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科技及創新政策研究中心

粵港澳大灣區
院士聯盟
The Greater Bay Area
Association of Academicians

研究報告

在北部都會區建設大學城 推動香港創科新經濟發展

Building a University Town in the Northern Metropolis to Promote the Development of Hong Kong's New Innovation and Technology Economy

The Hong Kong Polytechnic University
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Innovation and Technology Policy Research Collaboration Scheme

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《在北部都會區建設大學城，推動香港創科新經濟發展》

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I. Executive Summary

This report evaluates the potential for developing a university town in Hong Kong's Northern Metropolis to advance Hong Kong's emerging innovation and technology (I&T) economy. The rationale includes meeting Hong Kong's local needs and integrating with China's national development strategies. Along with reviewing Hong Kong's I&T policy background and development blueprint, analysing case studies of successful global university towns, and gathering stakeholder perspectives from eight Hong Kong universities, the research indicates a thoughtfully developed university town will substantially boost Hong Kong's I&T economy, despite expected challenges. Whilst issues remain regarding the university town's construction and operation, this project can significantly promote Hong Kong's development into an international I&T hub. Key findings and recommendations are made regarding fostering talent, addressing land constraints, promoting industry partnerships, leveraging strategic locations, learning from global best practices, and gathering stakeholders' perspectives to inform balanced policymaking in order to ensure success. To support government planning, this report distils its key findings and makes six sets of policy recommendations.

Key findings:

1. **Reasons Why Hong Kong Needs a University Town**
   Hong Kong faces a shortage of science, technology, engineering, and mathematics (STEM) talent, with a gap of over 200,000 skilled workers estimated by 2030. Local universities have limited space to expand teaching and research due to acute land constraints. The "Northern Metropolis Development Plan" provides a prime chance to solve these difficulties, with proximity to Shenzhen uniquely positioning Hong Kong to integrate with the innovation, infrastructure, industries, and living spheres of the Greater Bay Area (GBA).
2. **Policy Advantages and Strategic Development Opportunities**
   National policies aim to develop Hong Kong into an international I&T hub, providing strong support for major investments in a university town. The Northern Metropolis development presents a strategic opportunity to concentrate intellectual capital and

infrastructure in a thoughtfully planned university town that can advance collaboration.

3. **Worldwide experience**

   In-depth global case studies reveal how comprehensive planning, facilities, and integration with local innovation ecosystems enable leading university towns worldwide to become thriving talent and technology hubs. The lessons learned can help Hong Kong to better build a university town in the Northern Metropolis.

4. **Stakeholder Unity**

   Despite nuanced perspectives, diverse local stakeholders are united on the Northern Metropolis University Town's immense potential as an intellectual and economic fulcrum, if insights are synergised through tailored policymaking.

A strategic approach to building a university town in the Northern Metropolis

Synthesising extensive literature, illuminating global case studies, and insightful local interviews, we propose establishing university innovation hubs as a new asset-based strategy for the Northern Metropolis University Town. These hubs are defined as concentrated nodes centred on anchor research institutions to strengthen university-industry collaboration, amplify research impact, and attract exceptional talent worldwide. Although Hong Kong has limited experience in developing its I&T sectors, it is strategically positioned as a regional education and research hub, home to world-renowned universities and possessing robust research and development (R&D) capabilities. To build clear competitive advantages, it is imperative to fully leverage the potential of universities and research institutions to cultivate dynamic university-industry-government partnerships that turbocharge I&T development.

Policy recommendations:

1. **Start planning the layout early to facilitate overall planning of the Northern Metropolis**
   - Set up dedicated offices to collect suggestions and coordinate planning for the university town's development.
   - Align with the three key industries in the Northern Metropolis and provide necessary talents and technical support.

- Encourage universities to propose development plans based on their strengths and needs. Initiate the planning process for the university town in the Northern Metropolis early.

2. Rationale for Scale Study Planning

- Optimise scale based on available funding to ensure that the funding can support the whole project.
- Analyse land supply and design appropriate scale.
- Schedule its development in phases to gradually achieve scale and aggregation effects.
- Make reasonable arrangements for the distribution of the university town based on industrial development plans.

3. Promoting Industry-University-Research Cooperation and Technology Demonstration Research

- Collect industry talent demands and cultivate urgently needed talents. Collaborate with companies to jointly train research students.
- Universities can provide targeted short-term talent training and offer courses on emerging technologies.
- Increase funding to incentivise university-industry collaboration and create synergies.
- Provide scenarios and funding for technology demonstration and validation.
- Promote the translation of R&D achievements into products, and realise the commercialisation of technologies.
- Formulate mechanisms for reasonable distribution of benefits in university-industry collaboration to motivate researchers and facilitate sustainable university development.

4. Simultaneous planning of supporting facilities

- Strengthen regional supporting planning and establish a special group to coordinate the construction of university towns and surrounding supporting facilities.

- Satisfy the rigid demands of top talents for housing, transportation, healthcare, education, culture, and leisure to create a liveable environment.
- Build a community atmosphere and provide a good quality of life.
- Introduce attractive policies to draw and retain talents, addressing issues like housing, healthcare, and education for children.

5. Create a good science, technology, and innovation ecology

- Attract and encourage more young people to study science, technology, and innovation-related subjects through financial incentives like teaching allowances or interest-free loans.
- Streamline administrative procedures for scientific research projects to increase researchers' initiative.
- Establish distinctive innovative activity exclusive to the northern metropolitan area, provide platforms for talent exchange and activities to facilitate communication among talents.
- Simplify procedures for tech talents to travel between mainland China and Hong Kong.

6. Promote legal safeguards and governance structures

- Provide clear legal guarantees for the university town's development to ensure continuity and sustainability.
- Set up dedicated government bodies to coordinate and manage the development and address related issues promptly.
- Standardise the construction and operation mechanisms of the university town to ensure sustainable development.

II. Background

This study analyses the potential for developing a university town within Hong Kong's Northern Metropolis to promote I&T, providing policy recommendations to the government. It examines the complex factors involved in transforming the Northern Metropolis into a leading technology hub according to the broader economic development strategy.

With reference made to our country's policy support for Hong Kong, as underlined in the "Outline of the 14th Five-Year Plan for National Economic and Social Development of the People's Republic of China and the Long-Range Objectives Through the Year 2035" (the 14th Five-Year Plan) and the "Outline Development Plan for the Guangdong-Hong Kong-Macao GBA" (the Outline Development Plan), the Hong Kong SAR Government (the Government) proposed to expand and consolidate the Northern Economic Belt to become the Northern Metropolis in the report entitled "Hong Kong 2030+: Towards a Planning Vision and Strategy Transcending 2030". Published on 6 October 2021, the "Northern Metropolis Development Strategy Report" outlined the blueprint for developing the Northern Metropolis.

Capitalising on the geographical advantages of the Northern Metropolis being adjacent to Shenzhen and thus the synergy of integrated development of the two cities, the Government will dedicate effort to build a complete I&T industry ecosystem and to develop the I&T industry into Hong Kong's second economic engine. The Northern Metropolis will also be developed into a region that will be good for people to live, work, and travel. According to the Government's estimate, the Northern Metropolis will eventually accommodate about 2.5 million residents and provide about 650,000 jobs, of which about 150,000 (about 23.1%) will be jobs in the I&T industry.

The Northern Metropolis Development Strategy also proposed that advanced steps should be taken to plan for major territory-wide and region-based facilities, such as tertiary educational institutions, private hospitals, and recreational facilities, at suitable areas and locations. Indeed, international examples have demonstrated that clusters of tertiary

educational and advanced research institutions can significantly contribute to the development of I&T industries and inject vibrancy into city development.

It can be seen that the Northern Metropolis will play a pivotal role in the future of Hong Kong's I&T industry and economic development. It is a vast and long-term development project, involving a wide range of areas, fields, industries, and levels that requires a complete and comprehensive development plan to achieve the visions and goals of the Government.

On the road to developing the I&T industry in the Northern Metropolis, formulating a series of policies on technological research infrastructure, cultivation and attraction of technological research talents, establishment of I&T businesses, and so on are indispensable and closely linked to the overall infrastructure and facilities within the Northern Metropolis. Many sectors of our society have different opinions on, and proposals for, the development policy of the Northern Metropolis.

A university town can be defined as a cluster region formed by local, international, and mainland Chinese universities, scientific research institutions, and enterprise research centres. The geographical location of the university town can be reasonably distributed in combination with the industrial planning of the Northern Metropolis to maximise synergies. This clustered ecosystem of diverse academic and research institutions, aligned with the surrounding economic priorities, is the essence of an effective university town. Some have advocated for building a university town in the Northern Metropolis in which local tertiary institutions can set up their branches to cultivate a wide array of professionals needed for the future development of Hong Kong.

Many cases worldwide have shown that a cluster formed by higher education and technological research institutions can effectively promote and foster I&T development. This study aims to systematically analyse and discuss the development, direction, and potential of building a university town in the Northern Metropolis under the framework of the Northern Metropolis Development Strategy. In addition, it also seeks to provide recommendations on the formulation of relevant policies for the Government.

III. Hong Kong's Need for a University Town

Hong Kong aims to become a global I&T hub, but currently faces a shortage of science, technology, engineering, and mathematics (STEM) talent estimated at 200,000 workers by 2030. Even with increases in STEM graduates, factors like 'brain drain' mean that more talent needs to be nurtured. A university town can help achieve this by connecting industry and higher education to promote talent retention, student opportunities, and local economic benefits.

Hong Kong universities also face acute land shortages, hampering expansion of teaching and research facilities. Creative underground expansion has provided some relief but more space is needed. The "Northern Metropolis Development Plan" provides a prime opportunity to address this, with the Northern Metropolis's proximity to Shenzhen uniquely positioning it to better integrate Hong Kong with the GBA in terms of innovation, infrastructure, industry, and living environment. Its location makes it an ideal bridge between Hong Kong and mainland China by facilitating collaboration and knowledge exchange through the planned Innovation and Technology Park; enhancing connectivity via new transport links; jointly developing strategic industry clusters to boost economic momentum, including expansion of financial services with Qianhai; and providing comprehensive housing, healthcare, education, leisure, and tourism facilities.

The Government has committed an unprecedented HK$150 billion to I&T development and Northern Metropolis infrastructure, cementing Hong Kong's role as a leading Asian hub for I&T success. This includes huge funds for strategic investments, talent attraction, manufacturing upgrades, enterprise growth, and infrastructure.

3.1. Fostering Talent

Hong Kong has set its sights on becoming a global I&T hub. However, for that to occur, the city has to increase its number of STEM-trained talents to bridge the gap between talent demand and supply. Additionally, according to Hong Kong Science and Technology Parks

spokesman, the “technopole” in the Northern Metropolis will create at least 165,000 jobs, with 120,000 of these jobs being I&T-related.

Based on University Grants Committee statistics, this gap can only be filled by increasing the current and projected number of STEM-based graduates. From 2015 to 2022, Medicine, Dentistry, and Health students increased from 10,389 to 12,547, Science students increased from 15,880 to 18,313, and Engineering and Technology rose from 19,006 to 19,364. Even with the 49,866 STEM talents who graduated in 2022, factors such as trending population loss due to aging, retirement, and the proportion of graduates who do not enter the workforce should be accounted for. Indeed in 2022, Hong Kong experienced its highest net population loss since 1991. This is reflected in the almost 50% increase in information and communications job vacancies (UGC, 2022).

Coupled with the brain drain that Hong Kong is facing and the increased demand for I&T talent, there remains the fact that this talent must be sourced from somewhere. As primary and secondary school students are geared to consider I&T pathways enthusiastically, universities must have the resources and abilities to continue nurturing this talent. This is where the pool of resources and facilities provided by a Northern Metropolis University Town will come into action.

3.2. Current Insufficient Land Capacity

The acute shortage of land is felt not only in the housing sector but also in the higher education sector. Hong Kong has five higher education institutions ranked in the top 100 of the QS World University Rankings. Universities feel pressured to reflect this reputation, but they cannot easily expand teaching and research spaces due to land shortages. According to HKUMed’s Director of Development and Infrastructure, Professor Chan Ying-shing, HKUMed desires a larger research lab to meet international standards and “there is also a lack of laboratories for research.” In addition, student enrolment has tripled in some faculties in the last twenty years, but campus size has not matched this rate of expansion, placing pressure on universities to find space. Tables 1 and 2 provide a contemporary snapshot of the campus size, total student enrolment, and total faculty

headcount at Hong Kong's eight UGC-funded universities and two overseas studies, which are studied in Chapter five of this report, respectively.

In the last two decades, Hong Kong's top research universities have resorted to creative measures such as digging underground and moving existing infrastructure to construct facilities. One notable example of this is Hong Kong University's Centennial Garden Campus which was established by digging underground caverns to relocate the Western Freshwater Service Reservoir and release usable land for construction. Working within Hong Kong's space constraints, universities have also approached strengthening development by setting up campuses in China.

This is a unique milestone project for land use, as there is currently a lack of tangible and significant space that the top universities can collaboratively share and conduct research activities in. Achieving a community like this will allow for an efficient solution to the land shortage issue that universities face, facilitate multilateral innovation, and grow an innovation economy.

Table 1: 8 UGC funded Hong Kong Universities' campus size, total student enrolment, and total faculty headcount

University Name	Campus size (in hectares)	2021/22 student enrolment (sub-degree, undergraduate, research and taught postgraduate)	2021/22 faculty headcount (staff employed in academic departments)	2021/22 average school area available to students and staff (in square meters)
Chinese University of HK	137.3	20,175	5,829	53
University of Hong Kong	14	20,696	6,792	5
City University of Hong Kong	15.6	13,491	3,119	9
Hong Kong Polytechnic University	9.2	17,489	4,931	4
Hong Kong University of Science and Technology	60	11,462	2,924	42
Hong Kong Baptist University	12.88	7,724	2,145	4
Education University of Hong Kong	12.5	7,653	1,491	14
Lingnan University	8.6	2,777	795	24

Table 2: Global case study universities' campus size, total student enrolment, and total faculty headcount

	Campus size (in hectares)	2021/22 student enrolment (undergraduate and postgraduate)	2021/22 faculty headcount (staff employed in academic departments)	2021/22 average school area available to students and staff (in square meters)
Stanford University	8,180	17,326	2,304	4,169
University of Tsukuba	258	16,542 (as of 2021)	4,608 (as of 2021)	122

3.3. Industry and Higher Education Connectivity

A university town will facilitate a 'Town-Gown Relationship'. This relationship refers to the connectivity between industry and higher education, promoting community building, talent retention, and local economic benefits. The nature of the relationship varies by town; however, it implies a community dynamic between the town and adjacent universities.

This dynamic allows for university-business partnerships, which are important for talent retention and student satisfaction, benefiting both industries and higher education institutions. The key benefit of placing industries in the locality of academic institutions is the fostering of community. One case study reported that participants who resided in university areas where they were interested in obtaining local summer employment felt a larger sense of belonging in their community. In the long term, this supports student retention in the local area. The symbiotic relationship between higher education institutions and industries allows for talent retention. According to a case study conducted in Florida, human creativity, or I&T human talent, fosters the growth and development of cities. When "creative" talent is centred in one region, "rather than jobs forcing people to relocate, companies cluster in order to draw from the concentrations of talented people."

The benefit for students, on the other hand, is that industry partnerships allow for a thriving networking environment. This means that students can find the best opportunities suited

to their I&T interests. This is also beneficial to the Government as it will allow universities to connect their research to social needs through collaboration with industry and the local community. This aligns with the 14th Five-Year Plan's goals for Hong Kong's I&T development.

The industry partnerships present in university towns can be structured with the support of the government, creating a university-industry-government "triple helix" that will create a cohesive innovation ecosystem. As the selected case studies of this report will demonstrate, much of the innovation-driven economic success arose from industry partnerships that universities formed — through university towns.

3.4. The Northern Metropolitan Area as a Prime Location for GBA Connectivity

According to the Outline Development Plan, released in 2019, to fully leverage the comprehensive advantages of Guangdong, Hong Kong, and Macao, deepen cooperation between the mainland and Hong Kong and Macao, and support the integration of Hong Kong and Macao into national development, cooperation among cities in the GBA will be continuously promoted in aspects such as innovation, infrastructure, industrial systems, ecological civilisation, and living circles under the principle of "One Country, Two Systems". The plan addresses and resolves prominent discrepancies, such as excess production capacity and imbalance between supply and demand structures, that currently exist between cities in the GBA. For example, Hong Kong's economic growth lacks sustained and stable support. Efforts will be made to make the GBA a world-class bay area and city cluster participating in the international competition system and leading China's economic, innovation, science and technology, and institutional development.

Hong Kong's economy is predominantly service-oriented, with the service industry accounting for 93.4% of its gross domestic product (GDP) in 2022 (Yeung, 2023). Since the outbreak of the COVID-19 pandemic, Hong Kong's economy has been severely impacted; its real GDP decreased by 6.5% in 2020, a significant intensification from the 1.7% decrease in 2019 (Yeung, 2023). This situation requires comprehensive restructuring

and transformation measures to address the challenges it presents and facilitate sustainable growth. Re-industrialisation is one of the solutions proposed by the Government. In December 2022, the Government released the "(香港创科发展蓝图, 2022)" (the "I&T Blueprint"), which outlined the next five-to-ten years of I&T development in Hong Kong. The I&T Blueprint aims to strength the I&T ecosystem, propel "new industrialisation", augment the pool of I&T talent as a catalyst for robust growth, foster digital economy expansion, transform Hong Kong into a smart city, and actively integrate Hong Kong with the overarching national development agenda, whilst nurturing its role as a bridge connecting mainland China and the global community.

If Central is Hong Kong's bridge to the world, then the Northern Metropolis will become Hong Kong's bridge to the mainland. These two bridges will connect Hong Kong from north to south and will drive the development of a series of industries along the way, including infrastructure construction, housing supply, healthcare systems, and education redistribution. This will play a crucial role in upgrading Hong Kong's economy and industries.

The Outline Development Plan also mentions supporting enterprises, universities, and research institutes in Guangdong, Hong Kong, and Macao to jointly build high-level collaborative innovation platforms and promote the translation of scientific and technological achievements into deliverables and products. Sha Tin Science Park is undoubtedly a good location for this, and serves as a good example. This area will also help deepen innovation cooperation between Guangdong, Hong Kong, and Macao, gather international innovation resources, enhance the ability to translate scientific and technological achievements into deliverables and products, and strengthen cooperation in scientific and technological innovation. Currently, there seems to be a lack of a platform or region for coordinating these activities, and the University Town may be a potential choice.

3.5. HK I&T and Northern Metropolis Development Investment by Government statistics

Table 3: Development indicators

	Development Vision	2016 (Figures of 2014)	2022 (Figures of 2020)	2027 (Figures of 2025)	2032 (Figures of 2030)
1. R&D					
1.1	Gross Domestic Expenditure on R&D (GERD) as a ratio to GDP	0.74% (HK$16.727 billion)	0.99% (HK$26.554 billion)	1.3%	2%
1.2	GERD per capita	HK$2,306	HK$3,575	HK$5,000	HK$9,000
1.3	Public: Private Ratio of R&D Expenditure	56:44	58:42	50:50	40:60
2. Start-ups					
2.1	Number of start-ups operating in co-working spaces, incubators and accelerators	1 065	3 755 (2021)	About 5 000	About 7 000
2.2	Number of unicorn enterprises (accumulative)	0	12	18	30
3. Talent					
3.1	Number of I&T practitioners	35 450	45 310	60 000	No less than 100 000
3.2	Number of I&T practitioners per 1 000 labour force	9.15	11.56	16.54	28.05
4. Industry development					
4.1	Contribution percentage of manufacturing sector to GDP (at basic prices)	1.2%	1.0%	1.5%	5%

Note. Sourced from the Hong Kong Innovation and Technology Development Blueprint.

The Government has made an unprecedented strategic push to develop the city into a leading I&T hub. Massive funds of HK$150 billion have been committed, including the

US$22 billion Hong Kong Growth Portfolio and HK$5 billion Strategic Tech Fund. Attracting talent is a key focus, with expanded research subsidies and allowance increases up to HK$35,000 for highly skilled researchers. The Top Talent Pass Scheme aims to draw premier global talent as well.

Boosting manufacturing is supported through the Re-industrialisation Funding Scheme, providing matching subsidies up to HK$15 million for setting up smart production lines. The new HK$30 billion Co-Investment Fund also makes strategic investments to attract enterprises to scale up operations in Hong Kong. Venture capital and startups receive support via HK$2 billion in government matching funds, which have drawn over HK$7.4 billion in private capital.

Smart city development is progressing through the 10 million-user Faster Payment System and major infrastructure projects like reserving space for a future high speed rail station. With substantial funding, talent incentives, enterprise support, and next-gen infrastructure, this strategic push aims to cement Hong Kong as Asia's premier hub for innovation, technology, and economic success.

IV. To review and study I&T development in Hong Kong and the GBA

The 14th Five-Year Plan positions Hong Kong as an international I&T hub. In response, the Government has released the "Northern Metropolis Development Strategy Report" outlining plans to develop the area into a metropolitan city with I&T as its economic engine. Establishing a university town here can promote Hong Kong's I&T development. The "I&T Blueprint" provides a roadmap for developing the ecosystem, and the University Town can help achieve key strategies around enhancing research capabilities, fostering an entrepreneurial culture, attracting talent, and enabling academia-industry collaboration. The "Hong Kong Smart City Blueprint 2.0" (the "Smart City Blueprint") also provides guidance on leveraging technologies like smart mobility, living, environment and governance to improve quality of life and sustainability. Learning from global university town experiences reveals important success factors: integrating the university seamlessly into urban planning; developing the surrounding ecosystem with research parks and incubators; promoting multidisciplinary collaboration across academia and industry; phased development with long-term vision and short-term goals; attracting international talent; ensuring connectivity and transport links; enabling university-industry partnerships and commercialisation; embedding sustainability principles; and governance by an independent body. With astute planning and implementation, the University Town in the Northern Metropolis can become a catalyst for Hong Kong's development as a global I&T hub. It can nurture home-grown technological capabilities and talent, enable impactful research, support technology commercialisation and knowledge-based industry growth, provide a vibrant ecosystem for startups and entrepreneurs, and increase Hong Kong's competitiveness and strategic value as a world city. The University Town will also exemplify how smart city technologies can enhance quality of life and environmental sustainability. By learning from global best practices, the University Town can be thoughtfully developed into a key driver of Hong Kong's future. Some companies and organizations offer help to develop Hong Kong's I&T development, such as Hong Kong Science & Technology Parks Corporation, Hong Kong Cyberport Management Company Limited and The Hong Kong Productivity Council. Besides, the importance of government actions and initiatives cannot be ignored.

4.1. Hong Kong and the GBA as a future International I&T Hub

The 14th Five-Year Plan, published in March 2021, illustrates the role and important position of Hong Kong in the development of the country. In addition to consolidating and enhancing the development of Hong Kong as four traditional centres – International Financial Centre, International Trade Centre, International Shipping Centre, and Centre for International Legal and Dispute Resolution Services in the Asia-Pacific Region – it is more important to add four new centres to enhance, build, and develop, including an International Aviation Hub, International Innovation and Technology Centre, Regional Intellectual Property Trading Centre, and East-meets-West Centre for International Cultural Exchange.

In response to the mission of establishing the International Innovation and Technology Centre, the Hong Kong government has already taken action in planning and development. As early as 2017, the Hong Kong government signed a the "Memorandum of Cooperation on Promoting the Joint Development of the Lok Ma Chau Loop Area between Hong Kong and Shenzhen" with the Shenzhen Municipal People's government, laying a solid foundation for the next stage of development in northern Hong Kong. In October 2021, the government released the "Northern Metropolis Development Strategy Report", which clearly stated that it planned to develop Northern New Territories into a metropolitan area that is a good place for people to live, work, and travel. With I&T industry as its economic engine, this will serve as Hong Kong's second economic belt outside of Central and provide a better opportunity to integrate Hong Kong into the overall development of our country, as shown in Figure 1.

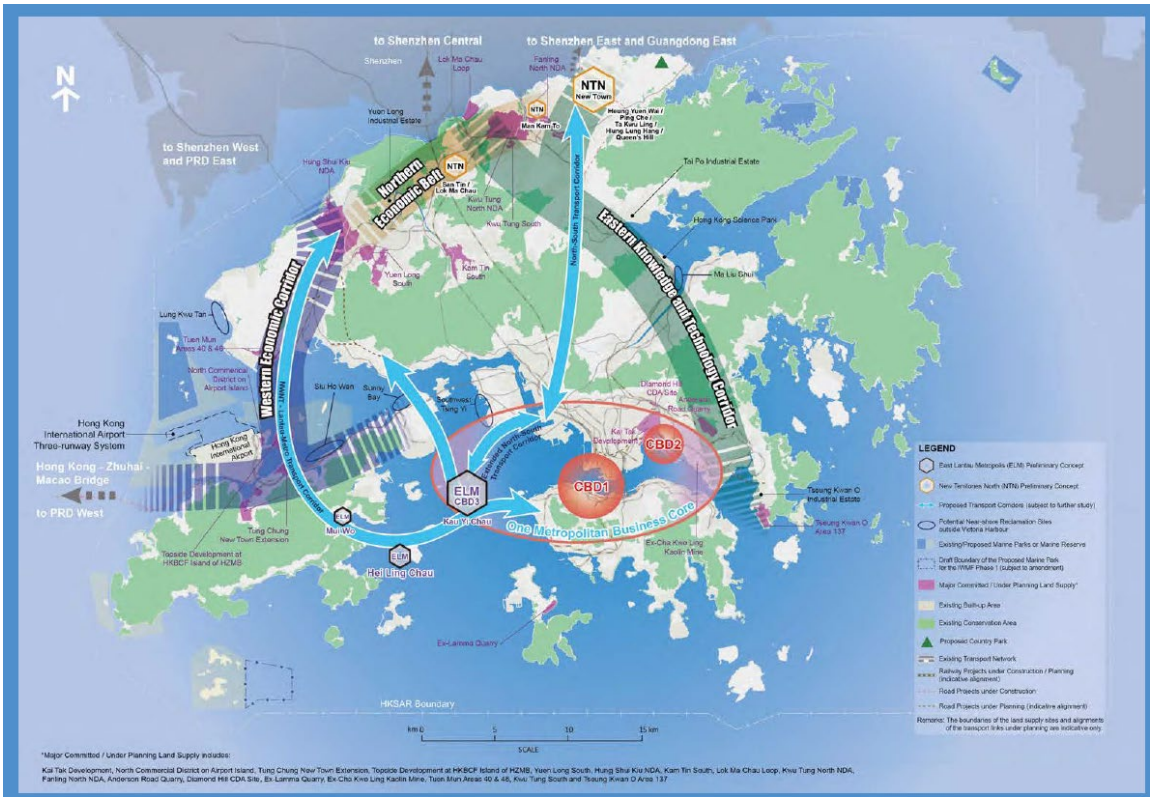

Figure 1: Conceptual Spatial Framework| source: Northern Metropolis Development Strategy Report, 2021

4.2. Hong Kong's existing I&T resources and institutions

According to the Global Innovation Index (WIPO, 2022), Hong Kong remains in a world-leading position, ranked from 11th to 14th in the recent years thanks to Hong Kong's I&T resources and institutions. Hong Kong's high quality of university education is well-known all over the world because it has the highest concentration of high-quality universities (5 world top 100 universities), surpassing international metropolises, including London, New York, Tokyo, etc. Besides, Hong Kong possesses 6 Hong Kong Branches of Chinese National Engineering Research Centres, 7 Research and Development Centres, 16 State Key Laboratories and 22 Chinese Academy of Sciences (CAS) Joint Laboratories, which provide various types of platforms for scholars and researchers to further research and transform their innovative ideas into practices, thereby attracting high number of world-renowned scholars and experts with proven track records, marked with revolutionary and forward-looking outcome in their respective fields.

Some companies and organizations offer help to develop Hong Kong's I&T development, such as Hong Kong Science & Technology Parks Corporation, Hong Kong Cyberport Management Company Limited and The Hong Kong Productivity Council. Besides, the importance of government actions and initiatives cannot be ignored. HKSAR established the Innovation, Technology and Industry Bureau to transform Hong Kong into a knowledge-based economy development and an innovation hub for technology and released 3 blueprints related to I&T development, including Smart City Blueprint, Smart City Blueprint 2.0 and Innovation and Technology Blueprint. Other resources associated with innovation and technology are shown in Table 4, like innovation infrastructures and support schemes.

Table 4: Hong Kong's existing scientific and technological resources and institutions

Type	Name	Description
Institutions, research centres and laboratories	5 world top 100 universities	• Hong Kong University • Chinese University of Hong Kong • City University of Hong Kong • Hong Kong University of Science and Technology • Hong Kong Polytechnic University Attract high number of world-renowned scholars and experts who possess revolutionary and forward-looking outcome in their respective fields
	Hong Kong Science & Technology Parks Corporation	Established in 2001, providing holistic and comprehensive services to meet the needs of companies at different stages
	Hong Kong Cyberport Management Company Limited	Owned by the Hong Kong SAR Government, cultivating talent, promoting entrepreneurship among youth, supporting start-ups, fostering industry development by promoting strategic collaboration with local and international partners, and integrating new and traditional economies
	The Hong Kong Productivity Council	A multi-disciplinary organisation, market-led applied R&D in smart products, smart manufacturing, automation, new materials, surface treatment, smart mobility, green transportation and environmental technology and providing consultancy, technology transfer, training and other support services

	7 Research and Development Centres	• The Automotive Parts and Accessory Systems R&D Centre • The Hong Kong Research and Development Centre for Information and Communications Technologies • The Hong Kong Research Institute of Textiles and Apparel • The Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies • The Nano and Advanced Materials Institute Limited • The Advanced Manufacturing Centre (in the coming years) • The Microelectronics Centre (in the coming years)
	6 Hong Kong Branches of Chinese National Engineering Research Centres	Chinese National Engineering Research Centres (CNERCs) serve as major impetus in providing engineering research and consultancy support to the industries, like National Rail Transit Electrification and Automation Engineering Technology Research Centre and National ASIC System Engineering Research Centre
	16 State Key Laboratories	The State Key Laboratory (SKL) scheme is one of the major national science and technology development schemes and today Hong Kong has 16 laboratories, like Chemical Biology and Drug Discovery hosting by Poly U, heading by Prof WONG Kwok-yin.
	22 Chinese Academy of Sciences (CAS) Joint Laboratories	Aimed for work together on highly specific scientific topics between Hong Kong universities and CAS research institutes, like the CAS AMSS-PolyU Joint Laboratory of Applied Mathematics
	7 Hong Kong campuses and facilities spreading across the GBA	• Zhuhai (the Hong Kong Baptist University) • Longgang, Shenzhen (campus and hospital of the Chinese University of Hong Kong) • Nansha, Guangzhou (the Hong Kong University of Science and Technology) • Foshan (the Hong Kong Polytechnic University) • Dongguan (the City University of Hong Kong)

		• Nanshan and Futian, Shenzhen (campus and hospital of the University of Hong Kong) • Zhaoqing (the Hong Kong Metropolitan University)
	The Greater Bay Area Association of Academicians (GBAAA)	Established on April 1, 2021 as a non-profit organization registered in Hong Kong. Combining Hong Kong's strengths in scientific research and its advantages as an international city and aimed to bring together leading scientists in the region to foster cross-disciplinary exchange and collaboration and promote technology and popular science education
Infrastructures	Hong Kong Science Park	Located in Pak Shek Kok, cover an area of 22 hectares, more than 1,100 technology companies and over 11,000 R&D practitioners, providing advanced equipment and software platforms in support of R&D work and stimulating professional exchange, investor matching, business development and commercialisation
	Cyberport	Hong Kong's digital technology flagship and incubator for entrepreneurship with over 1,900 members including over 800 onsite and close to 1,100 offsite start-ups and technology companies.
	The Data Technology Hub	Located in Tseung Kwan O Industrial Estate (TKOIE), aimed to accommodate uses ancillary or complementary to the data transfer operations and global telecommunications
	The InnoCell	Near to the Science Park, and providing around 500 residential spaces with flexible design and facilities such as shared workspaces
Initiatives	Innovation and technology fund (ITF)	there are 17 funding schemes under the *ITF*, with various objectives including supporting R&D, facilitating technology adoption, nurturing technology talent, supporting technology start-ups and fostering an I&T culture, like *Innovation and Technology Venture Fund* (*ITVF*) and *Technology Start-up Support Scheme for Universities* (*TSSSU*)
	Technology Talent Admission Scheme (TechTAS)	Started at May 2018 and provided fast-track arrangements for overseas and mainland research and development talent.

	STEM Internship Scheme	Launched in 2020, encourage STEM students to gain innovation and technology ("I&T")-related work experience during their studies and to foster their interest in pursuing a career in I&T after graduation
	Reindustrialisation and Technology Training Programme (RTTP)	Launched in August 2018, RTTP aims to subsidise local enterprises on a 2(Government):1(enterprise) matching basis to train their staff in advanced technologies, especially those related to "Industry 4.0".
	Government blueprints	released • *Hong Kong Smart City Blueprint* in December 2017 • *Hong Kong Smart City Blueprint 2.0* in December 2020 • *Hong Kong Innovation and Technology Blueprint* in December 2022

4.3. The “I&T Blueprint as a Roadmap

Research is an important part of the I&T ecosystem. Without research and innovation development, it is difficult to drive the vigorous development of the I&T industry. Universities in Hong Kong undertake the role of upstream and midstream research in the I&T ecosystem, whilst public research and commercial institutions are mostly engaged in midstream and downstream applications and industrial chains. Connecting scientific research results with social needs can help the I&T ecosystem develop sustainably. Based on this, the “Northern Metropolis Development Strategy Report” has clearly stated that the Hong Kong government will develop the San Tin Technopole into Hong Kong’s Silicon Valley, providing a total of about 148,000 I&T posts which can embrace the I&T industry with R&D. The current problem is how to accelerate the development of I&T and break down horizontal and vertical barriers between upstream, midstream, and downstream. Building a university town in the Northern Metropolis may be one feasible solution.

The “I&T Blueprint” is a long-term strategy document that outlines the government's vision and plan for developing the I&T industry in Hong Kong and is designed to ensure that the city remains competitive and at the forefront of technological innovation. It is a

comprehensive strategy that aims to position Hong Kong as a leading international I&T hub. It outlines various strategies to boost the city's R&D capabilities, promote technology adoption and commercialisation, foster a vibrant ecosystem for innovation and entrepreneurship, and attract global talent to support the growth of the I&T sector. Some of the specific initiatives outlined in the "I&T Blueprint" include the establishment of research clusters and innovation labs, the promotion of fintech and e-commerce, and the provision of funding and support for startups as well as small and medium-sized enterprises.

The government is also exploring innovative development models by accelerating the development of the San Tin Technopole in the Northern Metropolis to provide capacity for developing science and technology parks and advanced pilot production bases. The "I&T Blueprint" and the plan to build a university town in the Northern Metropolis are closely related. Building a university town in the Northern Metropolis can play a significant role in promoting the development of Hong Kong's I&T economy.

The "I&T Blueprint" helps create a conducive environment for I&T. It outlines various measures to enhance the city's R&D capabilities, such as increasing funding for R&D, improving the quality of research, and promoting collaboration between academia and industry. Building a university town with state-of-the-art research facilities and advanced infrastructure can provide a conducive environment for I&T. The "I&T Blueprint" also emphasises the need to foster an entrepreneurial culture in Hong Kong to support the growth of the I&T sector. A university town can provide an ideal platform for nurturing entrepreneurial talent and supporting startups by offering access to funding, mentorship, and networking opportunities. The "I&T Blueprint" also recognises the importance of attracting global talent to Hong Kong to support the growth of the I&T sector. A university town with world-class facilities and a vibrant research community can be a powerful magnet for attracting talented researchers, scientists, and entrepreneurs worldwide. The "I&T Blueprint" highlights the need for closer collaboration between academia and industry to promote the commercialisation of R&D outcomes. A university town can facilitate such collaboration by bringing researchers, entrepreneurs, and industry professionals together in a common ecosystem.

The "I&T Blueprint" can serve as a roadmap for building a university town in the Northern Metropolis to promote the development of Hong Kong's new I&T economy. By creating a conducive environment for I&T, promoting entrepreneurship, attracting global talent, and encouraging collaboration between academia and industry, establishing a university town in the Northern Metropolis aligns with the goal of the "I&T Blueprint" to develop a robust ecosystem for I&T development.

4.4. Insights from the "Smart City Blueprint"

The "Smart City Blueprint" aims to leverage I&T to enhance the quality of life in Hong Kong and promote sustainable development. It outlines various strategies to promote the adoption of smart city technologies, including smart mobility, smart living, smart environment, smart people, smart government, and smart economy. Building a university town with advanced smart infrastructure in the Northern Metropolis can provide a platform for I&T development and can benefit from the "Smart City Blueprint" in several ways.

