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INSTITUTE FOR PUBLIC POLICY 公共政策研究院
Innovation for Global Leaders

Building a World-Class Innovation District in Northern Metropolis : The Role of University Cluster Magnets

打造北部都會區成為世界級創新區：構建大學創科核心驅動圈

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Executive Summary

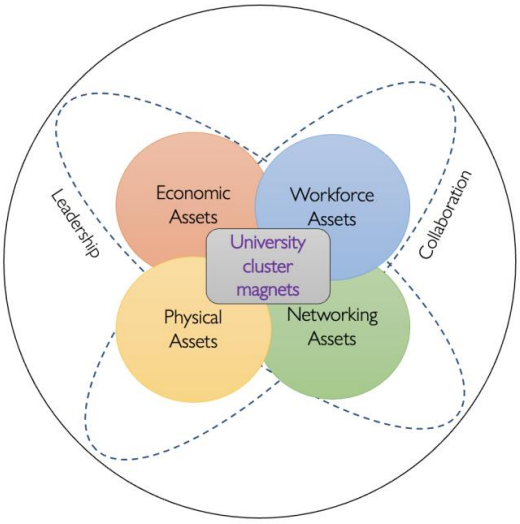
The Northern Metropolis Development Strategy put forth by the Hong Kong SAR Government represents one of the largest-scale development programs in recent decades. Its design and implementation will exert strategic impact on the long-term socioeconomic development of Hong Kong and the broader Greater Bay Area. One key vision of the Northern Metropolis is the development of San Tin Technopole, which is positioned to be an international hub for innovation and technology (I&T). With 627 hectares of allocated land, the San Tin Technopole has enormous potential to become a world-class innovation district that empowers the development of I&T sectors and facilities of various scales, as well as creates a vibrant community for living and working. Building such an innovation district will be of strategic importance for Hong Kong to enhance the I&T ecosystem and promote "new reindustrialization". In order to inform government planning, this study employs a mixed-method approach to put forward six actional policy recommendations.

Key findings

Principles of a world-class innovation district	- Four key assets as starting ingredients: economic, physical, networking, and workforce assets - The design and implementation of effective asset-based strategies under a collaborative governance approach - The clustering of innovative sectors and research strengths - Efforts in promoting diversity, inclusion, and collaboration
Strengths of I&T development in Hong Kong	- A high level of internationalization - Strong national support - Strong R&D capabilities - An attractive business environment - The geographical proximity to mainland China
Challenges of I&T development in Hong Kong	- A severe shortage of land supply - High costs of living and starting a business - Difficult to attract and retain talents - Relatively low commercialization of R&D results - Insufficient university-industry collaboration
Unique opportunities for Northern Metropolis to build an innovation district	- Large pieces of allocated land that enables the development of I&T sectors and facilities of various scales - Geographical proximity to Shenzhen that provides easy access to resources and talents across the boarder - Strong government support that facilitates the design of targeted strategic planning and policies

The proposed analytical framework

Synthesizing the vast literature, international cases, and in-depth interviews, we propose the concept of ***university cluster magnets*** (大學創科核心驅動圈) as a new asset-based strategy for the Northern Metropolis innovation district. University cluster magnets are defined as the geographically concentrated nodes centered around anchor research institutions to strengthen university-industry collaboration, enhance research impact, and attract global talents. While Hong Kong has limited experience in developing the I&T sector, it is well positioned as a regional education and research hub with world-class universities and strong R&D capabilities. In order to establish clear competitive advantages of the Northern Metropolis, it is critical to unleash the potential of universities and other research institutions to foster university-government-industry partnership and drive I&T development.



Analytical framework of this study

Policy recommendations

1.	Establish university-led mega innovation hubs with shared R&D platforms
2.	Set up state-of-the-art research infrastructure and facilities
3.	Allocate earmarked funding for I&T research and collaboration
4.	Create a high-level organizational authority for I&T development
5.	Implement creative networking programs to foster an innovative community
6.	Provide up-to-date amenities to support R&D activities and attract global talents

Introduction

Innovation and technology (I&T) are increasingly seen as key drivers for sustainable economic growth and core pillars to build a world-class, knowledge-based economy. Given the urgent need for Hong Kong to upgrade and transform traditional industries, it is of unprecedented importance to strengthen I&T capabilities in order to develop high value-added industries and promote economic diversification (Innovation, Technology and Industry Bureau, 2022). Developing I&T will also create a significant number of high-quality jobs, which will help attract global talents to Hong Kong. Furthermore, the strategic positioning of the Greater Bay Area as an international I&T hub has created valuable opportunities for Hong Kong to leverage its unique status and integrate resources from both sides to propel collaborative innovation (Hong Kong SAR Government, 2022).

Against this background, the Northern Metropolis Development Strategy was released by the Hong Kong SAR Government in 2021, with one of the key missions being the making of San Tin Technopole as Hong Kong's Silicon Valley. Achieving this ambitious goal undoubtedly requires detailed and careful planning to implement tailor-made policies and ensure effective utilization of resources. It is also worthy to learn from the past lessons and good practices of innovation districts worldwide. With an aim to inform policymaking in I&T development in Northern Metropolis, this study employs a mixed-method approach with comparative cases studies and in-depth interviews to synthesize global evidence, identify the strengthens and challenges of Hong Kong's I&T development, and explore the possibilities of building a world-class innovation district in Northern Metropolis. Based on these findings, this report puts forth a series of practical policy recommendations that are centered around leveraging the strong capabilities of world-leading universities.

Research objectives

- To assess the strengths and barriers of I&T development in Hong Kong.
- To identify regional and global good practices of innovation districts and reveal the key determining factors.
- To examine the opportunities for Northern Metropolis to build a world-class innovation district and the role of universities in this process.
- To advise on the measures needed to leverage Hong Kong's strengths to promote the development of an international I&T hub in Northern Metropolis.

Background

Overview of I&T development in Hong Kong

The Hong Kong SAR Government has long emphasized the importance of developing the I&T industry. The blueprint of I&T development in Hong Kong has been mapped out since

the 1998 Policy Address, which promoted fundamental policy measures including setting up the Innovation and Technology Fund (ITF), establishing R&D centers, and building the Hong Kong Science Park and Cyberport. In the ensuing years, successive governments continued the effort in supporting the I&T industry. In 2006, five R&D centers were set up to foster applied research in selected areas and promote commercialization of R&D results. The Innovation and Technology Bureau was established in 2015 (re-titled as the Innovation, Technology and Industry Bureau in 2022) to become a high-level government authority designated for I&T development. The 2018-19 Budget further pinpointed four targeted areas, namely biotechnology, artificial intelligence, smart city, and financial technologies.

Notably, the National 14th Five-Year Plan explicitly stated the central government's support for Hong Kong to develop into an international I&T hub. This mission is also among the top priorities of Chief Executive John Lee, who has made bold decisions to advance the I&T industry. As highlighted in the latest Hong Kong I&T Development Blueprint, future effort will be centered around four broad directions: 1) to enhance the I&T ecosystem and promote "new industrialization"; 2) to enlarge the I&T talent pool; 3) to promote digital economy and smart city development; and 4) to strengthen Hong Kong's integration into the overall development of China. Accordingly, eight strategies have been designed to realize these goals. More follow-up actions are expected to be carried out in the coming years.

Over the past decade, the Hong Kong SAR Government has made significant investment into the I&T sector. As shown in Figure 1, the total gross domestic expenditure on R&D (GERD) has increased by more than two-fold since 2010, reaching HK$27 billion in 2021. Within total GERD, the amount funded by the government also doubled within the same period and accounted for more than half of the total expenditure in 2021. GERD as a ratio to GDP gradually increased from 0.75% in 2010 to 0.97% in 2021. In addition, funding support from the Innovation and Technology Commission (ITC) has considerably increased since 2020, and the number of applied R&D projects funded rose steadily from 2017 to 2021 (Figure 2). Apart from increasing government input, several other key factors also contributed to Hong Kong's I&T development, including a high level of internationalization, a world-renowned free economy, a strong capability in R&D, and a decent business environment.

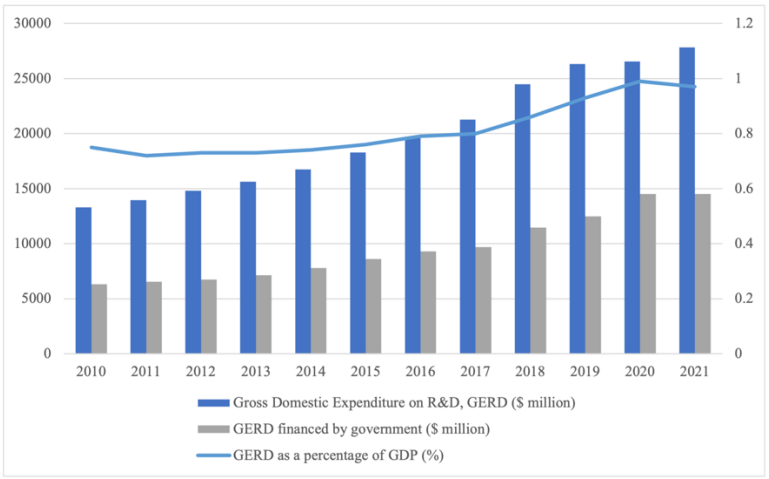


Figure 1. Gross Domestic Expenditure on R&D of Hong Kong (2010-2021)

Source: Hong Kong Census and Statistics Department (2022)

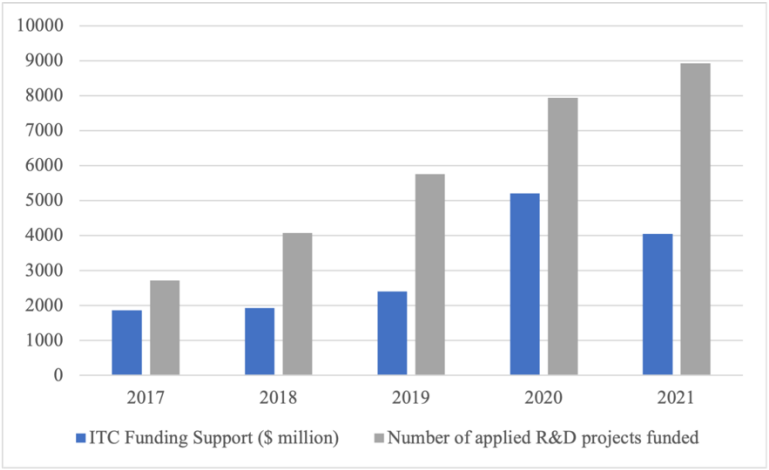


Figure 2. Funding support from the ITC (2017-2021)

Source: Hong Kong Census and Statistics Department (2022)

With these efforts, Hong Kong has made gradual progress in the I&T sector. As reported in Figure 3, the number of patents granted has shown an overall increase since 2016, reaching a peak of 15,346 in 2021. Local startups are flourishing, growing from less than 2,000 in 2016 to nearly 3,800 in 2021. The number of R&D personnel also showed an upward trend, rising from 31,282 to 37,455 over the same period. In 2022, Hong Kong ranked 9th globally in the World Digital Competitiveness Ranking and 2nd in the "technology" domain (IMD, 2023).

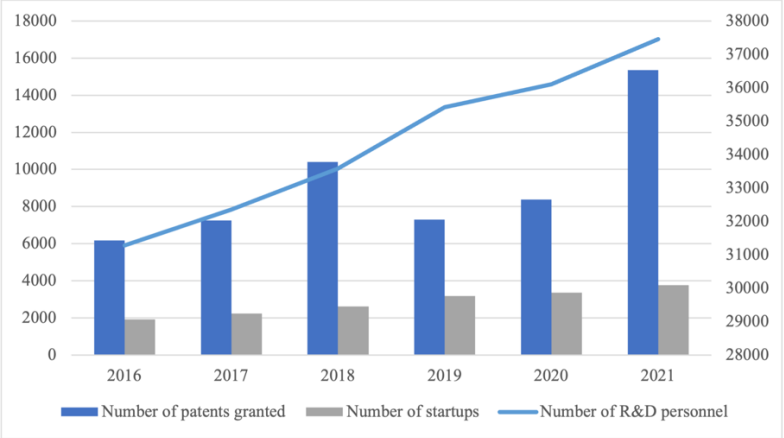


Figure 3. Key statistics of I&T development in Hong Kong (2016-2021)

Source: Census and Statistics Department (2022); StartmeupHK (2023)

Notwithstanding the achievements made, Hong Kong also encountered notable challenges that hindered sustainable I&T development. While the number of R&D personnel has steadily increased, Hong Kong is still short of talent supply. The number of R&D personnel per 1,000 population in Hong Kong was 4.9 in 2020, strongly lagging behind the figures of 8.1 in Singapore and 8.6 in South Korea (Legislative Council Secretariat, 2022). Despite the fact that Hong Kong is home to several top-notch research universities, the commercialization of R&D outcomes is yet satisfactory and university-industry collaboration remains limited. Furthermore, severe land shortage has also impeded the provision of necessary I&T infrastructure. In order to build up the I&T ecosystem and promote "new industrialization", it is crucial for the government to step up efforts to address these challenges.

The Northern Metropolis Development Strategy

The Northern Metropolis Development Strategy is a mega government-led project proposed by the former Chief Executive Carrie Lam and taken forward by the current Chief Executive John Lee. With a vision to become a new metropolitan area in Hong Kong that is ideal for living and working, the Northern Metropolis is planned to cover 30,000 hectares of land in Yuen Long District and North District, including Tin Shui Wai, Yuen Long, Fanling, Sheung Shui and neighboring areas. The geographical proximity to Shenzhen will also significantly enhance cross-border integration and strengthen Hong Kong's connections with the GBA.

A highlight of this mega plan is the development of the San Tin Technopole (Figure 4). Located at the heart of Northern Metropolis, the San Tin Technopole is positioned to be an international I&T hub and a vibrant community. It is expected that the technopole will cover a development area of 627 hectares, comprising of an I&T park and a town center. The I&T

park will provide a considerable amount of land (300 hectares) with land parcels of different sizes to accommodate varying types of I&T activities. Supporting measures such as flexible zonings and diverse means of land disposal will be employed to cater to various development needs. The town center is planned to become a self-sufficient community with public and private housing units and comprehensive facilities. In sum, the I&T park and San Tin town center will provide more than 50,000 flats and 165,000 job opportunities, which will greatly improve home-job balance in the New Territories.

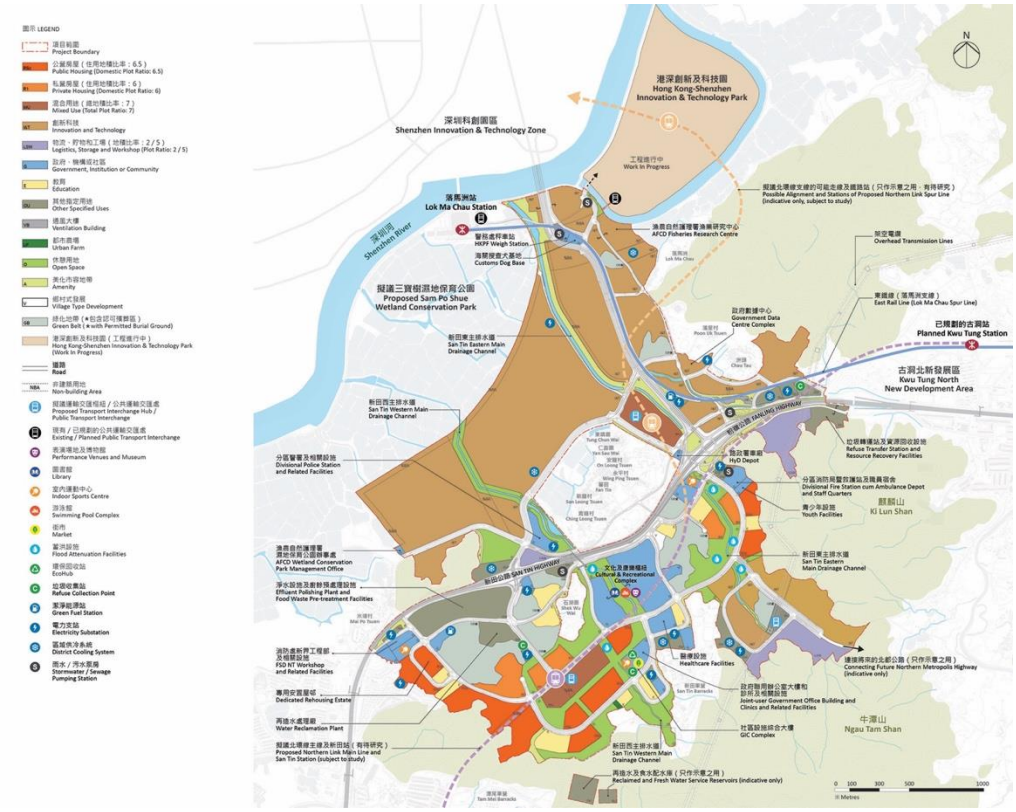


Figure 4. Land use proposal of San Tin Technopole
Source: Legislative Council (2023)

Apart from I&T development, the Northern Metropolis also aims at strengthening local and cross-boundary transportation, increasing housing supply, and supporting the construction of new development areas. In addition, environmental conservation and eco-tourism will be promoted, such as preserving wetlands and building conservation parks. It is expected that with its unique advantages, the Northern Metropolis will have great potential to become an international I&T hub and serve as the second economic engine for Hong Kong.

