystems.

To successfully transform science parks into globally competitive, five key policy recommendations emerge. First, stakeholders must define clear strategies and goals by establishing structured roadmaps that align science park development with national innovation priorities and measurable targets. Second, ensuring policy consistency and flexibility is essential to streamline regulatory frameworks, stabilise funding mechanisms, and foster environments that encourage public-private R&D investment. Third, strengthening cross-sector collaboration requires enhancing university-industry-government linkages, incentivising knowledge transfer, and integrating science parks into international innovation networks. Fourth, investing in talent and organisational skills means developing future-ready human capital and modern management practices that enhance leadership capabilities and operational efficiency. Finally, strengthening branding and accessibility requires not only showcasing success stories to attract global partners but also increasing public awareness of science parks' roles. Targeted outreach should make them more accessible to local entrepreneurs while positioning them as inclusive innovation hubs and premier global destinations.

While our foresight-based survey provides valuable insights, we recognise that further validation through workshops and scenario planning would strengthen findings and generate more concrete action plans. The contribution of this paper offers a transferable framework for other countries with similar contexts.