First, the "Smart City Blueprint" recognises the importance of promoting smart mobility to improve the efficiency and sustainability of transportation systems. A university town with advanced smart mobility solutions can promote sustainable and efficient transportation systems, reducing the need for private cars and reducing traffic congestion. Smart mobility solutions such as bike-sharing, electric vehicles, and autonomous shuttles can provide enhanced connectivity and accessibility to students, researchers, and industry professionals with convenient and sustainable transportation options. Additionally, adopting smart parking systems can optimise the use of parking spaces, reducing the demand for additional parking infrastructure.

Second, the "Smart City Blueprint" also emphasises the need to promote smart living to enhance the quality of life in the city. A university town with smart living solutions can improve the quality of life of students, researchers, and industry professionals. For instance, smart homes with advanced energy management systems and Internet of Things (IoT) devices can provide a comfortable and healthy living environment. Smart healthcare systems can promote wellness and support preventive care, whilst smart public spaces with

advanced lighting, air quality, and noise management systems can create a healthy and pleasant environment for studying and working.

Promoting a sustainable environment to support the development of a smart city is the third smart area in the "Smart City Blueprint". A university town with a sustainable environment can support the development of Hong Kong's I&T economy. For example, adopting renewable energy sources such as solar and wind power can provide a reliable and sustainable energy source. Additionally, implementing smart waste management systems can reduce waste and promote recycling, whilst adopting green building standards can promote sustainable development and energy efficiency.

Fourth, the "Smart City Blueprint" recognises the importance of smart people in the development of a smart city. It recognises that a knowledge-based economy is essential for developing a smart city. A university town offering high-quality education, research opportunities, high quality of life, affordable housing, convenient transportation, and diverse cultural and recreational activities can attract and retain talented individuals and provide a conducive environment for I&T development. The culture of innovation and entrepreneurship in a university town can provide opportunities for students, researchers, and industry professionals to develop and commercialise new ideas and technologies. The "Smart City Blueprint" also points out the importance of lifelong learning in supporting the development of a smart city. A university town that offers opportunities for lifelong learning, such as continuing education programmes, can help individuals acquire new skills and knowledge to adapt to changing technologies and industries.

Fifth, the "Smart City Blueprint" emphasises the need to promote smart government to enhance the efficiency and transparency of public services. A university town with smart governance systems can improve the efficiency and transparency of public services. The adoption of digital platforms for public engagement can improve citizen participation and feedback, whilst the use of smart data analytics can improve decision-making and resource allocation. Additionally, implementing smart city technologies such as smart lighting and water management systems can reduce the cost of public services whilst improving the quality of life of students, researchers, and industry professionals.

Last, a smart economy is characterised by a high level of connectivity, innovation, and productivity, and it relies on advanced technologies such as artificial intelligence, IoT, and blockchain. Fintech is an important sector that is growing rapidly in Hong Kong. Technology can also enhance the tourism and legal industries. A university town can support the development of fintech, smart tourism, and lawtech by providing education and training programmes in financial, tourism, and legal technologies, as well as incubation and acceleration programmes for startups. A university town can also establish partnerships with financial institutions, tourism operators, legal firms, and technology companies to promote the development of innovations in these areas.

It can be seen that the "Smart City Blueprint" can provide insights into building a university town in the Northern Metropolis to promote the development of Hong Kong's I&T economy. By leveraging smart city technologies, a university town can provide a conducive environment for I&T and enhance the quality of life of students, researchers, and industry professionals.

There are many university towns around the world, and they are mainly divided into two types: traditional university towns and innovative university towns. Traditional university towns generally originate from universities with a long history and gradually form a state of integration between the city and the university over time, such as Oxford and Cambridge in the United Kingdom and Delft in the Netherlands. Innovative university towns, on the other hand, aim to create economic value by directly serving society with scientific research results. They are often driven by national strategic goals, integrating university resources to achieve industry-university-research integration, such as Tsukuba University Town in Japan (Henini, 1999). The establishment of a university town in the Northern Metropolis combines these two types, aiming to create economic value and build a new city. Therefore, learning from past university towns' experiences and lessons is necessary.

Figure 2: Hong Kong-Shenzhen Innovation and Technology Park (under construction) | source: Northern Metropolis Development Strategy Report, 2021

V. Global Case Studies of University Towns and Science Parks

University towns, where the identity and pulse of the city or region are inextricably tied to the influence of higher education institutions, have become hubs of talent, innovation, and economic growth around the world. This paper explores the development and contributions of successful university towns in the United States, Japan, Singapore, South Korea, and China.

It first examines the rise of Silicon Valley, anchored by Stanford University, and Tsukuba Science City, anchored by the University of Tsukuba in Japan in the 1970s. Driven by government initiatives and "triple helix" collaborations between academia, industry and government, these university towns fostered technology clusters that revitalised local economies. The paper then analyses how Singapore Science Park and South Korea's Daedeok Innopolis leveraged proximity to multiple research universities to become thriving Asian innovation hubs since the 1990s.

Turning to China, Beijing's Future Science City and Liangxiang University Town align academic programmes with local pillar industries, translate research on-site, and customise talent cultivation to drive economic upgrading. Suzhou University Town concentrates top domestic and foreign universities to supply high-level human capital and technologies to Suzhou Industrial Park. Guangzhou University Town has catalysed thousands of startups and attracted billions in venture funding through its incubators and innovation platforms.

In conclusion, across different countries, successful university towns share common features of strong university-industry integration, abundant innovation resources, vibrant high-tech clusters, and measurable contributions to local economic and social development. They exemplify how world-class academic institutes can be a boon to their host cities and regions when close partnerships are forged.

A quintessential characteristic of the image and experience of university life is the campus. The campus is, according to Bromley (2006), "the prime symbol of institutional life – a

separate space and place for the academic community". Despite being a highly complex institution with linkages, resources, and commitments to regions and communities beyond its locale and vicinity, the college campus is a community of its own – an ecosystem of students, faculty members, university personnel, and other individuals who are directly or indirectly linked with the social fabric constituting higher education and "university life".

The college campus and community does not exist in a social vacuum. More often than not, it is constructed or developed in an existing village, town, or city. The relationship between the two communities is encapsulated in the general term "town-gown relationship". Though varying case-by-case, a town-gown relationship refers to the town-university (or town-college) dynamics and (formal and informal) arrangements regarding a variety of factors, ranging from off-campus student housing, to university-business partnerships (e.g., discounted rates on goods and services based on university affiliation), to infrastructure development and service delivery (Bromley, 2006; Rousmaniere, 1997).

In the context of a college whose influence on the character, composition, and vibrancy of a town's community life is ubiquitous, the town can be referred to as a "college town". The "college" is the core identity of a college town, as its direct influence (e.g., senior university staff hold advisory positions or are council members of schools, hospitals, and urban planning boards) and indirect influence (e.g., through attracting students, capital, and intellectuals) on the town's economic, social, cultural, and political life are omnipresent (Filion et al., 2004; Miller, 1963). On a micro-level, student involvement, for example living in off-campus accommodation, volunteering, or participating in the local economy as a consumer, becomes a significant shaping force of college towns (Rousmaniere, 1997). The college itself too shapes the town through admitting or recruiting talented young people, attracting investment, and creating markets that the town can capitalise on (Rousmaniere, 1997). On a macro-level, the development of college towns is planned by state-civil society relations, for example in government interventions to create favourable conditions for the college's growth (e.g., campus expansion through land reform policy) (Rousmaniere, 1997).

In contrast to regular metropolitan towns, college towns uniquely experience urban revitalisation, infrastructure development, and overall improved economic prospects (e.g., through increased tourism, beautification and restoration, and high concentration of

students) (Bromley, 2006; Filion et al., 2004). As Bromley (2006) put it, "colleges and universities are often described as 'economic development engines' and they serve as 'anchor institutions' in many neighbourhoods and municipalities". Yet, the mere presence of a college campus does not directly translate to long-term positive development for the town. Similarly, a good town, whilst crucial to attracting potential students and prospective faculty members, might not necessarily adapt in its entirety to a college within its vicinity.

Rather, it is through the joint efforts of university, industry, and government that truly successful, long-lasting college towns have emerged. This university-industry-government arrangement, which grew in popularity during the 20th Century, has been termed by Etzkowitz and Leydesdorff (1995) as the "triple helix". Historically, against the backdrop of increasing international competition or wars, the "triple helix" was encouraged by national governments to increase a country's competitiveness in economic, military, and technological capacities (Etzkowitz & Leydesdorff, 1995; Hall, 1997).

5.1. World-renowned college towns and science parks abroad

5.1.1. Silicon Valley, USA

Stanford University and Stanford Research Park (formerly known as Stanford Industrial Park), which is the anchor institution of Silicon Valley, in the San Francisco Bay Area, for instance, has a history of university-military-government relations, going as far back as supporting the USA's war effort in World War II (Hall, 1997). Supporting the financially struggling Stanford University, Stanford Industrial Park was built in 1951 as a high-tech park for scientific research and technological development (Sandelin, n.d.). Its major contracts during the early 1950s came from the military and affiliated departments with involvements in the Cold War (Hall, 1997; Sandelin, 2004). These early efforts, as well as the establishment of successful tech startups later in the 20th Century, helped transform the reputation of Stanford University and elevated the Park to its acclaimed name of "Silicon Valley" (see Figure 3).

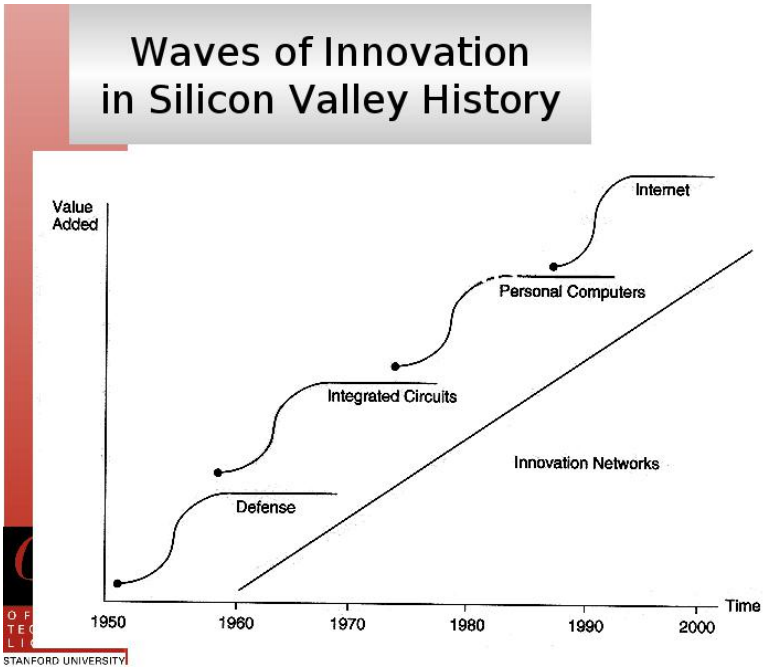

Figure 3: The development of Silicon Valley over time | source: Slide 9 of Sandelin (n.d.).

At the time, the idea to reuse the surrounding land of a regional college (the valley and land around Stanford was originally populated with fruit orchards; see Sandelin, 2004) to facilitate the development of hubs and/or parks to attract "excellent faculty and employees and high levels of research grants, charitable donations, corporate investments, and government support" (Bromley, 2006) was novel. Up until then, few colleges had initiatives to re-develop their land holdings into parks with intricate infrastructure development in order to enhance mobility and connectivity between residential complexes, industrial buildings, laboratories, teaching facilities, and leisure and entertainment amenities.

A systematic survey study sought to explore Stanford University's efforts In promoting innovation and entrepreneurship, and their impact on the national economy, in 2011. In total, out of 143,482 alumni[1] (i.e., Stanford graduates from the 1930s to the present), 27,783 provided responses (approximately 19.4% response rate). Also, 1,134 faculty (out

[1] It was sent to143,482 out of 191,332 living Stanford University degree-holders (i.e., alumni) (approximately 75.0%).

of 1,903 faculty members) (59.6% response rate) and 974 research staff at Stanford completed the survey (Eesley & Miller, 2017).

Based on the survey findings, it was estimated that 39,900 companies had been launched in connection with Stanford University (Eesley & Miller, 2017). In terms of economic impact, based on the report's findings, since the 1930s, approximately 5.4 million jobs had been created and annual global revenues of $2.7 trillion had been accrued as a result of these 39,900 companies (Eesley & Miller, 2017). If we account for firms based in California alone, an estimated 18,000 companies existed, providing 3 million jobs and accruing approximately $1.27 trillion in annual worldwide sales (Eesley & Miller, 2017). The report further estimated that "if these companies collectively formed an independent nation, its estimated economy would be the world's 10th largest" (Eesley & Miller, 2017).

Stanford has cultivated a thriving entrepreneurial ecosystem. According to the survey, around 29% of the alumni founded a for-profit or non-profit organisation; 32% of alumni were self-described investors, employees, or board members of a startup in the past; and 25% of faculty respondents reported incorporating or being among the founders of an entrepreneurial firm during their career. Furthermore, based on the alumni responses, there were 349 venture capital investors and 2,572 angel investors (Eesley & Miller, 2017).

The University has a long history of providing classes, seminars, programmes, and other opportunities to encourage entrepreneurship and innovation. For instance, students of Stanford are able to participate in activities organised by the Center for Entrepreneurial Studies, the Stanford Venture Studio, and the Stanford Technology Ventures Program. Furthermore, many firms in Silicon Valley collaborate with the Business School and/or School of Engineering to co-teach classes or get involved in related programmes. Thus, classes are taught not only by faculty members, but also entrepreneurs and domain-specific experts (e.g., start-up specialists or individuals who have expertise in securing funding). This tradition relates to a core part of Stanford's approach to encouraging entrepreneurship, which is "to bring together cutting-edge theory and real-world expertise in the classroom" (Eesley & Miller, 2017). A notable example is the Industrial Affiliates Program, where,

according to the website, “Stanford faculty and students can learn about industry perspectives and priorities, and corporate members are exposed to new ideas and research directions” (Stanford University, 2023). In addition, there are various competitions, networking programmes, and mentor-mentee programmes available to encourage students’ exploration of startups and entrepreneurship. Student associations, such as the Stanford Entrepreneurship Network, support these initiatives. A good example in this regard is Stanford Angels & Entrepreneurs (SA&E), an alumni association that aims to connect potential entrepreneurs and investors. As the report stated, “the alumni-driven organization provides networking and funding opportunities for students, alumni and startups plus educational programs to both angels and entrepreneurs” (Eesley & Miller, 2017).

Crucial to Stanford’s success in entrepreneurism and innovation are the close connections between alumni, Silicon Valley, and the University. According to the report, “forty percent of Stanford students find jobs through some form of networking, and the men and women who lead Silicon Valley’s most innovative companies interact regularly by visiting campus to lecture, collaborate with faculty, and share ideas with the next generation of entrepreneurs currently filling classrooms” (Eesley & Miller, 2017). Thus, it should be of little surprise that over 50% of Stanford Research Park companies employ Stanford University graduates (Stanford Research Park, 2023).

From the perspective of alumni, ‘giving back’ is a key motivator in staying connected with their alma mater. According to the report, many alumni return to the university (e.g., to recruit, lecture, collaborate with, and mentor students) and maintain links with the Bay Area more generally. For example, “thirty-nine percent of all alumni founded firms located within 60 miles of Stanford – or roughly a one hour’s drive” (Eesley & Miller, 2017). This commitment is not found among locals alone, but also among international students who attended Stanford: “15 percent (i.e., 2,600 persons in the survey) of graduate students from outside the United States stayed in the Bay Area and contributed to the region’s robust infrastructure and entrepreneurial spirit” (Eesley & Miller, 2017).

5.1.2. University of Tsukuba, Japan

Developed during the 1970s, Tsukuba Science City was the first "academic new town" established in Japan, housing national laboratories, institutes, and research agencies. Tsukuba Science City was born from visionary ambitions to promote science and technology, as well as forward-thinking pragmatic concerns regarding reducing overpopulation in Tokyo (Hall, 1997; Takahashi, 1981). According to Takahashi (1981), the Tokyo government decided in 1963 to establish a pioneering academic new town in Tsukuba, which at the time was not urbanised, with its characteristic essence (or "nucleus") being the concentration of research and higher education institutions. The decision to develop the urban space as a "town" was made in order to "provide the city with a high level of culture and other amenities so that the space for research and educational activities offers an adequate environment with good living conditions for research, educational staff and students" (Takahashi, 1981). Tsukuba Science City sat at the centre of the city, with the surrounding peripheries forming the suburban district (Takahashi, 1981). As Takahashi (1981) noted, the development of Tsukuba Science City had a strong impact on labour (i.e., restructuring the labour market from predominantly agricultural jobs to non-agricultural jobs among the native inhabitants) and population size (i.e., vastly increasing the number of urban residents in the area). Figure 4 shows a blueprint of Tsukuba Science City.

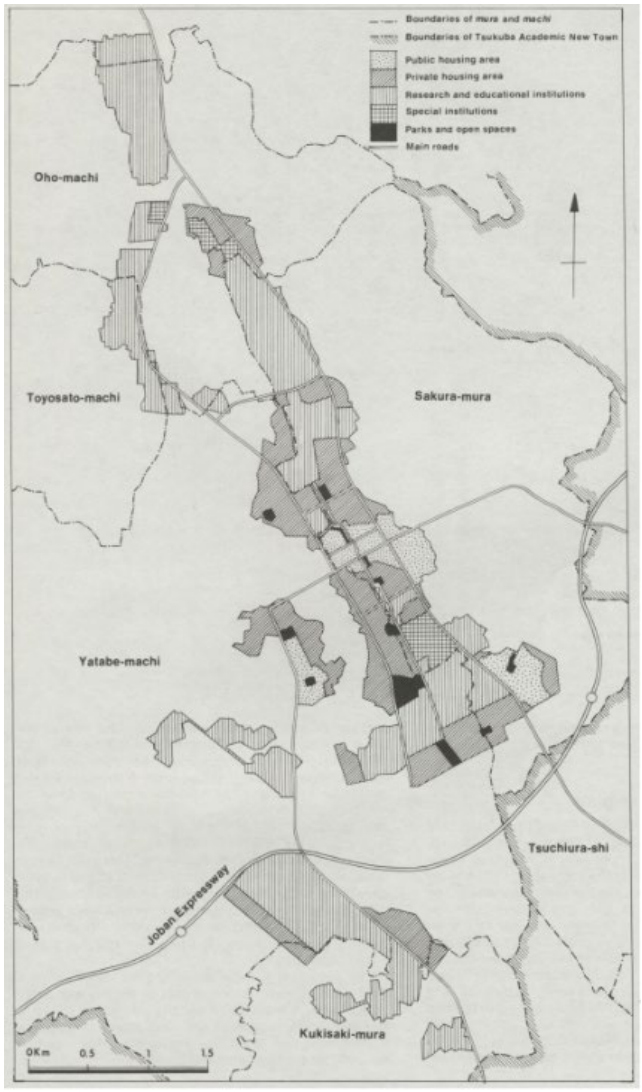

Figure 4: Tsukuba Science City or Academic New Town | Source: Takahashi (1981).

In the cases of Tsukuba and Stanford, the development of the science and technology parks led to the creation of new towns and communities. In both cases, the "triple helix" facilitated urban development in a way that positioned academic research and innovation as the beating heart of the town. As "college towns", according to Miller's (1963) definition, they assumed centrality in the fabric of community life, qualified by how much power they had in dominating town decision-making processes, relative to other institutions. Consequently, the surrounding towns in Tsukuba and Stanford were intractably influenced by the increased industry partnerships, development of start-ups, migration of intellectual workforce and other working professionals, and concentration of private capital and public funding (Hall, 1997; Sandelin, n.d.; Takahashi, 1981). In short, these institutional initiatives fuelled economic revitalisation and urban development.

As the largest I&T hub in Japan, Tsukuba Science City is home to 29 educational and research institutes. Around 20,000 people work in research institutes at Tsukuba Science City.

Based on materials published by the Ibaraki Prefectural Government on the University of Tsukuba and Tsukuba Science City, the University has one of the largest numbers of university-created venture companies in Japan (Ibaraki Prefectural Government, 2022). As of November 2021, according to one brochure from the Prefectural Government, 394 venture companies have been created (Ibaraki Prefectural Government, 2022). The brochure further stated, "the amount of funding raised has increased rapidly in recent years, surpassing 5 billion yen in FY2018" (Ibaraki Prefectural Government, 2022). Figure 5 provides more details on the number of venture companies created and the funds raised by the University's venture companies.

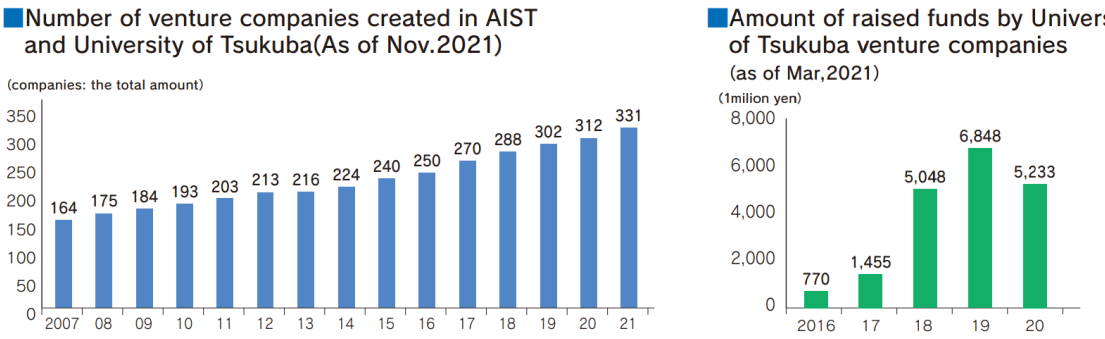

Figure 5: Number of venture companies established and funds raised by venture companies | source: Ibaraki Prefectural Government (2022, p.7).

Table 5 presents some of the basic characteristics of Stanford University and the University of Tsukuba. Both universities and their respective innovation and technology hubs are renowned and well-established in their respective countries.

Table 5: Basic characteristics of Stanford University and the University of Tsukuba

	Stanford University	**University of Tsukuba**
Country/region	Palo Alto, California, United States of America	Tsukuba, Ibaraki, Japan
Public or private	Private research university	Public research university
Year established	Established in 1891, but founded in 1885[1]	Established in 1973, but founded in 1872
Size of the land owned by the university	8,180 acres[4] (= approx. 33.1 km^2)	258 hectares[5] (= 2.58 km^2)
Year established (their flagship I&T hub)	Silicon Valley, established in 1951	Tsukuba Science City, established in 1963[2]
Size of the land occupied by the I&T hub	1,854 square miles[8] (= approx. 4,801.8 km^2)	28,400 hectares[9] (= 284 km^2)
Number of start-ups	39,900 companies[1]	394 companies[3]
Number of I&T facilities and laboratories	Among other smaller laboratories under Stanford's seven schools, it has 18 independent laboratories, centres, and institutes.[4]	29 national research institutes and more than 200 private research organisations.[3] It accounts for more than 30% of Japan's national research institutes.[5]
Notable start-ups	Google, Yahoo!, Nvidia, TSMC, Cisco Systems, Netflix, Tesla Motors, Nike, Gap Inc.[1]	Cyberdyne Inc., S'UIMIN Inc.[3]
Number of graduates/talents nurtured	220,000 Stanford alumni (among other prize winners and notable alumni, Stanford has 21 Nobel Laureates and 36 Nobel Prize winners)[6, 7]	One in 10 residents in the city of Tsukuba are researchers. The University of Tsukuba has three Nobel Laureates[5]

Note. [1] Eesley & Miller (2017); [2] Tsukuba Science City Network (2022); [3] Nature.com (March 20, 2019); [4] Times Higher Education (2023a); [5] Times Higher Education (2023b); [6] Stanford University (2023b); [7] Stanford University (2023c); [8] Jarvie (2020); [9] Ministry of Land, Infrastructure, Transport and Tourism (n.d.).

A great part of Stanford's success is attributable to President J. Wallace Sterling and the Vice President and Provost Frederick E. Terman. The inception of the technology-focused park (i.e., Stanford Research Park) and the underlying idea of cultivating close university-industry partnerships and a symbiotic ecosystem of knowledge and innovation transfer are credited to these two visionary leaders. According to the 2011 survey report by Eesley and Miller (2017), Sterling and Terman envisioned the park to be "a place where startups can find space to work, colleagues to bounce ideas off of, equipment to share and the constant stimulation that comes with new blood from the university… [in short,] to provide industry with access to the university and to offer researchers a change to try out their ideas in the business world". This "pioneering" entrepreneurial spirit is deeply entrenched in both the University and Silicon Valley, and they are renowned for it. For instance, among respondents who became entrepreneurs in the past decade, 55% reported choosing to study at Stanford because of its entrepreneurial environment (Eesley & Miller, 2017).

The University of Tsukuba and its Tsukuba Science City followed a different development trajectory. Unlike Silicon Valley, which was nurtured by industry-university partnerships and a steady stream of talent and expertise primarily running through Stanford University (Eesley & Miller, 2017), Tsukuba Science City enjoyed vast expansion due to support and investment from the national government (e.g., the government passed laws that sped up construction and expansion and increased resourcefulness and international outreach) (Nature.com, March 20, 2019; Takahashi, 1981). As Gonzalez Basurto (2016) mentioned, Tsukuba Science City was the first of its kind in Japan – an I&T city-park that was funded by the national government. The Science City was to lead the way forward in scientific research and technological innovations for the nation. Government involvement in nurturing strategic sectors and infrastructure is not atypical of Japan's governance style. What is unique to the story of the University of Tsukuba and its Science City, however, is that one key underpinning motivation for their creation was to reduce overpopulation and overcrowding in Tokyo. This is a major area of impact and contribution that distinguishes the case of University of Tsukuba/Tsukuba Science City from that of Stanford/Silicon Valley.

There are challenges in both regions. For the University of Tsukuba, first, its ability to stimulate startups may rely less on the existing financial infrastructure than on the cultural value system that permeates Japan's educated populace (Suzuki et al., 2002). Unlike the "business-owning" cultural aspirations and entrepreneurial spirit promoted in the United States, in Japan, prestige, fame, and respect are gained by working in large corporations. Put plainly by Suzuki et al. (2002), "highly educated people prefer to remain in larger corporations and thus only a limited number of charismatic people start up their own businesses".

A second – possibly connected – challenge concerns the collaboration between the University of Tsukuba and Tsukuba Science City. In short, unlike the relationship between Stanford University and Silicon Valley, the network and transference (e.g., of knowledge, human capital, and opportunities) between the two entities in Tsukuba still need development. According to Gonzalez Basurto (2016), writing on the opinion of one board member of the University, "although Tsukuba is a 'very good' university, it would be better if partnerships with more research institutes in the Science City were strengthened and deepened … 'a lot of times students and professors at the university don't recognize the relationship with the Science City.'"

In recent years, the University of Tsukuba and Tsukuba Science City have sought to tackle both challenges. They have reaped benefits from increased links to private enterprises set up in the Science City, joint research projects with foreign partners, funding from foreign grant-making bodies, and startup mentorship programmes (Nature.com, March 20, 2019). Importantly too, as Figure 6 shows, new plans for cultivating a "startup-friendly city" were put into motion in December 2018. The startup ecosystem, including the creation of a Tsukuba Startup Park, is nurtured by increased investment in infrastructure development as well as international partnerships and academic exchange, for example with Cambridge Innovation Center (Ibaraki Prefectural Government, 2022).

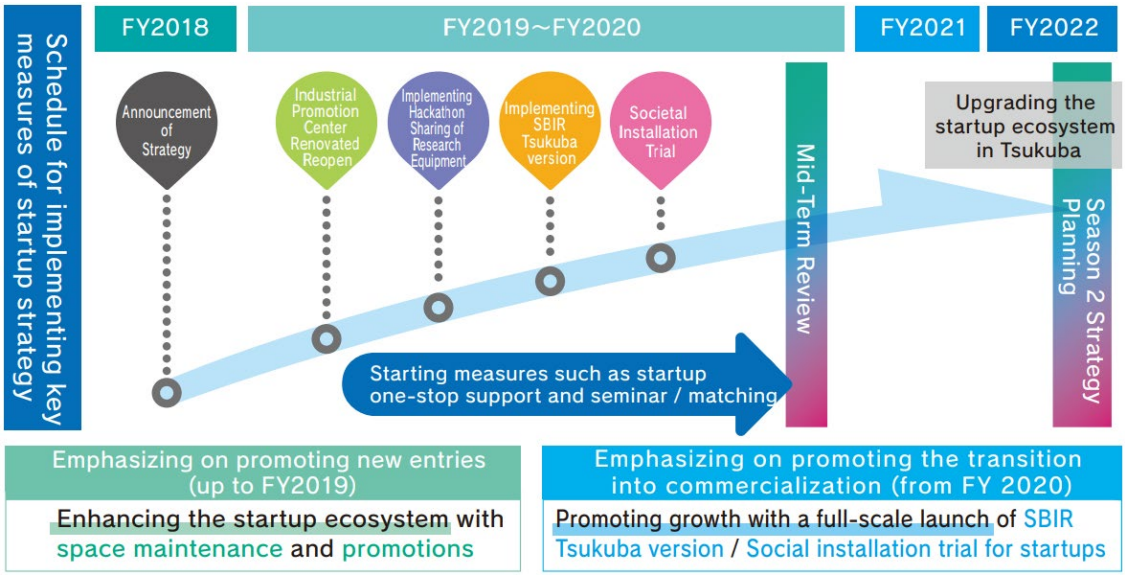

Figure 6: Strategy for growing a supportive startup ecosystem in Tsukuba Science City | Source: Ibaraki Prefectural Government (2022, p.8).

A third challenge facing the University of Tsukuba, which is related to a greater extent to its capacity to promote a welcoming college town, is its inclusiveness of non-Japanese-speaking persons. In an effort to increase their global competitiveness and contribution to the national economy, the national government targeted both the University and the Science City as strategic institutions for internationalisation (Gonzalez Basurto, 2016). Attracting talent from abroad and foreign interest are integral to this mission. Yet, recent literature and news reports have found that non-Japanese-speaking students and scholars face difficulties in being accepted and assimilated into the University and Science City due to the language barrier (Gonzalez Basurto, 2016; Tran, April 3, 2023). For non-Japanese-speaking scholars, based on a news report in the *Japan Times*, difficulties with the language barrier are compounded by biased recruitment, workload management, and promotion practices that discourage long-term commitment to the university (Tran, April 3, 2023). A recent effort by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) to support research excellence in the University of Tsukuba and other strategic high-standing universities in Japan may help solve the nagging problem of failing to attract and retain overseas talent (Tran, April 3, 2023). It remains to be seen if this initiative will be successful or not.

For Stanford, a longstanding challenge faced is the availability of affordable housing for its students, research support staff, and faculty. The origins of this problem are multi-

faceted and complex, not least because of national-level vulnerabilities (e.g., economic recession and inflation), state-level vulnerabilities (e.g., rising housing prices in California), and close proximity to Silicon Valley (which, for example, creates a large demand for executive suites or luxury housing options). It is a recurrent plight that has only seen gradual movement towards reaching a sustainable and satisfactory solution. As documented in the school's newspaper *The Stanford Daily*, in 2010, Palo Alto topped the charts of the most expensive college town to reside in (McGirr, November 18, 2010). Low land supply for new housing developments (against the increasing demand for housing) adversely impacts the ability of Stanford to perform effectively as an employer, on the one hand, and as an educator, on the other hand. Doctoral students and postdocs in particular have been hard pressed by the strong reverberations of increasing housing prices and rent. One subsidised housing project – the Escondido Village Graduate Residences (EVGR), which was built in 2017 for Stanford graduate students – for example, was met with dissatisfaction by the community of graduate students due to its high price point as an "affordable" student housing option (Bagdasarian, May 25, 2021; Dhawan, March 3, 2020). It was reported that rent prices in EVGR and other graduate student housing options provided by Stanford accounted for (on average) as much as 30%-40% of the monthly stipend offered to doctoral students (Bagdasarian, May 25, 2021; Dhawan, March 3, 2020).

Stanford has made some strides in addressing affordability issues. Notably, it established an Affordability Task Force (ATF) in 2018 to deal with a range of affordability concerns from the Stanford community, ranging from on-campus housing to childcare. Between 2018 and 2022, the ATF worked on gathering views from the Stanford community and launching initiatives and programmes that directly addressed major concerns, such as housing affordability issues for graduate students, postdocs, and faculty (see Stanford Affordability, 2023 for more details on the activity timeline of the ATF). Also, Stanford expanded its campus for the first time to Redwood City in 2019 (Berman, November 22, 2019). Among other objectives, the Redwood City campus expansion served to provide greater supply and options for affordable housing for Stanford employees, particularly early career employees such as postdocs (Berman, November 22, 2019). Whilst this strategic development is a significant milestone for Stanford (i.e., branching out from its well-established college town in Palo Alto), it remains to be seen how the new campus can

foster a similar sense of community and belonging between members of the “gown” and “town” in Redwood City.

The success of Silicon Valley and Stanford University, individually and together as an ecosystem of innovation and technological development, inspired science park projects around the world. The experiment with Tsukuba Science City and the University of Tsukuba gave governments in the Southeast Asian region confidence in the possibility of achieving economic prosperity and global competitiveness through investing in I&T. In recent years, based on evaluations by global leaders in the technology industry, KPMG’s annual report series on “Technology Innovation Hubs” show a consistent trend of I&T hubs from the Southeast Asian region attaining global recognition. As shown in Table 6, cities in Japan, South Korea, China, and Singapore have found themselves ranked in the top 10 list of world-leading I&T hubs.

Table 6: Leading I&T hubs ranked by global technology industry leaders

	2017	2018	2019	2020	2021
1	Shanghai	Shanghai	New York	Singapore	Singapore
2	New York	Tokyo	Beijing	London	New York
3	Beijing	London	London	Tel Aviv	Tel Aviv
4	Tokyo	New York	Tokyo	Tokyo	Beijing
5	London	Beijing	Shanghai	New York	London
6	Berlin	Singapore	Taipei	Shanghai	Shanghai
7	Chicago	Seoul	Singapore	Beijing	Tokyo
8	Washington	Bengaluru	Seoul	Seoul	Bengaluru
9	Boston	Tel Aviv	Boston	Bengaluru	Hong Kong SAR
10	Tel Aviv	Berlin	Austin	Hong Kong SAR	Austin; Seattle

Note. Data extracted from KPMG reports on I&T hubs (2017; 2018; 2019; 2020; 2021).

There are a variety of factors, such as the regulatory environment, availability of investment funding, and track record of successful startups, that one could deduce as being essential for establishing a resilient, responsive, and productive I&T hub. Based on survey responses from approximately 500 to 800 global technology industry leaders, Figure 7 compiles the results from recent KPMG reports on the factors that are determined as being conducive to building competitive, long-term I&T hubs. Interestingly, factors commonly associated with established campus towns were voted as being the most important for establishing I&T hubs: an urban locale that attracts young professionals, a pipeline of

skilled talent, modern infrastructure (such as high-speed bandwidth), and at least one research-intensive university in the vicinity (KPMG, 2020; 2021).