Innovation district: a strategic approach to I&T development

An innovation district is commonly defined as "the geographic area where leading-edge anchor institutions and companies cluster and connect with start-ups, business incubators, and

accelerators" (Katz and Wagner, 2014). It is "a localized hub of an innovation ecosystem" within a town or city that is dedicated to promoting innovative activities, thus boosting the growth of high-quality firms and jobs in competitive markets (Lawrence et al., 2019). Unlike conventional science parks that are spatially isolated, innovation districts are distinctive in the physical landscape that serves to create a diverse, open, and connective environment (Vey et al., 2018). They are usually comprised of various mixed-use buildings, shared facilities, and public spaces. This highly level of density and proximity can further facilitate the creation of new ideas and relationships, thereby fueling greater economic growth. From the perspective of urban development, building an innovation district is also an effective strategy to regenerate an under-performing downtown area into a modernised hub for technology-driven activities and a desirable community for living and working" (Morisson, 2020).

A number of critical factors for building successful innovation districts have been pointed out by previous studies:

- Wagner et al. (2017) put forward 12 principles based on their experiences and on-site observations of innovation districts, including the "clustering of innovative sectors and research strengths" as the backbone and the "melding of disparate sectors and disciplines" as an essential element. Key features such as diversity, connectivity, proximity, and inclusion were considered as guiding principles. They also highlighted the importance of a collaborative approach to governance, which referred to a bottom-up horizontal governance model responsible for identifying assets, designing strategic initiatives, managing public space, and evaluating progress.
- From an asset-based perspective, Katz and Wagner (2014) stated that in order to reach the full potential of innovation districts, decision-makers must deploy a set of asset-based strategies that leverage a district's economic, physical, and networking assets. They must also build a strong governance model to guide their growth.
- Based on in-depth interviews with experts from a number of successful innovation districts worldwide, Webster and colleagues (2021) concluded 5 fundamental elements of a qualified innovation district: 1) access to talent and research output from leading universities; 2) good transport connectivity; 3) flexible accommodation; 4) proximity and density; and 5) access to the services of innovation.
- In addition, studies analysing regional cases in Australia, UK and USA have emphasized the significance of early strategic planning (WPI Economics, 2020), qualified workforce (Baily and Montalbano, 2018), and the role of universities in promoting social integration, collaboration, and knowledge exchange (Pancholi et al., 2020).

Analytical Frameworks

One of the most fundamental frameworks of innovation districts is the innovation ecosystem proposed by Katz and Wagner (2014). They argue that innovation districts are comprised of three essential assets, namely economic, physical, and networking assets. To unleash the full potential of innovation districts, a series of asset-based strategies must be formulated to create synergies between the assets and build up an innovation ecosystem (Figure 5).

- **Economic assets** refer to the firms, institutions and organizations that perform innovative activities and foster an innovation-rich environment. They typically include large firms, startups, research institutions, and incubators.
- **Physical assets** are the public and privately owned spaces that are functioned to promote connectivity and collaboration. They help increase face-to-face encounters, strengthen social networks, and create vibrant environments for residents. The ways physical assets are allocated and utilized determine the quality of place in innovation districts and underpin the ability of a district to leverage its advantage.
- **Networking assets** are the relationships between actors that potentially generate and facilitate the advancement of knowledge. Broadly speaking, networking assets can be classified into formal and informal networks. Formalised networks can be seen as the "strong ties" which take place within the same sector or discipline, such as structured network events and training sessions. Informal networks across sectors are often referred to as "weak ties," including casual gatherings and community activities.

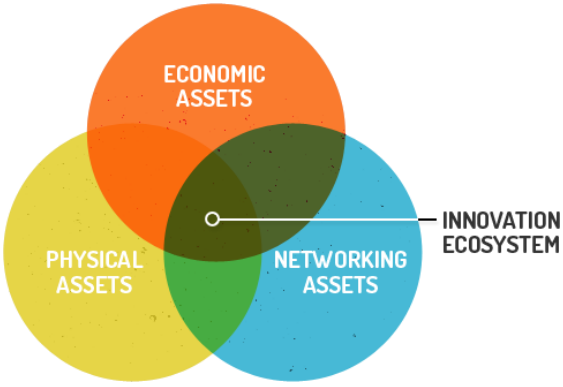


Figure 5. The innovation ecosystem framework (Katz and Wagner, 2014)

Based on the above framework, this study proposes a new framework to analyze the development of a world-class innovation district in Northern Metropolis. As illustrated in Figure 6, the core element is the concept of ***university cluster magnets*** (大學創科核心驅動圈), which is defined by this study as the geographically concentrated nodes centered around anchor research institutions to strengthen university-industry collaboration, enhance research impact, and attract global talents. Empowering strong research universities to take a central

role would be an effective strategy to establish clear competitive advantages of an innovation district. The four helices in the center represent the four critical assets that form the cornerstone of an innovation district. Built upon the economic, physical, and networking assets of the innovation ecosystem, this framework further incorporates the dimension of workforce assets, which concerns the quantity and quality of the workforce, as well as the mechanisms for selecting, employing, training, and retaining talents. Leveraging advantages of the four assets requires effective collaboration and leadership, which are presented in dotted lines surrounding the helices. The background represents the boarder context that shapes the environment for innovation districts to grow, including economic, political, societal, and spatial factors.

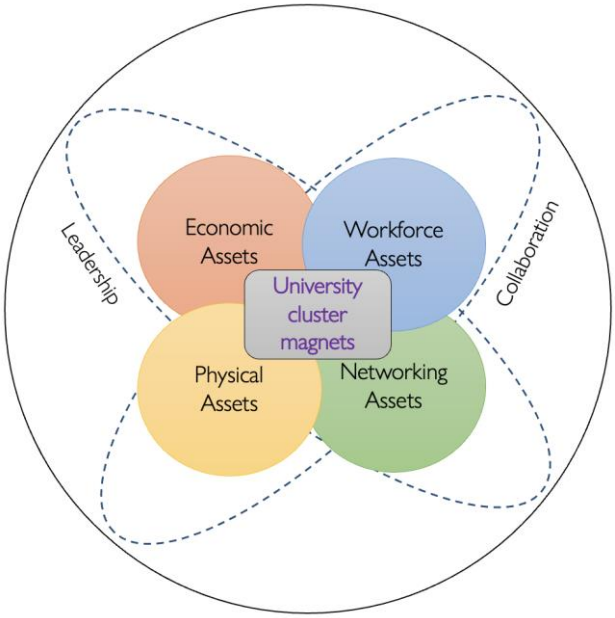


Figure 6. Analytical framework of this study

Research Methodology

Comparative case studies

This research is based on an explicit qualitative approach. Comparative case studies were first conducted to examine global practices of and key factors for building a successful innovation district. A total of 13 innovation districts were selected based on applicability and availability. As shown in Table 1 below, the cases covered eight countries in Asia, North America, and Europe. Relevant data were collected from secondary sources, including official websites, news reports, policy documents, and gray literature. Insights generated from the comparative case studies served to construct a thorough understanding of innovation districts, develop questions for in-depth interviews, and inform our policy recommendations.

Table 1. Innovation districts selected for comparative case studies

Name	City/Area	Country
Zhongguancun	Beijing	China
Zhangjiang Hi-Tech Park	Shanghai	China
Guangming Science City	Shenzhen	China
Jurong Innovation District	Singapore	Singapore
Yokohama Bay Area	Yokohama	Japan
Tsukuba Science City	Tsukuba	Japan
Daedeok Innopolis	Daejeon	South Korea
Be'er Sheva Innovation District	Be'er Sheva	Israel
Silicon Valley	Northern California	United States
Research Triangle Park	North Carolina	United States
Imperial West	London	United Kingdom
Harwell Science and Innovation Campus	Oxford	United Kingdom
Innovation District Zuidas	Amsterdam	Netherlands

In-depth interviews

In order to gauge different views on I&T development in Northern Metropolis and further consolidate our findings, 30 in-depth interviews with key stakeholders were conducted from May to July 2023. Purposive and snowball sampling were employed to recruit participants. As shown in Table 2, the interviewees represented a variety of sectors, including I&T companies, start-ups, Hong Kong universities, the Legislative Council, consultancies and banks, government agencies and non-profit organizations.

Table 2. Distribution of interviewees by sectors (n = 30)

Sector	Frequency	Percentage (%)
University	10	33
I&T company	6	20
Legislative Council	5	17
Consultancy and bank	4	13
Start-up	2	7
I&T related non-profit organization	2	7
Government agency	1	3

The semi-structured interviews consisted of three broad sections: 1) the respondents' understanding of I&T development in Hong Kong; 2) their knowledge and views on the Northern Metropolis development strategy; and 3) their feedback on the findings and policy recommendations proposed by this project (see Appendix for the list of interviewees and the

interview guide). Verbal or written consent was sought from respondents prior to each interview, and they were assured of data confidentiality. The majority of interviews took approximately 60 minutes and were conducted either face-to-face or online via Zoom. The research team members took notes during the interview and prepared the transcripts through typing and handwriting. Three interviews were conducted in written form, with respondents providing answers to a list of open-ended questions. Apart from qualitative data, quantitative data from open-source domain were also collected to support and validate our findings.

Analysis and Findings

Economic assets

- Economic assets are fundamental elements of an innovation district, performing day-to-day innovative activities and propelling economic growth. Although global innovation districts generally encompass a mix of innovation drivers, this analysis will mainly focus on R&D related economic assets.
- A core part of such assets is the presence of universities as anchor research institutions. Many well-known innovation districts, such as Zhongguancun and Silicon Valley, are based on R&D clusters centered around one or more leading universities. Another major form of economic assets boosting R&D capabilities is research hubs, including but not limited to national research centers, joint research labs, and shared research platforms. As shown in Table 3, they play a significant role in advancing research, fostering collaboration, and attracting talents and companies.

Table 3. Research hubs in Zhongguancun and Tsukuba Science City

	Zhongguancun, Beijing, China	Tsukuba Science City, Tsukuba, Japan
Total area	4,880 hectares	2,840 hectares
Specializations	Advanced manufacturing, modern transportation, new materials	Life sciences, high energy physics, telecommunication, biomedical sciences
Research hubs	• 112 State Key Laboratories • 206 national research institutes • 243 joint open labs with research institutions and enterprises • More than 40 universities	29 national research and education institutions, including: • Japan Aerospace Exploration Agency • National Institute of Advanced Industrial Science and Technology • University of Tsukuba
Talent and enterprise attraction	• Over 970,000 researchers • 466 listed companies • 102 unicorns	• Over 20,000 researchers and students • 8,000 PhD holders • Residents from 140 economies

	Zhongguancun, Beijing, China	Tsukuba Science City, Tsukuba, Japan
	• More than 300 regional headquarters and R&D centers of MNCs	• More than 100 private research centers of local enterprises and MNCs
Achievement	33.3% of local GDP in 2021	4 Nobel-Prize winners

- In order to further enhance research impact and promote commercialization of R&D results, innovation districts worldwide have also developed diverse forms of university-industry partnerships to maximize the utilization of resources and expertise on both sides (Figure 7).

Silicon Valley, Northern California, USA	Jurong Innovation District, Singapore
Corporate Sponsored Senior Projects Program	The Bosch Rexroth Regional Training Center
• To foster relationships between the Baskin School of Engineering at UC Santa Cruz and Silicon Valley business companies • Corporate Sponsors collaborate with faculty to design high-value projects. • Students participate in the projects as part of graduation requirements. • Corporate sponsor can receive intellectual property rights to the results developed by students.	• To drive the adoption of advanced manufacturing technologies and develop highly-skilled workforce for industry • A joint collaboration between Bosch Rexroth, Singapore Polytechnic, and government agencies • Certified training courses for industry specialists focusing on Bosch Rexroth technologies and taught by experts from Singapore Polytechnic

Figure 7. University-industry partnerships of Silicon Valley and Jurong Innovation District

- To leverage the advantages of university cluster magnets' strong research capabilities, a number of interviewees showed positive views towards setting up diverse forms of research hubs as a way of fostering R&D collaboration and commercialization.

Quotes from interviewees

"Merely establishing offices for universities may not be a good solution. Each university possesses unique research strengths, so I think a more feasible approach could be to establish joint research laboratories that facilitate inter-university collaboration. This could involve providing dedicated spaces for professors from different universities to collaborate and conduct research together."

Senior Legislative Council Member

"Many cities in Mainland China have established translational research institutes, and I strongly advocate for the implementation of similar initiatives in the Northern Metropolis. Our universities have placed too much emphasis on publishing academic papers, establishing translational research institutes or joint laboratories would be a promising opportunity to facilitate the transformation of basic research into translational research."

Professor-in-charge of research and innovation at a local university

Physical assets

- Research infrastructure and facilities play an indispensable role in the physical assets of innovation districts. State-of-the-art equipment and facilities empower high-level research and significantly drive innovation. They also provide opportunities for collaborative projects between universities and industry. In addition, advanced research facilities are highly beneficial for attracting outstanding talents. Consequently, in order to create a competitive advantage in research innovation, an increasing number of innovation districts have heavily invested in science and research infrastructure. As reflected in Table 4, the synchrotron light source facilities in Shanghai Zhanging Hi-Tech Park and Oxford Harwell Science and Innovation Campus have made remarkable progress in advancing scientific research and attracting global expertise.

Table 4. Zhangjiang Hi-Tech Park and Harwell Science and Innovation Campus

	Zhangjiang Hi-Tech Park, Shanghai, China	Harwell Science and Innovation Campus, Oxford, UK
Total area	2,826 hectares	300 hectares
Specializations	Information technology, biomedicine, artificial intelligence	Energy technology, health technology, space, quantum
No. of employees	400,000	6,000
No. of enterprises	24,000	120 startups and 220 organizations
No. of facilities	8 in use, 6 under construction	14
Landmark facility	Shanghai Synchrotron Radiation Facility (上海光源) • One of China's large research facilities with the highest number of users and most research output • Supported 15,000 projects from more than 3,100 research groups • 130 papers published in *Science*, *Nature*, and *Cell*	Diamond Light Source (鑽石光源) • One of UK's largest scientific facilities • Used by 14,000 researchers from academia and industry • Delivery of 12,000 journal papers • £2.6 billion impact on UK science and economy since 2007

Quotes from interviewees

"Why not establish inter-university collaborative facilities on a larger scale? We could create the best equipment in the world that serves as a central hub, utilizing a 'queen bee strategy.' When we have a 'queen bee', we will then attract tons of 'working bees' from all parts of the world. By identifying a key facility, we can cater to a wide range of research needs, resulting in numerous publications. This will attract overseas researchers and experts, ultimately leading to a significant boost in research and development in the district."

Professor-in-charge of knowledge transfer at a local university

- Besides state-of-the-art research facilities, other physical assets in the public realm also play a crucial role in providing support for the day-to-day innovative activities within innovation districts. Research-related amenities such as conference halls and innovation centres can greatly facilitate the promotion of research and education activities. Cultural and supportive amenities including sports centres, art museums, hospitals, and schools all contribute to the development of a vibrant and liveable community to attract and retain global researchers.

Case: Daedeok Innopolis, South Korea

Total area: **6,740** hectares

Number of talents: **86,140**

Research output: ranked **1st** in registered patents, technology transfers, and R&D expenditure among South Korea's six innovation districts

Public amenities:

- A **49,754** sqm Daejeon Convention Center that can accommodate **8,000** people
- A Korea Trade Exhibition Center capable of admitting **5,000** people
- Guesthouses for visiting researchers
- Cultural amenities such as the Daejeon Culture and Arts Center and the CMB Expo Art Halls

Quotes from interviewees

"To attract leading researchers to Hong Kong, it is imperative to consider developing a valley for world-class research. This not only entails providing world-class scientific facilities but also includes conference facilities and hotels that are exclusively available to scientists. This would provide a comprehensive solution to the needs of the scientific community."

Professor in computer science at a local university

Workforce assets

- Highly skilled workforce is fundamental to the continued growth and success of innovation districts. In this regard, leading universities within innovation districts often play a central role in cultivating talents by initiating education and training programs. Common practices include: 1) incorporating I&T elements into existing curriculums; 2) holding I&T-related conferences, events, and workshops; 3) partnering with businesses to establish internship and exchange programs; and 4) offering guidance and hands-on support for staff and students interested in entrepreneurship. Table 5 below lists a wide range of talent support programs led by anchor universities in Daedeok Innopolis in South Korea and White City Innovation District in the UK.
- Given the unique advantage of Hong Kong as having several world-class universities, many of our interviewees emphasized the importance of unleashing the potential of local universities to foster talent growth in I&T sectors.

