

# Innovation for Hong Kong's Upward Social Mobility

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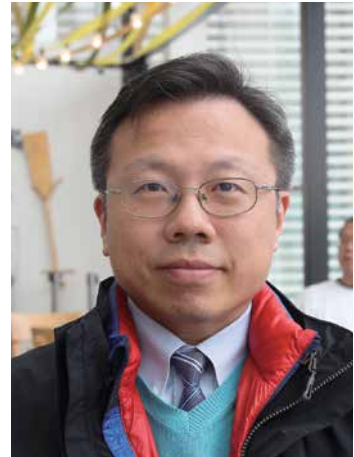
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## YU Chun, Calvin

During his postgraduate studies in HKUST, Mr YU Chun, Calvin obtained a Master of Science in Information System Management and a Master of Philosophy in Information System. He was supervised by Professor Yan XU in the Master of Philosophy Programme to focus on the research about technology and innovation topics. His graduation thesis was titled “Re-examining the Classification of Technology and Innovation Industry in the Context of Open Innovation” and explored how to employ Open Innovation thinking to help formulate more suitable technology and innovation industry policies.

Calvin assisted Professor XU in the research project “Innovated by Hong Kong”. The research result was subsequently published as the book “Innovated by Hong Kong”, co-authored by Professor XU and Calvin. Calvin has also published research papers about technology and innovation industry policies, electronic government, etc. in different international research conferences and journal, including Hawaii International Conference on System Sciences (HICSS), Pacific Asia Conference on Information Systems (PACIS), IEEE International Conference on Information Reuse and Integration, International Society for Professional Innovation Management Conference (ISPIM), and Journal of Science and Technology Policy in China.

# Chapter 1



## The Urgency for Further Developing Hong Kong's Technology and Innovation Industries





## 1.1 The Urgent Need for Breakthrough

1.1.1 Hong Kong is losing the momentum for economic growth.

1.1.2 Hong Kong was once the shining “Pearl of the Orient” among Asia’s Four Little Dragons. From “Made in Hong Kong” to “Made by Hong Kong”, Hong Kong has overcome various kinds of difficulties and challenges again and again over decades. However, the traditional industrial model is starting to lose its edge in the face of the changing world, and the catchphrase “Innovated by Hong Kong” still seems distant.

1.1.3 In the past two years, the economic downturn brought about by Hong Kong’s social instability and COVID-19 has not only severely damaged the economy and livelihood of Hong Kong residents, but also once again highlighted the problem of Hong Kong’s excessively concentrated industrial structure. The first to bear the brunt are those essential service industries for Hong Kong such as tourism, retail, and catering. Moreover, increasingly tense international political relations are significantly weakening Hong Kong’s role as a trade intermediary. The structurally excessive dependence of Hong Kong’s economy on the financial industry has also made the economic structure fragile. As the economy and people’s livelihood suffer a heavy blow, the government’s input and commitment to the society become more important. The increasing financial burden of the government is rapidly reducing Hong Kong’s financial reserves. All these statements point to the same direction: Hong Kong’s economy needs new impetus to drive long-term development and growth. Economic development has always been sailing against the current - either forging ahead or drifting downstream.

1.1.4 Young people born between 1980 and 2000 in Hong Kong, known as millennials, are now in the life stage of studying or career taking-off in the workplace. Compared with their parents, millennials grew up in a relatively affluent environment, but face more difficult challenges. Hong Kong’s declining economic momentum and weakening industries have made it difficult for young people in Hong Kong<sup>1</sup>, one of the cities with the highest living costs in the world, to move upward. It is difficult for them to escape the plight of the “working poor”<sup>2</sup>. The pressure of survival and life has become an overwhelming heavy burden for many young people<sup>3</sup>. In Chapters 4 and 5, we will delve into the issues of Youthquake and Social Mobility.

<sup>1</sup> Economist Intelligence Unit, Worldwide Cost of Living 2020, <https://www.eiu.com/n/campaigns/worldwide-cost-of-living-2020>