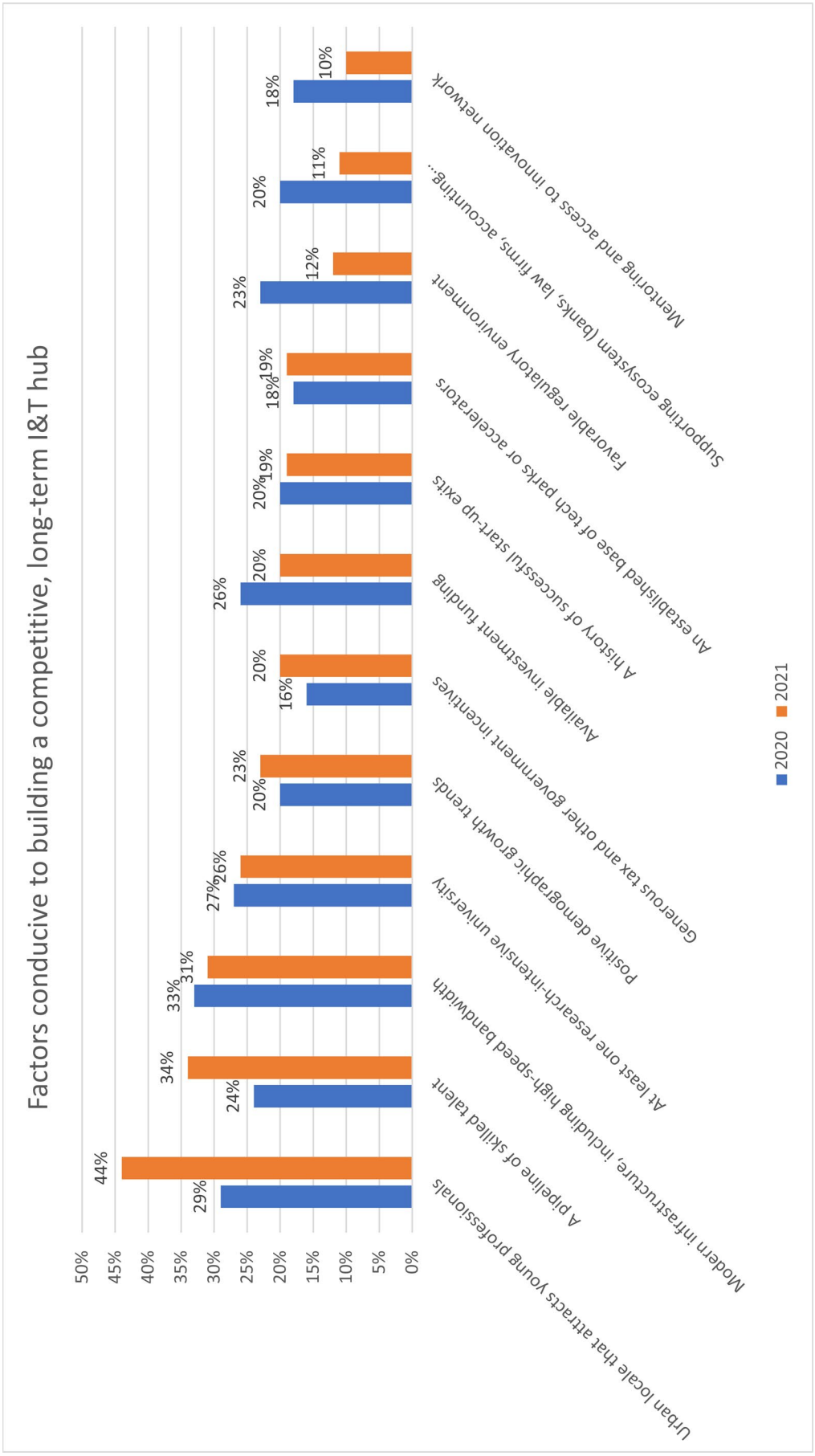

Figure 7: Factors conducive to building a competitive, long-term I&T hub. Source: KPMG (2020; 2021).

As the following sections demonstrate, unlike the previously discussed cases of Stanford and Tsukuba, an innovation and knowledge cluster can benefit from having more than one research-intensive university in its immediate vicinity. Singapore Science Park in Singapore and Daedeok Innopolis in South Korea are stellar examples of I&T hubs with connections and close spatial proximity to more than one research-intensive university.

5.1.3. Singapore Science Park in Singapore

Originally conceptualised in the 1970s, Singapore Science Park's construction kicked off in 1981, and the Park was officially opened in 1984. The Park was a key development that closely aligned with Singapore's national agenda to achieve global competitiveness by becoming a leading I&T city. As Phillips and Yeung (2003) explained, the Park was developed through "various [government] initiatives to generate agglomeration economies for R&D activities (for example, superior physical infrastructure, generous financial incentives and the nearby location of universities and research institutes)". Apart from receiving significant investment from the government, the Park also received support from various agencies under the Ministry of Trade and Industry (e.g., through the Economic Development Board and Jurong Town Corporation) to ensure a favourable location for R&D development and close proximity to research-intensive universities (e.g., the National University of Singapore and Singapore Institute of Technology are within walking distance from the Park, whilst Singapore Management University, Nanyang Technological University, Singapore University of Social Sciences, and Singapore University of Technology and Design are within driving distance), polytechnics (e.g., Singapore Polytechnic), research laboratories and agencies (e.g., the Agency for Science, Technology and Research [A*STAR]), healthcare institutions (e.g., the National University Hospital and Alexandra Hospital), and other institutions that are part of the innovation process or community development (e.g., lifestyle amenities). Infrastructure development of the Park expanded further during the 1990s and early-2000s with the construction of its second phase (i.e., Singapore Science Park 2 [SSP2]) (Singapore Science Park, n.d.). Figure 8 shows a topographical illustration of the Park and its neighbours.

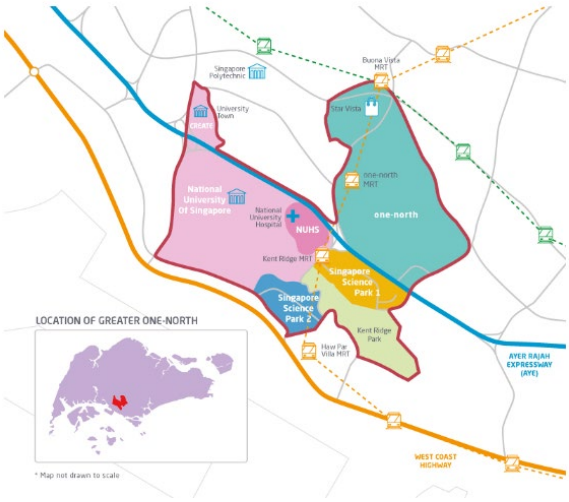

Figure 8: Singapore Science Park | Source: Singapore Science Park (n.d.).

Table 6 presents some basic information about Singapore Science Park.

Table 7: Basic characteristics of Singapore Science Park

Number of universities	All six public universities are within walking or driving distance
Year established (their flagship I&T hub)	Singapore Science Park, established in 1984
Size of the land occupied by the I&T hub	55 hectares[1] (= approx. 0.55 km^2)
Number of I&T facilities and laboratories	Over 350 multinational companies, local companies, and laboratories[1]
Number of listed companies	/

Note. There is no readily available information on the number of listed companies that are tenants of Singapore Science Park. However, there are a number of notable listed companies that have branches or headquarters in the Park, such as The Walt Disney Company, Ubisoft, Canon, and Fujitsu. Singapore Science Park (n.d.).

Singapore Science Park continues to enjoy strong government support and has made significant strides in developing state-of-the-art infrastructure. Notably, in 2019, the government announced its plan to invest millions of dollars to achieve full 5G coverage in the Park, affording unique opportunities for tenants in its ecosystem to engage in advanced R&D activities and technological developments (CNBC, June 27, 2019). More recently, a major addition to the Park was officially announced – the "Geneo" life sciences and innovation cluster/hub (CapitaLand, 2023). Expected to be fully operational by 2025, Geneo aims to draw firms and I&T talent with its state-of-the-art facilities and features that span commercial, R&D, educational, and recreational purposes (Yi, June 27, 2023). A 180,600-square mile development project in the Singapore Science Park, Geneo will include, among other offerings, a coworking laboratory space for startups with a focus on life sciences, diverse lifestyle amenities and entertainment, and housing (e.g., serviced residences) for tenants. Furthermore, approximately 44% (or 80,000 square miles) has been set aside for the expressed purpose of facilitating biomedical R&D activities (Yi, June 27, 2023). Overall, according to CapitaLand (2023), it is expected that Geneo will increase the I&T workforce in Singapore Science Park by around 75% (i.e., from 12,000 to 21,000 persons).

With the two above-mentioned strategic moves, Singapore is demonstrating well its commitment to promoting high-tech economic growth. High-quality infrastructure, advanced information networks, strong linkages to world-class universities and research institutes, a close proximity to Singapore's central business district, and strong support from the Government, venture capital funds, and community partners are just some of the key characteristics of Singapore Science Park that are certain to continue drawing foreign investment, multinational corporations, promising I&T firms, and talented I&T professionals. One potential challenge that the island country needs to address, however, is the issue of rising rent costs (Zalizan & Ong, May 12, 2023). There has been a steady increase in rent prices over the years, which alarmingly reached an apex last year of an annual increase of nearly 30% in private rental prices (Goh, January 27, 2023). This problem potentially impacts the ability of Singapore to be an attractive destination for I&T talents. For example, residential areas near Singapore Science Park, such as Queenstown or Buona Vista, have experienced rising property prices and rental costs (Goh, January 27, 2023). The increase in costs has posed some threat to the country's ability to retain foreign

talents, as some expats are considering moving out of Singapore due to the increased rent prices (see Zalizan & Ong, May 12, 2023). If Singapore wishes to remain internationally competitive as an I&T powerhouse of the Asia-Pacific region, a solution to appease renters or alleviate the burden of paying rising rent costs out-of-pocket needs to be devised.

5.1.4. Daedeok Innopolis in South Korea

The conceptualisation of Daedeok Innopolis (before 2005, Daedeok Science Park and University Town, or simply Daedeok Science Town) was finalised for construction in 1973. As Kim, Lee, and Hwang (2014) wrote, its final design benefitted from "benchmarking Japan's Tsukuba Science City". As a government-driven initiative, Daedeok Science Town was to form a national research-intensive cluster that would encourage local economic growth and global scientific competitiveness. The cluster would involve an agglomeration of research-intensive universities, public and private research institutes, non-profit organisations, and support agencies facilitating R&D activities (Oh & Yeom, 2012).

In the 1970s and 1980s, Daedeok Science Town was an area for conducting high-level scientific research with public research institutes and publicly-funded national universities (Oh & Yeom, 2012). However, in recognition of the need to engage in applied research, commercialise research output, and promote more positive relationships with the local economy and community (i.e., Daejeon Metropolitan City), the Science Town experienced its turning point. Mirroring Silicon Valley, construction began on a high-tech industrial zone, named Daedeok Techno-Valley, and this zone linked with the Science Town to expand the hub's overall function, character, and image (Oh & Yeom, 2012). In the 1990s and 2000s, the boundaries between Daejeon Metropolitan City and the Daedeok Valley (comprising the Science Town and Techno-Valley) became virtually blurred, as R&D activities, a talented and skilled workforce, start-up culture, and infrastructure development became ubiquitous with the city.

Since 2005, Daedeok Innopolis has achieved recognition as a "hub for global technology commercialisation, combining R&D, business, and production" (Oh & Yeom, 2012). As its backbone, Daedeok Innopolis maintains close cooperation between industry, academic institutions (e.g., Chungnam National University, Daeduk University, Hannam University, and KAIST), R&D institutes, people, and the government (Korea Innovation Foundation, 2019a). This effort is helped by supportive public agencies, such as the Korea Innovation Foundation. The Korea Innovation Foundation was established in 2005 as a key platform nurturing and supporting the Innopolis business ecosystem (Korea Innovation Foundation, 2019a). For instance, it helps with facilitating the dissemination and commercialisation of research findings, whilst also assisting competitive tenants to enter global markets (Korea Innovation Foundation, 2019b) (see Figure 9 for more details).

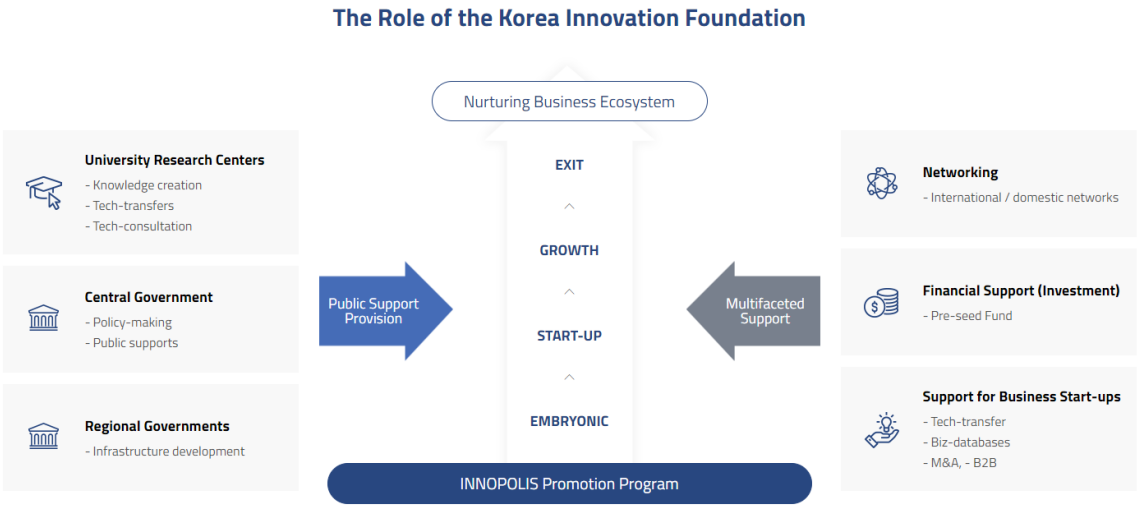

Figure 9. Mission of the Korea Innovation Foundation | Source: Korea Innovation Foundation (2019b).

The commercialisation of high-tech products, by leveraging robust R&D outputs and a skilled workforce from nearby research-intensive universities, is one of the key objectives of Daedeok Innopolis and a key stage in its 'virtuous circle' operation model (see Figure 10 for the full model).

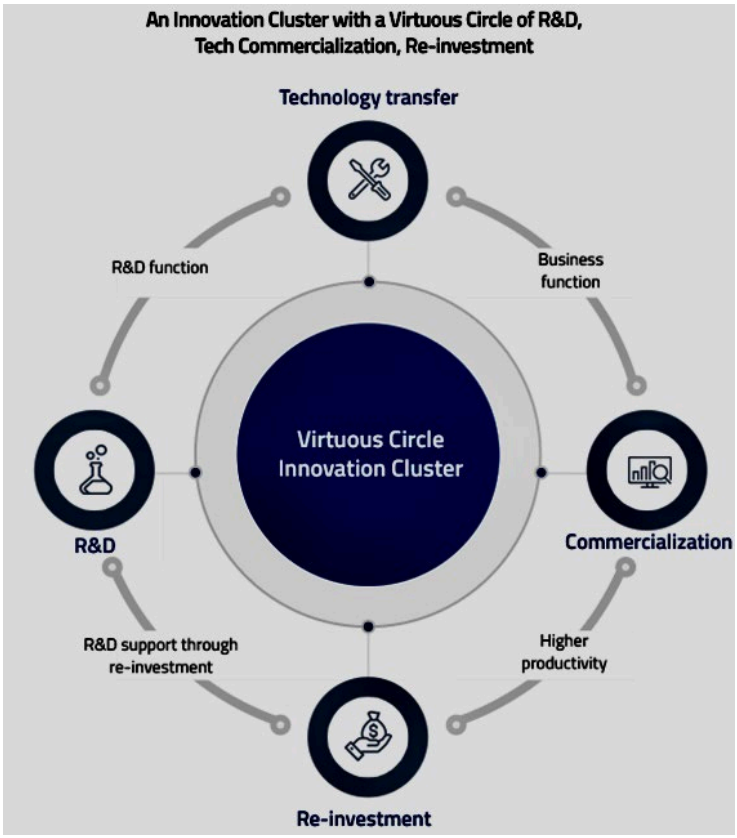

Figure 10: The Daedeok Innopolis model | Source: Korea Innovation Foundation (2019c).

As of December 2021, there were a total of 1,655 technology transfers, 34,795 international patent registrations, 80,026 domestic patent registrations, and 86,140 employees (Korea Innovation Foundation, 2021). Also, around 56 enterprises have been listed on the KOSDAQ (see Table 8 for other basic information about the Daedeok Innopolis).

Table 8: Basic characteristics of Daedeok Innopolis

Number of universities	7 universities[1]
Year established (their flagship I&T hub)	1973
Size of the land occupied by the I&T hub	27.8 km^2 [2]
Number of I&T facilities and laboratories	39 government and public research institutes, and 2,356 corporations[1]
Number of listed companies	56 enterprises in Innopolis are listed on the KOSDAQ[1]

Note. [1] Korea Innovation Foundation (2021); [2] Oh & Yeom (2012).

The close partnerships between the government, universities, and research institutes have helped Daedeok Innopolis maintain a steady growth since its inception. With assistance from the government in 1999, Daedeok Innopolis was able to successfully kick-off commercialisation of its research results, yielding high production and exports thereafter, whilst also drawing I&T talents to the innovation cluster (Kim, Kim, & Lee, 2022). In terms of long-term sustainability, Daedeok Innopolis appears to be resilient and on an upward growth trajectory, not least due to its steady domestic supply of highly educated I&T professionals and strong government support (Kim et al., 2022; Webb, 2007).

Although strides are being made in promoting the regional integration and interactions between Daedeok Innopolis and local actors (such as firms and intermediary government agencies in Daejeon), an issue that needs consistent monitoring and problem-solving is the cooperation and mutual support between administrators and authorities in the national government, Daejeon metropolitan city, Daedeok Innopolis, local communities, and other relevant regional actors (e.g., Kim et al., 2014). Continued support for each other would ensure the long-term sustainability and competitiveness of the innovation cluster.

5.2. University Towns in Mainland China

5.2.1. Future Science Park and Liangxiang Higher Education Park in Beijing

Located in the south of Changping District, Beijing Future Science Park spans 170.6 square kilometres, with a planned construction area of 87.2 square kilometres, including a built-up area of 71.01 million square meters.

The Park is poised to become a new tech hub in the Chinese capital, as part of Beijing's ambitious endeavour to create a national sci-tech innovation centre. It serves as a platform for advanced research in the fields of energy, manufacturing, and medicine, featuring a layout pattern of "Two Zones and One Centre"—an east zone, a west zone, and a central green space.

Specifically, the east zone will be developed into a globally influential strategic "Energy Valley" aimed at propelling China's energy industry, and the west zone, designated as a life science park, is evolving into a promising world-class "Health Valley", which will act as a catalyst for the advancement of China's healthcare sector. Shahe University Park in the west zone, which comprises six colleges, is designed as a research, education, and innovation community with a complete array of functions, fostering a university-based technological innovation system that integrates production, education, research, and operations. As a hub for healthcare innovation, the "Health Valley" benefits from a wealth of global resources in medical innovation. The "Energy Valley" is known as one of the areas with the richest set of elements of innovation in energy, boasting a host of state-owned enterprises and advanced technologies. Shahe University Park plays a vital role in promoting basic research and personnel training. Great efforts are focused on building the Future Science Park into a world-leading hub for technological innovation.

To date, the Science Park has accommodated 60 national and municipal key laboratories, nearly 20 provincial R&D centres, and 24 engineering technology centres affiliated with national-level or municipal-level institutions. Additionally, it is home to 12 academician-

led research centres, 22 postdoctoral workstations, and 23 collaborative innovation bases. Furthermore, over 1,100 innovation-driven enterprises have already established their presence in the area.

Liangxiang Higher Education Park, situated in Fangshan District, is home to five universities with a combined total of approximately 55,000 teachers and students. It has emerged as a hub of intellectual innovation and a high-tech business incubator, promising to be a vibrant centre for the entire region. Following a roadmap that integrates research and talent training into industry development, people at the Liangxiang Higher Education Park are working to promote the industrial application of scientific and technological advances through closer cooperation between universities, enterprises, and the local government. This concerted effort aims to provide a more decisive impetus for industrial transformation and upgrading in Fangshan District and even across southern Beijing.

Through concerted efforts of Fangshan District's government and three universities located within Liangxiang Higher Education Park, three new R&D centres have been completed and put into operation. These centres focus on engineering medicine research and application, traditional-Chinese-medicine-based healthcare, and biodegradable bio-based materials, respectively. The three centres have contributed to incubating enterprises in related industries through their available projects involving pilot studies and trials. Nearly 10 programmes have been initiated for the commercialisation of new advances.

Currently, 309 enterprises are being incubated in four leading incubators accredited by the People's Government of Beijing Municipality, resulting in the creation of 1,666 jobs. Beijing University Student Entrepreneurship Park (Liangxiang Park) has been established to provide training for college students interested in starting their own businesses. So far, Liangxiang Park has seen the initiation of 160 projects of this nature.

With its development rooted in local plans and policies, a college town is closely connected to the local community. For one thing, the local government actively attracts universities and institutions with proven research capabilities in high technology to support major industries underpinning the local economy and satisfy their demands. In turn, universities collaborate with industries to strengthen the leading position established by industries with local characteristics. For another, in leveraging the strong academic

disciplines and R&D resources of a college town, the local government will formulate guidelines and policies that lay the foundation for structural improvement and upgrading of local industries.

Benefiting from the abundant innovation resources brought by local universities, the People's Government of Beijing Municipality is dedicated to shaping an economic structure that highlights high technology. Beijing is actively cultivating and forming two internationally leading pillar industries, four "Beijing Intelligent Manufacturing" industries that leverage local strengths, four innovatively linked "Beijing Service" industries, and a batch of future frontier industries in order to build the "2441" system for high-end technological industries and institute the 2.0 upgraded version of the high-end technological industries. Among them, the two internationally leading pillar industries are the new-generation world-leading IT industry and medical care; the four "Beijing Intelligent Manufacturing" industries include integrated circuits, intelligent networked automobiles, intelligent manufacturing and equipment, and green energy and energy conservation; the four innovatively linked "Beijing Service" industries include block-chain and advanced computing, science and technology services, smart cities, and content consumption; and the batch of future frontier industries refers to biotechnology and life sciences, carbon reduction and neutrality, new materials, quantum information, optoelectronics, new memory storage, brain science, and brain-computer interfaces. These industries form a high-tech network that helps upgrade current industries.

In Fangshan District, the pillars of the economy span from the petrochemical industry, processing of coal and other fuels, intelligent emergency response, and transport equipment manufacturing to new materials. Based on the resources of the college town, healthcare and technological innovation services are playing a strategic role in local economic development. During the 14th Five-Year Plan period, Fangshan District is directing its efforts towards alternative energy, new materials, healthcare, and intelligent manufacturing, aligning with the distinctive disciplines of universities within Liangxiang Higher Education Park. The universities leverage their strong disciplines by initiating and organising research projects that respond to market demand. The Fangshan District government, on the other hand, provides support through enacting favourable polices and enabling industrial systems to promote the commercialisation of new advancements. Researchers working on small projects can access commercialisation services within the

west zone itself. For projects involving manufacturing, Zhongguancun Science Park facilitates a seamless transformation from laboratory results to deliverables and ultimately to products by providing contiguous places for both research and production.

Changping District sets great store by industries such as electronic information industry, automobiles and transportation equipment, equipment manufacturing, biology and medicine, and basic and new materials. It will continue to develop its digital economy, new infrastructure, modern agriculture, cultural tourism, and leisure industries.

The advantages brought by college towns are particularly evident in the sci-tech service industry. With a view to boosting high-tech industries, the People's Government of Beijing Municipality has focused on key areas such as Zhongguancun Science Park, Huairou Science Park, Future Science Park, Beijing Economic and Technological Development Zone, and Tongzhou District as the city's sub-centre. In 2020, the professional, scientific, and technical services sectors in Beijing yielded an output value of nearly 300 billion yuan, with a year-on-year growth rate of 6% and a compound growth rate of 11%.

The construction of Peking University Town highlights the risks and challenges associated with bringing in private developers to fund major infrastructure projects. When private developers were enlisted to help build Peking University Town, it likely seemed like a reasonable solution, as the government lacked sufficient capital resources. However, the lack of adequate funding amongst these private developers ultimately crippled the project and led to a string of problems. In the initial demolition and construction stage, the developers' shortage of capital meant progress was very slow. This severely delayed the overall timeline for building the university town. Later, as financial issues compounded, developers faced capital chain issues that brought most construction to a standstill. As a result, parts of the town remain unfinished and are simply vacant wastelands. Expectations for the project have certainly not been met. The number of universities settling in the town is far fewer than planned, and teacher and student populations are consequently also lower.

The Future Science and Technology City serves as a prime example of the mismatch between plans and reality. It was intended to house 80,000 students, yet today enrolment sits at just over 20,000. This stark difference reveals the flaws in relying on private developers who lack the financial means to fully execute such an ambitious and expensive

project. In retrospect, stronger oversight and contingency plans for potential funding crises may have helped avoid some of these pitfalls. The challenges faced by Peking University Town should serve as a cautionary tale when considering similar public-private partnerships on major infrastructure and development initiatives. Sufficient capital and strict oversight are essential.

5.2.2. University Towns in Suzhou

College towns in Suzhou are located in both the east and west of the city. In the east lies the science and education innovation zone, situated on the east bank of Dushu Lake in the industrial park. In the west, we find Suzhou International Education Park, on the west bank of Shihu Lake in Wuzhong District. The college towns are home to 33 renowned universities and research institutions from China and beyond, with nearly 80,000 students and teachers. Over the past two decades, the college towns have transformed Suzhou from a city with limited higher education resources into a vibrant hub that enjoys rich, high-quality educational offerings and a front-runner in pursuing higher-education internationalisation. The college towns have also brought numerous international cooperative projects accredited by the Ministry of Education, thus driving Suzhou's dynamic growth through the integration of enterprises, universities, and research institutes.

The college towns in Suzhou have tailored their development to satisfy the specific needs of industries within the city and adapted their talent training programmes to "customise" college graduates for urban development.

The colleges have integrated their growth with the economic progress of Suzhou Industrial Park by providing undergraduate and postgraduate programmes in line with key emerging industries and crucial supporting fields. By doing so, they have successfully nurtured high-calibre talents who are in high demand for the industrial transformation and upgrading of the Park. Through collaborative efforts with local enterprises, the colleges have started providing "well-targeted classes" to support tech-driven startup companies by nurturing "customised" personnel and developing cutting-edge technologies. Regarding the coordinated industry-university-research development supported by the local government, colleges increasingly engage with enterprises in the Park in an effort to build research

institutions or practical bases for graduate students and seek closer cooperation in technology research and development. By 2020, the first batch of instruction centres integrating technical training and academic education had been built, “well-targeted classes” had started, and the “apprenticeship training system” had been instituted. This has led to the formation of a robust mechanism for collaboration between academia and industry.

In Suzhou, approximately 45% of college graduates choose to seek employment or start their own businesses within the city; a total of 15 national-level research institutes have been established there, with a multitude of brilliant scientists ready to make their contributions. Furthermore, tens of thousands of talented individuals emerging from there are shining bright across the country and on the world stage. Suzhou has truly become a dynamic powerhouse with an ever-expanding talent pool. As the science and education innovation zone enters a new stage of leap-forward development, higher education plays an increasingly significant role in the economic and social progress of the Park. It will generate fresh momentum for the Park to evolve into a world-class high-tech park, a first-class pilot free trade zone, and a new centre in Suzhou embracing a glorious future.

The problem facing Suzhou University City is the relatively low quality of higher education institutions. It has only one “Double First-Class” university, and no internationally renowned universities. This leads to lower-quality students, especially at the postgraduate level, making it difficult to improve overall quality. It also results in lower-quality scientific research and innovation.

To address this, existing universities in Suzhou could be upgraded by providing more funding, resources, and autonomy. Helping these universities gain “Double First-Class” status and international recognition would attract high-performing students and faculty. Scholarships and incentives could also draw top students from across China. Investing in research facilities and industry collaborations could boost innovation. Reforming recruitment and evaluation systems to attract and retain excellent professors is also important. Allowing these universities more flexibility in student admissions based on merit could help them select better-quality students. More funding should also be allotted for graduate education.

In summary, a systematic approach is needed to improve the research environment, teaching quality, faculty, and student body at Suzhou's universities. Strategic upgrades can enhance the quality of higher education institutions in Suzhou University City. The government should make this a priority.

5.2.3. Guangzhou Higher Education Mega Center

Located in Panyu District in southeast Guangzhou, Guangzhou Higher Education Mega Center (HEMC) spans an area of 34.4 square kilometres and has attracted 12 universities and colleges to settle here. It is a national first-class college town in South China, recognised as an "information port" and "intelligence centre" for talent training, scientific research, and international exchanges. HEMC boasts integrated industry-university-research development and is systematically exploring new pathways for regional innovation-driven growth. To this end, it has carried out innovation mechanism reforms, developed a collaborative governance system for social innovators, and incubated a financial service system. It has taken steps to build an internationalised incubation system to encourage innovation. These efforts have resulted in overall improvements to the innovation and entrepreneurship ecosystem within HEMC, and have helped create a sound operating mechanism that facilitates startups and incubation.

HEMC boasts 213 key laboratories (including 13 national-level ones), 149 research centres for engineering technology, and eight institutions for advanced research. It also houses three national incubators, two provincial innovation and entrepreneurship demonstration bases, four national-level makerspaces, and one innovation and entrepreneurship demonstration site, as well as the Guangdong-Hong Kong-Macao Youth Entrepreneurship Incubator and the Guangzhou-based Guangdong-Macao Young Entrepreneurs International Industry Accelerator. Makerspaces of various kinds occupy an area of 43,600 square meters, with over 300 projects under incubation. Nearly 400 science and technology enterprises are incubated or stationed in the innovation and startup demonstration bases, including 60 key enterprises, 16 high-tech companies, and 15 enterprises above designated size with an annual revenue of at least 20 million yuan.

The 2021 List of Unicorn Companies features 1,058 businesses worldwide. Of the ten enterprises listed and headquartered in Guangzhou, two are located in HEMC's innovation and entrepreneurship demonstration base, accounting for one-fifth of the total. In 2020 alone, such bases in Guangzhou contributed a revenue of 2.74 billion yuan, accumulating over 3 billion yuan to date, and created more than 8,000 jobs. Ten companies have attracted direct financing, with a total investment of over 300 million yuan and a valuation exceeding 1.5 billion yuan.

HEMC has also stimulated the development of the surrounding infrastructure, which means a better life for local residents. Tourists can enjoy themselves in places of interest including Guangdong Science Center and Lingnan Impression Garden. Sports enthusiasts will delight in the Sports Center specially built for HEMC, as well as numerous small sports venues and stadiums. Shoppers can explore several large malls and nearly 100 supermarkets, with Guangzhou University Business Center and GOGO Xintiandi serving as popular destinations for local college students. Local education resources include a number of kindergartens, two primary schools, a junior high school, and a senior high school. Notably, the junior and senior high schools affiliated with Guangzhou University have made the list of the best local schools. In terms of healthcare, Guangdong Provincial Hospital of Traditional Chinese Medicine has recently opened up its branch in the Higher Education Mega Center, and many more on-campus clinics are available at local universities. An extensive transportation network has been established, with a number of new subway lines, trams, and docks put into use and several highways, bridges, and tunnels under construction.

Distinct characteristics can be observed among the college towns in Beijing, Suzhou, and Guangzhou. It is evident that each of them possesses unique cultural traits and has made remarkable contributions to their respective communities in terms of technological advancements as well as economic growth. Both Beijing Future Science Park and Liangxiang Higher Education Park integrate their development with the overall planning of disciplines. They have implemented comprehensive management practices to ensure effective institutional support for their growth. Moreover, they have ventured into innovative operating models that align with the needs of local industries, aiming for coordinated development with the local economy. Dushu Lake Sci-Edu Innovation District in Suzhou has been committed to the strategy of integrating production and

education, with its primary focus being to facilitate local industries by creating an enabling business environment and establishing top-notch industrial innovation clusters. These efforts will further enhance Suzhou's capability to translate the Innovation District's strengths in education, research, and talents into tangible economic performance and growth. HEMC, with independent innovation and entrepreneurship as the core driving force, is devoted to building a comprehensive innovation incubation system. The system incorporates "pre-incubators, incubators, accelerators, and industrial parks", facilitating the entire process of industrial application of high-tech advancements, from "nurturing inchoate ideas to launching entrepreneurial projects, establishing startups, and forming industry clusters". By integrating the innovation chain into the industrial chain, this initiative aims to extend the benefits of scientific and technological innovation incubation to a wider audience. It will not only prove the value of technological innovation but also provide a strong technological underpinning for industrial transformation and economic growth in the Guangdong-Hong Kong-Macao GBA.

A major problem faced by Guangzhou University City is that the road planning implemented in the early stage imposes great limitations. For example, a road passes through a school, cutting a whole school into several areas. This is inconvenient for teachers and students commuting between the living area and teaching area and creates potential safety hazards. In addition, the design of key road intersections in University City is unreasonable. After the growth, development, and completion of surrounding facilities, such poor designs often lead to long-term congestion.

With some creative redesigns focused on community needs and open collaboration with the city, Guangzhou University City's transportation woes could be turned into a model multi-modal transit network benefitting students, faculty, and staff alike. The potential is there if infrastructure can match the vision.

5.3. Key findings

Hong Kong can learn from both the successful and unsuccessful experiences of university towns worldwide. Key successes include comprehensive planning aligned with national goals, extensive customised facilities, promoting multidisciplinary collaboration and

industry partnerships, developing a vibrant innovation ecosystem, and providing a good transit system and good amenities. However, major pitfalls involve insufficient funding, inadequate land supply, lack of urban integration, overly ambitious scale, weak commercialisation pathways, and complex governance.

Hong Kong can learn from the comprehensive planning and development aligned with national strategic goals seen in Tsukuba and Chinese university towns, which provide policy support and resources; the provision of extensive facilities and infrastructure tailored to research, education, business, and living needs, which Stanford exhibited in its expansions, thus providing space to grow; the promotion of multidisciplinary collaboration and university-industry partnerships through shared labs, projects, and talent exchanges, at which Daedeok Innopolis excelled; the development of a surrounding innovation ecosystem by attracting companies, startups, and investment, as achieved by Singapore Science Park; good transportation links, affordable housing, and amenities for attracting and retaining talent, as in Delft; and independent governing bodies to enable oversight and continuity, as Tsukuba Science City Development Authority demonstrated. By assimilating these global best practices, Hong Kong can develop a world-class sustainable university town.

Hong Kong can learn from the insufficient funding that stalled Tsukuba Science City's construction, so financing models need examination; the inadequate land supply that constrained Stanford's growth, so space needs require attention; the lack of urban integration that created problems in Guangzhou University Town, so alignment with the Northern Metropolis masterplan is important; the overly ambitious scale and dispersed layouts that limited resource sharing in some Chinese towns, so a balanced scope is preferable; the weak industry linkages and commercialisation pathways that hindered Tsukuba initially, so close university-industry partnerships are key; and the governance complexities and power imbalances that affected Tsukuba Science City, so streamlined coordination is needed. By prudently assimilating these failure lessons, Hong Kong can avoid major pitfalls in developing its university town.

By strategically applying global best practices whilst avoiding common pitfalls, Hong Kong can develop a sustainable world-class university town in the Northern Metropolis. For example, (*The Tsukuba Science City Construction Law*, 1970) made clear provisions for the planning, construction, and management of different areas of the university town, providing strong support for the continuous promotion of construction and protecting it from being affected by governmental and/or policy changes over time. Despite this, the construction and relocation of Tsukuba University Town in Japan took more than 20 years from planning to completion. One of the reasons was that it missed the golden period of economic development. Other university towns show the same phenomenon except for the Guangzhou Higher Education Mega Centre, as shown in Table 9. This requires astute planning, sufficient resources, optimised space use, robust academia-industry linkages, streamlined administration, and a balanced scale. Prudently assimilating insights from international precedents can catalyse this initiative's development into a key driver of Hong Kong's emerging I&T economy.

Name	Country	When planed	When started	Estimated construction period	When finished	Whether delay
Tsukuba (Tsukuba-Science City Network, 2022)	Japan	1963; Cabinet approved construction	1967; Construction work began	10 years	1980; Most of the relocation of universities and institutions complete	Yes, three years delay
Singapore Science Park (Phase I) (National Library Board Singapore, 2021)	Singapore	1979; Jurong Town Corporation (JTC) outlined a programme	1981; The site was cleared for development of the science park	2 years	Estimated 1983;	Yes, Six-month delay
Daedeok Science Town (Kang et al., 2021)	South Korea	1973; Establishment of the master plan for the Daedeok R&D Complex	1974; construct the foundation of Daedeok Research Complex	8 years	1992;	Yes, 10 years delay because launched new Daedeok Industrial Base Development Plan
Guangzhou Higher Education Mega Centre (Phase I) (Guangzhou government, 2002)	China Mainland	2001; Guangzhou University Town Development Plan launched	2002; Guangzhou University Town Construction Plan launched	\	2004;	No

Table 9: Construction Timeline of Main University Towns

VI. Stakeholder Opinions from Hong Kong Universities

This report summarises perspectives from university leaders in Hong Kong on developing an effective shared university town. Interview respondents conveyed a common vision for the town to become a global hub advancing knowledge, talent, innovation, and quality of life through partnership. However, distinct views exist on optimal strategies for achieving this goal.

The prospect of developing a new university town in the Northern Metropolis has been eagerly embraced by key stakeholders. The leadership across the region's eight major universities has voiced resounding support, eager to participate in planning and establish robust government communication channels. Stakeholders emphasised that the new university town must prioritise distribution justice in expanding access to learning for Northern Metropolis residents. With the area expected to house 1.5 million residents, developing adequate education infrastructure is imperative. The university town presents an opportunity to equitably equip the Northern Metropolis with the same quality of higher education resources available in other districts. This would address unequal access issues and provide more affordable options for local youths. Beyond benefiting students traveling to study there, the town's programmes should also be designed to upskill workers and meet employment needs of local industries. This distributive approach caters to both existing and incoming residents across socioeconomic backgrounds. Universities can collaborate with policymakers to optimise programmes and admissions pathways for Northern Metropolis students. By consciously embedding principles of distribution justice centred on elevating local communities, the university town can uplift the Northern Metropolis as a district of abundant opportunities.