Table 5. Talent training and support in Daedeok Innopolis and White City Innovation District

Daedeok Innopolis, Daejeon, South Korea	Korea Advanced Institute of Science and Technology	• Annual Innovation and Entrepreneurship Research Boot Camp for graduate students and early-career researchers • K-school program for integrating entrepreneurship into engineering curriculum • Joint-degree undergraduate and graduate programs with New York University focusing on engineering, AI, and business • Startup KAIST program offering training and support for faculty, students, and the public: 1,276 KAIST startups as of 2021 (69 by faculty and 1,007 by students)
White City Innovation District, London, UK	Imperial College London	• Internship opportunities for Imperial students at start-ups and scale-ups within White City • Imperial Venture Mentoring Service connecting staff and students with 75 successful entrepreneurs and investors • MedTech SuperConnector program supporting early career researchers to commercialize medical innovations

Quotes from interviewees

"In my opinion, talent acquisition is the most critical aspect of industrial parks, with hardware being secondary. Without a sufficient pool of qualified individuals, industries may not be inclined to move there. Therefore, all universities in Hong Kong should focus on attracting talents in diverse fields."

Professor-in-charge of R&D at a local university

"I strongly advocate for increased collaboration between universities and industries in fostering talents. Providing students with a diverse range of internship opportunities within companies in innovation districts would be highly advantageous for the industry."

Social entrepreneur in information and technology

- To facilitate talent acquisition, a variety of supporting policies have been widely adopted in innovation districts, such as talent housing and living subsidies. For the R&D workforce, research related subsidies, awards, training, and career support are also popular strategies. For example, the Guangming Science City in Shenzhen has implemented a series of attraction policies for researchers. The targeted talents are classified into 14 categories under three broad areas, namely basic research, commercialization, and innovation. Generous subsidies (up to one million RMB) are offered to outstanding young researchers receiving national research grants. In addition, more than 14,470 talent housing units were provided by 2022. With these efforts, the number of talents in Guangming Science City reached 178,000 in April 2023, which doubled the amount since its establishment in 2020. With regard to the high living costs in Hong Kong, the majority of interviewees also explicitly stated the need to provide residential support to attract non-local talents.

Quotes from interviewees

"The cost of living in Hong Kong is undoubtedly higher than in Shenzhen or other places. Accommodation is our most expensive expense. I believe that residential support is important for innovation districts to develop, and it is necessary to offer lower-than-market-rate prices to enable people to afford housing. We must avoid a situation where people can work in Hong Kong but cannot afford to live here."

CEO of a leading Hong Kong I&T company

Networking assets

- Networking assets are critical for creating an inclusive and connected innovation district. Leveraging on the economic, physical, and workforce assets, innovation districts are capable of designing and implementing a wide variety of networking programs. Synthesizing case studies and existing literature, this study classifies networking assets as having two main purposes: fostering internal networks and external networks. As illustrated in Figure 8, assets strengthening internal networks can be further categorized into within-sector and cross-sector networking, while those for external networks can be further classified into community engagement and outward connections.

- To create a research-intensive environment in university cluster magnets, a number of interviewees have pointed out the importance of strengthening networking assets to knit people together across different research disciplines, promote cross-fertilization of ideas, and create opportunities for new partnerships.

Internal networks		External networks	
			
Within-sector networking Industry and sector-specific associations, workshops, and events	**Cross-sector networking** Programs and events open to everyone in the innovation district	**Community engagement** Activities and programs involving local and neighboring residents	**Outward connections** Branding of I&T output and promotion of achievements
The Silicon Valley Leadership Group: A business association established in 1977 for connecting companies across the Silicon Valley region	**RTP180:** A live speaker series inviting members of the Research Triangle Park in North Carolina, USA, to discuss various topics	**The Maker Challenge Program:** A program for young local people at UK White City Innovation District to realize innovative ideas using technological tools	**The Zhongguancun Forum:** A high-level forum for I&T promotion and exchange at Zhongguancun in China

Figure 8. Classification and examples of networking assets

Quotes from interviewees

"Knowledge often comes from intensive interactions and an independent environment that allows some people to think in a crazy way. Creating an atmosphere where everyone can interact openly, easily, and intensively is essential. We have seen many successful cases where a university or a research institution attracts people to come in, but don't think that success can be achieved by merely constructing buildings. The creation of communities is essential."

Professor in entrepreneurship in a local university

"The universities and research institutions often require the hiring of young, skilled individuals who may not possess strong research networks. Instead, they seek out different and new partners to work on innovative projects. Therefore, the atmosphere and environment in which they work are crucial for their success."

Social entrepreneur in information and technology

Leadership and governance

- Collaborative governance models have been commonly adopted by innovation districts worldwide. The designated organizational bodies are typically comprised of members from a wide range of stakeholders, representing universities, companies, startups, non-profits, and government agencies. Besides designing policy agendas and managing the daily operations of innovation districts, key responsibilities of collaborative organizational bodies usually involve the enhancement of inter-university and university-government-industry partnerships. As shown in Table 6, in order to further promote commercialization of university research, a University Innovation Council was also established in the Research Triangle Park (RTP) to advice on practical solutions for promoting commercialization. In the case of managing Northern Metropolis, several interviewees have advocated for the establishment of a collaborative government authority dedicated to the development of the district.

Table 6. Governance models of the Research Triangle Park in North Carolina, USA

	Research Triangle Foundation	University Innovation Council
Year established	1959	2016
Organizational form	Non-profit	North Carolina Governor initiative
Leadership team	25 members of Board of Directors: • RTP universities: 9 (36%) • Large companies: 5 (20%) • Local companies: 2 (8%) • Start-ups and non-profits: 2 (8%)	24 members representing universities in Research Triangle Park, entrepreneurs, investors, and the state government
Missions	• Facilitate collaboration between RTP universities • Promote university-industry cooperation • Create an economic impact for residents of North Carolina	• Promote inter-university cooperation and encourage R&D commercialization • Define best practices for commercialization at North Carolina universities and put forward policy recommendations
Main responsibilities	• Manage and oversee the RTP • Invest in programs that foster collaboration and cultivate vibrant communities • Collect and evaluate feedback from RTP companies and communities	• Conducted a detailed survey on innovation commercialization challenges in North Carolina universities and offered six policy recommendations

Quotes from interviewees

"The problem now is that although the Chief Executive wants to do something, it needs to go through too many departments. For the Northern Metropolis, you must develop it in an innovative way. You need to empower an organization, like the Airport Authority or a Northern Metropolis Management Committee, and you need to trust it. All the government's plans can then be executed immediately. Otherwise, it would not be feasible if everything needs to be planned for a long time."

Senior Legislative Council Member

"I think it would be good to have a dedicated organization to develop the Northern Metropolis. Currently there is a Northern Metropolis Co-ordination Office, but specific tasks are still carried out by different bureaus and departments. In Nansha District in Guangzhou, for example, a development committee was established to involve representatives from relevant government agencies. Therefore, it has a strong ability to coordinate and act. I feel that the current organizational structure of Northern Metropolis is not innovative enough."

Senior urban planner

Policy Recommendations

1. Establish university-led mega innovation hubs with shared R&D platforms

To capitalize on Hong Kong's competitive edge in R&D and to bridge the transition from research to commercialization, we propose the establishment of three to four university-led mega innovation hubs in the Northern Metropolis. While these hubs will be spearheaded by leading universities, both local and international, they are envisioned as shared platforms co-created by both academia and industry.

Objective and Requirements: The objective herein pivots around establishing a holistic, shared ecosystem where R&D efforts are not merely academic exercises but are collaborative ventures with tangible socioeconomic impacts. This necessitates a shared platform where universities, industries, research institutions, startups, and governmental entities collaboratively navigate through the R&D journey, from conceptualization to commercialization, whilst mutually benefiting from shared resources, knowledge, and networks. Key requirements include the formation of a collaborative governance and operational model, infrastructural development, policy frameworks conducive to collaboration, financial sustainability, and a harmonized strategy that aligns with the unique aspirations and challenges of each participating entity.

Shared R&D Platforms: Central to this initiative is the concept of shared R&D platforms. These platforms will serve as collaborative spaces where universities and companies can exchange resources, expertise, and jointly undertake research projects. By providing access to cutting-edge facilities, these platforms will foster joint industry-academia projects and startups, effectively bridging the gap from research to real-world application. The clustering of I&T companies, startups, and research institutions in these hubs will further amplify university-industry collaboration and R&D commercialization.

Strategic Focus and Location: The hubs will prioritize sectors integral to Hong Kong's I&T trajectory, such as healthcare technology, biotechnology, new materials, and artificial intelligence. Given the large land available at San Tin Technopole, it is an ideal location for these hubs, accommodating both upstream research and midstream transformations like prototyping.

Leveraging on Existing Resources: The hubs will benefit from the extensive R&D capabilities of leading Hong Kong universities such as HKUST, CUHK, PolyU, and HKU. Strong connections will be made between the hubs and existing R&D institutes and platforms. Particularly, the Hong Kong Applied Science and Technology Research Institute (ASTRI) will bolster these hubs with its resources in applied research and strengths in technology transfer and commercialization. The Hong Kong Science and Technology Parks Corporation (HKSTP) can offer consultancy and operational support, drawing from their experience in the Science Park, and facilitate the collaboration between mega innovation hubs and the 28 research centres in InnoHK. In brief, these mega innovation hubs, grounded in the shared R&D platform concept, will be instrumental in driving Hong Kong's I&T advancements. By fostering a symbiotic relationship between academic institutions and industries, they will catalyze the transformation of research into tangible, real-world applications, reinforcing Hong Kong's position as a global I&T powerhouse.

Implementation and Timeline

Short-Term Actions (1-2 years)

- Committee Formation: Assemble a core committee involving stakeholders from academia, industry, and government to structure governance and operations.
- Land Allocation: Identify and allocate suitable land in the Northern Metropolis for the dedicated R&D platforms, with a spotlight on biotechnology.
- Pilot Projects: Launch discerning pilot projects that underscore collaborative gains from academic-industry-government partnerships.

- Digital Collaboration Platform: Develop and initiate a specialized digital platform, incorporating existing technological tools, to facilitate smooth collaboration and knowledge sharing.

Medium-Term Actions (3-5 years)

- Facility Construction: Erect state-of-the-art facilities tailored for advanced R&D, ensuring that they align with both existing and emergent I&T needs.
- Performance Assessment: Implement a robust mechanism to evaluate the functionality, impact, and efficacy of the research hubs and affiliated projects.
- Collaborative Projects: Inaugurate high-impact collaborative projects that drive forward both local and global I&T advancement.

Long-Term Actions (5-10 years)

- International Alliances: Forge and solidify alliances with global entities, entwining Hong Kong's R&D platforms with worldwide innovation networks and ensuring a reciprocal flow of ideas and technologies.
- Continuous Adaptation: Deploy a dynamic feedback and adaptation mechanism, ensuring that the shared platforms evolve harmoniously with both global and local I&T trends.
- Sustainable Innovations: Prioritize and amplify innovations that champion sustainability and social responsibility, aligning them with international market demands and global challenges.
- Global Positioning: Position and affirm Hong Kong's R&D hubs and innovations on the global stage, fortifying its leadership in targeted I&T domains, especially biotechnology.

New Policy Initiative for Consideration: The initiation of the "HealthTech Innovation and Development Initiative" (HIDI, 健康科技創新發展計劃), a potential policy initiative, could be considered. Designed to enhance Hong Kong's presence in the international health technology sector, the establishment of a comprehensive mega innovation hub might be pursued. The HIDI seeks to weave a synergistic tapestry of academia, industry, and research institutions, particularly leveraging the healthcare and biomedical engineering prowess of notable universities such as The University of Hong Kong and The Chinese University of Hong Kong. Firstly, collaborative R&D platforms should be established as crucibles of innovation where academic, industrial, and research capacities coalesce to facilitate the evolution of health technologies. Concurrently, infrastructural support, coupled with financial and policy mechanisms, should be provisioned to nurture startups and facilitate the scalability of established corporations within the health technology space. An additional pillar of the

HIDI will be dedicated to talent development and knowledge transfer, deploying workshops, skill development programs, and international collaborations to engender a skilled workforce adept at pioneering advancements in health technology.

2. Set up state-of-the-art research infrastructure and facilities

World-class research equipment and facilities are essential for innovation districts, serving as the backbone for groundbreaking research and large-scale collaborative projects. Our research underscores the indispensable role of these state-of-the-art infrastructures in attracting global talents, fostering university-industry collaboration, and amplifying the impact of research endeavors. Setting up advanced research infrastructures has been employed as a core development strategy in emerging innovation districts in the Greater Bay Area. As of September 2023, nine flagship facilities have been established in Guangming Science City in Shenzhen (SZ News, 2023).

Objective and Requirements: The primary objective transcends the mere provision of cutting-edge facilities; it aims to integrate these establishments into the local and global I&T matrix. Achieving this necessitates adherence to a set of requirements: 1) strategic alignment of facility specialization with current and emergent I&T developmental trajectories, 2) incorporation and optimal utilization of existing science and technology resources, 3) establishing a collaborative framework that enables engagement across academic, industrial, and governmental sectors, and 4) ensuring robust, sustainable, and adaptive operational and financial models to support the infrastructural ecosystem. Moreover, there is a requisite to harmonize these developments with existing facilities within the Greater Bay Area (GBA), thereby creating a cohesive and synergized infrastructural network.

Strategic Infrastructure Development: The Hong Kong SAR Government, leveraging the expansive land at San Tin Technopole, should prioritize the establishment of infrastructure tailored for cutting-edge research. The choice of these facilities should align with Hong Kong's I&T development trajectory and its unique strengths. Potential focal areas include humanoid robots, supercomputing centres, and advanced biomedical equipment. It is imperative to consider existing research facilities in the GBA to ensure synergy and avoid redundancy.

Leveraging on Existing Resources: A holistic development strategy involves a gap analysis of existing infrastructures across Hong Kong's universities, Science Park, and research entities. This ensures complementary development and deters duplication. Collaborative partnerships with universities boasting relevant research expertise will be instrumental. For instance, the development of AI and robotics facilities (I deleted the center's name because it is not

mentioned until the last paragraph "New Policy Initiative for Consideration") will benefit from collaborations with the Cheng Kar-Shun Robotics Institute at HKUST and the Artificial Intelligence and Robotics Lab at PolyU. Gleaning insights from the Research Grants Council will ensure alignment with Hong Kong's multifaceted research needs. Furthermore, the Applied Science and Technology Research Institute will offer invaluable technical acumen in designing these state-of-the-art facilities. In essence, the emphasis on world-class research equipment and facilities is not just about infrastructure; it is about positioning Hong Kong as a global nexus for innovation, attracting the brightest minds, and catalyzing transformative technological advancements.

Implementation and Timeline

Short-Term Actions (1-2 years)

- Pinpoint and commence immediate development in 1-2 priority technological areas, such as artificial intelligence and robotics.
- Promptly begin the construction and operationalization of initial facilities, strategically integrating existing S&T resources.
- Engage in early partnership and collaboration development, focusing on both international and local academia and industry interactions.
- Launch platforms and programs that stimulate collaboration and resource-sharing among academia, industry, and governmental bodies.

Medium-Term Actions (3-5 years)

- Inaugurate and begin operations in developed facilities, ensuring that they are equipped with advanced scientific equipment.
- Establish expert-driven management committees tasked with supervising operations and fostering international collaborations.
- Kickstart industry-specific projects and introduce talent acquisition and retention programs, emphasizing creating a thriving ecosystem within the established facilities.
- Implement a robust mechanism for managing and transferring intellectual property, thereby stimulating innovative activities.

Long-Term Actions (5-10 years)

- Engage in a continuous upgrade and expansion of facilities and projects to stay abreast with technological advancements and market needs.
- Strengthen international alliances with technological hubs and global entities to ensure continuous collaborative and innovative activities.

New Policy Initiative for Consideration: We suggest launch a new initiative titled "The Hong Kong Technological Beacon Initiative" (香港科創燈塔計劃). This initiative seeks to establish the Northern Metropolis as a hub for technological advancement and international collaboration by developing flagship facilities, such as an International Robotics Centre and Quantum Computing Hub, focusing on service robots, autonomous vehicles, and quantum algorithms, respectively. These facilities, aimed at attracting global talent and enterprises by offering open access to researchers worldwide, will be managed by a designated scientific committee under the Northern Metropolis Innovation Council (to be elaborated next). Funded by the government and potentially co-financed by the private sector, this initiative is designed to expedite the development and operationalization of crucial research infrastructure, serving as a nexus for R&D collaborations between Hong Kong-based entities and their international counterparts. Strategic financial allocations will prioritize projects that align with Hong Kong's I&T vectors, laying a robust foundation for future developments in San Tin Technopole.