<sup>2</sup> <https://www.hk01.com/周報/354544/青年困境-沒有父幹如何向上流-香港的-窮忙-悲歌>

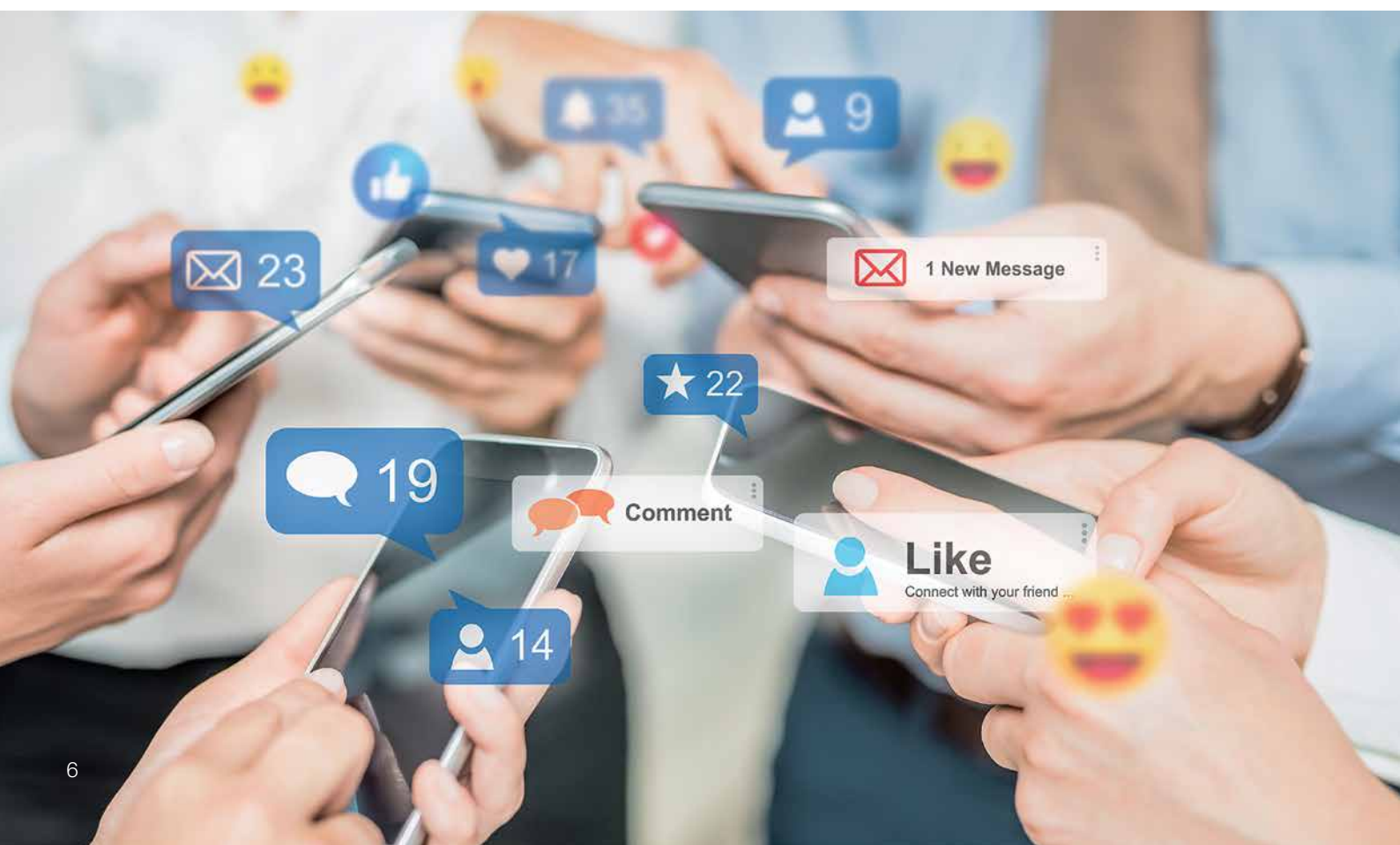
<sup>3</sup> <https://www.hk01.com/周報/355617/青年困境-活在全球生活費最貴城市-談何理財-談何追夢>



1.1.5 The cultural and social environment in which millennials grew up has offered them with a unique worldview, and also provided them with innate advantages in embracing the development of technology and innovation. For millennials growing up in the age of booming digital technology, the Internet and social media are as essential as breathing. Studies have pointed out that between 2014 and 2018, more than 90% of young people aged between 10 and 24 have used social media. In 2018, young people aged 15 to 24 spent the longest time using social media among all age groups, with an average of 17.7 hours per week<sup>4</sup>. Compared with traditional industries, technology and innovation industries are a familiar subject that millennials have been fascinated with and immersed in since they were young. According to studies, young people in Hong Kong are at an inherent advantage in fostering technology and innovation literacy in Hong Kong because they “have international perspective and are able to integrate Chinese and Western cultures. Compared with other developed countries and regions, the students in Hong Kong have outstanding learning abilities, and are among the best worldwide in many learning ability indicators. In addition, the students in Hong Kong are very open-minded in accepting new things and are willing to take the initiative to learn new skills and knowledge.”<sup>5</sup> If young people have no hope for the future, Hong Kong will have no future. Hence, fostering the development of technology and innovation industries is not only to address the problems of Hong Kong's economic structure, but also the key to allowing Hong Kong's young people to make best use of their strengths, and create employment, entrepreneurship, and long-term development opportunities for young people, and provide young people with channels for upward mobility, thus solving the problem of upward mobility for young people in Hong Kong.