A foremost impetus is the severe lack of expansion space hampering existing campuses. State-of-the-art facilities for teaching and research, especially upgraded scientific apparatuses, are sorely needed to maintain educational excellence and boost academic competitiveness. Attracting an influx of elite talent from across the globe is another hoped-

for outcome. Transportation infrastructure is a critical priority, with convenient transit links essential to fully harness the synergies of clustered campuses. Enabling seamless mobility between universities will facilitate collaboration and exchange among students and faculty across diverse disciplines, catalysing an innovative ecosystem whilst concurrently promoting young people's STEM interest and careers. Stakeholders highlighted the need for policies that smooth talent and academic resource flows between Hong Kong and the GBA. This includes enabling mobility for students, faculty, researchers, and workers to allow fuller participation in educational and research collaborations across the region. The university town's capacity could be leveraged to host cross-boundary exchanges, shared facilities, and collaborative degree programmes or research projects. Policy reforms around data sharing and sample transfers are also critical for increasing joint studies and optimising collective capabilities. By formulating cooperative frameworks, infrastructure, and governance mechanisms tailored to the university town context, connections between innovators and institutions across Hong Kong and the GBA can be strengthened. This policy-enabled integration will amplify the educational and technology resources accessible to all, catalysing innovation through opening channels for dynamic pan-regional exchange.

Strategic scientific facilities aligned with cutting-edge industries should be guided by proactive government intervention. The proximity of science and tech business parks provides a prime opportunity to fuse academia, enterprises, and policymakers in shaping the knowledge economy of the future. The focus is on addressing immediate challenges through applied research and education serving real needs, then leveraging the adjacent GBA's research and innovation advantages. Elevating liveability and amenities to enrich the area is also key to attracting and retaining talent. By coalescing the various elements of the university town into a dynamic and stimulating hub, the collective intellectual capital of the region can be fully harnessed. With astute planning aggregating critical masses of ideas, people, and resources, the northern university town can fulfil its immense potential. The stakes are undoubtedly high, but the potential upside for the metropolis and GBA is huge.

6.1. Importance of interviewing selected interviewees

The leaders of local universities in Hong Kong, especially the vice presidents, are more aware of the overall development direction of Hong Kong's higher education sector and the positioning and professional layout of each institution. Consulting with them can ensure that the planning of the university city meets the long-term planning and development needs of the higher education sector. At the same time, the vice presidents also have a better understanding of the teaching and scientific research situation of each university, and can give more practical suggestions, which will help to properly arrange the departmental setup, number of school buildings, and supporting facilities in the university town.

In addition, extensive consultation involving local university leaders can reflect the inclusiveness of the university town planning process and represent the interests and voices of major universities. This will help the design of the new university town not only meet the needs of social development, but also take into account the interests of universities so as to increase its sustainable development capability. Moreover, extensive consultation with local university leaders, especially vice presidents, is of great significance for ensuring that the planning of university towns meets the development needs of the higher education sector in Hong Kong. This will help create a university town that meets the needs of society, conforms to the long-term development plans of the higher education sector, and takes into account the interests of various universities.

From the perspective of the development of the higher education sector in Hong Kong, in the next 5-10 years, considering the process of integrating into the GBA and the development of the country, as well as the country's higher requirements for personnel training, Hong Kong's higher education sector will face the pressures of transformation and upgrading and the situation of coexistence of opportunities. In this context, the construction of a university town with a larger scale and more complete functions can provide a solid platform and space guarantee for the long-term development of universities.

However, in order to build a university town that truly meets the higher education sector's development needs, it is necessary to get rid of the mentality of eagerness for quick success and to gather consensus and strength. Therefore, early consultation with local colleges and

universities, especially the opinions of the middle- and high-level leaders of each university, is particularly critical to planning. This will help the design of the university town to be more scientific and reasonable, and the setting of various supporting facilities to be more in place. After moving into the university town, colleges and universities will also be able to integrate into the new environment more smoothly, and various teaching and scientific research efforts can be put on the right track faster and maximise their effectiveness. To sum up, policy researchers should advocate extensive consultation with local university leaders, especially the opinions of vice presidents of universities, in the planning of university towns. This not only contributes to the scientificity and rationality of the overall design of university towns, but also helps colleges and universities to begin operating faster after moving in, exerting the ultimate effectiveness of building a new university town. This is a critical step in planning a truly sustainable university town.

6.2. Interview Results and Summary

There is a shared vision among respondents for developing a university town in Hong Kong's Northern Metropolis into an innovation hub that can drive progress in the areas of knowledge, economy, and society. However, distinct perspectives exist on optimal strategies and models for achieving this vision. By synthesising complementary insights through open cooperation, the university town could emerge as a vibrant intellectual and industrial nexus for sustainable prosperity. Interview respondents conveyed a consistent goal of attracting global talent and investment to a high-quality living and working environment optimised for partnership and exchange. They proposed aligning development with national and regional strategies, including GBA integration, and advised optimising curricula, research, and facilities to meet contemporary demands. Some recommended focusing on areas like traditional Chinese medicine, culture, entrepreneurship, and technology. However, varying approaches to improving higher education—for example, through branch campuses, inter-university collaboration, credit transfer, and teacher exchange—require balancing resource constraints and avoiding redundancy.

Support from companies and governments is vital. Companies can partner with universities in innovation and talent training. Governments can increase funding, promote

cooperation, and support educational reform. Policies should correspond to universities' needs. Investing strategically across education, industry, and living sectors can maximise synergies and minimise costs. Clarifying the positioning and advantages of each university and company enables optimised cooperation and resource sharing. Competition spurs progress, but communication and consensus building are also key. Whilst distinct in their perspectives, the interview respondents conveyed a balanced vision for an innovation ecosystem that advances society collectively. By integrating complementary insights through cooperation, this vision can transform into reality. Comprehensive policymaking and strategic investment are required to cultivate an environment where knowledge, industry, and community intersect for shared gain. With open dialogue, prudent planning, and support across sectors, the university town could emerge as a striking urban innovation district. It could become a global talent magnet, intellectual and economic nexus, and centre of social progress by tailoring curricula, facilities, and opportunities to regional demands. By synthesising the perspectives of education and industry experts, Hong Kong can shape a vibrant future-facing community oriented toward sustainable prosperity. Overall, developing an impactful university town requires integrating diverse insights through collaboration to ensure the broadest progress.

In summary, the interview respondents provided both a shared vision and distinct perspectives on strategies for meaningful university town development. By synthesising their complementary insights through open cooperation, this initiative could fully realise its potential to advance society in a balanced manner. Comprehensive policymaking and strategic investment across education, industry, and community require dialogue to drive sustainable shared progress.

6.2.1. The Necessity of a University Town

Whilst Hong Kong universities agree on the potential benefits of a shared university town, including driving knowledge exchange, innovation, and talent cultivation, distinct perspectives require open dialogue to develop a balanced strategy. Integrating development with national and regional strategies can amplify impact, but planning must suit higher education institutions' unique positioning. Curricula and research should address social and economic needs, focusing on areas like traditional Chinese medicine,

culture, entrepreneurship, and technology, but prudent investment is needed to avoid redundancy. With visionary planning and support across sectors, a shared university town could accelerate an innovation ecosystem attracting top talent and enabling growth. Thoughtfully designed based on diverse input, it may emerge as a globally competitive hub advancing society through integrated learning, discovery, and commercialisation at the nexus of knowledge, industry, and community.

6.2.2. Increase Multilateral Engagement

Crafting an impactful shared university town requires input and support from diverse stakeholders to develop a balanced policy and strategy. Government leadership is crucial to convene and coordinate across sectors, but companies, educators, non-profits, and communities also make essential and distinct contributions. Whilst increasing multilateral involvement introduces complexity, the rewards of partnership outweigh the challenges it brings. Governments fund planning, incentivise cooperation, and establish feedback mechanisms. Companies and non-profits inform opportunities for industry-university collaboration and innovation. Community groups enhance liveability, inclusiveness, and cultural richness. Cross-sector engagement is challenging yet vital, requiring vision and mediation to translate differences and cultivate shared purpose.

Though stakeholders operate based on distinct standards and values, open exchange can clarify the responsibilities of and benefits for each, enabling cooperation at the nexus of knowledge, industry, and society. Community participation, though demanding, leads to human-centred outcomes. Overall, a genuinely shared vision and cooperative framework are fundamental to progress. Facilitating understanding between educators, industry, and urban planners is key. Whilst ambitious, this initiative requires consolidated insight across public and private domains to maximise opportunity. With governments spearheading coordination across divisions, and the rewards of partnership outweighing the issues arising from increased complexity, developing an impactful shared university town through multilateral engagement is achievable.

6.2.3. Conditions Required for an Effective University Town

Developing an effective shared university town demands a clearly articulated and shared vision across stakeholders to provide direction. Aligning on priorities for advancing knowledge, cultivating talent, building innovation capacity, and enhancing quality of life enables partnership essential for success.

Strong government support through responsive policies, funding, incentives, and facilitating cooperation across sectors is vital. Governments increase resources for planning and development, optimise conditions for industry-university collaboration, and attract companies and investment. They also coordinate across divisions and stakeholder groups. Comprehensive planning tailored to contemporary challenges and the higher education sector's strategic positioning is required. Consolidating insight across stakeholders suits strategic goals, addresses skills gaps, and meets urban planning aims. Coordinating education, research, industry, infrastructure, and living sectors maximises opportunities. A high-quality living and working environment with excellent facilities, equipment, and programmes attracts top talent, enabling exchange and collaboration. Housing, transportation, healthcare, recreation, and childcare considerations are also important. Ongoing cooperation and feedback mechanisms across stakeholder groups through inter-institutional partnerships, public-private partnerships, and discussion forums are therefore essential, identifying changing needs, evaluating progress, and enabling responsive adjustments.

Incentives and support structures for innovation and entrepreneurship include grants, incubators, accelerators, business pitch competitions, mentoring programmes, and investment funds. By catalysing new ideas, skills, and ventures, these power a knowledge economy. Opportunities for open exchange and serendipitous connection across disciplines, sectors, cultures, and fields include common spaces as well as organised events facilitating dialogue and relationship building, which drive interdisciplinary thinking, new partnerships, and a vibrant community. With vision, policy support, planning, and investment tailored to local needs, a university town could accelerate development of an urban innovation ecosystem attracting top talent and enabling growth. However, success relies on partnership across education, industry, government, and community. Facilitating understanding and cooperation is key, though demanding, and the rewards of collaboration

outweigh the challenges it poses. An effective shared university town demands partnership: cooperation enables coordination. By maximising insight and opportunity across domains, this initiative may advance knowledge, economy, and society through exchange designed for shared progress. Overall, cooperation comes first.

6.2.3.1. Accessible Location

An accessible location near public transit infrastructure like metro stations is essential for attracting top talent, enabling participation, and facilitating knowledge exchange. This includes local and international students, professors, industry partners, and residents. Easy access makes the university town convenient and liveable for a wide range of beneficiaries.

Strong transportation connections provide opportunities for serendipitous encounters and unplanned interactions that catalyse new ideas, partnerships, and ventures. This is especially important for cultivating an innovation ecosystem. Proximity to an international airport is also beneficial for global exchange. An accessible location supports environmental sustainability by reducing reliance on private vehicles. This is consistent with broader social aims for more liveable cities and transitions to sustainable energy and mobility systems. Good public transit options minimise traffic and emissions.

For higher education institutions, an accessible location provides greater access to resources, facilities, and opportunities concentrated in urban centres. This includes libraries, laboratories, healthcare institutions, entertainment and recreation options, and pipelines to employment - all advantageous for attracting and retaining top students and faculty. An accessible location with employment opportunities, affordable housing, and community services nearby suits the needs of faculty, students, and young professionals wanting to minimise costs and commuting time. This contributes to perceptions of liveability, ease of living, and good quality of life - all of which are factors that influence talent competitiveness. Strong transportation infrastructure amplifies potential connections between education, research, industry, business, and community sectors in a shared university town. This enables partnership and opens pathways for knowledge and technology exchange through movement of people and ideas. Overall, an accessible central location is optimal for cultivating intersections of sectors that drive innovation.

In summary, an accessible and well-connected central location provides significant benefits for developing an effective shared university town. By enabling participation, exchange, serendipity, sustainability, and access to resources, a central location with strong public transit amplifies potential for cooperation across education, research, industry, and community sectors. This powers opportunities at the nexus of knowledge, economy, and society that fuel collective progress through partnership designed for mutual gain. Overall, ease of access is key. A shared university town demands connectivity at its core.

6.2.3.2. Holistic Infrastructure

Housing, accommodation, and public transit options should suit the needs of diverse groups including students, faculty, young professionals, families, and seniors. Affordable living options with good connectivity minimise costs of living and make the university town accessible and liveable for people at different life stages.

High-quality facilities for education, healthcare, recreation, childcare, and elder care contribute to good quality of life, community wellbeing, and talent attraction competitiveness. They are also consistent with the mission of a shared university town to cultivate knowledge, partnership, and progress. Commercial zones should provide employment opportunities, spaces for new businesses, and retail options for daily living. This attracts companies and investors, enabling partnership and industry-university collaboration. It also makes the area liveable by minimising the need to commute outside the community.

Green recreational spaces encourage active living, wellness, and community cohesion. They provide areas for unstructured interaction, exchange, and relationship building outside work or study environments. Contact with nature enhances health, creativity, and quality of life. Community amenities should reflect cultural and lifestyle needs to suit Hong Kong's diverse, cosmopolitan population. This includes spaces for arts, culture, entertainment, dining, nightlife, and worship/spirituality. Vibrant community life appeals to talent and fuels a culture of openness, driving exchange.

Well-designed infrastructure with walking paths, cycling networks, and smart mobility options enables sustainable living and transportation. It also opens space by reducing needs for congested road networks and parking lots. Supporting active mobility and transit-oriented lifestyles helps realise broader goals for liveability. Optimising conditions for commercialising new ideas and intellectual property contributes to a culture of innovation and knowledge economy vitality. Resources, incentives, funding programmes, and business mentoring or pitching opportunities can catalyse startups and technology ventures.

In summary, holistic infrastructure encompassing housing, education, recreation, healthcare, commercial, community, and mobility considerations is essential for developing an effective shared university town. By enhancing liveability, wellbeing, talent attraction competitiveness, and innovation potential, high-quality and well-designed facilities across sectors amplify opportunities for partnership, progress, and a shared vision of prosperity through knowledge creation and exchange.

6.2.3.3. Smart City

With research, talent, and entrepreneurial ecosystems concentrated in proximity, a university town will accelerate innovation and development of smart technologies through cooperation. Cross-disciplinary exchange can lead to reimagining the future of cities. Connections built during initial planning provide a foundation for partnership, reducing misalignment in deploying technologies or policy.

A testbed will trial smart solutions, scaling up promising options and containing less useful ones. An educated base provides feedback to improve technologies based on experience. Digital infrastructures already connect the area, enabling deploying smart technologies. Makerspaces and skills programmes develop capacity for co-creating solutions. Concentrated resources power innovation. Vibrant community life in a liveable place means people want to interact using new technologies. Smart cities meet human needs, enhancing wellbeing, prosperity, and sustainability. Principles of sustainable development and liveability employed in planning the university town align with optimising efficiency,

improving life quality, and building resilience through transitioning to smart systems. The vision of a future city will inform progress.

Most importantly, a culture of open collaboration provides opportunities for co-creating, deploying, and improving smart solutions to advance economy, society, and environment together. But success relies on vision, understanding, and good faith: connection before technology or policy. Achieving a shared vision demands good faith; self-interest alone will not suffice.

6.2.3.4. Proximity to Industry

Being located near major business districts and industrial areas in the north provides opportunities for partnership, talent exchange, and commercialising intellectual property. Close ties between universities, researchers, and companies facilitate knowledge transfer, skills training for in-demand roles, and technology venturing. This cultivates an innovation ecosystem.

Several interviewees noted the roles of professional relationships and serendipitous encounters in driving collaboration. Proximity of education, research, and industry provides space for unplanned meetings and interactions, strengthening personal connections that lead to new ideas or ventures. Though complex, the rewards of cooperation can outweigh the challenges. Developing the university town near existing infrastructure and transportation routes in the north minimises costs and environmental impacts, whilst enabling access from other areas. Students, faculty, and workers can benefit from nearby employment opportunities, amenities, and services. This also suits industry needs for convenience. Overall, an accessible central location has advantages.

However, some interviewees suggested industry should not overly influence priorities for education and research. Academic autonomy and freedom of thought are important for open inquiry, social critique, and independence. Whilst contributing to economy and society, universities have different functions than companies. Balancing roles and responsibilities are key but complex. Other interviewees noted that rather than proximity alone, success relies on aligning visions and priorities across sectors. Effective partnership

demands mediating different interests through open communication and commitment to mutual benefit. Though location matters, shared purpose and reciprocal understanding have greater influence. Connection comes before place.

Some argued that a university town could attract new industries to the area. With talent, knowledge, and innovation concentrated nearby, companies may relocate or establish bases to access resources for growth. Meanwhile, others saw opportunities for revitalising existing districts through partnerships designed to foster inclusive prosperity across social groups.

Interviews with university leadership revealed a shared vision for the Northern Metropolis University Town to become a world-class hub advancing knowledge, talent, innovation, and quality of life through partnership. However, they expressed varied perspectives on optimal strategies, including balancing local access and global ambitions, overcoming land constraints, strengthening industry and government ties, integrating with national and regional policies, focusing research and curricula, attracting investment and talent, and elevating amenities and culture. Despite nuanced opinions, stakeholders agreed that astute planning to consolidate insights and optimise opportunities could enable the university town to fulfil its immense potential as an intellectual and economic catalyst propelling Hong Kong's development. Open communication and cooperation across education, industry, government, and community is key to materialising a meaningful shared vision.

VII. Discussion and Conclusion

The university town initiative presents major advantages and opportunities for Hong Kong's innovation and technology development, but also faces challenges around funding, land constraints, governance, and integration that necessitate astute planning and phased implementation.

7.1. Advantages of Building a University Town in the Northern Metropolis

As mentioned in Section 4.2, Hong Kong and GBA possess rich I&T resources and institutions, like Hong Kong Science Park and Cyberport. Also, various funds are set to support the I&T development. But there are still problems we need to solve. Unicorn companies, for example, are used to evaluate the effectiveness and outcome of the start-up ecosystem. According to HURUN Global Unicorn Index 2022 (Hurun, 2022), GBA has a total of 62 unicorns, with 33 in Shenzhen, 19 in Guangzhou, but only 7 in Hong Kong.

One of the primary contributors to the limitations in Hong Kong's I&T sector is the geographical dispersion of organizations. For instance, significant entities like Cyberport, Science Park and various research centres in universities, like the University of Hong Kong, the Hong Kong Polytechnic University and the Chinese University of Hong Kong, are spread out across different areas from Hong Kong Island, Kowloon Peninsula and the New Territories. Consequently, this spatial fragmentation hinders effective collaboration and in-depth exchanges among researchers.

Furthermore, the dispersed locations also present challenges regarding the need for more comprehensive industrial chains and skilled workers in these regions, impeding the successful translation of research outcomes into tangible results. DJI, a prominent drone unicorn whose founder hails from Hong Kong, highlights the advantages they experienced in Shenzhen—a neighbouring city with a robust industrial ecosystem and an ample pool

of highly skilled workers. These factors have facilitated the establishment and growth of businesses with greater cost efficiency and productivity.

To address these issues, the establishment a University Town in the northern metropolitan area aims to overcome these prevailing challenges within Hong Kong's innovation and technology sector. By creating a concentrated hub that brings together various organizations, research centres and universities within a single location, it seeks to foster collaboration, knowledge sharing, and interdisciplinary exchanges among researchers. Additionally, this collective environment aims to facilitate the development of robust and interconnected industrial chains, thereby expediting the transformation of research outcomes into practical applications. According to the Northern Metropolis Development Strategy Report, this area will provide over 150,000 I&T jobs for the young generation, and the University Town would serve as a magnet for attracting and retaining skilled workers, catalysing further advancements in innovation and technology within Hong Kong.

Significant and more advantages can be identified from the establishment of college towns, including:
1) establishing a distinctive city brand;
2) attracting excellent scientific research resources and high-calibre talents;
3) cultivating a skilled workforce;
4) stimulating social innovation and entrepreneurship, leading to positive technology spillover;
5) supporting local industries by enhancing the local industrial structure; and
6) expanding the sci-tech service industry for higher output value and more jobs.

Hong Kong boasts significant advantages that can enable the successful development of a world-class university town in the Northern Metropolis. The central and Hong Kong governments have clearly demonstrated their commitment to strengthening Hong Kong’s position as an international I&T hub. This provides robust policy support for major investments in frontier research and advanced facilities essential for a university town.

Hong Kong is already home to several top globally-ranked universities that attract elite research talent from across the world. The city is also a magnet for international students due to its cosmopolitan environment, vibrant student life, and reputation for academic

excellence. Hong Kong's extensive transport links and strategic location as a regional gateway enable convenient access that facilitates research partnerships and institutional collaborations. Moreover, Hong Kong has a thriving ecosystem for technology transfer and nurturing start-ups, thanks to the enterprising culture fostered by its universities and deep industry linkages. With its financial clout and robust intellectual property protection, Hong Kong furnishes an ideal base for commercialising new discoveries. Building on these robust foundations, the Northern Metropolis University Town can catalyse Hong Kong's innovation capabilities. By concentrating intellectual capital, nurturing technology entrepreneurs, and accelerating knowledge exchange, the university town can become a powerhouse to propel Hong Kong's ascent as a leading global I&T centre.

7.2. Problems Facing the Construction of a University Town in the Northern Metropolis

However, it is crucial to address the following challenges:
1) achieving efficient land utilisation;
2) ensuring a stable flow of government funding and favourable policy supports;
3) gaining a keen understanding of University Town's real distinction;
4) designing clear plans for both short-term and long-term development; and
5) enhancing the local infrastructure network to support the college town.

Problems faced by university towns around the world

1. Funds

Lack of financial resources was a common problem during the construction of Songjiang University Town in Shanghai, China (Ruoppila & Zhao, 2017). Although the government promised to provide land and cover all land-related costs after negotiations, construction costs still posed a big problem for universities because commercial banks were unwilling to provide loans with long-enough terms to universities, making it difficult to start the project. In the case of Tsukuba University Town, although funding came from public funds, there were still problems with funding shortages that led to delays during construction (Bloom & Asano, 1981).

2. Land supply

During the construction of Guangzhou University Town, conflicts arose between residents and the government due to land acquisition compensation issues. During the construction of Tsukuba University Town, soaring land prices resulted in the university town being scattered instead of contiguous, which caused problems such as inconvenient traffic and low communication (Bloom & Asano, 1981).

3. University Relocation

During the planning stage of Songjiang University Town in Shanghai, the Songjiang District government was particularly concerned about the partial or complete relocation of universities (Ruoppila & Zhao, 2017). For example, they were not satisfied with only receiving universities teaching arts majors, and were keen on having universities teaching engineering to drive the development of local industries. During the relocation time, some universities may change or adjust their previously-made plans. For example, 43 research institutions and universities were initially set to be located in Tsukuba University Town in Japan by 1976, but the target date was later changed to 1980 to allow relocation to be completed.

4. Resource Sharing

The original intention behind establishing university towns was to integrate resources better, break down barriers, and promote the exchange of ideas between universities. However, the reality is that university towns in China tend to be too large and dispersed. For instance, Guangzhou University Town covers an area of 4,300 ha and is simply a gathering of many universities. Students find the time cost of going to other universities is too high, which may encourage them to engage only in activities on their own campuses, resulting in repeated construction and waste of resources. Figure 11 provides a summary of selected university towns in China.

Table 1
Selected university towns in China.

Name	Province/municipality	Areas (ha)	Students (10,000)	Investments (100 million yuan)	Year of planning/ construction
Xianlin University Town	Jiangsu/Nanjing	3400	10	50	2002
Changzhou University Town	Jiangsu/Changzhou	667	6	25	2002
Songjiang University Town	Shanghai	300	17	25	2000
Chongqing University Town	Chongqing	2000	20	100	2003
Beijing Jili University Town	Beijing	200	2	8	2000
South University Town	Liaolin/Shenyang	180	10	40	2000
Jiaonan University Town	Shandong/Qingdao	2500	5	57	2004
West University Town	Shanxi/Xi'an	4000	10	85	2001
Fuzhou University Town	Fujian/Fuzhou	2000	10	30	2001
Shenzhen University Town	Guangdong/Shenzhen	1200	25	14	2000
Guangzhou University Town	Guangdong/ Guangzhou	4300	15	300	2002

Sources: data obtained from Shangguan, 2005, A study of the present conditions and the models of college town development in our country (Chongqing University, thesis); and other news sources; compiled by the author.

Figure 11: Area, number of students, and size of investments of selected university towns in China | Source: Li et al., 2014.

5. Power Structure

Traditional university towns are mainly centred on universities, such as the small university towns of Ann Arbor, Michigan and State College, Pennsylvania in the United States, where universities play an important role in community affairs (Miller, 1963). However, one of the characteristics of the Japanese government is its extreme vertical integration. Government agencies do not communicate well with each other, and jealousies abound as they compete for desirable programmes and necessary funds in the actual operation of Tsukuba University Town. As a result, only a few facilities are shared (Bloom & Asano, 1981). This has stifled the vitality and output efficiency of science and technology there.

6. Population Loss

The essence of a university town is still the town, and the three elements a town should be concerned with are work, life, and rest. In the early stages of Tsukuba University Town, the lack of daily consumption, leisure, and communication facilities for residents led to a situation where many people living there spent their weekends in Tokyo or other cities.

Whilst developing a university town presents enormous opportunities, Hong Kong also needs to address some key challenges for successful implementation.

Firstly, huge capital investments are required for constructing new campuses, acquiring equipment, and recruiting talent. Careful planning and phased development will be necessary to ensure availability of funding to sustain the ambitious vision. Secondly, the

university town's land use, layout, and transportation must be meticulously designed with future expansion in mind. The site area needs to adequately accommodate the full scale of the envisaged university town. Thirdly, the mix of programmes and degrees offered should align with the priority industries planned for the Northern Metropolis. This will ensure the talent pipeline meets key workforce needs. Fourthly, streamlined governance structures are necessary for efficient administration across multiple institutions within the university town. Finally, productive town-gown relationships and industry-university-research cooperation must be fostered to create a virtuous cycle of research, commercialisation, and talent development for sustainable growth.

Although surmountable, these issues need to be proactively addressed right from the planning stage for the university town to achieve its full potential as Hong Kong's next-generation innovation powerhouse.

7.3. Policy recommendations on building a University Town in the Northern Metropolis

To successfully develop a world-class university town, Hong Kong needs to adopt a thoughtful and well-coordinated approach right from the initial planning phase. Some policy recommendations are suggested and each suggestion is discussed from short-term to long-run.

Policy recommendations

1. **Start planning the layout early to facilitate overall planning of the Northern Metropolis**

To facilitate the overall planning of the Northern Metropolis, the layout and development of the university town needs to be strategized early. Dedicated offices should be set up to gather inputs, suggestions and coordinate the planning process for the university town. A specific office can be established just for this purpose of aggregating recommendations and consolidating related plans. The programmes and research priorities of the university town should align closely with the three key industries earmarked for the Northern Metropolis - healthcare technology, artificial intelligence, and advanced manufacturing. This will allow the university town to supply the necessary specialised talent and technical

support to catalyse growth in these sectors. Individual universities should also be encouraged to put forth development plans and proposals that optimally leverage their existing institutional strengths and future needs. By proactively initiating the planning process for the university town early, it can be coherent integrated into the overall masterplan for the Northern Metropolis right from the outset. This foresighted approach will maximise synergies and strategic advantages.

In the short term, the government must continue pushing forward with strong construction efforts, ensuring land acquisition and the relevant system establishment can be completed timely. Once construction is finished and the project enters the operational stage, long-term strategies should be implemented to avoid the problems experienced by the Science City in Tsukuba, Japan. To achieve this, we propose changing the government-led system, simplifying the approval process and delegating authority to universities or organizations. This will encourage the transformation of innovative technologies and bolster the efficiency of scientific and technological achievements. Additionally, establishing a series of incentives will be crucial.

In the long run, it is important to avoid issues such as the waste of resources and duplication of construction that have been observed in university towns in China. A strong emphasis should be placed on sharing and communication within the university town. This spirit should be incorporated into the campus code and effectively disseminated through various channels like media and mail to everyone studying or working in the university town.

2. Rationale for Scale Study Planning

To ensure the sustainable development of the university town, the scale and scope should be optimised based on a pragmatic assessment of available funding and land resources. The overall scale needs to be rationally designed to match funding levels, so that financial capabilities can support the entire multi-year project. At the same time, detailed analysis of land supply in the Northern Metropolis is imperative, to determine the appropriate construction scale and spatial footprint for the university town. Given the long-term nature of this undertaking, reasonably scheduling the development in graduated phases can progressively build up the scale and achieve agglomeration benefits over time.

In the past, the cost of building a university town was often borne by students through increased tuition fees, but this has been proven unworkable (Ruoppila & Zhao, 2017). Not only will it make it difficult for the university town to recover its costs, but it will also lead to the loss of many talents. Paying for construction costs through the commercialisation of education or attracting venture capital investment and linking it to the overall economic output of the university town to obtain returns may be feasible alternatives. However, a problem to consider is that new modes require detailed feasibility and operability demonstrations, and the risks brought by such funding also need further evaluation. In the short term, the government should establish an investment promotion team dedicated to the Northern Science City. This team should formulate policies and incentives to attract investment. Reference can be made to current incentives and best practices to maximize the attraction of the area. The government should actively engage with investment institutions, showcasing a strong willingness to cooperate in the northern metropolitan area. This can be done through visits, news media coverage, and other promotional activities.

To address the financial burden during the construction period, the government should explore alternative funding channels. One such option is to leverage the financial strength of Hong Kong to attract social capital and private investment. This can help share the financial burden and ensure the timely completion of the project. In the medium term, it is important to identify projects with high potential and provide them with encouragement and support. This can include funding, resources, and infrastructure to facilitate their development. By doing so, these projects can serve as role models and attract other innovative companies and start-ups to move to the area. This will help raise the visibility of the northern metropolitan area and contribute to the formation of a favourable ecosystem for innovation and technology. To ensure sustainable development, it is crucial to establish long-term partnerships with different industries and organizations. This can involve collaboration, knowledge sharing, and resource exchange to drive local development and create economic benefits. The government should actively attract and encourage more entrepreneurs to move into the northern metropolitan area by offering support, incentives, and a conducive environment for start-ups. This will not only benefit the entrepreneurs, but also stimulate venture capital investment and contribute to the overall growth of the community.

In addition, the distribution and layout of the university town should be judiciously aligned with the broader industrial development blueprint for the Northern Metropolis. Undertaking meticulous planning and studies around land use, spatial efficiency, construction feasibility and institutional requirements is key to designing the appropriate, contextual scale and distribution to match the planned industries. By taking a measured approach to planning the scale, funding, land use, phasing, and distribution, the university town can be intentionally designed for viable and enduring success.

3. Promoting Industry-University-Research Cooperation and Technology Demonstration Research

To maximise the impact of the university town, robust partnerships between academia and industry need to be forged. This requires collecting data on talent demands from industry and strategically cultivating graduates with urgently needed skillsets. Companies can collaborate with universities to jointly train research students and provide them professional opportunities. Universities can offer targeted short-term courses on emerging technologies to deliver industry-relevant training. Increased funding and incentives should be provided to encourage university-industry R&D collaboration and create synergies. Facilities and resources for technology demonstrations and validation pilots can help test innovations for real-world viability. Structured mechanisms are needed to facilitate the translation of R&D breakthroughs into market-ready products and technologies. Additionally, reasonable distribution models for intellectual property rights and commercialisation profits should be instituted to motivate researchers whilst also enabling the sustainable development of universities. By bringing together stakeholders across academia and industry to co-create talent pipelines, research solutions, and commercial sable technologies, the university town can become an engine of innovation, technology translation, and growth for priority industries. The purpose of establishing the University Town in the Northern Metropolis is mainly to promote I&T development, directly serve society with scientific research results, and generate economic value. The integration of production, education, and research is the core factor that should be considered in developing this university town. The University Town can share some campus facilities, save land, electronics, time, and other resources, promote interdisciplinary learning for students and researchers, and strengthen exchanges between colleges and universities.

In the short term, the government should maintain close contact with relevant enterprises from the initial stages of planning the university town. This includes setting up research institutes and providing experimental sites and production workshops. This approach ensures that after the establishment of the university town, barriers between upstream and downstream industries within the vertical system can be broken down. Additionally, it facilitates horizontal exchanges among tertiary institutions. Urgent action is also required to engage with the universities in Hong Kong to clarify which faculties and organizations will be relocated to the university town. This is crucial for their future development and interests. It may be necessary to have in-depth consultations and discussions on whether the university town should be dominated by engineering institutions or should include a range of different institutions. Clarifying these details will optimize the scale and scope of the site.

In the medium term, universities and industries should collaborate to identify key emerging technology areas that require urgent talent development and research breakthroughs. Targeted degree programmes, research projects, and commercialisation initiatives can then be launched to address these strategic needs. Robust incentivization structures are needed to encourage researchers and students to participate in these priority domain projects. Multi-stakeholder advisory boards should provide guidance and feedback to ensure the initiatives achieve maximum societal and economic impact. By channeling efforts towards tackling concrete technology and talent gaps, the university town can build distinctive capabilities and value.

4. Simultaneous planning of supporting facilities

Planning for supporting infrastructure and amenities needs to occur in tandem with the development of the university town. Regional facilities planning should be strengthened to seamlessly integrate and coordinate the construction of the university town with surrounding housing, transportation, recreation, healthcare, commercial, and other services. The facilities and urban environment need to fulfil the rigid demands of top talents by providing quality housing, convenient transportation, excellent healthcare, education for children, vibrant culture and leisure offerings. By cultivating a dynamic, liveable community atmosphere with a high standard of living, the university town can become a talent magnet. Attractive policies are required to draw and retain talent,

addressing pressing concerns around issues like affordable housing, access to healthcare, and schooling options for children. With meticulous planning across sectors to create a flourishing ecosystem and living environment, the university town can successfully attract and retain the premier global expertise essential for catalysing innovation.

It is of utmost importance to establish a high-level coordination and management committee, similar to that of Tsukuba University Town, to effectively coordinate and manage the relationship between the university town and the surrounding areas in a short time. This committee should specifically focus on the housing, transportation, and commerce facilities. Referring to the Northern Metropolitan Area Development Report, it is recommended to incorporate a separate chapter in the development plan for the northern university town explicitly addressing the connectivity between the university town and neighbouring facilities like transportation, industry, accommodation, and recreation. This chapter should have a clear timeline for the completion of each aspect. During the construction phase, setting up a monitoring group is necessary to ensure proper progress and prevent delays. It is crucial that the university town and related infrastructure are completed and ready for use simultaneously, as any delays can negatively impact the attraction of the area. An area of concern is the availability of land, which should be adequately prepared in advance to avoid setbacks.

In the long run, the maintenance and operation of the facilities become crucial. It is recommended to establish a dedicated care and maintenance team through a bidding process to avoid frequent repairs that could disrupt the normal functioning of the university town. For instance, road damage and railway maintenance issues must be promptly addressed. An essential consideration is the commercial viability of the area, as it directly influences the number of people who would be inclined to stay in the region for various activities like shopping and entertainment. Meanwhile, policies and initiatives to attract and retain leading talent could include housing subsidies, expedited residency pathways, competitive packages, and dual career hiring support. Top-tier international schools, childcare services, healthcare facilities, and transit links are essential for meeting families' needs. Networking programs help new recruits integrate, while grants assist spousal employment and ventures. By holistically addressing the pressing concerns of high-caliber recruits through housing assistance, immigration incentives, employment perks, educational access, community building, and family support, the university town can

become a globally competitive talent magnet. Tailoring policies and amenities to the needs of researchers, faculty, workers and their families is key to effectively attracting and retaining the talent imperative for flourishing as a dynamic hub of knowledge, technology and progress.

5. Create a good science, technology, and innovation ecology

To nurture a vibrant ecosystem of science, technology and innovation, policies and initiatives should aim to attract more youth to pursue STEM education and careers. Providing financial incentives like teaching allowances, scholarships or interest-free loans for science and technology programmes can encourage STEM participation. Streamlining administrative procedures involved in research funding and projects reduces bureaucratic hassles and empowers greater researcher autonomy and productivity. Platforms for exchange between students, researchers, entrepreneurs and industry professionals facilitate communication and relationships, sparking new collaborations. Simplifying cross-boundary travel and exchange procedures enables freer flow of talent between Hong Kong and mainland China, opening up partnerships. By creating a supportive environment for STEM education, research administration, talent engagement and mobility, a dynamic culture of innovation can flourish.