3. Allocate earmarked funding for I&T research and collaboration

Government funding is of critical importance in fostering innovation and technology (I&T) research and collaboration, especially within the context of the mega innovation hubs and research facilities in the Northern Metropolis. While the Innovation and Technology Fund (ITF) currently offers six funding programs for R&D, only 16.5% of all approved funds in 2022 were dedicated to this cause (Innovation and Technology Fund, 2023). This underscores the need for a more substantial allocation to bolster I&T research and collaboration.

Objectives and Requirements: Firstly, the allocated funding should not merely serve as a financial propellant but should also act as a strategic magnet, pulling in high-quality R&D ventures. Secondly, the funding should also guarantee the germination and fruition of these initiatives, strategically aligning with the capabilities of the innovation hubs and research facilities. Third, comprehensive guidelines dictating the allocation, utilization, and evaluation of the funds need to be sculpted, ensuring financial potency is maximally leveraged.

Leveraging World-Class Facilities: The state-of-the-art research facilities and shared R&D platforms in the mega innovation hubs present an opportunity for targeted government funding. Earmarked funding schemes can be introduced to attract top-tier I&T research within university cluster magnets. Generous subsidies can be extended to joint R&D projects between universities and industries, especially those focusing on pilot implementation and small-batch manufacturing. Such joint R&D projects can either benefit from a new targeted funding scheme or be integrated into existing ITC programs as a primary research theme.

Leveraging on Existing Resources: The Innovation and Technology Fund should be augmented with a dedicated allocation for the Northern Metropolis, emphasizing collaborative R&D projects that bridge industry, academia, and international partners. Research themes relevant to I&T development in the Northern Metropolis can be incorporated into existing collaborative funding programmes, such as the theme-based Innovation and Technology Support Programme and the Partnership Research Programme. The Research Grants Council should offer insights on priority areas, identifying current research voids and emerging technologies. Co-funding models, encouraging private sector collaboration with matching contributions, will be explored.

Implementation and Timeline

Short-Term Actions (1-2 years)

- Establish a distinct budget for collaborative innovation, ensuring it is ample to support key development areas within the innovation sector.
- Identify and highlight priority domains that elevate Hong Kong's inherent I&T strengths, ensuring the chosen areas to be viable in short-term.
- Revise the current ITF structure, focusing on creating more straightforward, transparent, and supportive application, approval, and evaluation processes to allure quality research and collaborations.
- 為協同創新活动設立專項預算，確保有足夠的資金支持主要的發展領域。
- 確定能夠發揮香港既有創科優勢的重點領域，同時確保其在短期內的可行性。
- 完善現有的創新及科技基金架構，制定更加直接、透明和支持性更強的申請、審批和評估程序，以吸引高質量的研究與合作項目。

Medium-Term Actions (3-5 years)

- Implement and promote funding initiatives explicitly designed to bolster university-industry collaborations.
- Utilize a dedicated, transparently structured funding scheme focused on maximizing the potential of new innovation hubs and research facilities, ensuring they not only drive I&T progression but also encourage frequent and optimal use of the established infrastructure.
- Implement mechanisms to track and evaluate the impact and progress of funded projects, considering factors like private-sector engagement, achieved milestones, and overall impact on I&T advancements.

Long-Term Actions (5-10 years)

- Develop and refine funding initiatives to ensure they not only promote technological advancements but also streamline the journey from innovation to market-ready solutions and commercialization.
- Introduce a flexible financial framework that can adapt in line with the evolving I&T landscape, ensuring continual alignment with emerging technologies, trends, and challenges.

New Policy Initiative for Consideration: The initiation of the "Hong Kong Technological Advancement and Innovation Network" (HK-TAIN, 香港科技進步及創新網絡) could be considered, envisioned as a vital and timely policy initiative. With substantive financial backing, predominantly from the government and potential augmentation by private and international stakeholders, the HK-TAIN will conscientiously channel investments into projects and collaborations that not only pioneer technological advancement but also guarantee tangible socioeconomic ramifications. A judiciously selected expert committee, tasked with the thorough evaluation of project proposals and annual reviews of fund utilization, will ensure the impactful and judicious allocation of resources, all whilst maintaining a committed focus on fostering a minimum of several collaborative ventures in its initial year of operation.

4. Create a high-level organizational authority for I&T development

Effective leadership and robust governance are paramount for the sustainable evolution of an innovation district. While the Northern Metropolis Co-ordination Office currently oversees the district's development, there is a compelling case for instituting a high-level organizational authority specifically for I&T promotion.

Objectives and Requirements: The strategic objective rests in curating an organizational structure that seamlessly amalgamates multifaceted stakeholders, encompassing universities, companies, investors, and government agencies, into a cohesive entity, steering the I&T development with a unified vision and governance. The essential requirements delineate the necessity of adept management of mega innovation hubs and research facilities, meticulous allocation of funding, and crafting policy initiatives. Whether opting for a collaborative governance model via the Northern Metropolis Innovation Council or a centralized, structured approach through the Northern Metropolis Authority, the entity must embody transparency, inclusivity, agility, and adaptability, ensuring the evolutionary progression of the I&T ecosystem.

Proposed Organizational Structures:

- Northern Metropolis Innovation Council (北部都會區創新委員會): This model champions a collaborative governance approach, blending decision-making and advisory capacities. Comprising members from diverse sectors such as universities, businesses, investors, and government agencies, the council's mandate extends beyond supervising I&T activities. It will be instrumental in managing the mega innovation hubs, research facilities, fostering collaborations, allocating funds, and shaping policy directives.
- Northern Metropolis Authority (北部都會區管理局): Envisioned as a statutory board, this entity would function akin to a public corporation. The government would appoint its chairman, who would report directly to the Chief Executive. The authority's remit would encompass overseeing I&T activities and spearheading strategic development, financial planning, and execution.

Leveraging on Existing Resources: The supervisory organization would assimilate strategic insights from established entities like the Innovation and Technology Commission, drawing from their policy-making experience. Operational expertise from the Hong Kong Science and Technology Parks Corporation would be invaluable in curating and managing the innovation ecosystem. The Applied Science and Technology Research Institute would offer insights on resource optimization and partnership cultivation, while local universities would elucidate academia's requirements. In essence, the creation of a dedicated authority for I&T development is not just about governance; it is about orchestrating a symphony of innovation, collaboration, and growth, positioning the Northern Metropolis as a global I&T beacon.

Implementation and Timeline

Short-Term Actions (1-2 years)

- Establish and legitimize the statutory body, defining precise roles and responsibilities for initial members drawn from key stakeholder groups.
- Construct a detailed proposal that lays out the structures, operational protocols, and functions of the proposed organizational entities.
- Begin conversations with varied stakeholders to gain insights and establish preliminary partnerships.

Medium-Term Actions (3-5 years)

- Develop detailed I&T strategies and policy frameworks within the Northern Metropolis, ensuring the initiation of vital infrastructure and funding mechanisms without delay.
- Kick off a pilot phase for the selected organizational model, which includes forging initial partnerships and launching first projects.

Long-Term Actions (5-10 years)

- Ensure the organization delivers palpable results in terms of innovation, technological adaptation, and commercialization.
- Proceed with the full-scale implementation of the organizational entity, which includes a substantial expansion of projects, partnerships, and strategic initiatives.
- Implement consistent progress tracking and recalibration strategies to ensure sustained alignment with the dynamically shifting I&T landscape.

5. Implement creative networking programs to foster an innovative community

A thriving innovation district is characterized by its innovative culture and a cohesive sense of community. Feedback from several interviewees highlighted a perceived deficiency in these aspects, particularly in established hubs like Science Park and Cyberport. For the Northern Metropolis to truly flourish as a beacon of I&T development, fostering an inclusive and dynamic community is paramount.

Objectives and Requirements: The focal objective of implementing creative networking programs revolves around fostering a thriving, innovative community that becomes the bedrock for I&T development and talent growth. This encompasses the creation of research-specific associations, orchestrating public events and workshops centered on I&T, and launching university-led community education programs that span across varied demographic spectrums. Simultaneously, requirements hinge upon financial and infrastructural support from the government, coalescence of expertise from universities, research institutions, and companies, and an overarching framework that ensures these initiatives are accessible, relevant, and scalable in alignment with the dynamic shifts within the I&T sphere.

Global Best Practices: As illustrated in the previous section, innovation districts worldwide have successfully instituted a myriad of networking programs, which have proven invaluable in forging new connections, fostering partnerships, and facilitating knowledge exchange. Such initiatives can serve as a blueprint for the Northern Metropolis.

Strategies for Community Building:

- Leverage University Cluster Magnets: The government should harness the potential of university cluster magnets to devise and execute innovative networking programs. This could include the formation of research-specific associations, bridging the gap between academia, research institutions, and the corporate world.
- Host Public Events: Mega innovation hubs can be the venues for live speaker series, I&T-focused workshops, and other events that draw participants from diverse sectors.

- Promote I&T Education: Universities can spearhead community education initiatives tailored for local residents across age groups, thereby ingraining an I&T culture. Financial backing from the government will be essential for the successful rollout of these programs.

Leveraging on Existing Resources: Existing events and initiatives by the Hong Kong Science Park and Cyberport offer a wealth of insights on organizing impactful outreach programs. For instance, the Meetup @ HK Science Park Initiative connects different stakeholders within the community and regularly hosts networking events, sharing sessions, workshops, and conferences. The Cyberport Startup Alumni Association provides a common platform for graduates of the Cyberport Incubation Programme to network and strengthen their links with Cyberport. Local universities with relevant programs can be roped in as co-designers of public education activities. Research entities can provide guidance on event themes and formats, accelerating meaningful professional exchanges. Corporate entities can play a dual role, both as sponsors and as recruitment platforms. All programs should be designed to complement and synergize with existing large-scale events, ensuring a holistic approach to fostering innovation in the Northern Metropolis.

Implementation and Timeline

Short-Term Actions (1-2 years)

- Launch networking programs explicitly tailored to unify various stakeholders and catalyse pilot initiatives, such as a live speaker series or thematic workshops, aimed at building an innovative culture.
- Engage with universities, companies, and local communities through a comprehensive consultation process to build a clear understanding of both the needs and potential opportunities for networking programs.

Medium-Term Actions (3-5 years)

- Elevate and expand the networking program in response to early feedback, increasing both their scope and frequency to steadily build a rich and diverse participant base.
- Introduce enhanced programs that move beyond pilot status, such as regular thematic workshops and speaker series, to maintain momentum and engagement among stakeholders, bypassing iterative evaluations in favor of more direct, action-driven programs.

Long-Term Actions (5-10 years)

- Position the Northern Metropolis as a distinctive innovation hub, leveraging the networks and collaborations formed in the earlier phases to realize groundbreaking projects and ventures.

New Policy Initiative for Consideration**:** An immediate, pragmatic policy initiative could be the "I&T Community Connect" program (創科社區聯絡計劃). This government-funded initiative would serve as a platform that hosts a multitude of networking events, ranging from speaker series to interactive workshops, specifically designed to bridge various stakeholders within the I&T ecosystem. Additionally, it would serve as a conduit through which collaborative endeavors, be it research projects or entrepreneurial ventures, are catalyzed. The "I&T Community Connect" would also strategically incorporate educational modules aimed at the broader community, ensuring that the innovative spirit permeates beyond the immediate I&T sector, engendering a wider inclusive culture of innovation within Northern Metropolis.

6. Provide up-to-date amenities to support R&D activities and attract global talents

Innovation districts thrive when they offer state-of-the-art amenities and a conducive environment for both work and leisure. The Northern Metropolis, envisioned as a hub for R&D, should be no exception.

Objectives and Requirements: The key objective is to enhance the global appeal of the Northern Metropolis through two smart thrusts: the provision of R&D-centric amenities and the formulation of strategies to mitigate the high living costs in Hong Kong. The former encompasses establishing amenities like conference halls, exhibition centers, and research support centers, while the latter emphasizes housing affordability for non-local talents and attractive living subsidies. Essential requirements manifest as sustainable government funding, a framework ensuring priority access to universities, strategic planning ensuring accessibility and connectivity of amenities, and a structured approach to providing varied housing units and living subsidies aimed at global researchers.

Amenities for Innovation: For the Northern Metropolis to truly support the activities of university cluster magnets, it should be equipped with a range of research-related amenities. This includes conference halls, exhibition centres, research support facilities, and guest houses. Given the government's pivotal role in fostering innovation, it should spearhead the establishment or funding of these amenities. Universities, as primary stakeholders, should be granted priority access. Furthermore, meticulous planning is essential to ensure these amenities are easily accessible and well-connected within the innovation clusters.

Addressing the Cost of Living: Attracting global research talent requires addressing the problem of Hong Kong's high living costs, with housing affordability being paramount. The initial Land Use Proposal of San Tin Technopole earmarked 6,400 talent housing units. Given the anticipated demand from the university cluster magnets, there is a pressing need to increase this number and offer diverse ownership options to cater to non-local talents. Additionally, comprehensive living subsidies, including schemes to attract top-tier global researchers, are crucial.

Leveraging on Existing Resources: To ensure the Northern Metropolis meets the needs of its intended audience, existing facilities across Hong Kong (especially New Territories North) should be audited to pinpoint gaps. Universities, as key stakeholders, should be consulted to determine the amenities required to complement existing infrastructure. By forging public-private partnerships, especially with real estate and retail sectors, the district can offer affordable housing and lifestyle options tailored for both local and international talents. Good practices of talent housing provision can be borrowed from the InnoCell in Science Park, which provides over 500 bed spaces for rent in different room types. The ultimate aim is to craft a vibrant, appealing environment that attracts the world's top talent.

Implementation Timeline

Short-Term Actions (1-2 years)

- Pinpoint areas of need by identifying tangible gaps in existing amenities through direct observation and immediate stakeholder input, prioritizing actionable facilities development without extended studies.
- Begin the development of readily attainable amenities, which includes the foundation of research support centers and the initiation of straightforward living subsidies for international researchers, ensuring quick, tangible support enhancement.

Medium-Term Actions (3-5 years)

- Commence construction on critical amenities, adhering closely to the needs previously identified, ensuring alignment with explicit stakeholder needs and initial plans.
- Deploy a multifaceted housing strategy by furnishing a variety of housing units, entailing varied ownership models, thereby catering to a broad swath of global talent. Complement this with a straightforward, tiered subsidy scheme, meticulously crafted to meet the varied requirements of different talent demographics.

Long-Term Actions (5-10 years)

- Solidify the Northern Metropolis as a magnet for international talent, by not just maintaining but continually enhancing a suite of modern amenities that visibly elevate both working and living conditions in the district.
- Systematically refine and broaden the amenity offerings by staying abreast of technological and research advancement without intensive periodic reviews, ensuring the offerings remain cutting-edge and relevant.
- Regarding housing and subsidies, apply a real-time review mechanism that ensures close alignment with financial and demographic landscapes, adapting and expanding offerings in tandem with shifts in the R&D environment and global talent demographics. This ensures that the Northern Metropolis remains an appealing, viable option for global talent on an ongoing basis.

Conclusion

Innovation and technology are increasingly seen as powerful engines for Hong Kong to fuel sustainable social and economic growth. While Hong Kong is world-renowned by its leading universities, strong R&D capabilities, and an attractive business environment, which have created competitive advantages in I&T development, the overall progress has been marginally satisfactory. Salient drawbacks such as a severe shortage of land supply, difficulties in attracting talents, and a low level of commercialization of R&D results have directly impeded the growth of the I&T industry. In order to build up the I&T ecosystem and promote "new industrialization", it is crucial for Hong Kong to seize the valuable opportunity of the Northern Metropolis to establish a world-class innovation district.

With an aim to inform strategic planning of I&T development in Northern Metropolis, this study employed a mixed-method approach to analyze existing practices of innovation districts worldwide, identify key determinants for success, and develop practical policy measures based on the context of Hong Kong. These findings were ultimately organized into six sets of asset-based strategies with a focus on utilizing the role of university cluster magnets. It is hoped that the proposed recommendations will bring new insights and contribute to future policymaking in I&T development in Northern Metropolis.

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Appendix

Appendix A. List of interviewees (n=30)

Name	Position	Name	Position
Mr T	CEO of a biotech company	Prof N	Professor at a HK university
Mr P	Head of a global consultancy	Prof R	Professor at a HK university
Dr W	Legislative Council Member	Dr E	Chief Strategy Officer of an I&T company
Mr M	Partner of a global consultancy	Mr C	President of an I&T related non-profit
Dr L	Partner of a global consultancy	Ms Y	Head of a start-up organization
Prof V	Professor at a HK university	Mr R	Vice President of an I&T related non-profit
Prof G	Professor at a HK university	Prof A	Professor at a HK university
Mr A	Legislative Council Member	Prof L	Professor at a HK university
Mr L	Legislative Council Member	Prof C	Professor at a HK university
Mr K	CEO of a fintech start-up	Mr E	CEO of a leading HK I&T company
Mr H	Government official	Ms F	Head of Public Affairs at a global bank
Prof K	Professor at a HK university	Prof Z	Professor at a HK university
Mr N	Legislative Council Member	Ms C	Legislative Council Member
Prof E	Professor at a HK university	Dr T	Pharma Tech of a biopharma company
Prof M	Professor at a HK university	Dr N	Founder of a local I&T company

Appendix B. Sample interview questions

1. What are your overall impressions of the Northern Metropolis (NM) Development Strategy in terms of fostering I&T development in Hong Kong? What elements of the NM Development Strategy stand out to you as particularly promising or innovative?