<sup>4</sup> Research Office of the Legislative Council Secretariat, “Social media usage in Hong Kong”, Data Analysis ISSH15/19-20. <https://www.legco.gov.hk/research-publications/english/1920issh15-social-media-usage-in-hong-kong-20191212-e.pdf>


<sup>5</sup> STEAM Education and Research Centre, Lingnan University, a research report on “Cultivating Hong Kong Youths; STEM Literacy”. <https://ln.edu.hk/serc/download/STEMLiteracy.pdf>



## 1.2 An Alert from “Global Innovation Index 2020”

- 1.2.1 Over the past decade or so, the annual “Global Innovation Index” published by the World Intellectual Property Organization (WIPO) provides data and insights for different economies around the world to facilitate discussions and policies on innovation. The latest 2020 report “Global Innovation Index 2020 - Who Will Finance Innovation?” expounds the trend of world innovation and evaluates the performance of 131 economies in terms of innovation.

**Table 1.1 Framework of the Global Innovation Index 2020 <sup>6</sup>**



<ul style="list-style-type: none"><li>• Political environment</li><li>• Regulatory environment</li><li>• Business environment</li></ul>	Institution	  Innovation Input Sub-Index	Global Innovation Index
<ul style="list-style-type: none"><li>• Education</li><li>• Tertiary education</li><li>• Research and development, R&amp;D</li></ul>	Human capital & research		
<ul style="list-style-type: none"><li>• Information and communication technologies, ICTs</li><li>• General infrastructure</li><li>• Ecological sustainability</li></ul>	Infrastructure		
<ul style="list-style-type: none"><li>• Credit</li><li>• Investment</li><li>• Trade, competition, and market scale</li></ul>	Market sophistication		
<ul style="list-style-type: none"><li>• Knowledge workers</li><li>• Innovation linkages</li><li>• Knowledge absorption</li></ul>	Business sophistication		
<ul style="list-style-type: none"><li>• Knowledge creation</li><li>• Knowledge impact</li><li>• Knowledge diffusion</li></ul>	Knowledge & technology output	Innovation Output Sub-Index	
<ul style="list-style-type: none"><li>• Intangible assets</li><li>• Creative goods and services</li><li>• Online creativity</li></ul>	Creative outputs		

<sup>6</sup> WIPO, Global Innovation Index 2020

1.2.2 Among the 131 economies, Sweden, Finland, Singapore and Israel excel in technology and innovation and are similar to Hong Kong in terms of the level of economic development and population. Hence, these economies, together with Mainland China and Hong Kong, are selected for comparison.

1.2.3 According to the research framework of the “Global Innovation Index 2020” (Table 1.1), although Hong Kong is ranked 11th overall, and even ranked 1st in the pillars of “Market sophistication” and “Creative outputs”, it is only ranked 54th in “Knowledge and technology output”, well behind the other economies on the list. Singapore is often selected for comparison with Hong Kong. Regarding this index, even though Singapore's overall ranking is only 3 places ahead of Hong Kong, it is 40 places ahead in terms of “Knowledge and technology output” (Table 1.2).

**Table 1.2 Global Innovation Index 2020 Rankings Overall and by Pillar <sup>7</sup>**

	Overall GII rank	Institution	Human capital & research	Infrastructure	Market sophistication	Business sophistication	Knowledge & technology output	Creative outputs
Sweden	2	11	3	2	12	1	2	7
Finland	7	2	4	9	33	8	6	16
Singapore	8	1	8	13	4	6	14	18
Hong Kong	11	5	23	11	1	24	54	1
Israel	13	35	15	40	14	3	4	26
Mainland China	14	62	21	36	19	15	7	12

<sup>7</sup> WIPO, Global Innovation Index 2020



## 1.3 Enlightenment from Hong Kong Innovation Activities Statistics

1.3.1 In the five years from 2015 to 2019, the business sector of Hong Kong spent billions of funding in research and development every year. From 2015 to 2018, the business sector was more inclined to entrust “Company not affiliated with the enterprise group” for R&D. In 2018, this figure was as high as HK\$2.75 billion, accounting for 61.1% of the total expenditure. However, in 2019, this number dropped significantly to 28.9%, while the percentage of R&D expenditures performed by “Affiliates or parent company of the enterprise group” to the total expenditure rose sharply, from 19.8% in 2018 to 48.2% in 2019. In the meantime, the proportion of R&D invested by “public technology support organizations” also rose sharply from 8.2% in 2018 to 14.5% in 2019 (Table 1.3).

**Table 1.3 Total Expenditure on Contracted-out R&D Activities in the Business Sector from 2015 to 2019 by Type of Performing Party**



Types of party performing R&D activity	2015	2016	2017	2018	2019
	HK\$ million (percentage)				
Public technology support organizations	265.5 (10.7%)	325.3 (10.6%)	551.7 (13.9%)	369.3 (8.2%)	544.5 (14.5%)
Higher education institution	461.7 (18.6%)	230.7 (7.5%)	*** <sup>8</sup>	416.4 (9.2%)	311.6 (8.3%)
Affiliates or parent company of the enterprise group	566.8 (22.8%)	1,342.4 (43.8%)	1,373.3 (34.7%)	892.0 (19.8%)	1,812.5 (48.2%)
Company not affiliated with the enterprise group	1,188.8 (47.9%)	1,162.4 (37.9%)	1,785.2 (45.0%)	2,750.6 (61.1%)	1,084.7 (28.9%)
Others	0.1 (0.0%)	6.6 (0.2%)	*** <sup>9</sup>	73.8 (1.6%)	3.5 (0.1%)
Total	2,482.9 (100.0%)	3,067.3 (100.0%)	3,963.1 (100.0%)	4,502.1 (100.0%)	3,756.8 (100.0%)