It is essential to foster a vibrant I&T atmosphere within the city. This can be achieved through hosting expositions, creating tourist routes and fostering an innovative mindset. A feasibility study should be conducted to assess the cultivation of such an atmosphere, providing the foundation for a number of proposals. During the intermediate stage, organising academic and innovative activities in the northern metropolitan area would be beneficial. It is imperative to keep detailed records and perform analyses to facilitate continuous improvement. These initiatives will contribute to the local tourism economy and provide residents with the opportunity to experience and engage with novel technologies. Examples of this could be setting up driverless pilot zones and self-charging roads, as well as creating augmented reality communities. By offering unique and futuristic experiences, the region will attract individuals looking to settle down rather than just seek short-term employment opportunities. In the long run, it is crucial to establish 1-2 distinctive innovative activities exclusive to the northern metropolitan area. This will help build the brand of the area as an innovation and technology hub, necessitating long-term exploration, sustained investment, and perseverance.

6. Promote legal safeguards and governance structures

In order to avoid potential problems arising from changes in government and policy, it is recommended to specially formulate relevant legal provisions for the construction and operation of university towns. Long intervals between the planning stage and the construction stage are not a good thing. Now is the time for the country and Hong Kong to care about and focus on developing the I&T industry. Scientific planning and agenda formulation should be started as soon as possible.

In the short term, it is important to develop a clear construction and law development schedule by starting early to outline important milestones and deadlines. This can help ensure that progress is made in a timely manner and that all tasks are completed within the expected timeframe. The government should also collaborate closely with Shenzhen's and national long-term planning initiatives to align goals and maximize advantages. This will help create synergy so that the development of laws in the Northern Metropolitan Area aligns with broader strategies and objectives.

As for a medium-term suggestion, it is necessary to establish a dedicated supervisory group to oversee the formulation process of laws. This group should be responsible for monitoring progress, providing guidance and offering incentives to motivate timely completion. Regular assessments should be conducted to evaluate the progress and identify any challenges or bottlenecks that must be addressed. Moreover, incentivize individuals and teams involved in the law-making process to ensure motivation and timely completion. These incentives can be in the form of rewards, recognition, or other incentives that encourage individuals to meet their responsibilities and contribute to the success of the project.

The final suggestion is to establish a Northern Metropolitan Area Law Preparation Committee, which means creating a dedicated committee that focuses on the preparation and development of relevant laws for the region. This committee should have a mandate to hear, collect, and set laws tailored to the needs and characteristics of the Northern Metropolitan Area. This will ensure that local operating, tax, and other essential laws are effectively developed and adhered to in the long term.

To develop a world-class university town in the Northern Metropolis, Hong Kong can learn from global best practices while avoiding common pitfalls. Comprehensive planning should align with national development goals and be initiated early to enable integration with the wider region. Extensive facilities customised to institutional needs provide space to grow. Multidisciplinary collaboration across academia and industry needs promotion through joint labs, projects and talent exchanges. Phased development enables gradual scale-up whilst maintaining long-term vision. Attracting international talent is key, so transit links, housing, healthcare, recreation and community building are important. Enabling commercialisation and university-industry partnerships fosters innovation ecosystems. Sustainability principles should be embedded regarding energy, waste and transport. Independent governance bodies will provide oversight on operations. Proactive policies and planning are vital across several key areas. Master planning should integrate the university town early on, gathering diverse inputs. Pragmatic scale alignment to funding and land will enable viable growth. Robust academia-industry partnerships will link research to economic and talent needs. Supporting infrastructure and amenities must fulfil talent demands. Incentives and streamlining will stimulate innovation and exchange. Legislative safeguards and governance structures will ensure efficiency, quality and sustainability. With meticulous planning across sectors, the Northern Metropolis University Town can fulfil its immense potential as a magnet for talent and the fulcrum of Hong Kong's emerging role as Asia's innovation hub.

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About the Policy Research Centre for Innovation and Technology

The Policy Research Centre for Innovation and Technology (PReCIT) was founded in 2022 as a university-level interdisciplinary policy research centre. Led by Prof. Christopher CHAO, Vice President (Research and Innovation) of PolyU and Director of PReCIT, and Prof. Eric Wing Hong CHUI, Head of the Department of Applied Social Sciences and Co-Director of PReCIT, the Centre aims to support Hong Kong's I&T development in the GBA via interdisciplinary collaborative research, including but not limited to carbon-neutral cities, I&T development in the GBA, and the Belt and Road Initiative's development in Southeast Asia.
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香港理工大學

Policy Research Centre for Innovation and Technology
科技及創新政策研究中心

粵港澳大灣區
院士聯盟
The Greater Bay Area
Association of Academicians

研究報告

在北部都會區建設大學城 推動香港創科新經濟發展

Building a University Town in the Northern Metropolis to Promote the Development of Hong Kong's New Innovation and Technology Economy

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創科政策研究合作計劃

《在北部都會區建設大學城，推動香港創科新經濟發展》

研究報告

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目錄

一、摘要

為評估“在香港北部都會區建設大學城”在推動香港新興創新科技經濟方面的潛力，本報告探究了香港北部都會區的發展規劃及建立大學城的原因，包括滿足香港本地的需求和國家發展戰略相融合。本報告回顧了香港的創科政策背景與發展藍圖，分析了全球成功大學城的案例，並收集了香港八所大學持份者的觀點。通過分析研究證明，經過深思熟慮建設的大學城雖然可能會面臨建設和營運等方面的挑戰，但仍可有力地推動香港的創科經濟發展，推動香港成為國際創科樞紐。本報告的關鍵結論和建議涉及培養人才、解決土地資源問題、促進產業合作、利用戰略要地、借鑒全球最佳經驗及匯集持份者的觀點以確保政策制定的平衡和項目的成功。本報告通過六組政策建議概述了關鍵結論，為政府規劃提供支援。

關鍵結論：

1、香港需要大學城的原因

香港面臨科學、技術、工程、數學（STEM）人才短缺的問題，預計到 2030 年，技術人才的缺口將超過 20 萬。與此同時，由於土地資源嚴重緊缺，香港本地大學在拓展教學和研究方面受到了空間的限制。而《北部都會區發展規劃》為香港提供了絕佳的機會。香港毗鄰深圳，在創新、基礎設施、產業和生活領域與粵港澳大灣區進行融合，有著得天獨厚的優勢。

2、政策優勢與戰略發展機遇

國家政策旨在將香港發展為國際創科樞紐，為大學城的重大投資提供有力支援。北部都會區的發展提供了一個戰略機遇，將智力資源和基礎設施集中在一個經過規劃的大學城，從而推動合作。

3、全球經驗

本報告進行了深入的全球案例研究，闡釋了全球一流大學城如何開展綜合規劃、設施建設，並與當地創新生態系統整合，從而成為蓬勃發展的人才和技術中心。這些經驗有助於香港更好地在北部都會區建設大學城。

4、持份者者的共識

儘管觀點存在細微差異，但本地各持份者都一致認為，如果通過針對性的政策制定形成各類見解的協同增效，那麼北部都會區大學城作為知識和經濟的支點，將發揮

巨大的潛力。

在北部都會區建設大學城的戰略方法

通過大量文獻調研、全球案例研究以及與持份者深入訪談，本報告建議建立大學創新中心，作為北部都會區大學城的一種基於資產的新戰略。本報告將這些創新中心定義為以主要研究機構為核心的集中節點，旨在加強大學與產業屆的合作，擴大研究影響力，並吸引全球傑出人才。儘管香港在發展創新和科技領域經驗有限，但是區域內當之無愧的教育和科研中心，擁有多所世界知名大學，並具備強大的研發能力。為明確競爭優勢，香港必須充分發揮大學和科研機構的潛力，培育活躍的高校—政府—產業合作夥伴關係，從而推動創新和科技蓬勃發展。

政策建議：

1. 儘早規劃佈局，促進北部都會區總體規劃

- 設立專門機構，收集建議，協調大學城發展規劃；
- 對接北部都會區三大主導產業，提供必要人才與技術支援；
- 鼓勵高校根據自身優勢和需求提出發展規劃。儘早啟動北部都會區大學城規劃進程。

2. 規模化研究計劃的基本原理

- 根據可用資金優化規模，確保資金可為整個項目提供支援；
- 分析土地供應情況，設計適當規模；
- 分階段發展，逐步實現規模和集聚效應；
- 根據產業發展計畫，合理設計大學城佈局

3. 促進產學研合作和技術示範研究

- 歸納產業人才需求，培養緊缺人才。與企業合作，聯合培養研究生；
- 高校可提供有針對性的短期人才培訓，並開設新興技術課程；
- 增加資金支持，促進大學與產業間合作，產生協同效應；
- 提供技術示範和科技驗證的方案與資金支持；
- 推動研發成果的產品轉化，實現技術的商業化；
- 為大學與產業間合作制定合理利益分配機制，激勵研究人員，促進大學可持續發展

4. 同步規劃配套設施

- 加強區域配套設施規劃，並設立專門小組，以協調大學城與周邊配套設施的建設；
- 營造社區氛圍，提供優質生活；
- 滿足頂尖人才對住房、交通、醫療、子女教育、文化和休閒的需求，打造舒適的生活環境；
- 出台吸引力的政策，吸納並留住人才。

5. 打造良好的科學和創新生態

- 通過教學津貼、無息貸款等經濟激勵措施，吸引和鼓勵更多的年輕人學習科學、技術和創新相關科目；
- 簡化科研項目的行政流程，提高研究人員的積極性；
- 提供人才交流和活動平台，促進人才交流；
- 簡化通關程序，為科技人才在中國內地和香港之間的通行提供便利

6. 推動完善配套法律規範

- 為大學城的發展提供明確的法律保障，確保發展的連續性和可持續性；
- 設立專門的政府機構，協調和管理開發大學城的工作，及時解決問題；
- 規範大學城的建設和運作機制，確保可持續發展

二、背景

本研究分析了在香港北部都會區建設大學城以推動創新科技發展的潛力，並向政府提供政策建議。本報告根據更為廣泛的經濟發展戰略，分析了將北部都會區轉變為領先的科技中心所涉及的複雜因素。

參考《中華人民共和國國民經濟和社會發展第十四個五年規劃（2021—2025 年）和 2035 年遠景目標綱要》（“十四五”規劃）和《粵港澳大灣區發展規劃綱要》（發展規劃綱要）中國家對香港提供的政策支持，香港特別行政區政府（香港政府）在《香港 2030+：跨越 2030 年的規劃遠景與策略》中提出，擴大及鞏固北部經濟帶，使其發展為北部都會區。《北部都會區發展策略報告》於 2021 年 10 月 6 日發佈，概述了北部都會區的發展藍圖。

香港政府將充分利用北部都會區與深圳毗鄰的地理優勢，實現兩城一體化發展的協同效應，從而全力打造完善的創科產業生態系統，將創科產業發展為香港的第二大經濟引擎。北部都會區也將發展為一個適宜人們生活、工作和旅行的地區。香港政府估算，北部都會區最終將容納約 250 萬居民，並提供約 65 萬個工作崗位，其中約 15 萬個（約 23.1%）屬於創科產業。

此外，《北部都會區發展策略》建議採取先進措施，在適當的地區和位置規劃全港及區域性的重要設施，如高等教育機構、私立醫院、娛樂設施等。事實上，國際範例已經證明，高等教育和先進研究機構的集聚可顯著推動創科產業發展，並為城市發展注入活力。

由此可見，北部都會區將在香港未來的創科產業及經濟發展中發揮舉足輕重的作用。這是一個龐大而長遠的發展項目，涉及廣泛的地區、領域、產業和社會層面，需要完整而全面的發展規劃，才能實現政府的願景與目標。

北部都會區在發展創科產業的過程中，必須制定一系列政策，改善科技研究基礎設施，培養和吸引科技研究人才，以促進創新和科技企業的創立。這些政策至關重要，且與北部都會區的整體基礎設施設備密切相關。社會各界對北部都會區的發展政策有著不同的看法和建議。

大學城是由香港本土、國際以及中國內地的大學、科研機構和企業研究中心形成的集群區域。大學城的地理位置可與北部都會區的產業規劃合理結合，最大限度地發揮協同效應。一個有效的大學城的精髓在於這種具備多樣化學術和研究機構的集群生態系統

與周邊的經濟重點保持一致。已經有人主張在北部都會區建設一座大學城，讓本地的高等教育機構在此設立分校，培養香港未來發展所需的各類專業人才。

全球的許多案例已經表明，高等教育和科研機構形成的集群能夠有效地推動和促進創科發展。基於《北部都會區發展策略》的框架，本研究旨在系統地分析和探討在北部都會區建設大學城的發展、方向和潛力。此外，也希望能夠為香港政府制定相關政策提供建議。

三、香港對大學城的需求

香港的目標是成為全球創科樞紐，但目前面臨著科學、技術、工程、數學（STEM）人才短缺的問題，預計到 2030 年人才缺口將達 20 萬。即使 STEM 畢業生人數增加，人才流失等因素也意味著需要培養更多人才。大學城可以連接產業與高等教育，助力香港留住人才，為學生提供更多機會並提升本地經濟效益，從而實現成為全球科創樞紐這一目標。

香港的大學還面臨著嚴重的土地短缺問題，限制了教學和研究設施的擴建。創新的地下擴建方案可在一定程度上緩解問題，但香港仍然需要更多的空間。《北部都會區發展策略》為解決這一問題提供了絕佳的機會，北部都會區毗鄰深圳，在創新、基礎設施、產業和生活環境方面具有獨特優勢，能夠更好地將香港與粵港澳大灣區進行融合。北部都會區的地理位置使其成為連接香港與中國內地的理想橋樑：按計劃打造的創新科技園以促進合作與知識交流；新建的交通樞紐以增強互聯互通；共同開發戰略性產業集群以推動經濟發展，包括與深圳前海開發區合作拓展的金融服務；以及提供完善的住房、醫療、教育、休閒和旅遊設施。

香港政府已投入 1500 億港元，用於創科發展以及北部都會區的基礎設施建設，這種前所未有的投資成功地鞏固了香港作為亞洲領先的創科樞紐地位。在此項投資中，大量的資金用於戰略投資、人才吸引、製造業升級、企業增長和基礎設施建設。

3.1 人才培養

香港志在成為全球創科樞紐。然而，要實現這一目標，香港必須增加其 STEM 領域的人才數量，以彌合人才供需之間的差距。此外，一位香港科學園發言人表示，北部都會區的“科技城”將創造至少 16.5 萬個就業崗位，其中 12 萬個與創科技相關。

根據大學教育資助委員會（UGC）的統計資料，這一缺口只能通過增加當前和預計的 STEM 領域畢業生人數來填補。從 2015 年至 2022 年，醫學、牙醫學和健康專業的學生人數從 10，389 人增加到 12，547 人，理學專業的學生人數從 15，880 人增加到 18，313 人，工程與技術專業的學生人數則出現了負增長，從 19，006 人下降到 19，364 人。2022 年 STEM 領域的畢業生達到 49，866 人，但即便如此，人口老齡化、退休，以及一定比例的畢業生不進入勞動力市場等因素造成的人口流失趨勢也應當納入考慮。事實上，在 2022 年，香港經歷了自 1991 年以來最大的人口淨流失，這反映在資訊與通信行業新增的近 50%的職位空缺 (UGC， 2022)。

面對人才流失和日漸增長的創科人才需求，香港必須從其他地方引進人才。中小學學生正積極規劃以 STEM 為主的學習生涯，大學必須擁有足夠的資源和能力進一步培養這些人才。這就是北部都會區大學城匯集資源和設施並發揮作用的意義。

3.2 現有土地容量不足

嚴重的土地短缺不單於住房領域，在高等教育領域也同樣有所體現。香港有五所大學進入了 QS 世界大學排名前 100 名。大學迫切希望能從各個方面體現這一聲譽，但由於土地短缺，無法輕易擴展教學和研究空間。香港大學醫學院生物醫學學院發展及基建總監兼院長高級顧問陳應城（Chan Ying-shing）教授表示，香港大學醫學院希望擁有更大的研究實驗室以符合國際標準，但是“港大的研究實驗室仍然不足”。此外，在過去 20 年間，一些院系的入學人數已增加了兩倍，然而校園規模並沒有相應擴大，這使大學面臨尋找空間的壓力。

在過去 20 年間，香港的頂尖研究型大學採取了創新手段來建設校園設施，例如地下挖掘施工和遷移現有基礎設施。香港大學的“百周年校園”就是一個典型的例子：通過挖掘地下洞穴，調整西部淡水服務水庫的位置，從而釋放出可用的土地用於建設。由於香港存在空間的限制，一些大學還在中國內地設立校區以促進其發展。

在土地利用方面，香港大學的“百周年校園”是一個獨特的里程碑。目前香港缺乏供頂尖大學合作共用和開展研究活動的充裕有形空間。建立這類大學共用的社區，可以有效解決香港各大學的土地短缺問題，促進多邊創新，並推動創新經濟發展。

大學名稱	校園面積（公頃）	2021/2022 年總學生入學人數（副學位、本科、研究/授課型研究生）	2021/2022 年總教職員工人數（學術部門聘任的員工）	2021/2022 年學生和教職員工可用平均校園面積（平方米）
香港中文大學	137.3	20，175	5，829	53
香港大學	14	20，696	6，792	5
香港城市大學	15.6	13，491	3，119	9
香港理工大學	9.2	17，489	4，931	4
香港科技大學	60	11，462	2，924	42
香港浸會大學	12.88	7，724	2，145	4
香港教育大學	12.5	7，653	1，491	14
嶺南大學	8.6	2，777	795	24

表 1：大學教育資助委員會（UGC）資助的香港 8 所大學的校園面積、總學生入學人數和總教職員工人數

大學名稱	校園面積（公頃）	2021/2022 年總學生入學人數（本科和研究生）	2021/2022 年總教職員工人數（學術部門聘任的員工）	2021/2022 年學生和教職員工可用平均校園面積（平方米）
斯坦福大學	8，180	17，326	2，304	4，169
築波大學	258	16，542 (2021)	4，608 (2021)	122

表 2：全球案例研究：大學的校園面積、總學生入學人數和總教職員工人數

3.3 產業與高等教育的聯通性

大學城將促進城市—大學關係（城校關係）的建立。這種關係是指產業界與高等教育之間的聯結，可推動社區建設、人才留存和本地經濟效益。這種關係的性質因城而異，但它意味著城市與相鄰大學之間的社區動態互動。

這種動態能夠促成大學與企業間的合作夥伴關係，這對於人才留存和提高學生滿意度非常重要，對產業和高等教育機構都有益處。將產業置於學術機構的四周可產生關鍵效益，促進社區發展。一項案例研究報告指出，在大學區居住的人更有興趣於暑期期間

在當地工作，對社區有更強的歸屬感。從長遠來看，這有助於學生留在當地發展。高等教育機構與產業之間的共生關係有利於人才的留存。美國佛羅里達州的一項案例研究指出，人類的創造力，即創科人才，促進了城市的成長和發展。當“創造性”人才集中在一個地區時，“公司並非迫使人們搬遷，而是為吸引人才而聚集”。

另一方面，對學生來說，產業合作夥伴關係為他們提供了豐富的社交環境。這意味著學生能夠找到最適合他們創科興趣的機會。這對香港政府也大有裨益，因為大學能夠與產業及本地社區合作，從而將學術研究與社會需求相聯結。這與“十四五”規劃中香港創科發展的目標是一致的。

大學城中的產業合作夥伴關係可在政府的支持下構建，形成大學—產業—政府的“三重螺旋”結構，從而創造一個有凝聚力的創新生態系統。本報告所選的案例研究將論證，創新驅動型經濟的成功很大程度上源於大學通過大學城而形成的產業合作夥伴關係。

3.4 北部都會區作為粵港澳大灣區互聯互通的重要區位

根據 2019 年發佈的《粵港澳大灣區發展規劃綱要》，為充分發揮廣東、香港和澳門的綜合優勢，深化內地與香港、澳門之間的合作，並支持香港和澳門融入國家發展，大灣區城市之間的合作將在“一國兩制”的原則下持續推進，其合作內容涉及創新、基礎設施、產業體系、生態文明和生活圈等方面。這一規劃著眼於解決粵港澳大灣區城市間目前存在的突出問題，如產能過剩和供需結構失衡，香港的經濟增長缺乏持續穩定的支持等。國家將全力推動大灣區發展為一個參與國際競爭體系的世界級灣區和城市集群，引領中國經濟、創新、科技和體制發展。

香港經濟以服務業為主。2022 年，服務業占其國內生產總值（GDP）的 93.4%（Yeung，2023）。自新型冠狀病毒（COVID-19）疫情爆發以來，香港的經濟受到嚴重衝擊：2020 年其實際 GDP 下降了 6.5%，與 2019 年 1.7%的降幅相比有顯著衰退（Yeung， 2023）。在這種情況下，香港迫切需要制訂轉型措施、全面地調整經濟結構，以應對衰退所帶來的挑戰並促進可持續增長。香港政府提出了再工業化，作為解決方案之一。2022 年 12 月，香港政府發佈了《香港創新科技發展藍圖》（“創科藍圖”），概述了未來 5 至 10 年香港的創新和科技發展計劃。“創科藍圖”旨在加強創新和科技生態系統，推動“新型工業化”，擴大創新和科技人才隊伍，促進經濟迅速增長，推動數字經濟擴展，將香港轉型為智慧城市，並積極地融入國家發展總體議程，同時亦將香港培育為連接中國內地和國際社會的橋樑。

如果中環是香港通往世界的橋樑，那麼北部都會區將成為香港通往內地的橋樑。這兩座橋樑將貫通香港南北，推動沿線產業的發展，包括基礎設施建設、住房供應、醫療體系和教育再分配。這將在香港的經濟和產業升級中，發揮至關重要的作用。如果說中國有“一國兩制”，那麼這可以形容為“一港兩橋”。

《發展規劃綱要》還提到支持廣東、香港和澳門的企業、大學和研究機構，共同構建高水準的合作創新平台，促進科技成果向可交付成果和產品轉化。沙田科學園無疑是個不錯的地點，起到了良好的範例作用。同時，該地區將有助於深化廣東、香港和澳門之間的創新合作，匯聚國際創新資源，提高科技成果向可交付成果和產品轉化的能力，加強科學技術創新合作。不過，目前全港似乎缺乏協調這些活動的平台，大學城可能是一個潛在的選擇。

3.5 香港政府對香港創科和北部都會區發展投資的統計

發展願景		2016 年（2014 年數據）	2022 年（2020 年數據）	2027 年（2025 年數據）	2032 年（2030 年數據）
1. 研發					
1.1	研發總支出與國內生產總值之比（GERD/GDP）	0.74%（167.27 億港元）	0.99%（265.54 億港元）	1.3%	2%
1.2	人均研發總支出	2，306 港元	3，575 港元	5，000 港元	9，000 港元
1.3	研發支出的公共與私人比例	56: 44	58:42	50: 50	40: 60
2. 初創企業					
2.1	在合作工作空間、孵化基地和加速器中運營的初創企業數量	1，065	3，755 (2021)	約 5，000	約 7，000
2.2	獨角獸企業數量（累計）	0	12	18	30
3. 人才					
3.1	創新和科技執業者的數量	35，450	45，310	60，000	不少於 100，000
3.2	每 1000 勞動力的創新和科技執業者數量	9.15	11.56	16.54	28.05
4. 產業發展					
4.1	製造業對國內生產總值（基本價格）的貢獻百分比	1.2%	1.0%	1.5%	5%

表 3：發展指標 | 資料來源：《香港創新和科技發展藍圖》

香港政府已採取了前所未有的戰略性舉措，力圖將城市發展為領先的創科樞紐。政府已投入 1500 億港元的巨額資金，其中包括 220 億美元的香港成長投資組合和 50 億港元的戰略科技基金。吸引人才是關鍵事項，政府擴大研究補助，對高技能研究人員的津貼提高至 3.5 萬港元。高端人才通行證計劃也旨在吸引全球的頂級人才。

政府通過再工業化資助計劃支持製造業發展，為設立智慧生產線提供高達 1500 萬港元的配套補貼。新設立的 300 億港元的共同投資基金也進行戰略性投資，吸引企業在香港擴大經營規模。風險投資和初創企業獲得 20 億港元的政府配套資金支持，吸引了超過 74 億港元的私人資本。

憑藉擁有 1000 萬使用者的快速支付系統和未來高鐵站預留空間等重大基礎設施項目，智慧城市發展正在不斷推進。這一戰略性舉措以充裕的資金、人才激勵、企業支持和新一代基礎設施為依託，旨在將香港鞏固為亞洲領先的創新、科技和經濟樞紐。

四、回顧並研究香港和粵港澳大灣區內的創科發展

“十四五”規劃將香港定位為國際創科樞紐。為此，香港政府發佈了《北部都會區發展策略報告》，概述計劃將該區域發展為以創科為經濟引擎的大都市。在此建立大學城可促進香港的創科發展。《創科藍圖》提供了發展生態系統的路線圖，大學城可幫助實現關於提升研發能力、培育創業文化、吸引人才以及促進學術界與產業界合作等關鍵策略。《香港智慧城市藍圖 2.0》(“智慧城市藍圖”)也就利用智慧出行、生活、環境和治理等技術來提高生活品質和可持續性提供了指引。總結全球大學城的經驗顯示了以下重要的成功因素：將大學與城市規劃無縫融合；開發周邊生態系統，包括研究園區和孵化器；推動跨學科、跨產業界的合作；分階段發展，兼顧長期願景和短期目標；吸引國際人才；確保互聯互通和交通連接；促進大學與產業界的合作夥伴關係和商業化；嵌入可持續發展原則；以及由獨立機構進行管理。如果規劃實施得當，北部都會區的大學城將成為推動香港發展為全球創新和科技樞紐的“催化劑”。它可以培育本地的技術能力和人才，開展有影響力的研究，支持技術商業化和知識型產業的增長，為初創企業和創業者提供充滿活力的生態系統，並提高香港作為世界級城市的競爭力和戰略價值。大學城還將示範智慧城市技術如何提升生活品質和環境可持續性。通過借鑑全球最佳實踐，借力本地公司和組織及政府的措施，大學城可深度發展為香港未來的關鍵驅動力。

4.1 香港和大灣區是未來的國際創科樞紐

2021 年 3 月發佈的“十四五”規劃闡明了香港在國家發展中的角色和重要地位。除了鞏固和加強香港作為國際金融中心、國際貿易中心、國際航運中心和亞太區國際法律及解決爭議服務中心這四大傳統中心的發展外，更重要的是增加了四個新的中心，包括國際航空樞紐、國際創新與技術中心、區域智慧財產權交易中心和東西方國際文化交流中心，以加強、構建和發展。

為回應建設國際創新與技術中心的使命，香港政府已在規劃和發展方面採取了行動。早在 2017 年，香港政府就與深圳市人民政府簽署了《關於港深推進落馬洲河套地區共同發展的合作備忘錄》，為香港北部下一階段的發展奠定了堅實的基礎。2021 年 10 月，香港政府發佈了《北部都會區發展策略報告》，明確表示計劃將新界北部發展成為一個適宜居住、工作和旅行的都會區。該區將以創科產業作為經濟引擎，成為除中環外的香港第二大經濟帶，為香港融入國家總體發展提供更好的機遇，如圖 1 所示。

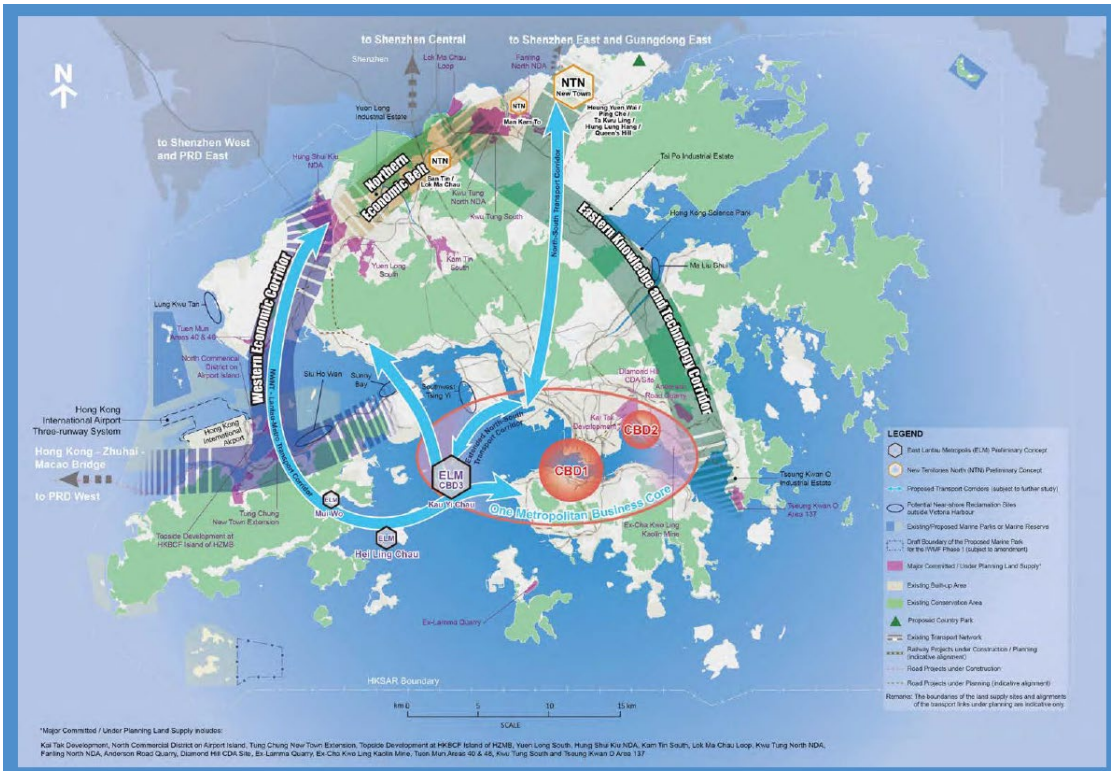

圖 1 概念空間框架 | 來源：《北部都會區發展策略報告》，2021 年

4.2 香港的現有創科資源和機構

根據全球創新指數(WIPO，2022)，由於香港擁有豐富的創科資源和機構，香港在最近幾年一直位居世界領先地位，排名從第 11 名至第 14 名。香港大學教育品質優良，享譽全球。香港擁有最高密度的世界一流大學(5 所世界百強大學)，超過其他國際大都市，包括倫敦、紐約、東京等。此外，香港設有 6 個國家工程研究中心香港分中心、7 個研發中心、16 個國家重點實驗室和 22 個中國科學院合作實驗室，為學者和研究人員提供不同類型的平台，進一步開展研究，將創新思維轉化為實踐，從而吸引大批世界知名學者和專家，他們在各自領域具有革命性和前瞻性的成果。

一些公司和組織對促進香港的創科發展提供幫助，例如香港科技園公司、香港數碼港管理有限公司和香港生產力促進局。此外，政府的行動和措施的重要性也不容忽視。香港特區政府成立了創新及科技局，旨在將香港轉型為知識型經濟體和創新科技樞紐，並發佈了 3 份與創科發展相關的藍圖，包括智慧城市藍圖、智慧城市藍圖 2.0 和創科藍圖。其他與創新和科技相關的資源見表 4，如創新基礎設施和支援計劃。

表 4：香港現有的科技資源和機構

類型	名稱	描述
機構、研究中心和實驗室	5 所世界百強大學	• 香港大學 • 香港中文大學 • 香港城市大學 • 香港科技大學 • 香港理工大學 吸引大批世界知名學者和專家，他們在各自領域具有革命性和前瞻性的成果。
	香港科技園公司	成立於 2001 年，提供全面的綜合服務，滿足不同發展階段公司的需求。
	香港數碼港管理有限公司	由香港特區政府擁有，培育人才，促進青年創業，支持初創企業，通過與本地和國際合作夥伴的戰略合作來促進行業發展，並將新經濟與傳統經濟相結合。
	香港生產力促進局	一個跨學科組織，在智能產品、智能製造、自動化、新材料、表面處理、智慧出行、綠色運輸和環保科技方面開展市場導向的應用研發，並提供諮詢、技術轉移、培訓和其他支援服務。
	7 個研發中心	• 汽車零部件研發中心 • 香港資訊及通訊科技研發中心 • 紡織及製衣研發中心 • 物流及供應鏈管理應用技術研發中心 • 納米及先進材料研發院 • 先進製造中心(未來數年) • 微電子中心(未來數年)
	6 個國家工程研究中心香港分中心	國家工程研究中心為產業提供重要的工程研究和諮詢支持，如國家軌道交通電氣化與自動化工程技術研究中心和國家集成電路系統工程技術研究中心。
	16 個國家重點實驗室	國家重點實驗室計劃是國家重要的科技發展計劃之一，香港現有 16 個實驗室，如理

		大化學生物與藥物研發國家重點實驗室，由黃國賢教授帶領。
	22 個中國科學院合作實驗室	旨在香港大學與中國科學院研究所之間就高度專門的科學議題開展合作，如中科院數學與系統科學研究院與理大聯合實驗室。
	7 個位於大灣區的香港校園和設施	• 珠海(香港浸會大學) • 深圳龍崗(香港中文大學校園和醫院) • 廣州南沙(香港科技大學) • 佛山(香港理工大學) • 東莞(香港城市大學) • 深圳南山和福田(香港大學校園和醫院) • 肇慶(香港都會大學)
	粵港澳大灣區院士聯盟	於 2021 年 4 月 1 日在香港註冊成立為非營利組織。旨在匯集區內頂尖科學家，促進跨學科交流與合作，推動科技和普及科學教育 。
基礎設施	香港科學園	位於白石角，佔地 22 公頃，擁有超過 1,100 間科技公司和超過 11,000 名研發從業員，提供先進設備和軟件平台以支援研發工作，並促進專業交流、投資者配對、業務發展和商業化。
	數碼港	香港數碼科技旗艦和創業孵化器，擁有超過 1,900 個成員，包括超過 800 個駐場和近 1,100 個非駐場初創企業和科技公司。
	數據技術中心	位於將軍澳工業邨，旨在容納與數據傳輸業務相輔相成的用途及全球電訊業務。
	創新斗室	靠近科學園，提供約 500 個居住單位，具有靈活的設計和共用工作空間等設施。
倡議	創新及科技基金	創新及科技基金下設有 17 項資助計劃，各有不同目標，包括支援研發、促進科技應用、培育科技人才、支援科技初創企業及營造創科文化，如創新及科技基金下的創新及科技投資基金和大學科技初創企業資助計劃。

	科技人才入境計劃	於 2018 年 5 月推出，為海外及內地的研發人才提供快速入境安排。
	創科實習計劃	於 2020 年推出，鼓勵修讀科學、科技、工程及數學的學生在學期間參與創新及科技相關的工作實習，培養他們畢業後從事創科行業的興趣。
	再工業化及科技培訓計劃	再工業化及科技培訓計劃 於 2018 年 8 月推出，旨在以“政府資助二分之一、企業資助二分之一”的配對形式，資助本地企業培訓員工掌握先進科技，尤其是與“工業 4.0”相關的技術
	政府藍圖	發佈 • 2017 年 12 月發佈香港智慧城市藍圖 • 2020 年 12 月發佈香港智慧城市藍圖 2.0 • 2022 年 12 月發佈香港創新科技發展藍圖

4.3 《香港創科發展藍圖》是發展路線圖

研究是創科生態系統的重要組成部分。沒有研究和創新，就難以推動創新和科技產業的蓬勃發展。香港的大學承擔著創科生態系統上游和中游研究的角色，而公共研究和商業機構則主要從事中下游應用和產業鏈的研究。將科學研究成果與社會需求相連接，有助於創科生態系統的持續發展。基於此，《北部都會區發展策略報告》明確指出，香港政府將發展新田科技園區，將其打造成香港的矽谷，提供總計約 14.8 萬個創科崗位，涵蓋研發領域。目前的問題是如何加速創科發展，打破上中下游間的橫向和縱向壁壘——在北部都會區建設大學城可能是一個可行的解決方案。

《創科藍圖》是一份長遠的戰略規劃，它將香港定位為國際領先的創科中心，概述了政府發展香港創科產業的願景和計劃，其目標是確保香港在科技創新方面保持競爭力和領先地位。該藍圖概述了各種政策，用於提升城市的研發能力，推動技術應用和商業化，培育充滿活力的創新創業生態系統，並吸引全球人才以支持其創科產業部門的發展。《創科藍圖》中概述的具體舉措包括建立研究集群和創新實驗室，推動金融科技和電子商務，為初創企業以及中小企業提供資金和支援。