2. How do you envision the creation of an innovation district within the NM as a catalyst for accelerating I&T development? What are the potential barriers and risks?

3. In what ways can the development of the NM innovation district present both challenges and opportunities for your field/sector?

4. We proposed the concept of "university cluster magnets" (大學創科核心驅動圈) as a key strategy for the NM innovation district. How feasible do you think it is to establish a university cluster magnet within the NM?

5. Considering the emphasis on shared space and facilities in the NM project, what types of shared resources would you like to see if your organization were to become part of NM?

How would shared buildings, co-working spaces, public zones for socialization, shared apartments, hospitals, and schools benefit your organization?

6. One of our key recommendations is the establishment of a Northern Metropolis Innovation Council (北部都會區創新委員會) as a collaborative governance model. How feasible do you think it is to establish such a council?

7. How can the Innovation Council effectively collaborate with existing organizational bodies in the development of NM? Is it possible to establish multiple levels of mechanisms to ensure smooth collaboration?

8. How feasible do you think it is to provide "free land" to enterprises? What types of firms should be prioritized on? What are the possible measures to evaluate their potentials?

9. How do you think the NM innovation district can attract and retain top talent in your field/sector? What strategies or initiatives can be employed to make the NM innovation district an attractive destination for professionals and researchers?

10. Do you think universities and other educational institutions should focus on expanding STEM education and creating co-curricular programs in NM? Why/why not? What are the potential barriers and concerns?

11. How will the government ensure all the social welfare packages and facilities can satisfy the needs of the large number of residents moving to the area?

12. As a long time is needed to develop the project, how will the government ensure that the efficiency of infrastructure, time and cost will not be overrun?

13. How can the government ensure that the development of NM benefits all stakeholders, including local communities, businesses, and educational institutions?

14. What measures should be taken to ensure the long-term sustainability of the NM innovation district, particularly in terms of environmental, social, and economic aspects?

15. Despite the recommendations we proposed, what other suggestions or opinions do you have on the successful development of the NM innovation district?

研究團隊

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目錄

行政摘要

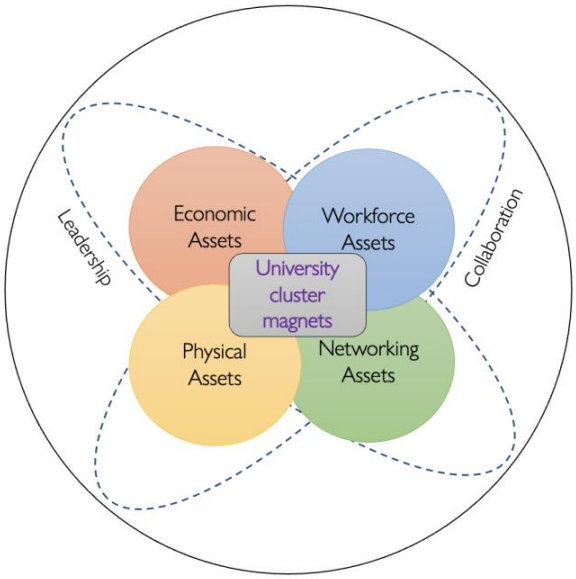
香港特區政府提出的《北部都會區發展策略》是近幾十年來最大規模的發展計劃之一。它的設計和實施將對香港和粵港澳大灣區長期的社會經濟發展產生深遠影響。北部都會區其中一個主要願景是將新田科技城打造成為國際創新科技（創科）中心。新田科技城擁有 627 公頃的創科用地，具有巨大的潛力建設成為世界一流的創新區，促進不同規模的創科行業發展，並建立宜居宜業的創新社區。建設具備顯著競爭優勢的創新區對於香港完善創科生態圈和推動“新型工業化”具有重要戰略意義。為了給政府規劃提供更多參考，本研究基於混合研究方法並結合香港發展現狀，提出六點切實可行的政策建議。

主要發現

創新區的重要特徵	- 四大初始條件：經濟資產、物理資產、網絡資產、勞動力資產 - 以資產為基礎的策略和協同治理模式 - 創新領域和研究優勢集群 - 多元化、包容性、互聯互通
香港創科發展的優勢	- 國際化水平高 - 國家政策支持 - 研究實力雄厚 - 有吸引力的營商環境 - 優越的地理位置
香港創科發展的挑戰	- 土地供應緊張 - 經商成本和生活成本高 - 人才短缺，難以留住人才 - 研發成果商品化不足 - 產學研合作不足
北部都會區建立創新區的獨特優勢	- 擁有大片不同面積的相連地塊以滿足多樣化的創科發展需求 - 毗鄰深圳，地處大灣區腹地，便於推動與大灣區的創科交流合作 - 特區政府大力支持，制定有針對性的發展策略

分析框架

綜合大量文獻、國際案例和深度訪談，我們提出了“大學創科核心驅動圈”（university cluster magnets）的新概念，作為在北部都會區建立創新區的新策略。大學創科核心驅動圈的定義是以重點研究型大學等科研機構為中心建立的創科集群，以加強產學研合作、提升研究影響力、吸引國際人才。雖然香港在發展創科產業方面經驗有限，但作為重要的國際教育和研究中心，香港擁有世界一流的大學和雄厚的研發實力。為打造北部都會區獨特的競爭優勢，應重點發揮大學以及其他研究機構的潛力，促進產學研緊密合作，共同推動科技產業發展。



本研究的分析框架

政策建議

1.	建立以大學為主導並提供多個公共研發平台的大型創科實驗室
2.	建設世界一流的研究基礎設施和設備
3.	為北部都會區創科研究及合作研究設立專項基金
4.	成立負責北部都會區創科發展的高層級管治架構
5.	舉辦豐富多樣的人際交流活動以打造創新氛圍濃厚的新型社區
6.	提供先進完善的生活及研究支持設施以配合研發活動和吸引國際人才

引言

創新科技日益被視為經濟可持續增長的重要動力，以及發展知識型經濟的核心支柱。香港正面臨傳統行業的轉型升級，提升創科能力以促進經濟多元化發展在當下具有前所未有的重要意義（創新科技及產業局，2022）。發展創科也將創造大量優質的就業機會，有助於吸引全球人才來港就業生活。此外，粵港澳大灣區作為國際創科樞紐的戰略定位也為香港帶來了前所未有的寶貴機遇，必須利用其得天獨厚的優勢整合兩地資源，共同推動科技創新蓬勃發展（香港特別行政區政府，2022）。在此背景下，香港特區政府於 2021 年發佈了《北部都會區發展策略》，其重點行動方向之一是將新田科技城打造成為香港的“硅谷”。實現這一宏偉目標無疑需要詳細而周密的政策規劃，因地制宜的政策，和資源的有效利用。同時，世界各地創新區的優秀做法也值得借鑒。為了向北部都會區創科發展決策提供參考，本研究採用比較案例分析和深度訪談，圍繞發揮世界一流大學的強大科研實力提出了一系列政策建議。

研究目的

- 評估香港創科發展的優勢與挑戰
- 歸納國內及國際創新區的特色措施，總結影響其發展的關鍵因素
- 探討在北部都會區建立世界級創新區的發展機會，以及大學所擔當的角色
- 就推動北部都會區成為國際創新科技樞紐提供政策意見

研究背景

香港創科發展概況

香港歷屆政府一直致力於推動創科發展。1998 年，時任行政長官董建華就已經在《施政報告》中提出了香港創科發展藍圖，具體政策措施包括成立創新及科技基金、設立研發中心，興建香港科學園和數碼港等。隨後幾年，香港特區政府繼續強力支持創科產業發展。2006 年，香港成立了五所以應用研究和成果商品化為重點的研發中心。2015 年，香港創新及科技局成立（2022 年更名為創新科技及產業局），成為專門負責制定和執行創科政策的高層級政府機構。2018-19 年度財政預算案更進一步明確了香港創科發展具有優勢的四大範疇，即生物科技、人工智能、智慧城市和金融科技。

2021 年，國家《十四五規劃》明確提出支持香港建設國際創科中心。行政長官李家超也將推動創科發展納入施政重點，在最新公布的《香港創新科技發展藍圖》中提出了四大發展方向：1）完善創科生態圈；2）壯大創科人才庫；3）推動數字經濟發展；4）積極融入國家發展大局。為實現以上目標，《藍圖》進一步制定了八大重點策略，預計未來會有更多的具體措施逐步出台。

過去十年，特區政府在創科領域投入了大量資金。如圖 1 所示，本地研發總開支自 2010 年以來增長超過兩倍，到 2021 年達到 270 億港元。其中，由政府資助的金額也在同期翻了一番，到 2021 年佔總開支的一半以上。同時，研發開支佔生產總值的比例從 2010 年的 0.75% 逐步增至 2021 年的 0.97%。自 2020 年起，創新科技署的基金投入也大幅增加。從 2017 年至 2021 年，受創新科技署資助的項目數量穩步上升（圖 2）。除此之外，其他關鍵因素也促進了香港的創科發展，包括高國際化水平、自由經濟、雄厚的科研實力，以及有吸引力的營商環境等。

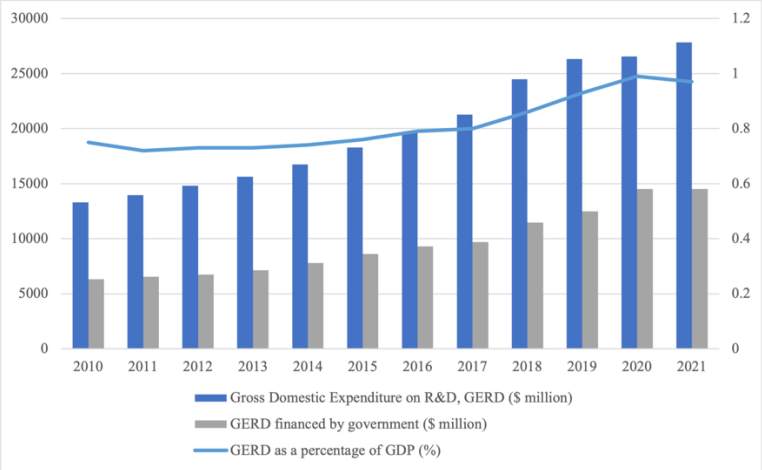


圖 1 香港本地研發總開支（2010 – 2021）

資料來源：香港特區政府統計處（2022）

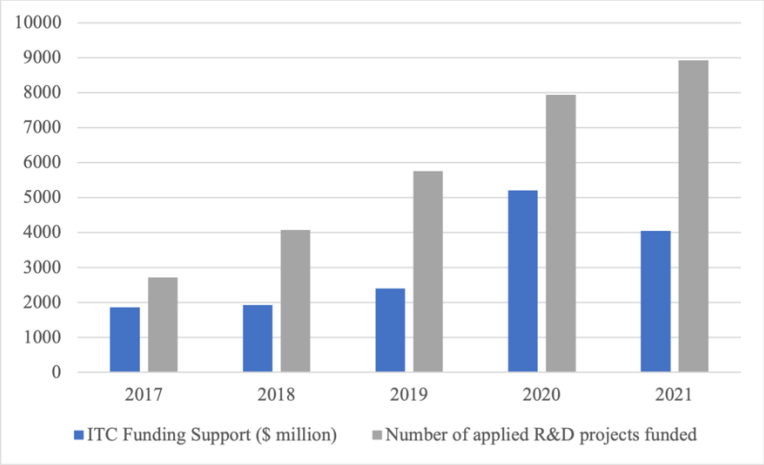


圖 2 創新及科技基金資助統計（2017 – 2021）

資料來源：香港特區政府統計處（2022）

通過這些努力，香港在創科領域逐步取得進展。如圖 3 所示，自 2016 年以來，香港獲批專利的數量總體呈上升趨勢，在 2021 年達到了 15,346 項的最高值。本地初創企業亦蓬勃發展，從 2016 年的不足 2,000 間增至 2021 年的近 3,800 間。研發人員數量也

呈上升趨勢，同期從 31,282 人增至 37,455 人。2022 年，香港在世界數碼競爭力排名中位列全球第九，在“科技”方面的表現排名全球第二（IMD, 2023）。

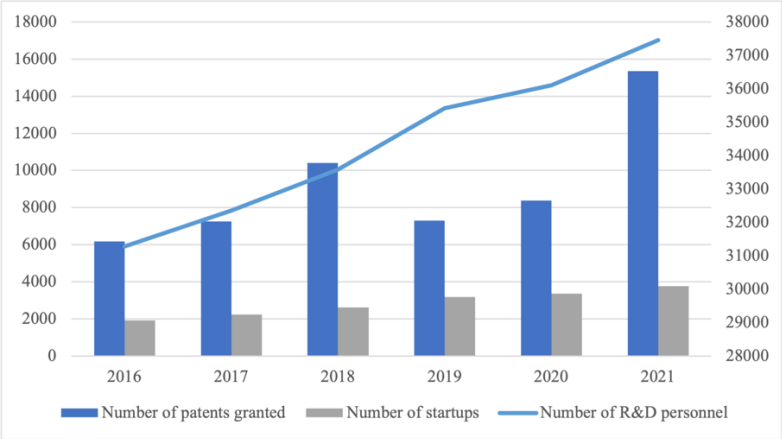


圖 3 香港創科發展統計數據（2016 – 2021）

資料來源：香港特區政府統計處（2022）；StartmeupHK（2023）

儘管如此，香港在創科發展過程中也不可避免地遇到了阻礙和挑戰。雖然研發人員數量穩步增長，但香港的人才供應仍明顯不足。2020 年，香港每千人口中的研發人員數量僅為 4.9 人，遠遠落後於新加坡的 8.1 人和韓國的 8.6 人（立法會秘書處，2022）。儘管香港擁有多所頂尖大學，但研發成果的商品化仍不盡如人意，產學研合作亟待加強。此外，土地的嚴重短缺也極大限制了創科基礎設施的建設。為盡快完善本港創科生態圈，推動“新型工業化”發展，政府必須加大力度應對這些挑戰。

北部都會區發展策略

北部都會區發展策略是由前任行政長官林鄭月娥提出，由現任行政長官李家超繼續推行的一項大型政府主導計劃。通過發展新界北部的元朗區和北區，包括天水圍、元朗、粉嶺、上水及鄰近地區共約 3 萬公頃的土地，該計劃將提升新界北部為一個完整的宜居宜業的新型都會區。其毗鄰深圳的優越地理位置將大大促進深港兩地合作，加強香港與大灣區其他地區的聯繫。

建設新田科技城（圖 4）是發展策略的重點行動方向之一。新田科技城位於北部都會區的心臟地帶，計劃建設成為創科發展集群以及宜居宜業的新社區。根據立法會最新公布的土地用途建議，新田科技城的總發展面積將達到 627 公頃，由創新科技園區和新田市中心組成。創新科技園區將提供約 300 公頃的創科用地，包括不同面積的相連地塊，並採取靈活的批地模式等配套措施以支持不同規模的產業需求。此外，新田市中心將發展成為一個自給自足、充滿活力的宜居社區，提供公營和私營的房屋單位、便利的交通以及完善的公共設施。總體而言，創新科技園區和新田市中心合計將提供超過 50,000 個房屋單位和 165,000 個就業機會，大大改善新界地區的職住平衡。

除發展創科外，北部都會區亦會致力於增強本地及跨境交通基建、增加房屋供應、推進城鄉共融，並採取積極的保育政策維護生態環境的多樣性。憑藉得天獨厚的優勢，北部都會區將極有潛力成為國際創新科技中心和香港的第二個經濟引擎。