Data Source: Census and Statistics Department,  
Hong Kong Innovation Activities Statistics 2015-2019

<sup>8</sup> The Hong Kong Innovation Activities Statistics 2017 does not contain the data of such sub-item. By deducting the items with data from “Total”, the total expenditure of R&D activities contracted-out by the business sector to the “Higher education institution” and “Others” was HK\$252.9 million (6.4%).

<sup>9</sup> The Hong Kong Innovation Activities Statistics 2017 does not contain the data of such sub-item. By deducting the items with data from the “total”, the total expenditure of R&D activities contracted-out by the business sector to “higher education institutions” and “others” was HK\$252.9 million (6.4%).

- 1.3.2 Among the business establishments “Having collaboration arrangements on R&D activities with other organizations”, the R&D activities are mainly contracted-out to local organizations in Hong Kong, accounting for about 50-80%. Among the non-Hong Kong establishments getting the collaboration arrangements, about 30-50% are organizations in the “Pearl River Delta (PRD) Economic Zone” and the “Guangdong-Hong Kong-Macao Greater Bay Area (other than Hong Kong)” (Table 1.4).

**Table 1.4 Distribution of Business Establishments having Undertaken R&D Activities from 2015 to 2019 by Whether having Collaboration Arrangements on R&D Activities with Other Organizations or Region in which the Collaborating Organization is Located**



Whether having collaboration arrangements on R&D activities with other organizations or region in which the collaborating organization is located <sup>10</sup>	2015	2016	2017	2018	2019
	Number of establishments <sup>11</sup>				
Having collaboration arrangements on R&D activities with other organizations	425 (10.9%)	622 (15.8%)	743 (17.9%)	955 (22.2%)	929 (20.8%)
Hong Kong	271 (63.8%)	377 (60.6%)	605 (81.4%)	496 (51.9%)	517 (55.7%)
The mainland of China and Macao					
• Guangdong-Hong Kong-Macao Greater Bay Area (other than Hong Kong) <sup>12</sup>	No such classification	No such classification	No such classification	No such classification	310 (33.3%)
• Pearl River Delta (PRD) Economic Zone <sup>13</sup>	119 (27.9%)	312 (50.2%)	326 (43.8%)	394 (41.2%)	No such classification
• Pan-PRD Region other than PRD Economic Zone and Hong Kong <sup>14</sup>	9 (2.2%)	190 (30.5%)	103 (13.8%)	9 (0.9%)	No such classification
• Other regions	82 (19.4%)	255 (41.0%)	120 (16.2%)	39 (4.0%)	100 (10.8%)
Places other than Hong Kong, Mainland China and Macao	98 (23.0%)	277 (44.5%)	264 (35.0%)	151 (15.8%)	162 (17.5%)
Having no collaborative R&D activity arrangements with other organizations	3,460 (89.1%)	3,321 (84.2%)	3,415 (82.1%)	3,357 (77.8%)	3,536 (79.2%)
Total	3,885 (100.0%)	3,942 (100.0%)	4,158 (100.0%)	4,312 (100.0%)	4,465 (100.0%)

Data Source: Census and Statistics Department, Hong Kong Innovation Activities Statistics 2015-2019)

<sup>10</sup> May involve more than one location..

<sup>11</sup> Figures include establishments with in-house R&D activities and establishments with R&D activities contracted out to other parties.

<sup>12</sup> The Guangdong-Hong Kong-Macao Greater Bay Area covers 9 cities in the Guangdong Province, namely Guangzhou, Shenzhen, Zhuhai, Foshan, Huizhou, Dongguan, Zhongshan, Jiangmen and Zhaoqing, as well as Hong Kong SAR and Macao SAR.

<sup>13</sup> The PRD Economic Zone covers urban area of 13 cities and counties (district) including Guangzhou, Shenzhen, Zhuhai, Foshan, Jiangmen, Dongguan, Zhongshan, Guizhou urban district, Hiding County, Boluo County, Zhaoqing urban district, Gaoyao and Sihui.

<sup>14</sup> The Pan-PRD Region covers 9 provinces/regions (including Fujian, Jiangxi, Hunan, Guangdong, Guangxi Zhuang Autonomous Region, Hainan, Sichuan, Guizhou and Yunnan) as well as Hong Kong and Macao Special Administrative Regions. Organizations in PRD Economic Zone and Hong Kong are excluded from this category in the table.