政府正加速發展北部都會區的新田科技園，以助力科技園區和先進試點生產基地的發展，從而探索創新的發展模式。《創科藍圖》與在北部都會區建設大學城的規劃密切相關。在北部都會區建設大學城可發揮重要作用，推動香港創科經濟的發展。

《創科藍圖》有助於為創科發展創造有利的環境。它概述了提升城市研發能力的各種措施，如增加研發資金，提高研究品質，促進學術界與產業界的合作。建設一座擁有最先進研究設施和基礎設施的大學城，可為創科產業創造有利環境。《創科藍圖》還強調了在香港培育創業文化以支持創科界的發展。大學城能夠為培養創業人才和支援初創企業提供理想平台，提供資金、指導和人脈網路的機會。此外，《創科藍圖》還指出吸引全球人才來香港支持創科產業發展的重要性。大學城擁有世界級的設施和充滿活力的科研社區，可以有效吸引全球傑出研究人員、科學家和企業家來港。《創科藍圖》亦強調了學術界和產業界需要更緊密的合作，以促進研發成果商業化。大學城可將研究人員、企業家和產業專業人士匯聚在一個共同的生態系統中，從而促進合作。

《創科藍圖》為北部都會區建設大學城提供了路線圖，促進香港新興的創科經濟發展。在北部都會區建立大學城與《創科藍圖》的目標相一致，旨在打造強大的創科生態系統，由此創造有利於創科進步的環境，培育創業精神，吸引全球人才，並鼓勵學術界與產業界的合作。

4.4 《香港智慧城市藍圖 2.0》的啟示

《香港智慧城市藍圖 2.0》（“智慧城市藍圖”）旨在利用創科提升香港的生活質素，並促進可持續發展。這概述了推動智慧城市技術應用的各種策略，包括智慧移動、智慧生活、智慧環境、智慧人才、智慧政府和智慧經濟。在北部都會區建設一座擁有先進智慧基礎設施的大學城，不僅可以為創科發展提供平台，還能從“智慧城市藍圖”中獲益。

首先，“智慧城市藍圖”提出促進智慧移動以改善交通系統的效率和可持續發展的重要性。一座擁有先進智慧移動解決方案的大學城能夠建立高效、可持續的交通系統，減少對私家車的需求，緩解交通堵塞。如共用單車、電動汽車和自動駕駛班車等智慧移動解決方案能夠為學生、研究人員和產業專業人士提供便捷和可持續的交通選擇，提高了互聯性和可達性。此外，採用智慧停車系統可優化停車位的使用，減少對額外的停車基礎設施的需求。

第二，“智慧城市藍圖”亦推廣智慧生活，提升城市生活質素。一座擁有智慧生活解決方案的大學城能夠改善學生、研究人員和產業專業人士的生活質素。例如，擁有先進能源管理系統和物聯網設備的智慧家居，可以提供舒適和健康的生活環境；智慧醫療系

統可促進健康，支援預防護理；而擁有先進照明、空氣品質和通訊管理系統的智慧公共空間則可創造一個健康、舒適的學習和工作環境。

第三，“智慧城市藍圖”促進環境的可持續，以支持智慧城市的發展。一座擁有可持續環境的大學城可支援香港的創科經濟發展。例如，採用太陽能和風能等可再生能源可以提供可靠、可持續的能源。此外，實施智慧廢棄物管理系統可減少廢棄物的產生，促進回收再用；而採用綠色建築標準可促進可持續發展，提升能源效率。

第四，“智慧城市藍圖”指出智慧人才在智慧城市發展中的重要性。知識型經濟對於發展智慧城市至關重要。一座提供高品質教育、研究機會、高品質生活、經濟適用的住房、便捷交通以及多樣性文化和娛樂活動的大學城，可以吸引並留住優秀人才，為創科發展提供有利環境。大學城內的創新和創業文化可為學生、研究人員和產業專業人士提供開發新想法和技術並將其商業化的機會。“智慧城市藍圖”還指出終身學習於支持智慧城市發展中的重要意義。大學城提供了一個終身學習的環境，如持續的教育項目能夠幫助個人獲得新的技能和知識，以適應不斷變化的技術和產業。

第五，“智慧城市藍圖”強調要推動智慧政府的建設，提升公共服務的效率和透明度。一座擁有智慧管理系統的大學城可改善公共服務的效率和透明度。採用數位平台邀請公眾參與可提高市民的參與及回饋，而智慧資料分析的運用可改善決策和資源配置。此外，實施智慧城市技術，如智慧照明和水管理系統，既可降低公共服務成本，又能夠改善學生、研究人員和產業專業人士的生活品質。

最後，智慧經濟依賴於人工智能、物聯網和區塊鏈等先進技術，具有高度互聯互通、活躍的創新和高生產力等特徵。金融科技是香港迅速發展的重要領域。技術同樣能夠促進旅遊業和法律行業的發展。一座大學城可以提供金融、旅遊和法律技術方面的教育和培訓項目，以及為初創企業提供孵化和加速計劃，從而支援金融科技、智慧旅遊和法律科技的發展。大學城還可與金融機構、旅遊運營商、律師事務所和科技企業建立合作夥伴關係，促進這些領域的創新發展。

可見，“智慧城市藍圖”可為北部都會區建設大學城，促進香港創科經濟發展提供參考。大學城通過利用智慧城市技術，能為創科發展提供有利環境，同時提升學生、研究人員和產業專業人士的生活質素。

世界各地存在許多大學城，主要分為兩種類型：傳統型大學城和創新型大學城。傳統型大學城通常起源於歷史悠久的大學，並隨著時間的推移逐漸在城市和大學之間形成一種融合狀態，例如英國的牛津和劍橋，以及荷蘭的代爾夫特。而創新型大學城則是直

接將科研成果服務於社會，從而創造經濟價值。它們通常受國家政策驅動，整合大學資源，實現產學研融合，例如日本的築波大學城（Henini， 1999）。在北部都會區建立的大學城將這兩種類型相結合，旨在創造具經濟價值的新城市。因此，過去大學城的經驗很值得參考借鑑。

圖 2：香港—深圳創新科技園（在建中）| 資料來源：《北部都會區發展戰略報告》，2021 年

五、全球大學城和科學園的案例研究

大學城已經成為世界各地人才、創新和經濟增長的中心，其中城市或地區的身份和脈搏與高等教育機構的影響緊密相連。本節探討了美國、日本、新加坡、韓國和中國成功的大學城的發展與貢獻。

本節首先探討了 20 世紀 70 年代以斯坦福大學為核心的矽谷及以築波大學為核心的日本築波科學城的崛起。學術、產業和政府之間“三重螺旋” 在政府倡議下合作推動，這些大學城培育了技術集群，振興了當地經濟。其次本節亦分析新加坡科學園和韓國的大德創新特區如何利用鄰近多所研究型大學的優勢，成為自 20 世紀 90 年代以來蓬勃發展的亞洲創新中心。

中國內地方面，北京的未來科技城和良鄉大學城將學術計劃與當地的支柱產業相結合，促進研究成果轉化，定制人才培養，推動經濟升級。蘇州大學城聚集了國內外頂尖大學，為蘇州工業園區提供高水準的人力資本和技術支援。廣州大學城通過孵化基地和創新平台，催生了成千上萬的初創企業，並吸引到了數十億的風險投資。

成功的大學城在不同國家都具備了一些共同特徵：強大的產學融合、豐富的創新資源、充滿活力的高科技集群，以及對當地經濟和社會貢獻顯著等。它們充分證明，當世界一流的學術機構與其所在城市和地區建立緊密的合作夥伴關係時，可產生巨大的效益。

校園的形象和體驗是大學生活的一個典型特徵。Bromley（2006）認為，校園是“機構生活（institutional life）的主要象徵，是學術界享有的獨立空間和場所”。雖然大學是一種高度複雜的機構，不僅與大學周邊地區和、所在社區存在著聯繫，而且也為更大的區域提供資源和服務，但校園還是一個獨立的社區，是由學生、教師、大學工作人員以及其他個體組成的生態系統，他們直接或間接地與高等教育和“校園生活”的社會結構聯繫在一起。

大學校園和大學社區並非孤立存在於社會之中。一般情況下，它是在現有的村莊、城鎮或城市中建立並發展起來的。這兩種社區之間的關係被概括為 “城市與大學的關係” 。儘管情況各異，城市與大學的關係指的是城市—大學（或城市—學院）之間的動態關係，以及（正式和非正式的）涉及各種因素的安排，從校外的學生住房到大學—企業的合作夥伴關係（例如，基於大學關係的商品和服務的折扣率），再到基礎設施發展和服務交付（Bromley， 2006； Rousmaniere， 1997）。

當大學對城鎮社區生活的特徵、結構和活力的影響無處不在，這座城鎮可被稱為“大

學城”。“大學”是大學城的核心，因為其對“城”的經濟、社會、文化和政治生活產生的直接影響（例如，大學的高級教職員同時擔任學校、醫院和城市規劃委員會的顧問或委員）和間接影響（例如，通過吸引學生、資本和知識份子）無處不在（Filion et al.， 2004；Miller， 1963）。在微觀層面上，學生的參與（例如在校外住宿，志願服務，或作為消費者參與當地經濟）是塑造大學城的重要力量（Rousmaniere， 1997）。大學本身也通過錄取或招募年輕人才，吸引投資，並創造“城”可利用的市場來塑造“城”（Rousmaniere，1997）。在宏觀層面上，大學城的發展是由國家與公民社會的關係規劃的，例如政府的干預，創造有利於大學發展的條件（例如，通過土地改革政策擴建校園）（Rousmaniere，1997）。

與常規的大都市相比，大學城經歷了獨特的城市復興、基礎設施發展和整體經濟前景的改善（例如，通過旅遊業的發展、美化和修復以及高度集中的學生）（Bromley，2006； Filion et al.， 2004）。正如 Bromley（2006）所稱：“學院和大學通常被描述為‘經濟發展的引擎’，它們在許多城區和市區中充當‘支柱機構’”。然而，僅有一個大學校園的存在並不能直接轉化為城鎮的長期積極發展。同樣，一座發展良好的城鎮雖然對吸引潛在學生和教職員工至關重要，但未必會完全適應其附近的大學。

然而，真正成功、持久發展的大學城是通過大學、產業界和政府的共同努力締造的。在 20 世紀，這種大學—產業—政府的安排日漸流行，埃茨科威茲（Etzkowitz）和雷德斯多夫（Leydesdorff）將其稱為“三重螺旋”模型（1995）。歷史上，面對日益激烈的國際競爭或戰爭，各國政府鼓勵“三重螺旋”以提升國家在經濟、軍事和技術能力等方面的競爭力（Etzkowitz & Leydesdorff， 1995； Hall， 1997）。

5.1 海外的國際知名大學城和科學園

5.1.1 美國矽谷

位於三藩市灣區的斯坦福大學和斯坦福研究園（原名斯坦福工業園）是矽谷的核心機構，其大學—軍方—政府關係的歷史可追溯到第二次世界大戰期間有力地支持了美國的戰爭行動（Hall， 1997）。1951 年，斯坦福工業園建成，作為科學研究和技術開發的高科技園區，為支援財務處境困難的斯坦福大學提供支援。（Sandelin， n.d.）。20 世紀 50 年代初，該園區的主要合同來自軍方及參與冷戰的附屬部門（Hall， 1997；Sandelin， 2004）。這些早年的努力以及 20 世紀後期成功建立的科技創業公司提升了斯坦福大學的聲譽，並將該園區發展為享有盛譽的“矽谷”（見插圖 1）。

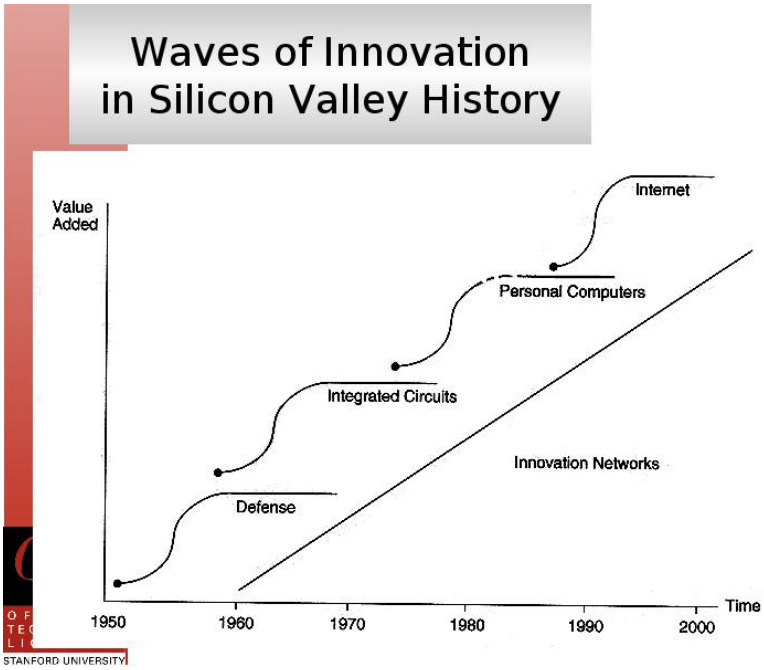

插圖 1：矽谷的發展歷程。資料來源：Sandelin (n.d.). 幻燈片第 9 頁。

最初，斯坦福大學周圍的山谷和土地佈滿了果園（參見 Sandelin， 2004）。當時，一個新穎的想法付諸實施：重新利用大學四周的土地，促進科技中心和/或園區發展，吸引"優秀的教職員工、高水準的研究經費、慈善捐款、企業投資和政府支援"（Bromley，2006）。在此之前，很少有大學會主動採取措施，將所擁有的土地重新開發為園區，配備複雜的基礎設施，以加強住宅區、工業建築、實驗室、教學設施以及休閒娛樂設施之間的流動性和連通性。

2011 年進行的一項系統性調查，旨在探索斯坦福大學在促進創新和創業方面的努力，以及它們對國民經濟的影響。從 20 世紀 30 年代至今的總計 143，482 名斯坦福校友中[1]，有 27，783 人完成了調查（回應率約為 19.4%）。在斯坦福大學的 1，903 名教職員中，有 1，134 名教師（回應率為 59.6%）完成了調查。此外，有 974 名研究人員也參與了這項調查（Eesley & Miller， 2017）。

根據調查結果估算，與斯坦福大學有關的公司達到 39，900 家（Eesley & Miller，2017）。在經濟影響方面，自 20 世紀 30 年代以來，這 39，900 家公司大約創造了 540 萬個就業機會，全球年收入達到 2.7 萬億美元（Eesley & Miller， 2017）。如果僅考慮位於加利福尼亞州的企業，估計有 18，000 家公司提供 300 萬個工作崗位，全球年銷售

[1] 該調查問卷髮送給了共計 191,332 名在世的斯坦福大學學位持有者（即校友）中的 143,482 人（約占總人數的 75.0%）。

額達到約 1.27 萬億美元（Eesley & Miller， 2017）。該報告進一步估計：“如果這些公司共同組成一個獨立國家，則該國將成為世界第十大經濟體”（Eesley & Miller， 2017）。

斯坦福大學培育了一個蓬勃發展的創業生態系統。調查顯示，約 29%的校友創辦了營利或非營利組織；32%的校友自稱曾是創業公司的投資者、員工或董事會成員；25%的受訪教職員稱，曾在職業生涯中成立過創業公司，或是創業公司的創始人之一。此外，根據校友的回饋，受訪者中共有 349 名風險投資人和 2，572 名天使投資人（Eesley & Miller， 2017）。

斯坦福大學長期提供課程、研討會、項目和其他機會，鼓勵創業和創新。例如，斯坦福大學的學生可以參與由創業研究中心、斯坦福創業工作室和斯坦福科技創業項目組織的活動。此外，許多矽谷的公司與商學院和/或工程學院合作，共同授課或參與相關項目。因此，授課的不僅是教職員，還有創業者和領域專家（例如，創業專家或具有籌資專業知識的人）。這一傳統與斯坦福鼓勵創業的核心方法有關，即“將尖端理論和現實世界的專業知識融合於課堂”（Eesley & Miller， 2017）。工業聯盟計劃就是一個典型的例子，根據網站所述，“斯坦福的教職員和學生能夠瞭解行業的觀點和優先事項，企業成員則可接觸到新思想和研究方向”（Stanford University， 2023）。此外，還有各種競賽、社交計劃和導師計劃，鼓勵學生探索初創企業和創業精神。斯坦福創業網路等學生協會為這些舉措提供支援。斯坦福天使與創業者（SA&E）就是一個很好的例子。該校友會旨在促進潛在創業者和投資者之間的聯繫。正如報告所述，“這個由校友主導的組織為學生、校友和初創企業提供社交網路和資金機會，同時向天使投資人和創業者提供教育項目”（Eesley & Miller， 2017）。

斯坦福大學在創業和創新方面成功的關鍵在於校友、矽谷和大學之間的緊密聯繫。根據報告，“40%的斯坦福學生通過某種形式的人際社交網路找到工作，矽谷最具創新力公司的領導者們會定期訪問校園並作演講、與教職員合作，並與‘目前尚在教室學習的’下一代企業家分享創意”（Eesley & Miller， 2017）。因此，在斯坦福研究園內，超過 50%的公司雇用了斯坦福大學畢業生也不足為奇了 (Stanford Research Park， 2023)。

從校友的角度來看，“回饋”是他們與母校保持聯繫的關鍵動機。根據報告，許多校友回到大學（例如進行招聘、作演講、與學生合作和指導學生），並且與三藩市灣區保持更廣泛的聯繫。例如，“39%的校友創辦公司位於距斯坦福 60 英里的範圍內，即大約 1 小時車程的範圍內”（Eesley & Miller， 2017）。這不僅存在於本地校友，也存在於曾在斯坦福就讀的國際學生之中：“15%（即調查中的 2600 人）來自美國以外的畢業生留

在了三藩市灣區，為該地區強大的基礎設施和創業精神做出了貢獻”（Eesley & Miller，2017）。

5.1.2 日本築波大學

築波科學城建於 20 世紀 70 年代，是日本的第一座“學術新城”，其中設有國家實驗室、研究所和科研機構。築波科學城的誕生源於推進科學技術發展的遠見雄心，以及人們對緩解東京人口過剩的前瞻性務實考慮（Hall， 1997；Takahashi， 1981）。根據高橋（Takahashi， 1981）的說法，東京政府於 1963 年決定在當時尚未城市化的築波建立一座先驅性的學術新城，其特徵本質（或“核心”）是集中研究機構和高等教育機構。將城市空間開發為“新城”的決定旨在“為城市提供高水準的文化設施和其他設施，優化研究和教育活動的空間，為研究、教育工作人員和學生提供適宜的環境和良好的生活條件”（Takahashi， 1981）。築波科學城位於市中心，周圍的邊緣地區形成了郊區（Takahashi，1981）。正如高橋（Takahashi， 1981）指出，築波科學城的發展對勞動力（即，改變了勞動力市場的結構，當地主要居民由主要從事農業工作轉變為從事非農業工作）和人口規模（即，該地區的城市居民人數大幅增加）產生了重大影響。插圖 2 是築波科學城的藍圖。

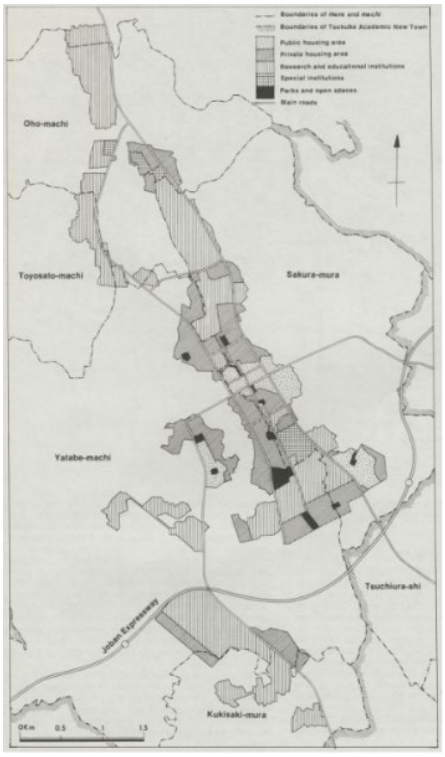

插圖 2：築波科學城（或學術新城）。資料來源：高橋（Takahashi， 1981）

就築波和斯坦福而言，科技園區的發展帶來了新城區和新社區的建立。在這兩個案

例中，“三重螺旋”模式促進了城市發展，將學術研究和創新定位為城市的核心。根據米勒（Miller， 1963）的定義，“大學城”在社區生活的結構中佔據中心地位，這取決於它們相對於其他機構，在主導城鎮決策過程中所擁有的影響力。因此，築波和斯坦福周邊的城鎮不可避免地受到各種因素的影響，包括日益增多的行業合作夥伴關係、初創企業的發展、知識型勞動力和其他工作專業人士的遷移，以及私人資本和公共資金的集中（Hall， 1997； Sandelin， n.d.； Takahashi， 1981）。簡而言之，這些制度性舉措推動了經濟振興和城市發展。

作為日本最大的創新和科技中心，築波科學城擁有 29 個教育和研究機構。約有 2 萬人在築波科學城的研究機構內工作。

根據茨城縣政府發佈的關於築波大學和築波科學城的文件顯示，築波大學是日本創辦風險投資公司數量最多的大學之一 (Ibaraki Prefectural Government， 2022)。根據縣政府的宣傳冊，截至 2021 年 11 月，築波大學已創辦了 394 家風險投資公司 (Ibaraki Prefectural Government， 2022)。宣傳冊進一步指出：“近年來，籌集的資金迅速增長，在 2018 財年超過 50 億日元” (Ibaraki Prefectural Government， 2022)。插圖 3 詳細說明了由築波大學創辦的風險投資公司數量及其籌集的資金。

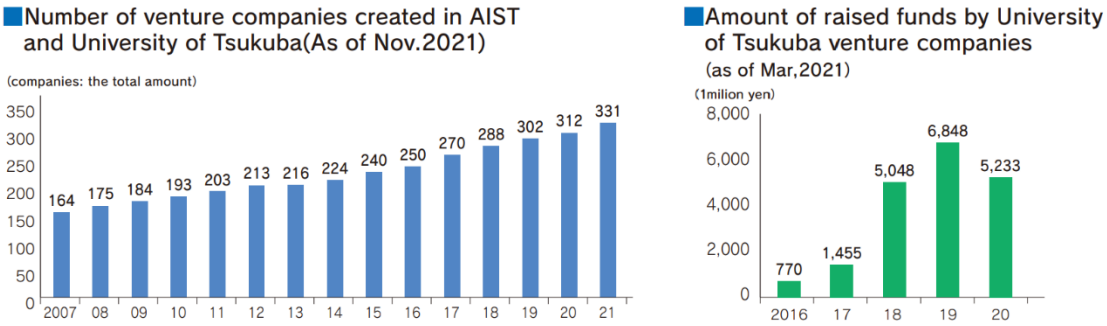

插圖 3：創業公司成立數量和籌集資金情況。資料來源：茨城縣政府（2022 年，第 7 頁）。

表 1 呈現了斯坦福大學和築波大學的一些基本特徵。這兩所大學及其各自的創新與技術中心在各自的國家享有盛譽並已經發展成熟。

表 1 斯坦福大學和築波大學的基本特徵

	斯坦福大學	**築波大學**
國家/地區	美國加利福尼亞州三藩市灣區的帕洛阿托	日本茨城縣築波市
公立/私立	私立研究型大學	公立研究型大學
建校年份	建于 1891 年，成立於 1885 年[1]	建于 1973 年，成立於 1872 年
大學占地面積	8，180 英畝[4]（33.12 平方千米）	258 公頃[5]（2.58 平方千米）
主要創新和科技中心建立年份	矽谷，建立於 1951 年	築波科學城，建立於 1963 年[2]
創新和科技中心占地面積	1，854 平方英里[8]（4，801.8 平方千米）	28，400 公頃[9]（284 平方千米）
初創企業數量	39，900[1]	141[3]
創新與科技設施和實驗室數量	在斯坦福大學的 7 個學院中，除了其他規模較小的實驗室外，還設有 18 個獨立的實驗室、中心和研究所[4]。	29 個國家級研究機構和 200 多家私營研究機構[3]，占日本國家研究機構的 30%以上[5]。
著名初創企業	谷歌、雅虎、英偉達、台積電、思科系統、網飛、特斯拉汽車、耐克、Gap 公司[1]	賽博控股有限公司，素敏科技有限公司[3]
畢業生/培養人才數量	220，000 名斯坦福校友（除其他獎項獲得者和著名校友外，斯坦福擁有 21 位諾貝爾獎得主和 36 位諾貝爾獎獲得者）[6，7]	在築波市，每 10 名居民中就有一名是研究人員。築波大學擁有 3 位諾貝爾獎得主[5]

注釋：[1] Eesley & Miller（2017）；[2] 築波科學城網路（2022）；[3] Nature.com（2019 年 3 月 20 日）；[4]《泰晤士高等教育》（2023a）；[5]《泰晤士高等教育》（2023b）；[6] 斯坦福大學（2023b）；[7] 斯坦福大學（2023c）；[8] Jarvie（2020）；[9] 國土交通省（未標明年份）。

斯坦福大學的成功，有很大部分歸功於校長詹姆斯·華萊士·斯特林（J. Wallace Sterling）和副校長兼教務長弗雷德里克·特曼（Frederick E. Terman）。這兩位具有遠見卓識的領袖促成了科技的園區（斯坦福研究園）的建立，並提出了斯坦福的基本理念：培育緊密的大學—產業夥伴關係，建設傳遞知識創新的共生生態系統。根據 Eesley 和 Miller（2017）2011 年的調查報告，斯特林和特曼構想該園區"為初創企業提供工作空間、交流創意的同事、共用使用的設備，以及來自大學的源源不斷的新鮮動力……[簡而言之]，為產業界提供與大學互通的途徑，同時為研究人員提供在商業世界嘗試自己想法的機會"。這種"先驅性"的創業精神在斯坦福大學和矽谷均深入人心，廣為流傳。例如，在過去十年成為創業者的受訪者中，有 55%表示，他們選擇在斯坦福學習，正是因為其優異的創業環境（Eesley & Miller， 2017）。

矽谷的興起主要得益於產學合作夥伴關係，以及斯坦福等大學源源不斷輸送的人才和專業知識（Eesley & Miller， 2017）。與此相比，築波大學及其築波科學城的發展軌跡大相徑庭。築波科學城的擴建得益於國家政府的支持和投資（例如，政府通過了加快建設和擴建的法律，並增加科學城的資源和國際推廣）（Nature.com， March 20， 2019；Takahashi， 1981）。正如 Gonzalez Basurto（2016）所述，築波科學城是日本第一座以國家政府資金支持的創新和科技城市園區。該科學城旨在引領全國的科研和技術創新。政府在培育戰略部門和基礎設施方面的參與是日本治理風格的典型特點。不過，築波大學及其科學城的創立還有一個獨特的關鍵動因：緩解東京的人口過剩和過度擁擠問題。這是區分築波大學/築波科學城案例與斯坦福大學/矽谷案例及其影響和貢獻的一個重要方面。

兩個地區都面臨著挑戰。對於築波大學而言，首先，它刺激初創企業的能力可能不僅僅依賴于現有的金融基礎設施，而是更多取決於滲透在日本受教育人群中的文化價值體系（Suzuki et al.， 2002）。與美國推崇的"經商"文化願景和創業精神不同，在日本，聲望、名譽和尊重是通過在大型公司工作獲得的。正如 Suzuki et al.（2002）所言，"受過高等教育的人更願意留在大型公司工作，因此只有少數有魅力的人才會自己創業"。

第二個可能與之相關的挑戰涉及築波大學與築波科學城之間的合作。簡而言之，與斯坦福大學和矽谷之間的關係不同，築波兩個實體之間的網路和交換（如知識、人力資本和機會）仍需發展。岡薩雷斯·巴蘇爾托（Gonzalez Basurto， 2016）在報導中引述了一位元大學董事會成員的觀點："雖然築波大學是一所'非常好'的大學，但如果能夠加強

和深化與科學城中更多研究機構的合作，情況會變得更好……‘很多時候，大學的學生和教授都沒有意識到與科學城的關係’。”

近年來，築波大學和築波科學城已努力應對這兩項挑戰。他們增強了與設立在科學城的私營企業的聯繫，與外國合作夥伴開展了聯合研究項目，接受了外國捐款機構的資金支持，開展了創業導師計畫（Nature.com， March 20， 2019），並由此從中獲益良多。如插圖 4 所示，旨在培育“創業友好型城市”的新計劃於 2018 年 12 月啟動，這一點同樣重要。創業生態系統，包括築波創業園的創建，都是通過增加基礎設施發展的投資以及國際合作夥伴關係和學術交流來培育的，例如與劍橋創新中心的合作(Ibaraki Prefectural Government， 2022)。

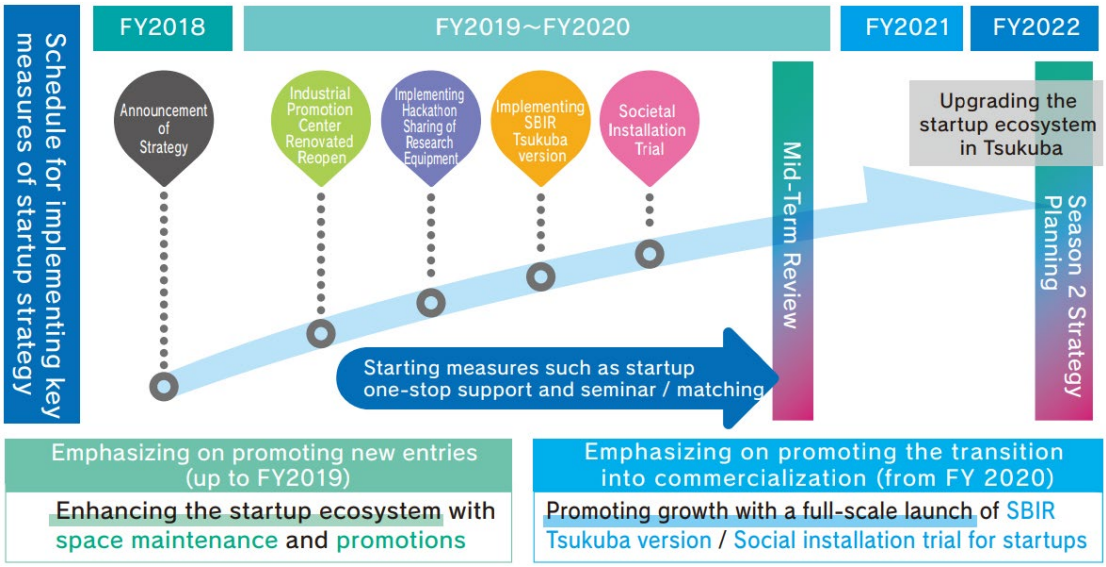

插圖 4：築波科學城支援性創業生態系統的成長戰略。資料來源：茨城縣政府（2022 年，第 8 頁）。

築波大學面臨的第三個挑戰是對非日語人士的包容性，這在很大程度上與其建設人才友好的大學城的能力有關。為了增強全球競爭力和對國民經濟的貢獻，國家政府將築波大學和築波科學城作為國際化的戰略性機構（Gonzalez Basurto， 2016）。吸引來自國外的人才和引發外國的興趣對於完成這一使命至關重要。然而，近期的文獻和新聞報導發現，由於語言障礙，非日語學生和學者難以被大學和科學城所接受，在融入方面也面臨困難（Gonzalez Basurto， 2016； Tran， April 3， 2023）。根據《日本時報》的一篇新聞報導，對於非日語學者而言，語言障礙因招聘時的偏見歧視、工作量管理和令人打消向學校長期承諾念頭的晉升安排而變得更加複雜（Tran， April 3， 2023）。日

本文部科學省（MEXT）近期充分支持築波大學和日本其他戰略性高水準大學的卓越研究，這可能有助解決困擾築波大學的問題：難以吸引和留住海外人才（Tran， April 3，2023）。目前，這一舉措能否成功尚不明確。

斯坦福大學長期以來面臨的一個挑戰是為學生、研究支援人員和教職員工提供經濟實惠的住房。這個問題的根源錯綜複雜，不僅僅因為國家層面的脆弱性（例如，經濟衰退和通貨膨脹），還與州級層面的脆弱性（例如，加州房價上漲）和與矽谷的地理鄰近（導致對高管套房或豪華住宅的大量需求）有關。這一困境反復出現，校方一直在逐步尋找可持續並令人滿意的解決方案。正如斯坦福大校報《斯坦福日報》所記錄，2010 年，帕洛阿托成為居住成本最昂貴的大學城居住地之一（McGirr， November 18， 2010）。新住房開發的土地供應量少（而住房需求卻在不斷增加），這對斯坦福作為雇主的有效性以及作為教育者的能力產生了不利影響。博士研究生和博士後受到不斷上漲的房價和租金的影響尤為嚴重。例如，2017 年為斯坦福研究生建造的補貼性住房項目埃斯孔迪多村研究生公寓（EVGR），雖然被列為“經濟實惠”的學生住房選項，但卻維持高昂的價格，因此遭到研究生群體的不滿（Bagdasarian， May 25， 2021； Dhawan， March 3， 2020）。據報導，EVGR 和斯坦福提供的其他研究生住房選項的租金價格平均占到博士生每月津貼的 30%至 40%（Bagdasarian， May 25， 2021； Dhawan， March 3，2020）。

斯坦福大學在解決住房負擔能力問題方面取得了一些進展。值得注意的是，2018 年，校方成立了“負擔能力工作組”（ATF），以處理斯坦福社區所面臨的一系列負擔能力問題，包括校園住房和兒童保育等。2018 年至 2022 年期間，負擔能力工作組致力於收集斯坦福社區的意見，並啟動了直接解決主要問題的舉措和計劃，例如研究生、博士後和教職員的住房負擔問題（有關負擔能力工作組活動時間表的詳細資訊，請參閱 2023 年斯坦福大學負擔能力頁面）。此外，斯坦福大學於 2019 年首次將校園擴展到了紅木城（Berman， November 22， 2019）。紅木城校園擴建的目標之一是為斯坦福員工，尤其是博士後等早期職業員工，提供更多經濟實惠的住房供應和選擇（Berman， November 22， 2019）。雖然這個戰略性發展是斯坦福大學的重要里程碑（即從帕洛阿托的已建大學城擴展出來），但紅木城的新校區如何在“大學”和“城“間取得平衡，為成員培養出類似的社區感和歸屬感，仍然有待觀察。

矽谷和斯坦福大學的成功，無論是作為個體還是作為創新和技術發展的生態系統，都在世界各地激勵了科技園專案。築波科學城和築波大學的經驗讓東南亞地區的政府相

信，通過投資創科有可能實現其經濟繁榮和全球競爭力。近年來，科技產業全球領導者畢馬威（KPMG）關於“科技創新中心”的年度系列報告顯示，東南亞地區的創新和科技中心持續受到全球認可。如表 2 所示，日本、韓國、中國和新加坡等國的城市在世界領先的創新和科技中心排名中名列前十。

表 2 全球科技產業領導者認可的世界領先的創科中心

	2017	2018	2019	2020	2021
1	上海	上海	紐約	新加坡	新加坡
2	紐約	東京	北京	倫敦	紐約、特拉維夫
3	北京、東京	倫敦、紐約	倫敦、東京	特拉維夫	
4				東京	北京
5	倫敦	北京、新加坡	上海、臺北	紐約	倫敦
6	柏林、芝加哥、華盛頓			上海	上海
7		首爾	新加坡	北京	東京
8		班加羅爾、特拉維夫	首爾	首爾	班加羅爾
9	波士頓、特拉維夫		波士頓	班加羅爾	香港特區
10		柏林	奧斯丁	香港特區	奧斯丁、西雅圖

注：資料摘自畢馬威（KPMG）關於創科中心的報告（2017 年；2018 年；2019 年；2020 年；2021 年）。

監管環境、投資資金的可用性、成功初創企業的記錄等許多因素都可以被認定為建立一個堅韌、應變能力強且高效的創科中心所必需的要素。基於大約 500 至 800 名全球科技行業領導者的調查回饋，插圖 5 彙編了畢馬威（KPMG）最近的報告中確定為有助於建立具有競爭力的長期創科中心的因素。有趣的是，與成熟的大學城相關的因素通常被選為建立創新和科技中心最重要的因素：吸引年輕專業人士的城市區位、高素質人才的輸送管道、現代化的基礎設施（如高速頻寬），以及附近至少有一所研究密集型大學（KPMG， 2020， 2021）。