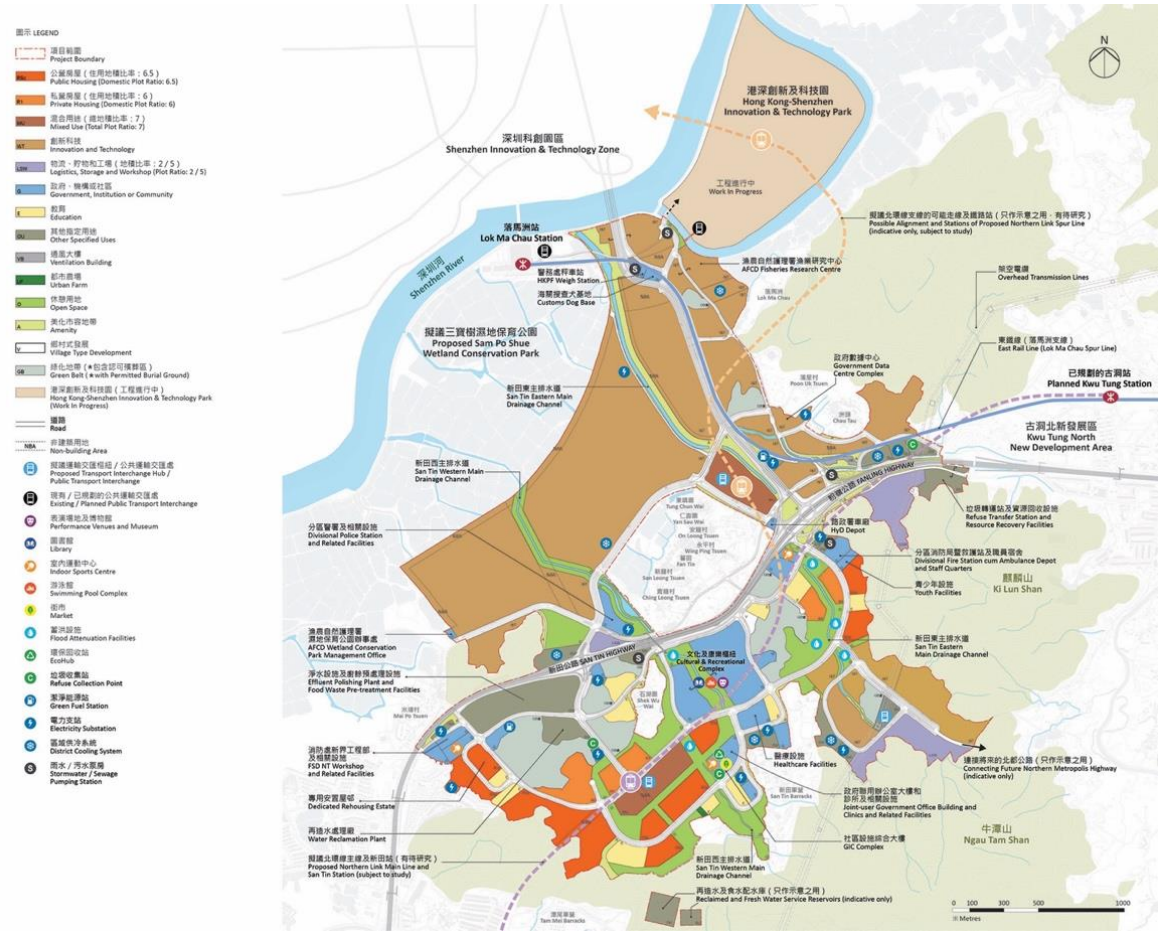


圖 4 新田科技城土地用途建議

資料來源：立法會（2023）

創新區：發展創科的有效策略

創新區通常被定義為“一個領先的龍頭機構和公司聚集並與初創公司、商業孵化器和加速器緊密聯繫的地理區域”（Katz and Wagner, 2014）。它作為城市中的創新生態系統樞紐，致力於促進創新发展，並推動高質量企業和工作崗位的增长（Lawrence et al., 2019）。與空間上相對分散的傳統科學園不同，創新區空間緊湊且獨具特色，能夠創造一個多樣化和互聯互通的環境（Vey et al., 2018）。它們通常配備先進技術，提供混合使用的居住、辦公和商業空間以及完善的共享設施，能夠進一步促進新理念和新關係的產生，從而帶動經濟增長。同時，創新區也是一個城市發展策略，旨在將傳統的市中心社區再造為創新和創業活動的理想場所（Morisson, 2020）。

現有研究歸納了建設成功的創新區所需具備的一些關鍵因素：

- Wagner 等（2017）根據自身經驗和現場調研提出了 12 項發展原則，包括創新領域和研究優勢的集群、跨部門和學科的融合、多樣性、連通性、鄰近性和包容性等。同時，他們還強調了自下而上的協同治理模式的重要性，主要職責包括制定發展規劃、管理園區運行和評估發展進度等。
- Katz 和 Wagner（2014）從資產利用的角度出發，提出為充分發揮創新區的潛力，決策者必須制定一系列以資產為基礎的發展策略以合理利用經濟、物理和網絡資產，並建立一個強有力的治理機構進行統籌管理。
- Webster 等（2021）通過對全球多個成功創新區的相關專家進行深入訪談總結得出 5 個基本要素：1）擁有頂尖大學的人才和研究成果；2）交通便利；3）靈活的住宿選擇；4）鄰近性和高密度；5）創新服務的普及。
- 此外，有關澳大利亞、英國和美國的案例研究則強調了早期規劃（WPI Economics, 2020）、優質勞動力（Baily and Montalbano, 2018）以及大學在促進合作和知識交流方面的作用（Pancholi et al., 2020）等因素的重要性。

分析框架

創新區相關研究最常採用的分析框架之一是 Katz 和 Wagner（2014）提出的創新生態系統框架。他們認為，創新區由三種基本資產組成，即經濟資產、物理資產和網絡資產。為了充分釋放創新區的潛力，政府必須制定一系列基於三種資產的發展策略，在資產之間形成協同效應，從而建立起完善的創新生態系統（圖 5）：

- **經濟資產**是指從事創新活動和營造創新氛圍的企業、機構和組織。它們通常包括大型創科企業、初創公司、研究機構和商業孵化器等。
- **物理資產**是指能夠促進人與人之間交流合作的公共和私人空間。它們有助於增加面對面的互動，拓展社交網絡，以及創造充滿活力的生活環境。物理資產的分配和使用很大程度上決定了創新區的環境質量，並奠定了其發揮自身優勢的基礎。
- **網絡資產**是指能夠幫助激發創新的人際關係網絡。從廣義上講，網絡資產可分為正式和非正式網絡。正式網絡可視為同一領域或部門內的“強聯繫”，如專為特定領域開展的社交活動和工作坊等。跨領域和部門的非正式網絡通常被稱為“弱聯繫”，包括休閒活動和社區文化活動等。

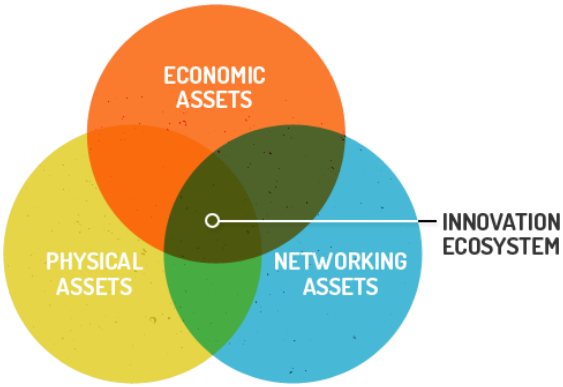


圖 5 創新生態系統框架（Katz and Wagner, 2014）

在上述框架的基礎上，本研究進一步提出了一個新的框架來分析北部都會區創新區的發展。如圖 6 所示，我們提出了“大學創科核心驅動圈”（university cluster magnets）的新概念，其定義為以重點研究型大學等科研機構為中心建立的創科集群，以加強產學研合作、提升研究影響力、吸引國際人才。發揮重點研究型大學的核心作用是建立創新區顯著競爭優勢的有效戰略。位於圖 6 中心的四個圓圈代表構成創新區的四種初始資產。在上述經濟、物理和網絡資產的基礎上，本研究框架進一步納入了勞動力資產，包括勞動力的數量和質量，以及選拔、雇用、培訓和留住人才的各項機制。環繞四種資產的虛線代表北部都會區如要充分利用資產的優勢，必須具備良好的治理能力和合作能力。框架的整體背景則代表形成創新區的環境因素，包括經濟、政治、社會和地理因素等。

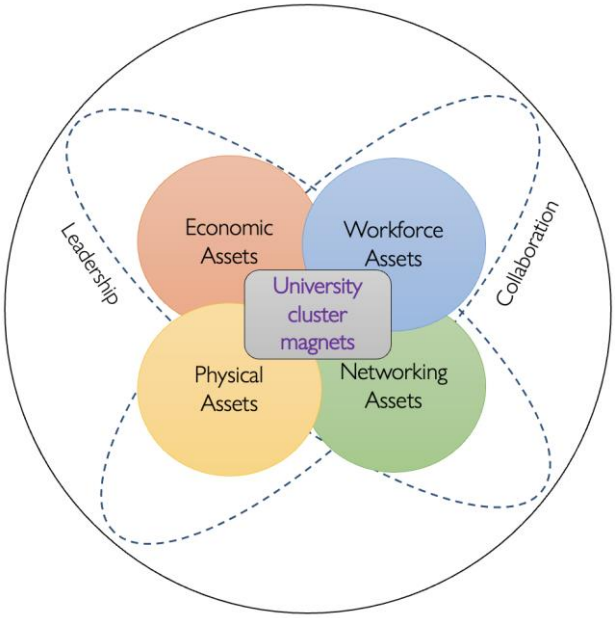


圖 6 本研究的分析框架

研究方法

比較案例分析

本研究主要採用定性研究方法，包括比較案例分析和深度訪談。比較案例分析用於探究世界各地創新區的政策措施和關鍵發展因素，以及為深度訪談提供內容素材。根據數據可及性和案例匹配度，我們選取了來自亞洲、北美洲和歐洲共 8 個國家的 13 個創新區（表 1）。資料來源主要為官方網站、新聞報道、政策文件和灰色文獻等。

表 1 選作比較案例分析的創新區

名稱	城市/地區	國家
中關村	北京	中國
張江高科技園區	上海	中國
光明科學城	深圳	中國
裕廊創新區	新加坡	新加坡
橫濱港	橫濱	日本
筑波科學城	筑波	日本
大德科學園	大德	韓國
貝爾謝巴創新區	貝爾謝巴	以色列
硅谷	北加利福尼亞州	美國
三角研究園	北卡羅萊納州	美國
白城創新區	倫敦	英國
哈威爾科學與創新區	牛津	英國
須達士創新區	阿姆斯特丹	荷蘭

深度訪談

為深入瞭解不同持份者對於北部都會區創科發展的看法和建議，我們在 2023 年 5 月至 7 月期間進行了 30 次深度訪談。通過目的抽樣和滾雪球抽樣，我們選取了來自本港大學、創科公司、初創企業、立法會、諮詢公司、銀行、政府機構和非營利組織的受訪者（表 2）。訪談內容包括三個主要部分：受訪者對香港創科發展的理解，對北部都會區發展創新區的看法，以及對本研究擬提出的政策建議的反饋（受訪者名單和問題示例見附錄）。單次訪談時間約為 60 分鐘，主要通過線上或面對面的形式進行（有三次訪談以書面形式進行）。我們對所有受訪者的個人信息及訪談內容均進行了匿名化處理。除此之外，我們還通過不同渠道收集了大量的定量數據以支持我們的研究結果。

表 2 受訪者背景分布情況（n = 30）

組織	數量	佔比(%)
大學	10	33
創科公司	6	20
立法會	5	17
諮詢公司及銀行	4	13
初創企業	2	7
創科相關非營利組織	2	7
政府部門	1	3

研究結果

經濟資產

- 經濟資產是創新區的基本要素，負責開展創新活動，推動經濟增長。世界各地的創新區通常包含多種經濟資產組合，本分析將主要關注與研發相關的經濟資產。
- 研發類經濟資產的核心部分是重點研究型大學等科研機構。中關村、硅谷等許多知名的創新區都是基於以一所或多所頂尖大學為中心的研發集群。除此之外，另一種不可或缺的經濟資產是研發中心，包括但不限於國家級研究中心、聯合研究實驗室和共享研究平台。如表 3 所示，它們在推動研究、促進合作以及吸引人才和企業方面發揮著重要作用。

表 3 中關村和筑波科學城的研發中心概況

	中關村（中國）	筑波科學城（日本）
總面積	4,880 公頃	2,840 公頃
優勢領域	先進製造、現代交通、新材料等	生命科學、高能物理、生物醫藥等
研究實驗室	• 112 個國家級重點實驗室 • 206 個國家（市）科研院所 • 243 家開放實驗室 • 40 多間高校	29 家公共教育和研究機構，包括： • JAXA 筑波宇宙中心 • 日本產業技術綜合研究所 • 筑波大學
人才和企業	• 研發人員 97.8 萬人 • 上市企業 466 家 • 獨角獸企業 102 家 • 跨國公司地區總部和研發中心 300 多家	• 研發人員和學生超 2 萬名 • 博士學歷人員約 8,000 名 • 共來自 140 個國家和地區 • 跨國公司和地方企業研發中心 100 多家
發展成果	2021 年實現增加值佔全市 GDP 的 33.3%	4 位諾貝爾獎獲得者

- 為了進一步擴大研究影響力，促進研發成果的轉化，創新區還發展了形式多樣的產學研合作項目，以最大限度地利用學校和企業的資源和專業知識（圖 7）。

硅谷（美國）	裕廊創新區（新加坡）
企業贊助高級研究項目計劃 • 促進加州大學聖克魯斯分校巴斯金工程學院與矽谷商業公司之間的合作 • 由企業與大學教授合作設計研究項目 • 學院學生有機會參與研究並作為畢業要求的一部分 • 贊助企業可以獲得研究結果的知識產權	博世力士樂區域培訓中心 • 推動先進製造技術的使用和應用型人才的培養 • 由博世力士樂、新加坡理工學院和政府機構合作運行 • 由新加坡理工學院講授與博世力士樂技術相關的專業認證課程

圖 7 硅谷和裕廊創新區的產學研合作項目

- 為充分發揮大學創科核心驅動圈的強大科研實力，我們的受訪者大多對建立多種形式的研發中心以促進合作和成果轉化持積極態度。

受訪者語錄

“僅僅為大學在北部都會區設立辦公地點並不可取。每所大學都擁有自身的研究優勢，因此我認為更可行的辦法是建立聯合實驗室，促進大學間的合作。比如為來自不同大學的教授提供專門的空間，讓他們合作開展研究。”

資深立法會議員

“中國內地許多城市都建立了類似技術創新研究院的轉化研究機構，我極力主張在北部都會區實施類似舉措。我們的大學過於重視學術論文發表，建立轉化研究機構或聯合實驗室將是促進基礎研究向轉化研究發展的好機會。”

本地某大學負責研究及創新的教授

物理資產

- 科研基礎設施和設備在創新區的物理資產中發揮著不可或缺的作用。先進的設備和設施能夠為高水平研究提供有力支持，從而顯著推動研究創新。它們還為大學和企業之間的大型合作項目提供了發展機會。此外，先進的科研設施也非常有利於吸引本地和全球人才。因此，為了在科研創新方面創造優勢，越來越多的創新區開始大力投資建設大型科研基礎設施。如表 4 所示，上海張江高科技園區和牛津哈威爾科學與創新區的同步輻射光源在推進科學研究和吸引全球專業人才方面取得了顯著成果。

表 4 張江高科技園區和哈威爾科學與創新區的研究設施

	張江高科技園區（中國）	哈威爾科學與創新園區（英國）
總面積	2,826 公頃	300 公頃
優勢領域	資訊科技、生物醫藥、人工智能	能源科技、醫療科技、太空科技
從業人員數量	400,000 人	6,000 人
企業數量	24,000 家	120 家初創企業和 220 個公司/組織
大型研究設施數量	8 個已投入使用，6 個建設中	14 個
標誌性設施	上海光源 • 我國用戶最多、產出成果最多的大科學裝置之一 • 累計服務 3,100 多個研究組的 15,000 項研究計劃 • 用戶在 *Nature*, *Science* 和 *Cell* 三大國際頂級刊物發表論文 130 篇	鑽石光源 • 英國最大的科學裝置之一 • 累計服務 14,000 名來自高校和企業的用戶 • 用戶發表論文 12,000 餘篇 • 自 2007 年起為英國科學和經濟帶來 2.6 億英鎊的價值

受訪者語錄

“為什麼不建立更大規模的大學間合作設施呢？我們可以採取‘蜂王戰略’來打造世界頂級的設備作為強大的‘磁場’。當我們有了‘蜂王’，就能夠吸引來自世界各地的大量‘工蜂’。這些設施可以滿足廣泛的研究需求，幫助產出大量的優質學術論文，並吸引海內外的優秀研究人員，最終大大促進本地區的研究與發展。”

本地某大學負責知識轉移的教授

- 除了先進的研究設施外，其他在公共空間的物理資產也為創新區內的日常活動提供了重要支持。研究支持設施如會議中心和創新中心等可以極大地促進研究和教育活動的開展。文化支持設施如體育中心、藝術館、醫院和學校等則有助於建設一個充滿活力和宜居的社區，以吸引和留住全球研究人才。

案例：韓國大德科學園

總面積: **6,740** 公頃

人才數量: **86,140** 人

研究成就: 在註冊專利、知識轉移及研發支出方面均位列韓國六大科學園之首

公共設施:

- 擁有佔地 **49,754** 平方米的大德會議中心，可容納 **8,000** 人
- 擁有可容納 **5,000** 人的韓國貿易展覽中心
- 為外來研究人員提供酒店住宿
- 擁有大德文化藝術中心、CMB 博覽館等文化設施