- 1.3.3 These data on the one hand reflect the close connection between Hong Kong and the Greater Bay Area in terms of collaborative R&D arrangements, while on the other hand also reflect that local organizations also have certain capabilities to support R&D in the business sector. To develop Hong Kong's technology and innovation industries, it is of course necessary to be closely integrated with the Greater Bay Area, but more importantly, Hong Kong must find a unique position which allows it to complement other cities in the Greater Bay Area by contributing a better synergy. In addition, when Hong Kong can develop its own unique positioning of technology and innovation industries, Hong Kong's young people will have more room and opportunities for local development.

## 1.4 Opportunities in the Greater Bay Area

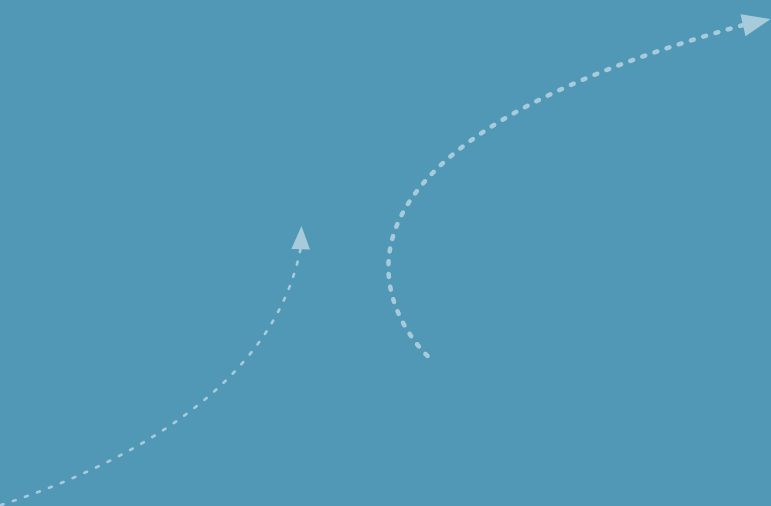
- 1.4.1 The Global Innovation Index 2020 pointed out that: "As long as innovation has existed, a central challenge facing innovators worldwide is the mobilization of stable and accessible financing mechanisms. Financing affects all stages of an innovation cycle, from ideation to commercialization, expansion, and, eventually, long-term business sustainability."
- 1.4.2 No one can ignore the importance of financial resources and investment in cultivating and developing technology and innovation industries. With aging population, strained international political relations, and increasing unilateralism, coupled with the COVID-19 pandemic that has swept across the world to catastrophic effect, the world economy is becoming increasingly unstable, and many economies are facing a dilemma: In addition to the need for technology and innovation to boost the economy, they also face the challenge to obtain the financial resources to invest in technology and innovation and enable them to achieve sustainable development, so as to become the driving force of long-term economic development and bring hope to the future.
- 1.4.3 For this reason, when considering how to develop technology and innovation industries, we must combine the strength of partner cities in the Greater Bay Area while taking a foothold in Hong Kong. The benefits of "Cooperation and Complementation" are obvious in terms of financial resources. In recent years, the Global Innovation Index has included the "Top 100 Science and Technology Clusters" in its report, highlighting the advantages of combining the strength of regional cities. Among others, the "Shenzhen-Hong Kong-Guangzhou" cluster ranks second<sup>15</sup>. Looking to the future, the "Shenzhen-Hong Kong-Guangzhou" cluster can consolidate the power of other cities in the Greater Bay Area to form a 56,000 square-kilometer city cluster with a population of more than 72 million, which will bring about limitless opportunities. The national policy has set the direction for the development of the Greater Bay Area. Hong Kong must timely seize this golden opportunity to inject new impetus into the economy and open up new horizons for young people.

<sup>15</sup> WIPO, "The Top 100 Science and Technology Clusters", Global Innovation Index 2020

## Chapter 2



# Current Status of Hong Kong's Technology and Innovation Industries





The government plays a vital role in improving the innovation capacity of the economy<sup>16</sup>. Empirical practice has proved that effective government policies are the foundation for fostering the development of a prosperous technology and innovation ecosystem. However, compared with many other advanced economies, Hong Kong started late in the fostering of technology and innovation industries. In this chapter, we will compare the innovation activities and performance among Hong Kong and other economies.

## 2.1 Global Snapshot: Comparison with Other Economies

**2.1.1 Selected economies and reason for the selection:** Selecting economies for comparison is a crucial step in benchmarking. Sweden, Finland, Singapore and Israel have excelled in technology and innovation, and are similar to Hong Kong in terms of the level of economic development and population. Therefore, these economies, together with Mainland China and Hong Kong, were selected for comparison. Benchmarking is carried out according to the following criteria:


- Ranking of knowledge and technological output competitiveness in the Global Innovation Index
- Gross domestic expenditure on research and development (GERD) as a percentage of Gross Domestic Product (GDP)
- Number of research and development personnel (per million people)
- Number of granted patent rights (per million people)
- Intellectual property income

<sup>16</sup> R. Richard Nelson (1993) *National Innovation Systems: a Comparative Analysis*, Oxford University Press



- 2.1.2 **Global R&D capabilities:** Knowledge and technology output competitiveness is the sixth pillar of the Global Innovation Index (Table 1.1), which reflects the impact of knowledge creation and innovation activities at the micro and macro economic levels, and the absorption of knowledge. Despite Hong Kong's encouraging overall ranking of 11 in the Global Innovation Index 2020, Hong Kong's ranking in terms of competitiveness in knowledge and technology output is still very low (Table 2.1), let alone its score in 2020 being the lowest in the past five years. This exposed Hong Kong's shortcomings in patents and the value generated by high-tech exports.