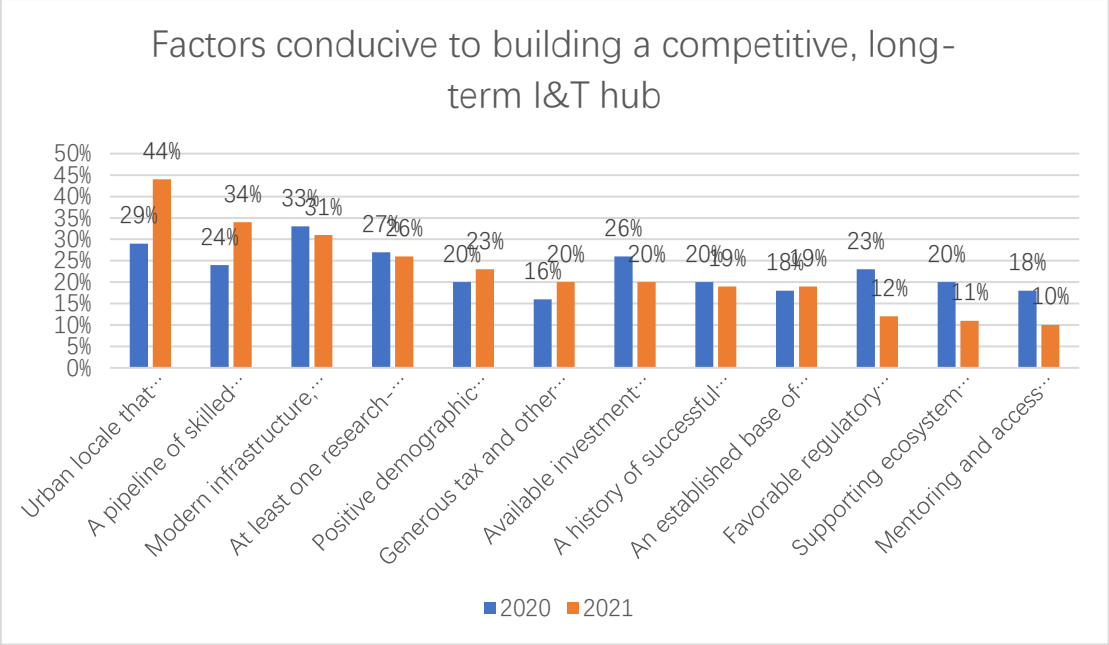

插圖 5 有利於建立競爭力強的長期創新和科技中心的因素。資料來源：畢馬威（2020； 2021）。

下列章節所展示的內容與前文討論的斯坦福和築波這兩個案例不同。創新和知識集群可受益於其附近的一所以上研究密集型大學。新加坡科學園和韓國的大德創新特區就是此類創科中心，它們與其附近的多所研究密集型大學建立了緊密聯繫。

5.1.3 新加坡科學園

新加坡科學園的最初構想始於 20 世紀 70 年代，建設工作於 1981 年開始，園區於 1984 年正式開放。科學園的建設是一項關鍵的發展計劃，與新加坡的國家議程緊密相符，旨在使新加坡成為領先的創科城市，從而實現全球競爭力。正如菲力浦斯（Phillips）和楊（Yeung）2003 年所解釋的，科學園的發展是通過“各種政府舉措來促進研發活動聚集的經濟行為（例如，優越的物質基礎設施、豐厚的財政激勵以及臨近的大學和研究機構）”。除了從政府獲得大量投資外，科學園還得到了新加坡貿易與工業部旗下各機構的支持（例如，經濟發展局和新加坡裕廊集團），以確保研發發展的有利位置以及與研究密集型大學（例如，從新加坡國立大學或新加坡理工大學出發，步行可達科學園，而新加坡管理大學、南洋理工大學、新加坡新躍社科大學和新加坡科技設計大學則與科學園相距一定車程），理工學院（例如，新加坡理工學院）、研究實驗室和機構（例如，新加坡科技研究局）、醫療機構（例如，新加坡國立大學醫院和亞歷山卓醫院）以及創新過程或社區發展中的其他機構（例如，生活設施）的地理接近。在 20 世紀 90 年代和

21 世紀初，科學園的基礎設施進一步擴展，建設了第二階段（即新加坡科學園 2 期）（Singapore Science Park， n.d.）。插圖 6 是科學園及其周邊地區的地形圖。

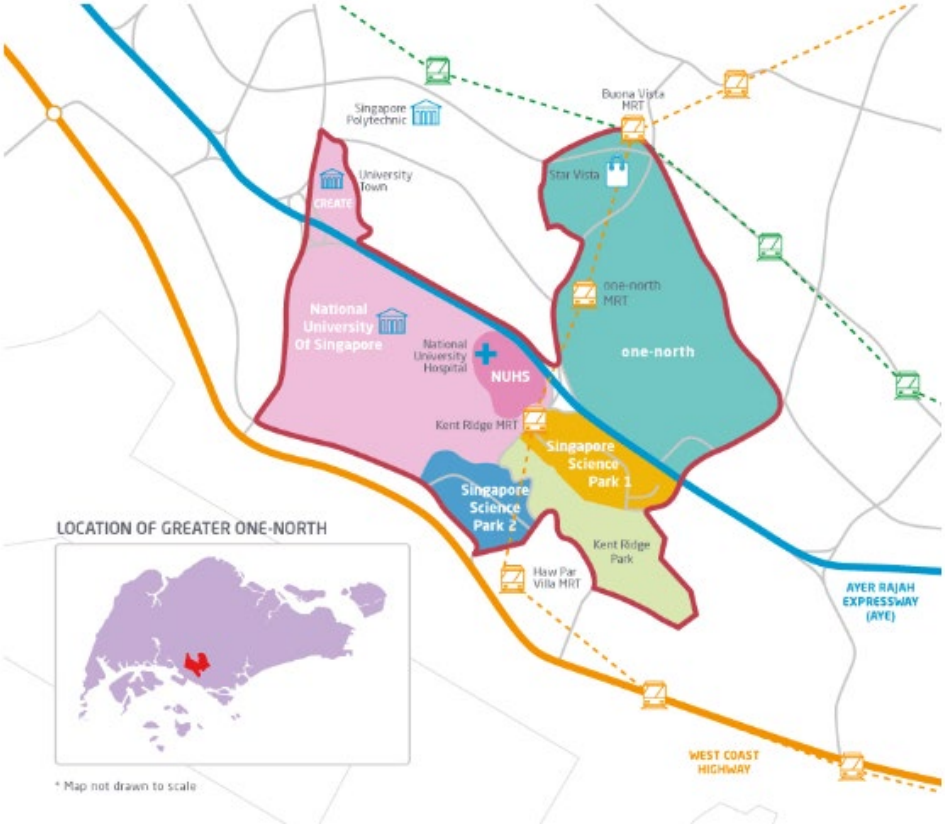

插圖 6 新加坡科學園。資料來源：新加坡科學園 (年份未知)。

表 3 是關於新加坡科學園的基本資訊。

表 3 新加坡科學園的基本特徵

大學數量	六所公立大學均在步行或駕車的距離之內
首要的創新和科技中心成立年份	新加坡科技園，建於 1984 年
創新和科技中心占地面積	55 公頃[1]（約為 0.55 平方千米）
創新和科技中心設施和實驗室數量	超過 350 家跨國公司、本地公司和實驗室
上市公司數量	/

注：目前尚無新加坡科學園內租戶上市公司數量的可得資訊。然而，有一些著名的上市公司在科學園設有分支機構或總部，如華特迪士尼公司、育碧、佳能和富士通。資料來源：新加坡科學園（未提供出版年份）。

政府持續強力支持新加坡科學園，且其在發展最先進的基礎設施方面取得了重大進展。尤其是在 2019 年，新加坡政府宣佈計劃投資數百萬美元，在科學園實現 5G 網絡

全面覆蓋，為其生態系統內的租戶提供獨特的機會，使其能夠參與先進的研發活動和技術開發（CNBC， June 27， 2019）。近期，科學園還正式宣佈了一個重大新增項目："Geneo"生命科學和創新集群/中心（CapitaLand， 2023），預計於 2025 年全面投入運營。Geneo 旨在通過最先進的設施，以及商業、研發、教育和娛樂功能等方面的特點，吸引企業和創新科技人才（Yi， June 27， 2023）。Geneo 是新加坡科學園內的一個占地 180，600 平方英里的開發項目，其中包括一個專注於生命科學的初創企業合作實驗室空間、多樣化的生活方式設施和娛樂設施，以及住房（如服務式住宅）。此外，約有 44%（即 80，000 平方英里）的區域已被預留用於促進生物醫學研發活動（Yi， June 27，2023）。總體而言，根據凱德集團（2023）的預測，Geneo 將使新加坡科學園內的創新和科技人才隊伍增加約 75%（即從 12，000 人增至 21，000 人）。

新加坡通過上述兩項戰略舉措，充分展示了其促進高科技經濟增長的決心。高品質的基礎設施、先進的資訊網路、與世界一流大學和研究機構的緊密聯繫、與新加坡中央商務區的地理接近，以及來自政府、風險資本基金和社區合作夥伴的強大支持，這些都是新加坡科學園的關鍵特徵，必定會繼續吸引外國投資、跨國公司、前途無量的創科企業，以及優秀的創新和科技專業人才。然而，新加坡需要應對不斷上漲的租金成本問題這一潛在挑戰（Zalizan & Ong， May 12， 2023）。多年來，租金價格穩步上漲，去年的私人租金價格達到了驚人的峰值，年增長率接近 30%（Goh， January 27， 2023）。這個問題可能影響新加坡吸引創科人才的能力。例如，在靠近新加坡科學園的住宅區，如女皇鎮或波娜維斯達，房價和租金成本不斷上漲（Goh， January 27， 2023）。成本的增長對新加坡留住外籍人才的能力構成了一些威脅，因為一些外籍人士正因租金的上漲而考慮離開新加坡（Zalizan & Ong， May 12， 2023）。如果新加坡希望繼續保持國際競爭力和亞太地區創新科技強國的地位，就需要找到一個解決方案以安撫租戶，減輕不斷上漲的租金負擔。

5.1.4 韓國大德創新特區

1973 年，大德創新特區（2005 年前稱"大德科學園和大學城"或簡稱"大德得科學城"）的建設構想最終確定。正如 Kim、Lee 和 Hwang（2014）所述，其最終設計受益於"對標日本築波科學城的經驗"。作為一個政府主導的倡議，大德科學城的目標是形成一個國家級研究密集型集群，促進本地經濟增長和全球科學競爭力。這個集群將涉及一系列研究密集型大學、公共和私人研究機構、非營利組織，以及促進研發活動的支持機構（Oh & Yeom， 2012）。

在 20 世紀 70 年代和 80 年代，大德科學城與公共研究機構和公立國立大學共同開展高水準科學研究（Oh & Yeom， 2012）。然而，科學城此後經歷了轉捩點，因為人們認識到需要進行應用研究、將研究成果商業化，並促進與當地經濟和社區（即大田市）建立更積極的關係。高科技工業區“大德得科技穀”開始興建，與矽谷遙相呼應。該區域與科學城相連，擴展了整體功能、特點和形象（Oh & Yeom， 2012）。20 世紀 90 年代至 21 世紀初，大田市和大德科技穀（包括科學城和技術穀）之間的界限變得模糊，因為研發活動、人才和高技能工作隊伍、創業文化和基礎設施發展已成為該城市的普遍特徵。

自 2005 年以來，大德創新特區已被公認為是一個“融合研發、商業和生產的全球技術商業化中心”（Oh & Yeom， 2012）。大德創新特區保持著產業界、學術界（例如，忠南國立大學、大德大學、韓南大學和韓國科學技術院）、研發機構、人民和政府之間的密切合作，並將這種合作視為特區的支柱（Korea Innovation Foundation， 2019a）。這一努力得到了韓國創新基金會等支持性公共機構的幫助。韓國創新基金會成立於 2005 年，是培育和支援創新特區商業生態系統的關鍵平台（Korea Innovation Foundation，2019a）。例如，它有助於促進研究成果的推廣和商業化，同時還幫助有競爭力的租戶進入全球市場（Korea Innovation Foundation， 2019b）（細節請參考插圖 7）。

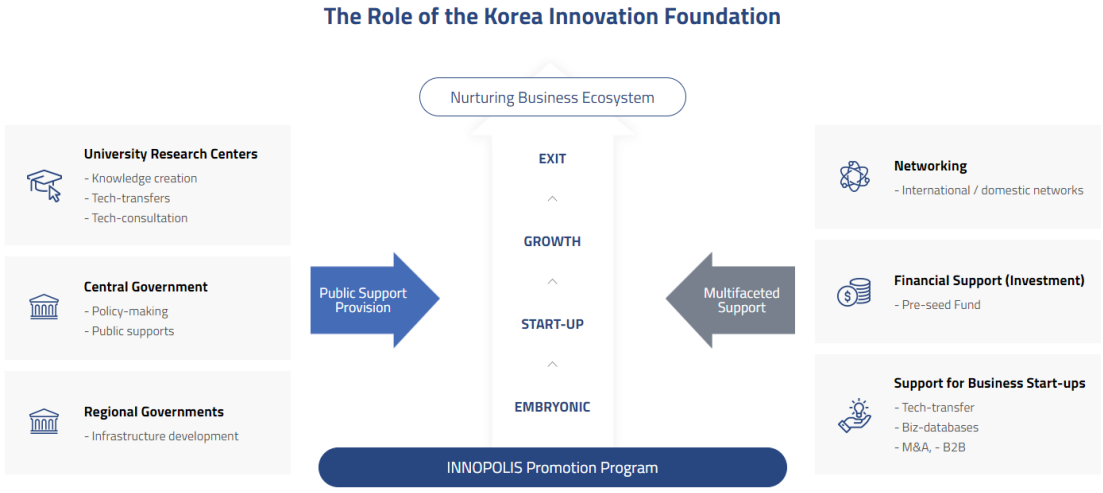

插圖 7 韓國創新基金會的任務。資料來源：韓國創新基金會（2019b）。

大德創新特區的主要目標之一是充分利用附近的研究密集型大學的強大研發產出和技術成熟的勞動力，從而實現高科技產品的商業化。這種實踐也是其“良性迴圈”運營模式的關鍵階段之一（完整模式參見插圖 8）。

插圖 8 大德創新特區的運營模式。資料來源：韓國創新基金會（2019c）。

截至 2021 年 12 月，大德創新特區總計實現了 1，655 項技術轉讓、34，795 項國際專利註冊，80，026 項國內專利註冊，並擁有 86，140 名雇員（Korea Innovation Foundation，2021）。此外，約有 56 家企業在科斯達克（KOSDAQ）上市（有關大德創新特區的其他基本資訊，可參見表 4）。

表 4 大德創新特區的基本特點

大學數量	7 所大學 [1]
建立年份（主要的創新和科技中心）	1973 年
創新和科技中心占地面積	27.8 平方千米 [2]
創新和科技設施和實驗室數量	39 家政府/公共研究所，2，356 家公司
上市公司數量	創新特區的 56 家公司在科斯達克（KOSDAQ）上市

注：[1] 韓國創新基金會（2021）；[2] Oh & Yeom (2012)。

得益於政府、大學和研究機構之間的緊密合作關係，大德創新特區自誕生以來能夠保持穩定增長。1999 年，在政府的幫助下，特區成功開啟了研究成果的商業化，隨後產量和出口量都取得了高度增長，同時還吸引了創新和科技人才加入創新集群（Kim， Kim，& Lee， 2022）。就長期可持續發展而言，大德創新特區似乎韌性十足，正處於持續增長的軌道上，這種成果特別要歸功於韓國國內穩定的高素質科技創新人才供應，以及政府強有力的支持（Kim et al.， 2022； Webb， 2007）。

儘管在促進大德創新特區和地方參與者（例如，大田市的企業和仲介政府機構）之間的區域一體化和互動方面取得了長足進展，但仍需持續監測和解決的一個問題是國家政府、大田市、大德創新特區、當地社區以及其他相關地區參與者之間的合作與相互支持（例如，Kim et al.， 2014）。持續的相互支持將確保創新集群的長遠可持續發展和競爭力。

5.2 中國內地的大學城

5.2.1 北京未來科學園和北京良鄉高教園

北京未來科學園位於北京市昌平區南部，占地 170.6 平方千米，計畫建設面積為 87.2 平方千米，其中建成區面積達 71.01 平方千米。

該科學園將成為中國首都的新科技中心，也是北京打造國家科技創新中心宏偉計畫劃的一部分。它是能源、製造業和醫藥領域的先進研究平台，採用“兩區一中心”的佈局模式，包括東區、西區和中央綠地。

具體而言，東區將發展為一個具有全球影響力的戰略性“能源谷”，旨在推動中國的能源產業發展。西區被規劃為生命科學園區，正在發展成為一個前景廣闊的世界級“健康谷”，並將成為促進中國醫療保健領域進步的催化劑。西區的沙河大學園區包括六個學院，設計為功能齊全的研究、教育和創新社區，培育基於大學的技術創新體系，集生產、教育、研究和運營於一體。“健康谷”作為醫療創新中心，在醫療創新領域擁有豐富的全球資源。而“能源穀”是擁有最豐富能源創新因素的地區之一，囊括了眾多國有企業和先進技術。沙河大學園區在推動基礎研究和人才培養方面發揮著至關重要的作用。人們正在努力將未來科學園打造成世界領先的科技創新中心。

迄今為止，科學園已容納了 60 個國家級和市級重點實驗室、近 20 個省級研發中

心，以及 24 個隸屬於國家級或市級機構的工程技術中心。此外，它還擁有 12 個院士領銜的研究中心、22 個博士後工作站和 23 個協同創新基地。目前，已有超過 1100 家創新驅動型企業入駐。

良鄉高教園位於北京市房山區，匯集了五所大學，共計約 5.5 萬名師生。它已成為知識創新中心和高科技企業孵化基地，有望成為整個地區的活力中心。良鄉高教園將研究和人才培養與產業發展融為一體，通過大學、企業和地方政府之間的緊密合作，推動科技進步的產業應用。這一協同努力旨在為房山區乃至整個北京南部的產業轉型升級提供更有決定性的推動力。

在房山區政府與良鄉高教園內的三所大學的共同努力下，三個新的研發中心已經建成並投入運營。這些中心分別專注於工程醫學研究與應用、中醫藥保健和可降解生物基材料。三個中心通過其現有的試點研究和試驗項目，促進相關產業企業的孵化。中心已啟動近 10 個項目，旨在推動新研究進展的商業化。

目前，由北京市人民政府認定的四家龍頭孵化基地共孵化 309 家企業，從而創造了 1，666 個就業崗位。北京高校大學生創業園（良鄉園區）旨在為有意創業的大學生提供培訓。截至目前，良鄉園區已經啟動了 160 個類似性質的項目。

大學城的發展根植於地方計畫和政策，與當地社區聯繫緊密。一方面，地方政府積極吸引具有高技術研究實力的大學和機構，以支撐當地經濟的重要基礎產業並滿足其需求。反過來，大學與產業界合作，以加強產業的領先地位，並與當地特色協同發展。另一方面，地方政府將制定指導方針和政策，充分利用大學城強大的學科和研發資源，為當地產業的結構優化和升級奠定基礎。

北京市人民政府依託於本地大學帶來的豐富的創新資源，致力於打造以高新技術為主導的經濟結構。北京正積極培育和構建兩個國際領先的支柱產業、四個依託本地優勢的“北京智慧製造”產業、四個創新關聯的“北京服務”產業，以及一批未來前沿產業，以打造高端技術產業的“2441”體系和高端技術產業的 2.0 升級版。其中，“兩個國際領先的支柱產業”為新一代世界領先的資訊技術產業和醫療保健產業；“四個‘北京智慧製造’產業”包括積體電路、智慧型網路汽車、智慧製造與裝備、綠色能源與節能；“四個創新關聯的‘北京服務’產業”包括區塊鏈和先進計算、科技服務、智慧城市，以及內容消費；“一批未來前沿產業”指生物技術與生命科學、碳減排與碳中和、新材料、量子資訊、光電子學、新型記憶體存儲、腦科學，以及腦機接口。這些產業形成了一個高科技網路，助力現有產業升級。

在房山區，經濟支柱涵蓋石化行業、煤炭及其他燃料加工、智慧應急回應、交通設備製造，以及新材料等領域。以大學城的資源為基礎，醫療保健和技術創新服務在地方經濟發展中發揮著戰略性作用。在“十四五”規劃期間，房山區將重點發展替代性能源、新材料、醫療保健和智慧製造，與良鄉高教園內大學設置的特色學科相契合。各高校通過發起和組織回應市場需求的研究項目，充分發揮其強大的學科優勢。而房山區政府則通過制定優惠政策和扶持產業體系，為新研究成果的商業化提供支援。從事小型項目的研究人員可以在西區內獲得商業化服務。中關村房山科學園向涉及製造業的項目提供研究和生產的連續場所，從而實現了從實驗室結果到交付產品，再到最終產品的無縫轉化。

昌平區高度重視電子資訊產業、汽車與交通設備、裝備製造、生物與醫藥、以及基礎材料和新材料等行業，並將繼續發展數字經濟、新基建、現代農業、文化旅遊業和休閒產業。

大學城所帶來的優勢在科技服務行業尤為明顯。為了推動高科技產業發展，北京市人民政府聚焦於中關村科技園區、懷柔科學城、未來科學園、北京經濟技術開發區和通州區等重點地區，將其作為城市副中心。2020 年，北京的專業、科學和技術服務行業產值接近 3000 億元，同比增長 6%，複合增長率達到 11%。

北京大學的建設

北京大學昌平新校區的建設情況凸顯了引入私人開發商資助重大基礎設施項目所帶來的風險和挑戰。私人開發商應徵協助建設新校區看似是一個合理的解決方案，因為政府自身缺乏足夠的資本資源。然而，這些私人開發商之間缺乏充足的資金，最終使該項目癱瘓，並引發了一連串的問題。在最初的拆遷和建設階段，開發商資金短缺導致進展非常緩慢。這嚴重拖延了建設大學城的整體時間。隨後，由於財務問題不斷累積，開發商面臨資金鏈問題，大部分建設陷入停滯狀態。因此，大學城的部分區域仍未完成，只是空置的荒地。人們對於這個項目的期望顯然沒有實現。大學城落地的大學數量遠少於計畫，因此教師和學生的數量也隨之減少。

北京市昌平區的未來科技城是計畫與現實不符的典型案例。科技城原本計畫容納 8 萬名學生，但如今的入學人數僅為 2 萬多人。這樣明顯的差距揭示了依賴私人開發商所導致的缺陷，因為他們缺乏金融手段來充分執行如此雄心勃勃且昂貴的項目。回顧起來，加強監管並制定針對潛在資金危機的應急計畫可能有助於避免一些此類陷阱。但是北京大學昌平新校區面臨的挑戰應當成為一個警示，當人們考慮利用類似的公私合作夥伴關係來推進重大基礎設施和發展項目時，可以以此為戒。充裕的資金和嚴格的監管是必不

可少的。

5.2.2 蘇州大學城

蘇州大學城分佈於蘇州市的東西兩翼。東部是科教創新區，位於獨墅湖工業園區的東岸；西部是蘇州國際教育園，位於吳中區石湖的西岸。蘇州大學城彙聚了來自國內外的 33 所知名大學和研究機構，擁有近 8 萬名學生和教師。在過去的 20 年間，大學城將蘇州從一個高等教育資源有限的城市轉變為一個充滿活力的樞紐，享有豐富、高品質的教育資源，成為高等教育國際化的領軍者。大學城還帶來了許多經教育部認可的國際合作項目，推動了產學研一體化融合發展。

蘇州大學城根據城市產業發展的具體要求，調整了人才培養計畫，為城市發展“定制”了大學畢業生。

這些院校將其發展與蘇州工業園區的經濟進步相融合，根據關鍵新興產業和關鍵支援領域開設本科生和研究生課程。通過這樣的方式，院校成功培養了園區產業轉型升級所需的高素質人才。通過與本地企業合作，學院開始提供“有針對性的課程”，通過培養“定制”的人才並開發前沿技術來支援科技驅動的初創公司。至於地方政府支援的產學研協同發展，學院增強與園區企業的合作，建立研究機構或研究生實踐基地，並在技術研發方面尋求更緊密的合作。截至 2020 年，第一批融合了技術培訓和學術教育的教學中心已經建成，開始了“有針對性的課程”，並實施了“學徒制培訓體系”。由此形成了學術界和產業界之間穩健的合作機制。

在蘇州，約 45%的大學畢業生選擇在市內就業或創業；共有 15 個國家級研究機構在此落戶，眾多傑出的科學家蓄勢待發。此外，蘇州培育的成千上萬的人才在全國乃至世界舞臺上熠熠生輝。蘇州真正成為一個充滿活力的城市，人才庫不斷壯大。隨著科教創新區進入跨越式發展的新階段，高等教育在園區的經濟和社會進步中扮演著日益重要的角色，它將為園區注入新動力，促使其發展為世界一流的高科技園區、一流的自由貿易試驗區和蘇州的新中心，創造新的輝煌。

蘇州大學城面臨的問題是高等教育機構的品質相對較低。它只有一個“雙一流”大學，沒有國際知名大學。這導致學生品質較低，特別是研究生水準較低，難以提升整體素質。這也導致了科研和創新的品質較低。

為此，可以通過提供更多資金、資源和自主權，助力蘇州現有大學的升級，幫助這些大學獲得“雙一流”地位和國際認可，從而吸引優異的學生和教職員。獎學金和激勵措施也能夠吸引來自全國各地的頂尖學生。對研究設施和產業合作的投資能夠推動創新。

改革招聘和評估體系以吸引和留住優秀教授也很重要。賦予這些大學在擇優錄取方面更靈活的招生權，擇優錄取可以幫助他們選擇更高品質的學生。此外，應為研究生教育劃撥更多資金。

總之，需要採取系統性的方法，來改善蘇州大學城內大學的研究環境、教學品質、師資隊伍和學生群體。戰略性升級可提高蘇州大學城的高等教育機構品質。政府應當將此列為優先事項。

5.2.3 廣州大學城

廣州大學城（HEMC）位於廣州市東南部的番禺區，占地 34.4 平方千米，現有 12 所高校入駐。作為華南地區的國家一流大學城，廣州大學城是人才培養、科研和國際交流的“資訊港”和“智力中心”。廣州大學城擁有融合產學研發展的能力，並在系統地探索區域創新驅動增長的新途徑。為此，它進行了創新機制改革，建立了社會創新者合作治理體系，並孵化了金融服務體系。它還採取措施構建國際化的孵化系統，以鼓勵創新。這些努力使得廣州大學城內的創新和創業生態系統得到全面提升，並推動建立促進初創企業和孵化基地發展的完善良好運行機制。

廣州大學城擁有 213 個重點實驗室（其中國家級重點實驗室 13 個）、149 個工程技術研究中心和 8 個高級研究機構。此外，它還擁有 3 家國家級孵化基地、2 個省級創新創業示範基地、4 個國家級創客空間，1 個創新創業示範基地，以及廣東港澳青年創業孵化基地和以廣州為總部的粵澳青年創業國際產業加速基地。各類眾創空間已達 4.36 萬平方米，在孵項目超 300 個。創新創業示範基地合計孵化或進駐科技企業近 400 家，其中重點企業 60 家、高新技術企業 16 家，年收入不低於 2000 萬元以上企業有 15 家。

全球共有 1058 家獨角獸企業上榜。在上榜的十家總部位於廣州的企業中，有 2 家位於廣州大學城的創新創業示範基地，占總數的五分之一。僅 2020 年，廣州此類基地就貢獻了 27.4 億元的營業收入，迄今累計超過 30 億元，創造了超過 8000 個就業機會。這 10 家企業已吸引到了直接融資，總投資額超過 3 億元，估值超過 15 億元。

廣州大學城還推動了周邊基礎設施的發展，為當地居民提供了更好的生活。遊客可以在廣東科學中心和嶺南印象園等著名景點中盡情遊覽。體育愛好者可前往專門為廣州大學城建設的體育中心，以及眾多的小型運動場館和體育場。購物者可以探索大型商場和近 100 家超市，廣州大學商業中心和 GOGO 新天地是當地大學生的熱門購物場所。當地教育資源包括多所幼稚園、兩所小學、一所初中和一所高中，且廣州大學的附屬初中與高中已入選本地最佳學校之列。在醫療方面，廣東省中醫院近期在廣州大學城開設

了分院，本地大學也開設了更多的校內診所。大學城周邊已建成完善的交通網絡，多條新地鐵線路、有軌電車和碼頭已投入使用，數條高速公路、橋樑和隧道正在建設中。

北京、蘇州和廣州的大學城各具特色。顯然，它們都擁有獨特的文化特質，並在技術進步和經濟增長方面為各自的社區做出了顯著貢獻。北京未來科學園和良鄉高教園將其發展與學科整體規劃相結合，實施了全面的管理實踐，以確保為自身發展提供有效的制度支援。此外，它們嘗試了與本地產業需求相符的創新運營模式，力求與地方經濟協調發展。蘇州獨墅湖科教創新區致力於實施產教融合戰略，通過營造良好的商業環境並建立一流的產業創新集群，促進當地產業發展。這些努力將進一步增強蘇州的能力，將創新區在教育、研究和人才方面的優勢轉化為切實的經濟績效和增長。廣州大學城以自主創新和創業為核心驅動力，致力於建立綜合性的創新孵化體系。該體系包括“預孵化器、孵化器、加速器和產業園區”，促進了高新技術成果“從培育初步想法到啟動創業項目、建立初創企業、形成產業集群”的產業應用過程。這一舉措將創新鏈與產業鏈相結合，旨在將科技創新孵化的效益惠及更廣泛的人群。這不僅可證明技術創新的價值，還將為粵港澳大灣區的產業轉型和經濟增長提供強有力的技術支援。

廣州大學城面臨的一個主要問題是，早期實施的道路規劃有很大的局限性。例如，一條道路穿過學校，將整個學校分割成了幾個區域。這既為師生往返生活區和教學區造成了不便，又存在安全隱患。此外，大學城主要道路交叉口的設計也是不合理的。隨著周邊設施的增長、發展和完善，這些不合理的設計往往導致長期的交通堵塞。

廣州大學城的交通問題可以通過一些以社區需求和開放合作為重點的創造性重新設計，轉化為一個多模式的交通網絡典範，惠及學生、教職員等。如果基礎設施能夠與願景相匹配，則發展潛力巨大。

5.3 主要結論

香港可以從全球範圍內大學城成功與失敗的實踐中吸取經驗。成功經驗包括：制定與國家目標一致的綜合規劃、廣泛採用定制設施、促進多學科合作和產業合作夥伴關係、發展充滿活力的創新生態系統，以及提供良好的交通系統和便利設施。然而，主要的挑戰包括：資金不足、土地供應短缺、城市整合的缺失、過於宏大的規模、薄弱的商業化途徑，以及複雜的管理結構。

香港可以借鑒日本築波和中國大學城的做法，即根據國家戰略目標進行全面規劃和發展，並提供政策支持和資源。斯坦福大學在擴張過程中，為研究、教育、商業和居住需求廣泛地定制了基礎設施和其他各類設施，從而為增長提供了空間。韓國大德創新特

區的出眾之處在於通過共用實驗室、項目和人才交流，促進多學科合作和大學—產業界的合作夥伴關係。新加坡科學園取得的成就是通過吸引企業、初創公司和投資來發展周邊的創新生態系統；荷蘭代爾夫特的方法是通過良好的交通網絡、經濟適用的住房和設施來吸引並留住人才。築波科學城發展管理局還設置獨立的管理機構來實現有效監督和持續發展。通過吸收借鑒這些全球最佳實例，香港可建設一個世界級可持續發展的大學城。

香港還能從國際上大學城建設中暴露出的問題中吸取教訓。資金不足阻礙了築波科學城的建設，因此需要審查融資模式。土地供應不足限制了斯坦福的發展，因此需要關注空間需求。廣州大學城面臨城市融合不足的問題，因此與北部都會區總體規劃保持一致非常重要。在內地的一些城市中，過於宏大的規模和分散的佈局限制了資源分享，因此大學城的規模平衡至關重要。築波最初面臨產業聯繫和商業化途徑不足的問題，因此緊密的產學合作夥伴關係舉足輕重；管理的複雜性和權力的不平衡問題限制了築波科學城的發展，因此需要簡化協調機制。香港在發展大學城時，應謹慎地汲取這些经验，才能避免陷入重大困境。

香港應在避免常見陷阱的同時戰略性地應用全球最佳實踐，從而在北部都會區建設一個可持續發展的世界級大學城。例如，《築波科學城建設法》(1970 年)對大學城不同區域的規劃、建設和管理進行了明確的規定，為持續推進建設提供了有力的支援，並保護其免受政府和/或政策變化的影響。儘管如此，日本築波大學城的建設和搬遷從規劃到完成花費了 20 多年時間。原因之一是錯過了經濟發展的黃金時期。除廣州大學城外，其他大學城也呈現同樣的現象，如表 9 所示。這需要細緻的規劃、充足的資源、優化的空間利用、強大的學術—產業界合作關係、簡化的行政管理，以及平衡的規模。通過審慎地汲取國際先例的經驗，香港能夠將這一舉措發展為關鍵推動力，促進香港新興的創科經濟進步。

名称	國家	計劃年份	動工年份	預計建設期	竣工年份	是否延誤
筑波(筑波科学城网,2022)	日本	1963年; 内閣批准建設	1967年; 動工興建	10年	1980年; 大部分大學和機構遷入基本完成	是,延誤3年
新加坡科學園(第一期)(新加坡國家圖書館委員會,2021)	新加坡	1979年; 裕廊城市公司概述科學園計劃	1981年; 清理科學園用地以進行開發	2年	預計1983年;	是,延誤6個月
大德科學城(康等,2021)	韓國	1973年; 確立大德科研園區總體規劃	1974年; 動工興建大德科研園區基礎設施	8年	1992;	是,因為推出新的大德工業基地發展計劃,延誤10年
廣州高教城(第一期)(廣州政府,2002)	中國内地	2001年; 廣州大學城發展規劃出台	2002年; 廣州大學城建設規劃出台	\	2004;	否

表9:主要大學城建設時間表

六、香港各大學的持份者意見

本節總結出香港各大學領導者關於開發一個有效共用的大學城的觀點。受訪者表達了一個共同的願景，即通過合作，把大學城建設為一個促進知識、人才、創新和生活質素的全球樞紐。然而，關於實現這一目標的最佳策略，受訪者存在不同的看法。

在北部都會區開發新的大學城的前景受到主要持份者的熱切關注。香港 8 所主要大學的領導者表示強烈支持，迫切希望參與規劃並建立健全的政府溝通渠道。他們強調，新的大學城必須優先考慮分配公平，擴大北部都會區居民的學習機會。該地區預計將容納 150 萬居民，因此開發充裕的教育基礎設施至關重要。大學城為北部都會區亦提供機會，使其能夠配備與其他地區相同質素的高等教育資源。這將解決不平等的教育權問題，為當地青年提供更多可負擔的選項。大學城項目除了讓在本區學習的學生受益外，還應提升工人技能並滿足當區的就業需求。這種分配方法迎合了不同社會經濟背景的現有和新居民。大學亦可與政策制定者合作，優化大學城的課程和錄取途徑。通過恪守以提升當地社區為中心的分配公平原則，並將其有意識地融入大學城建設，大學城可令北部都會區提升為一個充滿機遇的地區。

擴展空間嚴重不足是阻礙現有校園發展的首要因素。配備先進的教學和研究設施，尤其是升級的科學設備對保持優質教育和提升學術競爭力至關重要。此外，吸引來自世界各地的精英人才湧入香港也是人們希望看到的結果。交通基礎設施是優先考慮的事項，便利的交通聯繫對於充分發揮校園集聚的協同效應至關重要。實現不同大學之間資源的暢通流動，有助於促進學生和教師跨學科的合作和交流，催生創新生態系統，同時推動年輕人對 STEM 學科的興趣和職業發展。持份者強調應制定政策，暢通香港和粵港澳大灣區之間的人才和學術資源流動，包括學生、教師、研究人員和其他工作者在該地區內順暢流動，參與教育和研究合作。可以利用大學城開展跨界交流、共用設施，合作學位課程或研究項目。關於資料共用和樣本轉移的政策改革也至關重要，其有助於加強聯合研究並優化集體能力。通過制定適合大學城背景的合作框架、基礎設施和治理機制，香港和粵港澳大灣區得以強化創新者與機構之間的聯繫。這種政策支持將擴大公眾可獲取的教育和技術資源，為動態跨區域交流開闢管道，從而催生創新。

政府應當積極參與，引導戰略性科學設施與前沿產業相結合。科技產業園區的臨近性為學術界、企業和政策制定者提供了絕佳的融合機會，共同塑造未來的知識經濟。重點在於通過應用研究和滿足實際需求的教育，應對當下的挑戰，然後充分利用鄰近的粵