受訪者語錄

“為吸引頂尖研究人員來港，我們必須打造能夠開展世界級研究的創新區。這不僅需要提供先進的科研設施，還包括專供科學家使用的會議設施和酒店等，以全面解決科研人員的需求。”

本地某大學計算機科學教授

勞動力資產

- 高技能勞動力是創新區持續發展和取得成功的基礎。在此方面，創新區內的重點大學往往通過開展各項教育和培訓項目發揮其在人才培養方面的核心作用。常見做法包括：1）將創科元素納入現有課程；2) 舉辦與創科有關的會議、活動及工作坊；3) 與企業合作建立實習和交流計劃；以及 4) 為對創業感興趣的教職員工和學生提供指導和實踐支持。下表 5 列出了韓國大德科學園和英國白城創新區由大學牽頭實施的一系列人才支持計劃。
- 鑒於香港擁有多所世界一流大學的獨特優勢，許多受訪者都強調了釋放本地大學的潛力以促進創科行業人才發展的重要性。

表 5 大德科學園和白城創新區的人才培訓和支持項目

大德科學園（韓國）	韓國科學技術院	• 面向研究生和青年學者舉辦年度創新創業研究訓練營 • 將創業知識納入工程學學士課程的 K-school 計劃 • 在工程、人工智能、商學等領域與紐約大大學建立本科和研究生合作學位課程 • 為教師、學生和公眾人士提供創業培訓和支持的 Startup KAIST program：截至 2021 年共建立初創企業 1,276 家，其中 69 家由教師成立，1,007 家由學生成立
白城創新區（英國）	倫敦帝國理工學院	• 為帝國理工學院學生提供在創新區的初創企業實習機會 • 為教職工和學生提供創業指導服務，導師團隊由 75 位成功企業家和投資者組成 • 通過 MedTech SuperConnector 計劃為來自英國各地研究機構的早期職業研究人員提供醫療創新商品化支持

受訪者語錄

“在我看來，人才引進是創新區最關鍵的方面，硬件則是次要的。如果沒有足夠的高素質人才，產業就未必願意進駐到創新區。因此，我認為香港所有大學都應注重吸引不同領域的人才。”

本地某大學負責研發的教授

"我強烈主張加強大學與產業界在培養人才方面加強合作。在創新區的企業中為學生提供豐富多樣的實習機會將對產業發展大有幫助。"

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- 為了進一步吸引人才，創新區廣泛採取了人才住房、生活補貼等多項配套措施。對於吸引研發人員，與研究相關的補貼、獎勵、培訓和職業支持也是常見措施。例如，深圳光明科學城自成立以來推出了一系列吸引科研人才的專項政策，目標人才被分為基礎研究、成果轉化和創新三大領域的 14 個具體類別，并對獲得國家重大基金項目支持的優秀青年科技人才給予最高 100 萬元人民幣的生活補貼。截止到 2022 年，光明科學城還累計提供了超過 14,470 套人才公寓。通過這些努力，光明科學城的人才數量在 2023 年 4 月已達到 17.8 萬人，比 2020 年成立時翻了兩倍。考慮到香港高昂的生活成本，大多數受訪者也明確表示需要提供居住配套以協助吸引人才。

受訪者語錄

"香港的生活成本無疑高於深圳或其他地方，住宿尤為昂貴。我認為住宅配套對創新區的發展至關重要，且必須提供低於市價的價格使人們能夠負擔得起住房。我們必須避免出現人們過來工作但難以在此生活的情況。"

本地某領先創科公司行政總裁

網絡資產

- 網絡資產對於創建包容、開放和互聯互通的創新區至關重要。借助經濟、物理和勞動力資產，創新區通常為員工和居民提供形式多樣的人際交流活動。綜合案例研究和現有文獻，本研究根據主要目的將網絡資產分為兩類：加強內部聯繫和外部聯繫。如圖 8 所示，加強內部聯繫的網絡資產可被進一步分為組織內部網絡和跨組織網絡，而加強外部聯繫的資產可被進一步分為社區參與和對外推廣。

- 為了在北部都會區的大學創科核心驅動圈中創造一個研究密集型環境，一些受訪者指出，必須加強利用網絡資產，匯聚不同學科的科研人員，促進思想的相互交流，為新的合作夥伴關係創造機會。

內部聯繫		外部聯繫	
			
組織內部網絡 特定行業和部門的協會、研討會和工作坊	**跨組織網絡** 向創新區所有人開放的社交項目和活動	社區參與 當地和鄰近居民參與的活動和計劃	**對外推廣** 創科成果的宣傳和推廣
矽谷領導集團： 成立於 1977 年的商業協會，旨在加強矽谷地區商業公司的聯繫	**RTP180:** 邀請美國北卡羅來納州三角研究園的成員就不同特定主題進行系列公開演講	創科挑戰計劃： 為英國白城創新區及周邊地區的年輕人提供場地和技術來實現他們的創新理念	**中關村論壇:** 在中關村舉辦的促進創科推廣與交流的高級別論壇

圖 8 網絡資產的類型和實例

受訪者語錄

“新的知識往往產生自密集的互動和獨立的環境，允許人們以非同尋常的方式進行思考。我認為營造一種每個人都可以公開、輕鬆和密集地互動的氛圍至關重要。我們已經看到許多大學或研究機構吸引人才進駐的成功案例，但不要以為僅僅建造大樓就能成功，而是要創建一個屬於他們自己的社區。”

本地某大學創業學教授

“大學和研究機構往往需要聘用年輕的技術人才，而這些人才通常沒有強大的研究網絡。相反，他們會積極尋找不同的合作夥伴來共同開展創新項目。因此，我認為他們的工作氛圍和環境是成功的關鍵因素。”

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領導與管治

- 協同治理模式已被世界各地的創新區普遍採用。治理機構通常由來自大學、公司、初創企業、非營利組織和政府機構等多方成員組成。除了負責制定發展策略和管理日常工作外，協同治理機構的主要職責通常還包括加強大學之間和官產學研之間的合作關係。如表 6 所示，為了進一步促進大學研究成果的轉化，美國三角研究園成立了專門的大學創新委員會，負責就推動北卡羅萊納地區各大學研究成果商品化提供評估和建議。對於北部都會區未來的管理，一些受訪者也主張建立一個專門負責該地區發展的協同管治架構。

表 6 美國北卡羅萊納州三角研究園的治理模式

	三角研究基金會	大學創新委員會
成立年份	1959	2016
組織形式	非營利組織	北卡羅萊納州州長提案
領導團隊	25 名董事會成員： • 9 名來自三角研究園內大學(36%) • 5 名來自大型公司 (20%) • 2 名來自本地中小型公司 (8%) • 2 名來自初創企業和非營利組織 (8%)	24 名董事會成員，來自三角研究園內大學、初創企業、投資公司、政府部門等
發展使命	• 促進三角研究園內大學間的合作 • 促進產學研合作 • 為北卡羅來納州創造經濟價值	• 促進大學間合作，推進科研成果商品化 • 研究北卡羅來納州各大學成果轉化的最佳做法，並對後續發展提出政策建議
主要職責	• 管理和監督三角研究園日常工作 • 投資建立促進合作和發展社區的項目計劃 • 收集和評估來自三角研究園公司和組織的意見	• 對北卡羅來納州各大學在科研成果商品化方面所面臨的挑戰進行詳細調研，並提出具體政策建議

受訪者語錄

“現在的問題是，雖然行政長官說想做點什麼，但實際落實需要經過太多的部門。對於北部都會區而言，你必須以創新的方式去發展它。你需要授權一個組織，類似機場管理局或北部都會區管理委員會，並給予它足夠的信任。這樣政府的所有計劃才可以有效地執行。長期不斷地計劃是不可行的。”

立法會資深議員

“我認為最好有一個專門的機構來負責北部都會區的發展。雖然政府已經設立了北部都會區統籌辦事處，但具體工作仍由不同的局和部門負責執行。以廣州市南沙區為例，該區成立了一個由不同政府機構代表共同參與的發展委員會，這樣它就能夠具有很強的協調和行動能力。我認為北部都會區目前的組織架構還不夠創新。”

資深城市規劃師

政策建議

1. 建立以大學為主導並提供多個公共研發平台的大型創科實驗室

為了充分利用香港在研發方面的競爭優勢，推動研究成果的商品化進程，我們建議在北部都會區建立三至四所由大學主導的大型創科實驗室。實驗室雖由本地和國際的一流大學牽頭，但同時也致力於成為學術界和產業界共同創建的共享平台。

目標和要求：此建議的目標是構建一個全面、共享的研發生態系統，使研發工作不僅具有學術意義，更能通過合作研究產生切實的社會經濟影響。達到此目標需要建立一個共享的研發平台，使大學、大型企業、研究機構、初創企業和政府部門共同參與到從概念化到商品化的過程當中，同時從共享的資源、知識和社交網絡中相互受益。關鍵工作包括建立協同的治理和運營模式、基礎設施建設、鼓勵多方合作的政策框架、財務可持續性，以及配合每個參與方獨特需求的融合戰略。

共享研發平台：大型創科實驗室的核心是搭建共享研發平台，成為大學和企業交換資源、共享知識、和開展研究項目的合作空間。通過提供一流的設施，這些平台將促進產學研項目和初創企業的發展，有效彌合從研究到實際應用之間的差距。科技公司、初創企業和研究機構在平台的聚集將進一步擴大產學研合作和成果的商品化。

戰略重點和地點選擇：大型創科實驗室將優先考慮與香港創科發展緊密聯繫的領域，如醫療科技、生物科技、先進材料和人工智能。新田科技城無疑是建立實驗室的理想地點，其充足的創科用地能夠滿足上游基礎研究和中游成果轉化（如原型設計）的發展需求。

現有資源的利用：大型創科實驗室將得益於香港科技大學、香港中文大學、香港理工大學、和香港大學等本地一流大學的強大研發能力。實驗室可與現有的研發機構和平台建立緊密聯繫。例如，香港應用科技研究院可在應用研究以及技術轉讓和商品化方面提供支持。香港科技園公司可利用其運營科學園的經驗提供顧問支援，並促進大型創科實驗室與 InnoHK 的 28 個研究中心之間的合作。總之，這些以共享研發平台為基礎的大型創科實驗室將在香港的創科進步中發揮關鍵作用。通過增強產學研之間的連結，實驗室將推動研究成果轉化為實際應用，鞏固香港作為全球創科樞紐的地位。

實施時間表：

短期行動（1-2 年）

- 組建委員會：組建一個由學術界、產業界和政府利益相關者組成的核心委員會，以制定管理和運營架構。
- 土地分配：以生物科技為重點在北部都會區為研發平台分配合適的土地。
- 試點項目：啓動具有前瞻性的，促進“官產學研”合作共贏的試點項目。

- 數字合作平台：結合現有的科技工具開發促進合作和知識共享的數字平台。

中期行動（3-5 年）

- 設施建設：為前沿研發工作提供最先進的相關設施，並確保其能夠滿足現有及新興的創科發展需求。
- 績效評估：實施健全的評估機制，以評估大型創科實驗室和相關項目的功能性、影響力和運行效率。
- 合作項目：發起能夠推動本地和全球創科進步的高影響力合作項目。

長期行動（5-10 年）

- 國際聯盟：在國際上建立並鞏固聯盟關係，將香港的研發平台與全球創新網絡結合起來，促進創意和技術的互惠流動。
- 調節機制：建立動態的反饋和調節機制，使共享研發平台與本地和全球的創科趨勢相接軌。
- 可持續創新：優先發展有助於可持續發展和社會責任的創新活動，使其與國際市場需求和全球挑戰保持同步。
- 全球定位：在全球舞台上推廣香港的研發中心和創新成果，鞏固其在目標創科領域，尤其是生物科技領域的領先地位。

具體政策建議：特區政府可考慮建立“健康科技創新發展計劃”（HIDI）。為提升香港在國際健康科技領域的地位，可考慮建立一個綜合性的大型創科中心，在學術界、產業界和研究機構之間建立協同效應，並利用香港大學和香港中文大學等著名大學在醫療健康和生物醫學工程方面的優勢。計劃的第一步是建立合作研發平台，以匯聚學術界和產業界的研究力量，共同促進醫療科技的創新。與此同時，應加強基礎設施建設以及財政和政策機制的配套，以培育更多初創企業並促進成熟企業的拓展。HIDI 的另一個分支將致力於人才培養和知識轉移，通過舉辦研討會、技能提升計劃和國際合作項目，培養一批致力於推動醫療科技進步的先進人才隊伍。

2. 建設世界一流的研究基礎設施和設備

世界一流的研究設備和設施是開展突破性研究和大型合作項目的核心要素，對創新區的發展至關重要。我們的研究表明，先進的基礎設施在吸引全球人才、促進產學研合作、和擴大研究影響力等方面有著不可或缺的作用。事實上，建立先進的科研基礎設施已成為粵港澳大灣區新興創新區的核心發展戰略之一。截至 2023 年 9 月，深圳光明科學城已經建成 9 個重大科技基礎設施（深圳新聞網，2023）。

目標和要求：此建議的主要目標不僅是提供尖端設施，而是將這些設施與本地和全球的創科發展相接軌。實現這一目標須達到以下幾點要求：1）設施建設與當前和新興的創科發展趨勢保持同步；2）整合併優化利用現有的科技資源；3）建立融合學術界、

產業界和政府部門的協同框架；4）採用穩健、可持續和靈活強的運營和財務模式來支持基礎設施的生態系統建設。此外，還需要將這些發展方向與粵港澳大灣區現有的設施佈局相配合，從而創建一個具有凝聚力和協同作用的基礎設施網絡。

戰略性基礎設施建設：特區政府應利用新田科技城的大片創科用地，優先建設適合前瞻性研究的基礎設施。具體的設施選擇應符合香港創科發展的路徑及獨特優勢。可能的重點領域包括人型機器人、超級計算機中心和先進的生物醫學設備等。同時，應參考粵港澳大灣區現有的重點設施，以更好地發揮協同作用並避免重復建設。

現有資源的利用：整體發展戰略包括對香港的大學、香港科學園和研究機構現有的基礎設施進行需求分析，確保互補發展，避免重復建設。與擁有相關研究專長的大學建立合作夥伴關係也至關重要。例如，與香港科技大學鄭家純機器人研究院和香港理工大學人工智能機器人實驗室的合作將有利於該領域基礎設施的投資建設。向研究資助局咨詢意見將有助於保障基礎設施的發展與香港多方面的研究需求相一致。此外，香港應用科技研究院可在基礎設施的設計方面提供寶貴的技術支援。事實上，對世界級研究設備和設施的重視不僅僅在於基礎設施的提升，更在於將香港定位為全球創新中心，吸引頂尖人才，推動科技變革。

實施時間表：

短期行動（1-2 年）

- 明確並盡快發展 1-2 個重點科技領域，如人工智能和機器人科技等。
- 盡快開始初期設施的建設和運行，戰略性地整合現有科技資源。
- 建立初步的合作夥伴關係，關注與本地和國際之間的產學研互動。
- 開展促進“官產學研”合作和資源共享的平台和計劃。

中期行動（3-5 年）

- 將已開發的設施投入使用，並確保其配備先進的科學設備。
- 建立以專家為主導的管理委員會，負責監督日常運營和促進國際合作。
- 啓動針對特定行業的研究項目，開展人才引進和保留計劃，基於基礎設施創建蓬勃的生態系統。
- 實施健全的知識產權管理和轉讓機制，從而進一步激勵創新活動。

長期行動（5-10 年）

- 持續升級和擴充基礎設施和項目，以配合科技進步和市場需求。
- 加強與各全球科技中心的聯繫，持續開展合作性的創新活動。

具體政策建議：我們建議推出「香港科創燈塔計劃」，旨在通過建設標誌性研究基礎設施，如國際機器人中心和量子計算中心（分別側重於服務型機器人、自動駕駛汽車

和量子計算），將北部都會區打造成為推動科技進步和國際合作的樞紐。這些設施將通過向全球研究人員開放使用來吸引國際人才和企業，並由北部都會區創新委員會內設的科學委員會負責管理（詳見建議四）。該計劃由政府資助或與私營企業共同出資，旨在加快重大研究基礎設施的開發和使用，為香港研究機構與國際同行之間的合作提供紐帶。戰略性的財政撥款將優先考慮符合香港創科發展方向的項目，從而為新田科技城未來的發展奠定堅實基礎。

3. 為北部都會區創科研究及合作研究設立專項基金

政府資助對於促進創科研究與合作，尤其是在北部都會區大型創科實驗室和研究設施的基礎上，有著至關重要的作用。雖然創新及科技基金（ITF）現設有六項支持研究及發展的資助計劃，但其核准金額僅佔 2022 年 ITF 總核准金額的 16.5%（創新及科技基金，2023）。這突出表明瞭增加政府資助力度的必要性。

目標和要求：首先，划撥的資金不應僅作為經濟驅動，還應發揮其磁場效應吸引高質量的研發企業。其次，資金還應為研究項目的發展和產出提供保障，與創科實驗室和研究設施的能力有機結合。第三，需要制定全面的指導方針來規定資金的分配、使用和評估，確保最大限度地發揮資金的用途。