**Table 2.1 Ranking of Selected Economies in the Global Innovation Index in Terms of Their Knowledge and Technology Output Competitiveness from 2016 to 2020<sup>17</sup>**



	2016	2017	2018	2019	2020
Sweden	2	3	3	2	2
Israel	12	9	7	6	4
Finland	7	10	8	9	6
Mainland China	6	4	5	5	7
Singapore	10	11	11	11	14
Hong Kong	30	25	26	33	54

- 2.1.3 The gross domestic expenditure on research and development (GERD) as a percentage of GDP is an internationally recognized evaluation indicator that reflects the economy's scientific and technological R&D investment and technological competitiveness. On a global scale, the GERD as a percentage of GDP averages 2.27%<sup>18</sup>. Hong Kong's figure remains low, at less than 1%, well below the global average and other developed economies such as Israel (4.95%), Sweden (3.30%), Finland (2.77%), Mainland China (2.19%) and Singapore (1.60%) (Table 2.2).


- 2.1.4 In terms of R&D personnel, Hong Kong's research talent pool is relatively limited. In 2018, Hong Kong had 4,026 researchers per million people, which is much lower than the figures of comparable economies such as Sweden (7,536) and Finland (6,861) (Table 2.2). Hong Kong's excellent education system can train R&D personnel, but the market lacks career opportunities suitable for R&D personnel. This has caused difficulties in maintaining the development of research talents and led to a shortage of talents.

<sup>17</sup> WIPO, Global Innovation Index 2016-2020

<sup>18</sup> WorldBank, Research and development expenditure (% of GDP), <https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS>

- 2.1.5 From R&D to commercialization and to final market development, patent rights play an important role throughout the entire technological life cycle. In fact, the extent to which patent rights encourage innovation is difficult to measure with actual data<sup>19</sup>, but the number of patent rights can still indicate the ability of the economy to support the development of comprehensive and complex technology and innovation industries<sup>20</sup>. Global patent activity continues to increase, with active patents worldwide increasing by 6.7%, to 14 million in 2018<sup>21</sup>. However, Hong Kong's low R&D investment and insufficient supply of local R&D researchers have inevitably led to a scarce amount of research results. The number of patents granted in 2018 is far fewer than in other advanced economies (Table 2.2).
- 2.1.6 Intellectual property revenue highlights the value brought by the commercialization of innovation. Hong Kong's income from intellectual property rights is much lower than that of Sweden, Israel, Finland, Mainland China and Singapore (Table 2.2).

**Table 2.2 Ranking of Selected Economies in the Global Innovation Index 2020 and Data of Key R&D Indicators**

	Competitiveness of knowledge and technological output <sup>22</sup>	GERD as a percentage of GDP	Number of research and development personnel (Per million people)	Number of granted patent rights (Per million people)	Intellectual property income (US\$ billion)
	Ranking in 2020	2018 <sup>23</sup>	2018 <sup>24</sup>	2018 <sup>25,26,27</sup>	2019 <sup>28</sup>
Sweden	2	3.3%	7,536	E: 347.61 W: 434.68	8.25
Israel	4	4.95%	No data	E: 80.27 W: 83.53	1.58
Finland	6	2.77%	6,861	E: 279.76 W: 364.61	3.55
Mainland China	7	2.19%	1,307	E: 3.47 W: 248.40	6.60
Singapore	14	1.60%	6,803 <sup>29</sup>	E: 70.94 W: 55.33	8.47
Hong Kong	54	0.86%	4,026	E: 8.19 W: No data	0.74

<sup>19</sup> Nicol & Liddicoat (2012), *Do patents promote innovation*, The Conversation

<sup>20</sup> For more information, see Lehman, Lee & Xu, *What is the difference between an invention patent and a utility model patent?*

<sup>21</sup> WIPO (2018), *World Intellectual Property Indicators: Filings for Patents, Trademarks, Industrial Designs Reach New Records on Strength in China*

<sup>22</sup> WIPO, Global Innovation Index 2020

<sup>23</sup> WorldBank, Research and development expenditure (% of GDP), <https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS>

<sup>24</sup> WorldBank, Researchers in R&D (per million people), <https://data.worldbank.org/indicator/SP.POP.SCIE.RD.P6>

<sup>25</sup> WIPO, Statistical Country Profiles, [https://www.wipo.int/ipstats/en/statistics/country\\_profile/](https://www.wipo.int/ipstats/en/statistics/country_profile/)

<sup>26</sup> European Patent Office, Annual Report 2018, <https://www.epo.org/about-us/annual-reports-statistics/annual-report/2018.html>

<sup>27</sup> E represents the figure obtained by dividing the data from the European Patent Office by the population data of the World Bank database; W represents the figure obtained by dividing the data from the WIPO by the population data of the World Bank database.