港澳大灣區的研究和創新優勢。吸引和留住人才的關鍵還在於提升宜居性和配套設施，以豐富地區的資源。若將大學城的各種要素融合成充滿活力、鼓舞人心的中心樞紐，該區的集體智力資本就可以得到充分發揮。通過周密的規劃，匯聚了大量的思想、人才和資源，這座北部大學城可以發揮巨大的潛力。這其中的風險無疑是巨大的，但對於香港和粵港澳大灣區而言，潛在的回報也同樣可觀。

6.1 訪談受訪者的重要性

香港本地各大學的領導者，特別是副校長，更加瞭解香港高等教育領域的整體發展方向以及每個高教機構的定位和專業佈局。向他們進行諮詢可以確保大學城的規劃符合高等教育部門的長期規劃和發展需求。同時，副校長們也更瞭解各大學的教學和科研情況，能夠提供更切實可行的建議，這有助於合理安排大學城的學院設置、教學樓數量和配套設施。

此外，向本地各大學的領導者廣泛諮詢可以體現大學城規劃過程的包容性，代表主要大學的利益和聲音。這將使新大學城在設計上不僅滿足社會發展的需求，還兼顧各大學的利益，以便增強其可持續發展能力。同時，與本地大學的領導者，特別是副校長們進行廣泛磋商具有重要意義，可確保大學城的規劃滿足香港高等教育部門的發展需求。這將有助於建造一個滿足社會需求的大學城，符合高等教育部門的長期發展計劃，又兼顧各大學的利益。

從香港高等教育部門的發展來看，在未來 5 至 10 年內，由於香港融入大灣區的過程和國家發展，以及國家對人才培養的更高要求，香港的高等教育部門將面臨轉型升級的壓力和機遇並存的局勢。在此背景下，建設一座規模更大、功能更完備的大學城可為香港的大學的長期發展提供堅實的平台和空間保障。

然而，要建設一座能真正滿足高等教育部門發展需求的大學城，必須摒棄急功近利的心態，匯聚共識和力量。因此，早期與地方院校和大學進行廣泛磋商，特別是聽取各大學中高層領導的意見，對規劃尤為關鍵。這將有助大學城更加科學合理的設計，各種配套設施更加得當的設置。高校入駐大學城後，也將能夠更順利地融入新環境，各類教學和科研工作能更快地步入正軌，最大程度地發揮效益。總之，政策研究者應當宣導與地方大學領導，尤其是各大學的副校長廣泛磋商，在大學城的規劃中密切合作。這不僅有助於確保大學城整體設計的科學性和合理性，還有助於高校入駐大學城後儘早營運，發揮新建大學城的最終效益。這是規劃一座真正可持續的大學城的關鍵。

6.2 訪談結果與總結

受訪者有著共同的願景：將香港北部都會區的大學城打造成一座能夠推動知識、經濟和社會領域進步的創新中心。然而，在實現這一願景的最佳策略和模式，受訪者持有不同觀點。通過開放合作，見解綜合互補，大學城可發展為一個充滿活力的智力和產業中心樞紐，實現可持續繁榮。受訪者一致強調吸引全球人才和投資這一目標，旨在營造一個優質的生活和工作環境，促進合作與交流。他們建議將大學城的發展與國家和地區戰略，包括粵港澳大灣區一體化保持一致，並建議優化課程、研究和設施以滿足當代需求。部分受訪者建議將重點放在傳統中醫藥、文化、創業和技術等領域。然而，改進高等教育的各種方法，例如分校區建設、大學間合作、學分轉移和教師交流等，需在平衡資源限制和避免冗餘的前提下進行。

企業和政府的支援至關重要。企業可與大學合作，共同推動創新和人才培養。政府可增加資金投入，促進合作，支持教育改革； 政策應符合大學的需求。涉及教育、產業和生活領域的戰略性投資能夠最大限度地實現協同效應，降低成本。明確每所大學和企業的定位與優勢，有助優化合作，資源分享。競爭促進進步，但溝通並建立共識同樣重要。儘管觀點各異，但受訪者都表達了一個平衡的願景，即通過創新生態系統共同推動社會進步。通過合作整合互補性的見解，這一願景就能轉化為現實。綜合性的政策制定和戰略性投資也是一個關鍵步驟之一，有利於培育一個知識、產業和社區相互交匯的環境，實現共同利益。通過開放對話、審慎規劃以及跨領域的支持，大學城可發展為一個惹人注目的城市創新區。根據地區的需求調整課程設置、設施和機會，大學城可發展為一個吸引全球人才、智力和經濟的樞紐，以及社會進步的中心。在綜合教育和產業專家觀點的基礎上，香港可塑造一個以可持續的繁榮為導向，面向未來、充滿活力的社區。要建設有影響力的大學城，需要開展合作，整合多樣性的見解，以確保取得最廣泛的進展。

總之，受訪者為建設意義重大的大學城提出了共同的發展願景和獨特的策略觀點。他們的互補性見解應當通過開放合作得到綜合，令這一倡議能夠充分實現其在促進社會平衡發展方面的潛力。教育、產業和社區的全面決策和戰略性投資需要通過對話推動可持續的共同進步。

6.2.1 大學城的必要性

香港各大學對共用大學城的潛在效益達成了一致意見，認為其能夠推動知識交流、創新和人才培養，但需要通過開放的對話，整合不同觀點，從而制定一個平衡的戰略。將大學城的發展與國家和地區戰略相結合能夠放大影響，但規劃必須適應高等教育機構

的獨特定位。課程和研究應滿足社會和經濟需求，重點關注傳統中醫藥、文化、創業和技術等領域，但需要謹慎的投資，避免重複建設。在高瞻遠矚的規劃和跨領域的支持下，共用的大學城可能加速發展為一個吸引頂尖人才、促進增長的創新生態系統。大學城應根據多元化的意見進行周密的設計，成為知識、產業和社區交匯的樞紐，並通過整合學習、探索和商業化，成為推動社會進步的全球競爭中心。

6.2.2 加強多邊合作

打造影響力深遠的共用大學城需要各持份者的建議和支持，從而制定合適的政策和戰略。政府的領導對於跨部門召集和協調至關重要，但公司、教育者、非營利組織和社區的貢獻同樣重要且獨特。雖然加強多邊參與帶來了複雜性，但合作帶來的回報大於挑戰。政府資助規劃，鼓勵合作並建立回饋機制。公司和非營利組織為產業界和學術界之間的合作和創新提供了機會。社區團體提升了宜居性、包容性和文化豐富度。跨部門參與具有挑戰性，但其作用至關重要，需要通過遠見和調和，化解分歧並建立共同目標。

雖然持份者基於不同的標準和價值觀行事，但開放的交流可以明確各方的責任和利益，促成知識、產業和社會間的合作。社區參與雖然有高要求，但也會產生以人為本的成效。總體而言，一個真正共用的願景和合作框架是取得進展的基礎。促進教育者、產業界和城市規劃者之間的相互理解至關重要。這項計劃需要在公共和私人領域中整合洞察力，以最大限度地把握機會。政府主導跨部門協調，但合作帶來的回報遠超因複雜性增加而產生的問題，在這種情況下，通過多邊參與建立一個有影響力的共用大學城是可以實現的。

6.2.3 有效大學城的條件

為打造一座卓有成效的共用大學城，各持份者需要明確表達共用的願景，以提供發展方向。建立夥伴關係的關鍵在於在推進知識、培養人才、建設創新能力和提升生活品質等優先事項上取得一致。

政府通過回應政策、資金、激勵措施以及促進跨部門合作提供強而有力的支援至關重要。政府增加規劃和發展資源，優化產業界和學術界合作的條件，吸引企業和投資，並協調不同部門和持份者群體。政府需要進行全面的規劃，以應對當下的挑戰，與高等教育領域的戰略定位相適應。整合持份者的深刻見解符合戰略目標，可解決技能缺口並滿足城市規劃目標。協調教育、研究、產業、基礎設施和居住等領域可創造最多機會。高質素生活和工作環境，加上一流的設施、裝備和項目，能夠吸引到頂尖人才，促進交流和合作。住房、交通、醫療、休閒和育兒方面的考慮也很重要。因此，應通過機構間

合作、公私合作夥伴關係和研討論壇建立不同持份者群體間的持續合作和回饋機制。這個機制極為重要，可識別需求的變化，評估進展，做出有針對性的調整。

創新與創業的激勵措施和支援結構包括資助、孵化器、加速器、商業創意競賽、導師計劃和投資基金。它們通過催化新思想、技能和創業項目，為知識經濟注入動力。跨學科、跨部門、跨文化和跨領域的開放交流機會和偶然的聯繫機會包括共用空間以及組織的活動，可促進對話和人際關係的建立，推動跨學科思維、新夥伴關係和充滿活力的社區發展。一座大學城可憑藉符合本地需求的願景、政策支持、規劃和投資，加速城市創新生態系統的發展，吸引頂尖人才並實現增長。然而，成功有賴於教育、產業、政府和社區間的合作夥伴關係。促進理解和合作是關鍵要素，其中雖然具有挑戰性，但合作的回報遠大於帶來的挑戰。一座卓有成效的共用大學城需要合作：合作實現協調。這一舉措可最大限度催生跨領域的見解和機會，憑藉為共同進步而設計的交流方式，它可以推動知識、經濟和社會的進步。總之，合作是首要的目標。

6.2.3.1 區位便利

區位便利（例如，靠近地鐵站等公共交通基礎設施）對於吸引頂尖人才、保障參與和促進知識交流至關重要。吸引的對象包括本地和國際學生、教授、產業合作夥伴和居民。便捷的交通使大學城方便且宜居。

強大的交通連接網路為偶然的相遇和計劃外的互動創造了機會，從而能催化新創意、合作夥伴關係和創業項目。這在培育創新生態系統方面尤為重要。靠近國際機場的同樣有利於全球交流。便利的位置減少了對私人車輛的依賴，從而支持環境的可持續性。這與建設更宜居的城市和轉向可持續發展的能源和交通系統等廣泛社會目標是一致的。良好的公共交通可以大大減少交通堵塞和廢氣排放。

對於高等教育機構而言，便捷的地點有利於更好地獲得城市中心聚集的資源、設施和機會。這包括圖書館、實驗室、醫療機構、娛樂和休閒選擇，以及就業渠道，這些都有利於吸引和留住頂尖水準的學生和教職員。便捷地點附近擁有的就業機會、經濟實惠的住房以及社區服務，符合教職員、學生和年輕專業人士的需求，減少成本和通勤時間。這有助於提升宜居感、生活便利性和生活品質，這些因素都影響著人才的競爭力。強大的交通基礎設施可加強教育、研究、產業、商業和社區部門之間的潛在聯繫，為共用的大學城創造合作機會，並通過人員和思想的流動開闢知識和技術交流的途徑。總之，便捷的中心位置是促進創新、培育各領域交叉點的最佳選擇。

總之，一個交通便利而四通八達的中心區位為共用大學城的有效發展提供了重要的

優勢。中心位置能夠促進參與、交流、偶然性、可持續發展和資源的獲取，通過強大的公共交通基礎設施增強教育、研究、產業和社區領域間合作的潛力。這為知識、經濟和社會的交匯創造了機會，通過以互利為目的的合作關係，共同邁向進步。總而言之，便捷的區位和聯繫至關重要。共用大學城需要以互聯互通為核心。

6.2.3.2 整體基礎設施

住房、住宿和公共交通選擇應能滿足不同群體的需求，包括學生、教職員、年輕專業人士、家庭和老年人。經濟實惠、交通便利的居住選擇可大幅降低生活成本，使不同生活階層的人居住大學城，從而讓這個地方變得更加便捷、宜居。

高品質的教育、醫療、娛樂、育兒和養老設施有助於提升生活質素、社區福祉和人才吸引的競爭力。這也與共用大學城培育知識、夥伴關係和進步的使命相一致。商業區應提供就業機會、新業務場所以及日常生活的零售選擇。這吸引了公司和投資者，促進產業界和學術界之間的合作。同時，它也減少了外出通勤的需求，使社區變得更加宜居。

綠色休閒空間帶動了積極生活、健康和社區的凝聚力，為工作或學習環境之外的非結構化互動、交流和人際關係提供了場所。與大自然的接觸有助於提升健康、創造力和生活質素。社區設施應當反映文化和生活方式的需求，以適應香港多樣化、國際化的人口。這包括藝術、文化、娛樂、餐飲、夜生活以及宗教活動的空間。充滿活力的社區生活可吸引人才，推動開放文化，促進交流。

設計精良的基礎設施包括步行道、自行車網路和智慧出行等選項，能夠促進可持續的生活和交通方式。同時，也能減少對堵塞的道路網路和停車場的需求，從而開闢空間。支援積極出行和以交通為導向的生活方式也有助於實現更廣泛的宜居目標。若新思想和智慧財產權商業化的條件得到優化，則有助於培育創新文化和知識經濟的活力。資源、激勵措施、資金計劃以及商業輔導或項目推介的機會可催化初創企業和科技創業。

總之，為了打造一座卓有成效的共用大學城，必須考慮到整體性的基礎設施，包括住房、教育、娛樂、醫療、商業、社區和出行等各個方面。通過提升宜居性、人民福祉、吸引人才的競爭力以及創新潛力，設計精巧的跨領域高品質設施可增加合作機會，推動進步，通過知識創造和交流實現共用的繁榮願景。

6.2.3.3 智慧城市

大學城毗鄰研究、人才和創業生態系，將通過合作加速智慧技術的創新和發展。跨學科交流能夠引領對城市未來的重新構想。在初步規劃階段建立的聯繫為合作奠定了基礎，減少了在採用技術或政策方面的不協調。

一個實驗基地將試驗智慧解決方案，擴大前景廣闊的選項，限制作用甚微的選項。教育基地為改進基於經驗的技術提供回饋。數位基礎設施已將該地區連接起來，使智慧技術的部署成為可能。創客空間和技能項目培養了共創解決方案的能力。集中的資源為創新提供了動力。在宜居、充滿活力的社區中生活意味著人們希望採用新技術進行互動。智慧城市滿足人類的需求，提升人民福祉，促進繁榮和可持續發展。採用智慧系統，可優化效率、提高生活品質並增強恢復力，這與在規劃大學城時採用的可持續發展和宜居性原則相一致。未來城市的願景將為大學城建立的進展提供指導。

最重要的是，開放協作的文化為共同創造、部署和改進智慧解決方案提供了機會，從而共同推動經濟、社會和環境建設的發展。但成功依賴於願景、理解和誠信：在技術或政策之前，要先建立聯繫。實現共同願景需要誠信，僅憑自身利益是不夠的。

6.2.3.4 毗鄰產業

坐落於北部主要商業區和工業區附近的區位為合作、人才交流和智慧財產權的商業化提供了機會。大學、研究人員和企業之間的緊密聯繫有助於知識傳遞、需求緊缺崗位的技能培訓，以及科技創業，從而培育了一個創新生態系統。

部分受訪者指出，職業關係和偶然性在推動合作方面發揮了重要作用。教育、研究和產業的毗鄰為未經計劃的會面和互動提供了空間，加強了個人關係，從而帶來新想法或商業項目。儘管複雜，合作的回報遠大於其帶來的挑戰。在北部現有基礎設施和交通路線附近發展大學城，可最大限度地降低成本和環境影響，同時也方便人們從其他地區進入大學城。學生、教職員及其他工作人員可從附近的就業機會、設施和服務中獲益。這也符合產業對便利性的需求。總體而言，一個交通便利的中心區位具有諸多優勢。

然而，部分受訪者提出，產業不應過度影響教育和研究的優先事項。學術自主權和思想自由對於開放式的探究、社會批判和獨立性都很重要。大學儘管也為經濟和社會作出貢獻，但與公司有著不同的功能。平衡角色和責任是關鍵，但也很複雜。其他受訪者指出，成功不僅僅取決於地理上的鄰近，還取決於在不同領域之間的協調和優先事項。為實現有效的合作，人們應保持開放溝通，致力實現共同效益，從而調解不同的利益需求。雖然位置很重要，但共同目標和相互理解的影響更顯著。聯繫的重要性大於區位。

一些人認為，大學城可吸引新的產業進入該地區。由於人才、知識和創新集中在附近，公司可能會遷移或建立基地，以獲取增長所需的資源。與此同時，有人認為，應該發展旨在促進社會各界包容性繁榮的夥伴關係，為活化現有區域創造機會。

與大學領導層的訪談揭示了一個共同的願景，即北部都會區大學城將通過合作夥伴

關係，發展為一個推動知識、人才、創新和生活品質發展的世界級中心。然而，他們對實現的最佳策略表達了不同的觀點，包括平衡本地資源和全球志向、克服土地限制、加強產業和政府間的聯繫、與國家和地區的政策相整合、聚焦研究和課程設置、吸引投資和人才、提升設施和文化水準等。儘管意見各異，持份者一致認為，應採用精密的規劃來整合不同見解並優化機會，使大學城能夠充分發揮其潛力，成為香港發展智識和經濟的催化劑。教育、產業、政府和社區之間的開放交流與合作是實現這共用願景的關鍵點。

七、討論與結論

大學城計劃為香港的創新和科技發展帶來了顯著優勢和機遇，但也面臨著資金、土地限制、管治和一體化等方面的挑戰，需要採取仔細的規劃並分階段實施。

7.1 在北部都會區建設大學城的優勢

從建立大學城的過程中，可以發現大學城的重要優勢，包括：

（1）塑造獨特的城市品牌；

（2）吸引優秀的科研資源和高素質人才；

（3）培養熟練的勞動力；

（4）刺激社會創新和創業，促進積極的技術溢出；

（5）通過升級本地產業結構來支援本地產業發展；

（6）擴展科技服務產業，提高產值並創造更多就業機會。

香港擁有得天獨厚的優勢，足以在北部都會區成功地建設好一座世界級的大學城。中央政府和香港特區政府均明確表示會加強香港作為國際創新和科技中心的地位，這為大學城的重大投資提供了堅實的政策支持，包括針對前沿領域研究和先進設施，這些對於大學城至關重要。

香港已經擁有數所全球排名靠前的頂尖大學，吸引世界各地的精英研究人才前來。得益於其國際化的環境、充滿活力的學生生活和卓越的學術聲譽，香港也吸引了眾多國際學生。香港四通八達的交通網絡以及作為區域門戶的戰略地理位置，為研究和機構合作提供了便利。此外，香港各大學培育的創業文化以及大學與產業界的深厚聯繫，為技術轉移和培育初創企業提供了蓬勃發展的生態系統。香港憑藉其金融影響力和強大的知識財產權保護體系，為新發現成果的商業化提供了理想的基礎。在此堅實的基礎上，北部都會區大學城可以催生香港的創新能力。通過匯聚知識資本、培育科技創業者和加速知識交流，大學城可以發展為一個強大的引擎，推動香港升級為全球領先的創新和科技中心。

7.2 在北部都會區建設大學城面臨的問題

但面臨以下問題有待解決：

（1）實現高效的土地利用；

（2）確保穩定的政府資金流動和有利的政策支持；

（3）充分瞭解香港真正的優越之處；

（4）設計清晰的短期和長期發展規劃；

（5）加強本地基礎設施網路，支援大學城的發展。

世界各地的大學城面臨的問題

（1）資金

金融資源不足是上海松江大學城建設中的一個普遍問題(Ruoppila & Zhao， 2017)。雖然政府在談判後承諾提供土地並支付所有土地相關費用，但由於商業銀行不願向大學提供期限足夠長的貸款，建設成本仍然對大學構成了一個嚴重問題，使項目難以啟動。在築波大學城的案例中，雖然資金來自公共基金，但仍存在資金短缺的問題，導致誤工延期（Bloom & Asano， 1981）。

（2）土地供應

在廣州大學城的建設過程中，由於土地徵收補償問題，居民與政府之間產生了衝突。在築波大學城的建設過程中，土地價格飆升導致了大學城分散而非鄰接建設，引發了諸如不同校區相距較遠、交流不便等問題（Bloom & Asano， 1981）。

（3）大學搬遷

在上海松江大學城的規劃階段，松江區政府特別關注大學的部分或整體搬遷（Ruoppila & Zhao， 2017）。例如，他們並不滿足於大學城只有藝術專業的大學，更希望有工程專業的大學，以推動本地產業發展。在搬遷期間，部分大學可能會改變或調整之前制定的計劃。例如最初有 43 家研究機構和大學計劃於 1976 年遷到日本築波大學城，但後來為了完成搬遷，他們將目標日期改為 1980 年。

（4）資源分享

建立大學城最初是為了更好地整合資源，打破障礙，促進大學之間的思想交流。然而，現實情況是，中國的大學城往往規模過大且分散。例如，廣州大學城占地 4300 公頃，只是許多大學的聚集地。學生發現，前往其他大學耗費的時間成本太高，於是只在自己的校園內參與活動，這導致重複建設和資源浪費。

表 1 中國的一些大學城

大學名稱	省/市	面積（公頃）	學生人數（萬）	投資（億元）	規劃/建設年
仙林大學城	江蘇/南京	3400	10	50	2002
常州大學城	江蘇/常州	667	6	25	2002
松江大學城	上海	300	17	25	2000
重慶大學城	重慶	2000	20	100	2003
北京吉利大學城	北京	200	2	8	2000
渾南大學城	遼寧/瀋陽	180	10	40	2000
膠南大學城	山東/青島	2500	5	57	2004
西大學城	陝西/西安	4000	10	85	2001
福州大學城	福建/福州	2000	10	30	2001
深圳大學城	廣東/深圳	1200	25	14	2000
廣州大學城	廣東/廣州	4300	15	300	2002

資料來源：取自上官琳（2005）《我國大學城開發現狀及開發運作模式研究》（重慶大學，學位論文）以及其他新聞來源；由作者編譯整理。

圖 3 中國部分大學城的面積、學生人數和投資規模（Li et al.， 2014）

（5）權力結構

傳統的大學城主要以大學為中心，例如美國密西根州安娜堡和賓夕法尼亞州州立學院等地的小型大學城，其中大學在社區事務中扮演著重要角色（Miller， 1963）。然而，日本政府的特點是極端的垂直整合。政府機構之間溝通不暢，在籌建築波大學城的實際運營中，它們為爭取合意的項目和必需的資金而競相角逐，充斥著嫉妒情緒。因此，在築波大學城中，只有少數設施是共用的（(Bloom & Asano， 1981）。這扼殺了築波大學

城的科技活力和產出效率。

（6）人口流失

大學城的本質仍然是城市，而城市應當關注的三個要素是工作、生活和休息。早期，築波大學城缺乏日常消費、休閒和交流的設施，導致許多居民都前往東京或其他城市度週末。

發展大學城的過程中雖然存在巨大的機遇，但香港也需要應對一些關鍵的挑戰，以確保計畫的成功實施。

首先，建設新校區、購置設備和招聘人才需要巨額的資本投資。確保有足夠的資金來支援這宏偉的願景，就必須進行周密的規劃和分階段的發展。其次，大學城的土地使用、佈局和交通必須考慮到未來的擴展，進行精心設計。用地面積需要充分容納所設想的大學城的全部規模。第三，課程和學位的組合應與北部都會區規劃的重點產業保持一致，確保人才輸送可滿足關鍵的勞動力需求。第四，精簡管理結構，以便有限管理大學城內多個機構。最後，需要培育富有成效的城市—大學合作關係以及產學研合作，從而創造研究、商業化和人才發展的良性循環，實現可持續增長。

雖然這些問題可以解決，但需要由大學城的規劃階段起就開始解決，才能發揮大學城作為香港下一代創新引擎的全部潛力。

7.3 建設北部都會區大學城的建議

要成功打造一個世界級的大學城，香港需要從初期規劃階段開始就採取周密而協調一致的方法。

建議

（1）儘早規劃佈局，促進北部都會區總體規劃

為促進北部都會區的總體規劃，需要儘早策劃大學城的佈局和發展。應該成立專門機構收集意見和建議，並協調大學城規劃建立的全過程。可以專門成立一個辦公室，負責聚合建議並整合相關規劃。大學城的專業和研究重點應與北部都會區規劃的三大重點產業——醫療技術、人工智能和先進製造業緊密結合。這將使大學城能夠提供這些領域所需的專業人才和技術支持，以催化增長。同時還應鼓勵各個大學提出發展規劃和建議，以充分發揮其現有機構優勢並滿足未來需求。通過儘早主動啟動大學城的規劃過程，可以從一開始就將其與北部都會區的總體規劃相協調整合。這種遠見卓識的方法將最大限度地發揮協同效應和戰略優勢。

短期而言，政府必須繼續大力推進建設工作，確保土地徵收和相關制度建設能夠及時完成。一旦建設完成並進入運營階段，應實施長期戰略，以避免日本築波科學城曾遇到的問題。為此，我們建議從政府主導的體系轉向以大學或機構為中心的體系，簡化審批流程並下放權力。這將有助於鼓勵創新技術的轉化，提升科技成果的轉化效率。此外，建立一系列激勵措施至關重要。

從長遠來看，重要的是要避免中國大學城曾出現的資源浪費和重複建設等問題。應強調大學城內的共享和交流。這種精神應納入校規，並通過各種渠道有效傳播給大學城內的所有學習和工作人員。

（2）規模化研究計劃的基本原理

為確保大學城的可持續發展，應根據可用資金和土地資源進行務實評估，優化其規模和範圍。整體規模需要合理設計，以匹配資金水平，從而使资金可以支持整個将持续多年的項目。與此同時，應對北部都會區土地供進行詳細分析，以確定大學城的適當建設規模和空間範圍。鑑於這是一項長期承諾，合理地、分階段規劃發展可以逐步形成規模並隨時間推移逐步實現聚集效應。

過去，建設大學城的費用往往通過增加學費由學生來承擔，但事實證明這種做法行不通(Ruoppila & Zhao， 2017)。這不僅會使大學城難以收回成本，還會導致許多人才流失。通過教育的商業化來支付建設成本或許是一種可行的方法。不過，也許還有更好的方式，比如吸引風險投資，將其與大學城的整體經濟產出聯繫起來以獲得回報。然而，問題在於，這種新模式需要進行詳細的可行性和可操作性演示，而且這種融資帶來的風險也需要進一步評估。短期而言，政府應成立一個專門的投資促進團隊，負責北部科學城的發展。該團隊應制定政策和激勵措施以吸引投資。可以參考當前的激勵措施和最佳實踐，以最大限度地提升該地區的吸引力。政府應該積極聯繫投資機構，展示與北部都會區開展合作的強烈意願。這可以通過參訪、新聞媒體報導和其他推廣活動來實現。

為了應對建設期間的可能出現的財務負擔，政府應探索不同的融資渠道。其中一項選擇是利用香港的金融實力吸引社會資本和私人投資。這可以幫助分擔財務負擔，確保項目的及時完成。中期而言，重要的是識別具有高潛力的項目並給予鼓勵和支持。這可以包括為促進其發展提供資金、資源和基礎設施。通過這樣做，這些項目可以成為榜樣，吸引其他創新企業和初創企業落戶該地區。這將有助於提高北部都會區的知名度，有利於形成一個有利於創新和科技的生態環境。為了確保可持續發展，與不同行業和組織建

立長期夥伴關係至關重要。這可以涉及合作、知識共享和資源交流，以推動當地發展並創造經濟效益。政府應該積極吸引和鼓勵更多的企業家進入北部都會區，為創業提供支持、激勵和有利的環境。這不僅有利於企業家，還可以刺激風險投資，促進社區整體增長。

此外，大學城的分佈和佈局應與北部都會區更廣泛的產業發展藍圖保持謹慎一致。進行細緻的計劃和研究對土地使用、空間效率、建設可行性和機構要求至關重要，這是設計適當的、與規劃的產業相符的規模和分佈的關鍵。通過採取漸進的規劃方法，大學城的規模、資金、土地使用、分期和分佈都可以經過精心設計，以實現可行且持久的成功。

（3）促進產學研合作和技術示範研究

為最大化發揮大學城的影響力，需要打造強大的學術界與產業界合作夥伴關係。這需要收集行業對人才需求的數據，並戰略性地培養具備緊缺技能的畢業生。公司可以與大學合作共同培養研究生，並為他們提供專業機會。大學可以開設關於新興技術的有針對性的短期課程，提供與行業相關的培訓。政府應增加資助和激勵措施，以鼓勵大學與產業的研發合作，發揮協同效應。為技術演示和驗證試點提供設施和資源，可以幫助測試創新在現實中的可行性。還需要建立明確的機制，以促進研發突破向市場準備產品和技術的轉化。此外，應制定合理的知識產權轉讓或授權模式和商業化利潤模式，以激勵研究人員，同時也支持大學的可持續發展。通過匯聚學術界和產業界的持份者共同培養人才、研究解決方案和可商業化的技術，大學城可以成為優先產業創新、技術轉化和增長的引擎。

建立北部都會區大學城的宗旨主要是促進創科發展，直接通過科研成果為社會提供服務，並創造經濟價值。產教研一體化是大學城發展需要考慮的核心因素。大學城可以共用部分校園設施，節省土地、能源、時間等資源，促進學生和研究人員的跨學科學習，加強高校之間的交流。

短期而言，政府應在大學城規劃的初期階段就與相關企業保持密切聯繫。這包括設立研究機構並提供實驗場地和生產車間。這種方法可以確保大學城建立後，打破垂直體系內上下游產業之間的壁壘，還可以促進高等院校之間的橫向交流。此外，亦需採取緊急行動與香港各大學接洽，明確哪些學院和組織將遷入大學城。這對各大學的未來發展和利益至關重要。可能還有必要就大學城應以工程院校為主還是應包括不同類型的院校

進行深入磋商和討論——澄清這些細節將優化場地規模和範圍。

中期而言，大學和產業應合作確定急需人才發展和研究突破的關鍵新興技術領域。然後可以啟動有針對性的學位課程、研究項目和商業化舉措來解決這些戰略需求。需要健全的激勵結構，以鼓勵研究人員和學生參與這些優先領域項目。多方持份者諮詢委員會應提供指導和反饋，以確保這些舉措實現最大的社會效益和經濟效益。通過將努力集中在解決具體的技術問題和人才缺口上，大學城可以建立獨特的能力和價值。

（4）同步規劃配套設施

規劃支持性基礎設施和便利設施需要與大學城的發展同步進行。應加強區域設施規劃，以無縫集成和協調大學城的建設與周邊的住房、交通、娛樂、醫療、商業等服務。設施和城市環境需要滿足頂尖人才對優質住房、便捷交通、卓越醫療、兒童教育、充滿活力的文化和休閒的剛性需求。通過培育充滿活力、宜居的社區氛圍和高標準的生活品質，大學城可以變成一個人才聚集地。政府需要制定有吸引力的政策以吸引和留住人才，解決諸如經濟適用房、醫療保健獲得途徑、兒童入學選擇等迫切問題。通過跨領域規劃營造繁榮生態系統和宜居環境，大學城可以成功吸引和留住催化創新的全球頂尖專業人士。

盡早成立類似築波大學城的高級別協調管理委員會，在短時間內有效協調和管理大學城與周邊地區的關係，非常重要。該委員會應具體關注住房、交通和商業設施問題。參考《北部都會區發展報告》，建議在北部大學城發展計劃中增加一個單獨的章節，明確闡述大學城與鄰近交通、產業、住房和娛樂設施之間的連接性。該章節應有每個方面的完成時間表。在建設階段，還有必要成立一個監測小組，以確保取得適當的進展，防止延誤。大學城及其相關基礎設施能夠同時完工並投入使用至關重要，任何延誤都可能對該地區的吸引力產生負面影響。一個需要關注的問題是土地的可獲得性，這應該提前做好充分準備，以避免延誤。

長期而言，設施的維護和運營變得至關重要。建議通過招標流程成立一個專門的護理和維護團隊，以避免頻繁的維修影響大學城的正常運行。例如，必須及時解決道路損壞和鐵路維護問題。一個關鍵考量是該地區的商業可行性，因為它直接影響著可能願意在該地區進行各種活動(如購物和娛樂)的人數。與此同時，吸引和留住頂尖人才的政策和舉措可能包括住房補貼、快速居留權通道、有競爭力的套餐以及雙職業配偶聘用支持。一流的國際學校、兒童照料服務、醫療設施和交通鏈路對於滿足家庭需求至關重要。聯

誼活動幫助新員工融入，而補助則可以協助配偶就業和創業。通過全面解決高素質人才迫切需要的住房援助、移民激勵、就業福利、教育機會、社區建設和家庭支持，大學城可以成為一個具有全球競爭力的人才樞紐。因此，制定因材施教的政策和設施以滿足研究人員、教職員工及其家人的需求，這對於有效吸引和留住推動知識、技術和進步蓬勃發展所必需的人才至關重要。

（5）打造良好的科學和創新生態

為培育充滿活力的科學、技術和創新生態系統，政策和舉措應該以吸引更多的青年追求 STEM 教育和職業為目標。提供研究津貼、獎學金或免息貸款等經濟激勵措施可以鼓勵更多人參與 STEM 領域的學習和發展。簡化與研究津貼和管理相關的官僚流程，減少繁文縟節，賦予研究人員更大的自主權和生產力。為學生、研究人員、企業家和產業專業人士之間的交流創建網絡和平台，可以促進溝通和人際關係的建立，激發新的合作。簡化跨境流動和交流程序，使人才在香港和內地之間能夠更自由流動，打開合作夥伴關係。通過為 STEM 教育、研究管理、人才參與和流動創造有利的環境，可以催生一個充滿活力的創新文化。

培育城市內充滿活力的創科氛圍至關重要。這可以通過舉辦博覽會、創建旅遊路線和營造創新思維來實現。政府應為評估培養這種氛圍進行可行性研究，為提案奠定基礎。在中期階段，在北部都會區組織學術和創新活動將是有益的。保持詳細記錄並進行分析以促進持續改進是必要的。這些舉措將促進當地旅遊業經濟發展，並為居民提供體驗和接觸新技術的機會。這些可以是設立無人駕駛試驗區和自充電道路，以及創建擴增實境社區。通過提供獨特和未來感的體驗，該區域將吸引尋求長期定居而不是只是短期就業機會的人才。長遠來看，關鍵是在北部都會區建立 1-2 個獨特的創新活動。這將有助於打造該區域作為創新和技術樞紐的品牌，需要長期的探索、持續的投資和堅持。

（6）推動完善配套法律規範

為了避免因政府和政策的變化而產生潛在問題，建議專門制定相關法律規定，以規範大學城的建設和運營。規劃階段和建設階段之間的長時間間隔不是一件好事。現在正是國家和香港關注和專注於發展創科產業的時候，因此，應儘快開始科學規劃和議程制定。

短期而言，重要的是通過儘早制定明確的建設和法律發展時間表，以概述重要里程碑和期限。這可以幫助確保及時推進並按預期時間框架完成所有任務。政府還應與深圳

和國家的長期規劃舉措進行緊密協作和配合，以保持目標一致並最大限度發揮優勢。這將有助於創造協同效應，使北部都會區的法律發展與更廣泛的戰略和目標保持一致。

中期建議方面，有必要成立一個專門的監督小組，以監督法律制定過程。該小組應負責監測進展情況、提供指導並提供激勵措施，以促進及時完成，應定期進行評估，以評價進展情況，確定必須解決的任何挑戰或瓶頸。此外，應激勵參與法律制定過程的個人和團隊，以確保積極性和及時完成。這些激勵措施可以是獎勵、表彰或其他鼓勵個人履行職責並為項目的成功做出貢獻的措施。

最後一個建議是成立北部都會區法律準備委員會，這意味著成立一個專門委員會，專注於為該地區準備和制定相關法律。該委員會應具有聽取、收集和制定符合北部都會區需求和特點的法律的授權。這將確保長期有效制定和遵守當地的運營、稅收等關鍵法律。

要在北部都會區發展一座世界級的大學城，香港可以借鑒全球最佳實踐，同時避免常見的困境。全面規劃應與國家發展目標保持一致，並儘早開始以實現與更廣泛地區的融合。定制的廣泛設施可為發展提供空間。需要通過聯合實驗室、項目和人才交流來推動跨學科和跨產業的協作。分階段發展可以在保持長遠願景的同時逐步擴大規模。吸引國際人才關係重大，所以交通聯繫、住房、醫療保健、娛樂和社區建設很重要。支持商業化和大學-產業合作夥伴關係可以催生創新生態系統。在能源、廢棄物和運輸等方面應當嵌入可持續發展原則。獨立的治理機構將對運營進行監管。跨多個關鍵領域的積極政策和規劃也非常關鍵。總體規劃應儘早整合大學城，廣泛收集各方意見。根據資金和土地情況進行合理的規模調整，以實現可持續的發展。強大的學術-產業合作夥伴關係將研究與經濟和人才需求聯繫起來。支持性基礎設施和設施必須滿足人才需求。激勵和簡化流程將促進創新和交流。法律保障和治理結構將確保效率、品質和可持續性。通過跨部門的細緻規劃，北部都會區大學城可以充分發揮其吸引人才和推動香港作為亞洲創新樞紐角色的巨大潛力。

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Kowloon
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