世界一流研究設施的利用：大型創科實驗室所擁有的先進研究設施和共享研發平台為建立針對性政府資助提供了機會。特區政府可設立專項基金，來鼓勵進行與大學創科核心驅動圈相關的前沿研究。同時，可為大學與產業之間的聯合研發項目，尤其是以產品測試和小批量生產為重點的項目，給予慷慨的補貼。此類聯合研發項目既可屬於一項新的專項基金，也可作為創新及科技基金現有資助計劃的一個主題。

現有資源的利用：應在創新及科技基金內為北部都會區劃撥專項基金，重點支持連接產業界、學術界和國際合作夥伴的聯合研發項目。與北部都會區創科發展相關的研究主題可被納入現有的合作性資助計劃，如主題性創新及科技支援計劃和夥伴研究計劃。研究資助局應對重點領域的選擇提供建議，協助探索當前的研究空白和新興技術，並探討建立與私營機構合作的融資模式。

實施時間表：

短期行動（1-2 年）

- 為合作創新活动設立專項預算，確保有足夠的資金支持重點發展領域。
- 明確能夠發揮香港既有創科優勢的優先領域，同時確保其在短期內的可行性。
- 完善現有的創新及科技基金架構，制定更加直接、透明和支持性更強的申請、審批和評估程序，以吸引高質量的研究與合作項目。

中期行動（3-5 年）

- 實施並推廣明確旨在促進產學合作的資助計劃
- 採用專門的、結構透明的資助計劃，最大限度地發揮新的創科實驗室和研究設施的作用，確保它們不僅能推動創科發展，而且還能促進研究基礎設施的最大化利用。
- 建立跟蹤評估受資助項目的影響和進展的有效機制，重點考慮私營企業的參與、研究目標、以及總體影響力等因素。

長期行動（5-10 年）

- 制定並完善資助計劃，確保其不僅能促進技術進步，還能幫助簡化從創新到商業化的過程。
- 引入靈活的財務框架，以適應不斷變化的創科環境，並與新興技術、趨勢和挑戰保持一致。

具體政策建議：我們提出建立“香港科技進步及創新網絡”（HK-TAIN）作為一項重要且及時的舉措。該計劃將以政府資助為主要資金來源，同時考慮私人和國際利益相關者的支持。通過精心考量，HK-TAIN 將會投資既能帶來科技進步，也能產生切實的社會經濟影響的項目。嚴格挑選的專家委員會將負責全面評估研究計劃書、審查年度資金的使用情況以確保資源分配的合理性、以及致力於在第一年運作期間促成多个合作項目。

4. 成立負責北部都會區創科發展的高層級管治架構

有效的領導和健全的管理對於創新區的可持續發展至關重要。雖然政府已成立北部都會區統籌辦事處負責區域的整體發展，我們認為仍需考慮設立一個專門負責促進區域創科發展的高層級管治架構。

目標和要求：此建議的戰略目標是設立一個將大學、公司、投資者和政府機構等多方利益相關者凝聚在一起的管治架構，以統一的願景和治理模式指導創科發展。主要職責包括對大型創科實驗室和研究基礎設施進行良好的管理，嚴謹地分配資金，並精心制定政策措施。無論是選擇合作治理模式的北部都會區創新委員會，還是更加集中、結構化的北部都會區管理局，該架構都必須體現透明度、包容性、靈活性和適應性，以推動創科生態系統的不斷成長。

建議的管治架構：

- 北部都會區創新委員會：體現協同的治理模式，將決策和咨詢功能相結合。委員會成員將來自大學、企業、投資機構和政府機構等不同部門。除負責監督管理創科工作外，委員會還將負責管理大型創科實驗室和研究基礎設施、增強各方合作、分配研究資金、以及制定政策方向。

- 北部都會區管理局：作為一個以公營公司模式運行的法定機構。管理局主席由政府任命並直接向行政長官彙報。管理局的主要職責包括監督創科工作、制定發展戰略、管理財務和執行政策等。

現有資源的利用：新成立的管治架構可充分吸收創新科技署等現有機構的政策制定經驗。香港科技園公司的運營專長可為策劃和管理創新生態系統提供寶貴參考。香港應用科技研究院可在資源優化和夥伴關係培養方面提供真知灼見，而本地大學則可以幫助闡明學術界的需求。從本質上講，成立一個專門的創科發展機構不僅是為了加強管理，更是為了融合創新、合作與發展，引領北部都會區成為全球創科的風向標。

實施時間表：

短期行動（1-2 年）

- 建立起法定機構並使其合法化，明確界定來自主要利益相關者群體的初始委員的職責。
- 為擬議組織的管治架構制定一份詳細的建議書，規定運作規則和職能。
- 開始與各利益相關方進行交流探討，以收集意見並建立初步的合作夥伴關係。

中期行動（3-5 年）

- 制定關於北部都會區詳細的創科發展策略和政策框架，確保按時啓動主要的基礎設施建設和資助機制。
- 對選定的組織模式進行試點，包括建立初步夥伴關係和啓動首批項目。

長期行動（5-10 年）

- 確保新組織在創新、技術發展和成果商品化方面取得顯著成果。
- 全面推行新的管治架構，包括大幅擴展研究項目、夥伴關係和戰略舉措等。
- 進行持續的進度跟蹤和戰略調整，與多變的創科形勢保持一致。

5. 舉辦豐富多樣的人際交流活動以打造創新氛圍濃厚的新型社區

創新文化和社區歸屬感是蓬勃發展的創新區的重要特徵。在本研究中，幾位受訪者也強調了香港在這些方面的不足，尤其是在科學園和數碼港這樣相對成熟的創新集群。因此，如果北部都會區要真正成為創科發展的核心樞紐，則必須建立起一個包容和充滿活力的社區。

目標和要求：開展形式多樣的人際交流項目的重點目標即是打造一個蓬勃發展的創新社區，使其成為創科發展和人才成長的孵化器。例如，可以創建特定的研究協會，組織以創科主題的公共活動和研討會，以及設立由大學主導的、涵蓋不同人群的社區教育計劃。同時，還需要政府提供財政和基礎設施支持，匯聚大學、研究機構和企業的

專業才能，並建立一個總體性框架以確保這些舉措具有包容性、相關性和推廣性，從而與科技領域的動態變化保持一致。

全球最佳實踐：如分析結果部分所述，世界各地的創新區已成功開展了各式各樣的人際交流項目，在建立新聯繫、促進合作和推動知識交流方面具有重要意義。這些舉措可為北部都會區的社區建設提供方向參考。

社區建設戰略：

- 發揮大學創科核心驅動圈的作用：政府應充分發揮大學創科核心驅動圈的潛力，設計並開展形勢新穎的人際交流項目，包括成立專門的研究協會以加強學術界、研究機構和企業界之間的聯結。
- 舉辦公共活動：大型創科實驗室可作為現場演講、主題研討會和其他活動的舉辦地，吸引來自不同領域的人士參加。
- 推廣創科教育：大學可以帶頭開展針對不同年齡段的本地居民的社區教育活動，從而推廣創科文化。政府應提供必要的資金支持以確保各項計劃的順利實施。

現有資源的利用：香港科學園和數碼港的現有活動為舉辦具有影響力的計劃提供了豐富的啟示。舉例來說，Meetup @ HK Science Park 把科學園內不同的人群聯繫起來，並定期舉辦交流活動、分享會、工作坊和會議。數碼港創業學會則為數碼港培育計劃的畢業生提供交流平台，幫助他們搭建關係網絡，加強與數碼港的聯繫。開辦相關課程的本地大學可成為公眾教育活動的共同設計者。研究機構可就活動主題和形式提供指導，確保活動帶來有意義的專業交流。企業則可發揮其作為贊助商和招募平台的雙重作用。所有項目的設計都應與現有的大型活動相輔相成，從整體角度出發促進北部都會區的創新發展。

實施和時間表：

短期行動（1-2 年）

- 開展旨在匯集各利益相關方成員並增強創科文化的人際交流項目並推動試點項目，如現場演講或專題研討會等。
- 通過全面的咨詢與大學、公司和當地社區進行溝通，以便清楚地瞭解其對於人際交流項目的需求和潛在機會。

中期行動（3-5 年）

- 根據早期的反饋意見優化並擴大人際交流項目，增加其範圍和頻率，以穩步建立一個多元的參與者群體。
- 從試點轉變為長期項目，如定期專題研討會和系列演講，以保持發展勢頭和維持參與群體。同時，應從反復評估轉為更直接的、以行動為導向的計劃調整。

長期行動（5-10 年）

- 將北部都會區定位為一個獨具特色的創新中心，利用前期形成的人際網絡和合作關係建立突破性的項目和企業。

具體政策建議：我們提出「創科社區聯絡計劃」作為一項直接、務實的政策措施。這項由政府資助的計劃將作為一個舉辦系列演講、互動工作坊等多種交流活動的平台，旨在將創科生態系統中的各利益相關方緊密聯繫起來。此外，它還將作為一個促進研究項目、創業等多方合作的渠道。該計劃同時也將戰略性地納入面向廣大社區的教育模塊，發揚創新精神，在北部都會區內形成更廣泛的包容性創新文化。

6. 提供先進完善的生活及研究支持設施以配合研發活動和吸引國際人才

蓬勃發展的創新區通常擁有先進的設施和理想的居住工作環境，這對於致力於成為研發中心的北部都會區也不例外。

目標和要求：此建議的主要目標是通過兩個關鍵切入點來提升北部都會區的全球吸引力：提供以研發為中心的便利設施和制定降低香港高昂生活成本的戰略。前者包括建立會議中心、展覽中心和研究支持中心等設施，後者則強調為非本地人才提供經濟適用住房和有吸引力的生活補貼。基本發展要求包括持續性的政府資助、確保大學優先使用權的機制、確保便利設施的可及性和連通性的戰略規劃，以及為全球研究人員提供多種人才公寓和生活補貼的系統方法。

創新支持設施：北部都會區要真正能夠為大學創科核心驅動圈的活動提供支撐，就應配備一系列與研究相關的便利設施，包括會議中心、展覽中心、研究輔助設施和酒店等。鑒於政府在促進創新方面的關鍵作用，應帶头建立或資助這些設施。大學作為主要利益相關者應優先獲得使用權。此外，必須進行周密的規劃以確保這些設施在創新集群內的可及性和連通性。

解決生活成本問題：若要吸引全球科研人才，香港必須重視解決生活成本過高的問題，其中住房負擔能力問題最為突出。根據最初公佈的《新田科技城的土地用途建議》，政府初步計劃提供 6,400 個人才公寓單位。考慮到大學創科核心驅動圈的預期需求，我們認為亟需增加公寓數量，並為非本地人才提供不同所有權形式的住房選擇。此外，政府也應考慮提供全面的生活補貼，如吸引全球頂尖研究人員的補貼計劃等。

現有資源的利用：為確保北部都會區滿足其目標群體的需求，政府應對香港各地（尤其是新界北）的現有設施進行審核，找出不足之處。同時，應咨詢作為主要利益相關者的本地大學，以進一步明確補充現有基礎設施所需的新設施。通過建立公私合作夥伴關係，特別是與房地產和零售業的合作，北部都會區可為本地和國際人才提供適宜的住房和生活方式選擇。在人才公寓方面，政府可借鑒科學園擁有 500 多個住宿單位

的創新斗室（InnoCell）的有益實踐。總之，最終目的是打造一個能夠吸引全球頂尖人才的充滿活力和吸引力的工作和居住環境。

實施時間表：

短期行動（1-2 年）

- 通過直接觀察和收集利益相關者的意見找出現有設施中的不足，確定需要加強的領域，並優先發展無需進行長期研究即可操作的設施。
- 從易於施行的支持項目做起，包括建立研究支持中心和為國際研究人員提供直接的生活補貼，確保快速、切實地加強支持。

中期行動（3-5 年）

- 開始建設關鍵的配套設施，與先前確定的需求緊密結合，並與利益相關者的明確需求以及初步計劃保持一致。
- 實施多元的住房策略，提供形式多樣的住宿選擇和不同的所有權模式，從而滿足廣大全球人才的需求。同時，需輔之以清晰的多層級補貼計劃，以滿足不同人才群體的不同需求。

長期行動（5-10 年）

- 為鞏固北部都會區吸引國際人才的「磁場」地位，需維持且不斷加強現代化的生活設施建設，顯著提升該地區的工作和生活條件。
- 有計劃地完善和拓展配套設施，取消密集的定期審查，通過緊跟技術和研究發展前沿確保提供的設施始終具有前沿性和相關性。
- 在住房和補貼方面採用實時審查機制，使其與財政和人口狀況密切配合，並根據研發環境和全球人才結構的變化適時調整或擴大供給。這將有利於保持北部都會區對於全球人才的吸引力。

結語

創新科技日益被視為推動香港社會和經濟持續增長的強大引擎。雖然香港擁有世界知名的頂尖大學、雄厚的研發實力和極具吸引力的營商環境等顯著優勢，創科發展現狀卻不盡如人意。土地供應嚴重不足、人才短缺、研發成果商品化程度低等因素直接阻礙了科技產業的發展。為加快完善本地創科生態圈，推進“新型工業化”發展，必須牢牢把握北部都會區帶來的寶貴機遇，打造世界一流的創新區。通過案例分析和深度訪談，本研究探索了世界各地創新區的特色做法，歸納其成功的關鍵因素，並收集了不同持份者對北部都會區發展創科的意見和看法。結合香港的背景、優勢及挑戰，本研究提出了六點以發揮“大學創科核心驅動圈”的作用為核心的政策措施，以期為北部都會區的創科發展策略提供參考。

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附錄

附錄 A 受訪者名單（n=30）

名稱	職位	名稱	職位
T 先生	生物技術公司 CEO	N 教授	香港某大學教授
P 先生	國際諮詢公司區域負責人	R 教授	香港某大學教授
W 博士	立法會議員	E 博士	創科公司首席戰略官
M 先生	國際諮詢公司合夥人	C 先生	創科相關非營利組織主席
L 博士	國際諮詢公司合夥人	Y 女士	初創企業組織負責人
V 教授	香港某大學教授	R 先生	創科相關非營利組織副總裁
G 教授	香港某大學教授	A 教授	香港某大學教授
A 先生	立法會議員	L 教授	香港某大學教授
L 先生	立法會議員	C 教授	香港某大學教授
K 先生	金融科技初創企業 CEO	E 先生	香港創科公司 CEO
H 先生	政府官員	F 女士	國際銀行公共事務主管
K 教授	香港某大學教授	Z 教授	香港某大學教授
N 先生	立法會議員	C 女士	立法會議員
E 教授	香港某大學教授	T 博士	生物製藥公司技術人員
M 教授	香港某大學教授	N 博士	香港創科公司創始人

附錄 B 訪談問題示例

1. 就促進香港創科發展而言，您對《北部都會區發展策略》的整體看法如何？您認為《北部都會區發展策略》中的哪些內容特別具有前瞻性或創新性？

2. 您如何看待在北部都會區建立一個創新區來作為加快創科發展的催化劑？有沒有哪些潛在的風險或阻礙？

3. 在北部都會區打造創新區會在哪些方面為您所在的領域帶來挑戰或機遇？

4. 我們擬提出“大學創科核心驅動圈”的概念作為北部都會區發展創新區的一項關鍵策略。您認為建立大學創科核心驅動圈的可行性有多大？

5. 我們認為共享的空間和設施對於北部都會區至關重要，如果您的組織將來成為該區的一員，您會希望看到哪些類型的共享資源？共享建築、共享辦公空間、公共社交場所、共享公寓、醫院和學校等設施將如何惠及您的組織？

6. 我們擬提出的政策建議之一是建立北部都會區創新委員會來作為一種協同治理的模式。您認為建立這樣一個委員會的可行性有多大？

7. 您認為北部都會區創新委員如何有效地與現有的組織機構合作來共同發展該區域？是否可以建立多層次的管治架構來確保協同治理的順利進行？

8. 您認為政府為企業提供零地價的可行性有多大？應優先考慮哪類企業？有哪些可能的措施來評估它們的發展潛力？

9. 您認為北部都會區的創新區如何吸引和留住您所在領域或行業的頂尖人才？可以採取哪些策略和措施來吸引專業人士和研究人員？

10. 您認為大學和其他教育機構是否應該重點擴大 STEM 教育，並在北部都會區開設聯合課程？為什麼？

11. 政府將如何確保社會福利和設施能夠滿足未來大量遷入該地區的居民的需求？

12. 由於項目開發需要很長的時間，您認為政府將如何確保基礎設施建設的效率、時間和成本在預期之內？

13. 政府如何確保北部都會區的發展能夠惠及所有利益相關者，包括當地社區、企業和教育機構等？

14. 您認為應採取哪些措施確保北部都會區創新區的可持續發展，尤其是在環境、社會和經濟方面？

15. 除上述問題外，您對打造北部都會區的世界級創新區還有哪些建議或意見？