<sup>28</sup> WorldBank, <https://data.worldbank.org/indicator/BX.GSR.ROYL.CD>

<sup>29</sup> In the World Bank database, Singapore only has data for 2017, so the data for 2017 is used here for comparison.



## 2.2 Comparison with Other Cities in the Greater Bay Area

2.2.1 **Selected cities and reasons for the selection:** In the past ten years, the Greater Bay Area (GBA) has developed into a world-class technology and business hub. The GBA is composed of 9 mainland cities in Guangdong Province, Hong Kong and Macao Special Administrative Regions, forming an innovative city cluster. In 2019, the Central Government of China issued the “Outline Development Plan for Guangdong-Hong Kong-Macao Greater Bay Area”, clarifying the new stage of social and economic integration in the GBA. In the past 25 years, Hong Kong has had the lowest annual GDP growth rate among the 11 cities in the GBA<sup>30</sup>. Analyzing the innovation environment and performance of cities in the GBA is of great significance to fostering the development of Hong Kong's technology and innovation industries. We selected the 5 fastest-growing cities for comparison, namely Guangzhou, Shenzhen, Zhuhai, Dongguan and Zhongshan. Benchmarking is carried out according to the following criteria:

- GERD as a percentage of GDP
- GERD
- Number of PCT international patent applications

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<sup>30</sup> CEIC data





- 2.2.2 In 2019, Shenzhen's GERD reached 132.828 billion CNY (Table 2.3), which is far ahead of all cities in the GBA and more than five times that of Hong Kong. Among the six cities, Hong Kong has the lowest GERD as a percentage of GDP, at 0.92%, which is much lower than the other five GBA cities<sup>31</sup> (Table 2.3).
- 2.2.3 The Patent Cooperation Treaty (PCT) international patent application is one of the indicators that can reflect the technology and innovation capabilities of an economy. In 2019, Shenzhen applied for 17,459 PCT international patent rights, making it one of China's most active technology and innovation cities, a number that is far ahead of other cities in the GBA. Hong Kong has only 500 PCT international patent applications, which is far behind Shenzhen, Dongguan and Guangzhou (Table 2.3).

**Table 2.3 Data on Key R&D Indicators of Cities in the GBA**

	GERD as a percentage of GDP	GERD (Hundreds of millions of CNY)	Number of PCT international patent applications
	2019 <sup>32,33</sup>	2019 <sup>34,35</sup>	2019 <sup>36,37</sup>
Shenzhen	4.93%	1,328.28	17,459
Zhuhai	3.15%	108.31	561
Dongguan	3.06%	289.96	3,268
Guangzhou	2.87%	677.74	1,622
Zhongshan	2.11%	65.37	192
Hong Kong	0.92%	237.20	429

<sup>31</sup> National Bureau of Statistics of China

<sup>32</sup> Department of Science and Technology of Guangdong Province, Guangdong Provincial Science and Technology Statistics Data <http://gdstc.gd.gov.cn/attachment/0/415/415545/3242355.pdf>

<sup>33</sup> <https://www.statista.com/statistics/632546/hong-kong-research-development-expenditure-ratio-to-gdp/>

<sup>34</sup> Department of Science and Technology of Guangdong Province, Guangdong Provincial Science and Technology Statistics Data <http://gdstc.gd.gov.cn/attachment/0/415/415544/3242348.pdf>

<sup>35</sup> <https://www.statista.com/statistics/632620/hong-kong-research-development-expenditure/>, Exchange rate 1:1.11 (2019)

<sup>36</sup> Department of Science and Technology of Guangdong Province, Guangdong Provincial Science and Technology Statistics Data <http://gdstc.gd.gov.cn/attachment/0/415/415544/3242348.pdf>

<sup>37</sup> WIPO, World Intellectual Property Indicators 2020, [https://www.wipo.int/edocs/pubdocs/en/wipo\\_pub\\_941\\_2020.pdf](https://www.wipo.int/edocs/pubdocs/en/wipo_pub_941_2020.pdf)

# Chapter 3



## Challenges for the Development of Hong Kong's Technology and Innovation Industries



Since the 1990s, Hong Kong has encountered many obstacles in developing a knowledge-based society and advancing technology and innovation. As a result, Hong Kong has fallen behind other developed economies in the region, and faces the risk of being marginalized<sup>38</sup>. Under the national policy of building the Guangdong-Hong Kong-Macao Greater Bay Area (GBA), Hong Kong should seize this opportunity to seek economic transformation by examining current pain points and making the best use of the advanced experience of Mainland China and the world. This chapter reviews the main factors hindering the development of Hong Kong's technology and innovation industries, including government, infrastructure, cultural and social domains, and explores the future development opportunities.

### 3.1 Government: Insufficient Investment in R&D, Incoherent Policies and Insufficient Coordination, Laissez-faire Economic Policies, and Lack of STEM-oriented Policies in the Education System

**3.1.1 Insufficient investment in R&D:** The Hong Kong government has long been criticized for its allocation and management of resources dedicated to technology and innovation. According to the Census and Statistics Department, Hong Kong spent HK\$24.5 billion (US\$3.14 billion) on R&D in 2018. In 2018, the GERD as a percentage of GDP was only 0.86%<sup>39</sup>. According to the latest World Bank data,<sup>40</sup> this figure lags far behind South Korea (4.81%), Japan (3.26%) and Mainland China (2.19%), and is much lower than the average 2.37% of the Organization for Economic Cooperation and Development (OECD) member economies.<sup>41</sup> Low public R&D investment has had its consequences: the lack of R&D investment inevitably limits the number of research results, which is clearly reflected in the number of patent applications. According to the WIPO, Hong Kong, amongst the more than 100 economies surveyed in 2019, only applied for 429 patents. This is in sharp contrast to the thousands or even tens of thousands of applications from economies such as Sweden, Finland, Singapore, and Israel, which have similar economic volume and populations. When compared with Mainland China, Hong Kong's applications represent less than 1%. As OECD experts Guellec and van Pottelsberghe (2001) pointed out, R&D performed in public sector, in particular the higher education sector, have a substantial impact on economic growth in the long run.<sup>42</sup> At the end of 2018, the Hong Kong government promised to increase its R&D expenditure to 1.5% of GDP before the five-year term of Ms Carrie Lam Cheng Yuet-ngor's current term of government expires. This shows that the Government has taken a substantial and hopeful step in the right direction to accelerate the development of Hong Kong's technology and innovation industries.

<sup>38</sup> Xingji, S. (2018, May 14). Hong Kong must 'innovate or die', new study warns. South China Morning Post. <https://www.scmp.com/news/hong-kong/hong-kong-economy/article/2146076/universities-warn-hong-kong-must-innovate-or-die>

<sup>39</sup> Table 207 : Research and development (R&D) expenditure by performing sector | Census and statistics department. (2019, December 23). Census and Statistics Department. <https://www.censtatd.gov.hk/hkstat/sub/sp120.jsp?ID=0&productType=8&tableID=207>

<sup>40</sup> The World Bank, Research and development expenditure (% of GDP), <https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS>

<sup>41</sup> OECD, OECD Main Science and Technology Indicators, 2019 data release, <https://www.oecd.org/sti/msti2019.pdf>

<sup>42</sup> OECD. (n.d.). R&D AND PRODUCTIVITY GROWTH: PANEL DATA ANALYSIS OF 16 OECD COUNTRIES. <https://www.oecd.org/economy/growth/1958639.pdf>

**Table 3.1 The Number of PCT International Applications that have Entered the National/Regional Level Published by the WIPO**



	2014 <sup>43</sup>	2015 <sup>44</sup>	2016 <sup>45</sup>	2017 <sup>46</sup>	2018 <sup>47</sup>	2019 <sup>48</sup>
Sweden	12,663	12,967	12,315	12,276	13,693	17,982
Finland	6,093	5,510	5,543	5,669	5,126	6,059
Singapore	2,581	2,605	2,880	2,941	2,830	2,693
Hong Kong	279	343	341	408	511	429
Israel	6,055	6,391	6,724	7,027	7,176	6,874
Mainland China	22,473	27,656	34,377	35,332	35,991	47,631

**3.1.2 Incoherent policies and insufficient coordination:** In terms of technology and innovation industries, Hong Kong has long lacked consistent leadership and coordination in terms of policies and funding. This can be traced back to before the handover in 1997. The Applied Research Fund (ARF) was established in 1993 as a government-owned venture capital. The initial asset value held was HK\$750 million (approximately US\$96 million)<sup>49</sup>. The ARF aims to foster R&D activities with local commercial potentials. However, due to the poor performance under the management of officials, its business was transferred to a private venture capital company in 1998. Although the government had tried to shut it down due to continuous high losses, its demise hardly attracted the attention of stakeholders. As of June 2004, the ARF had been listed as an important part of Hong Kong's innovation system in the consultation document of the Innovation and Technology Commission, but continued losses had forced the ARF to stop investing since March 2005<sup>50</sup>. Cases of poor innovation resource management are not rare. According to a report issued by Our Hong Kong Foundation at the end of 2018, the government's R&D funding mechanism is too fragmented, and the approval process is usually lengthy and inflexible<sup>51</sup>. The government has five agencies that are mainly responsible for approving and allocating funding,

<sup>43</sup> WIPO, Patent Cooperation Treaty Yearly Review 2018, [https://www.wipo.int/edocs/pubdocs/en/wipo\\_pub\\_901\\_2018.pdf](https://www.wipo.int/edocs/pubdocs/en/wipo_pub_901_2018.pdf)

<sup>44</sup> WIPO, Patent Cooperation Treaty Yearly Review 2018, [https://www.wipo.int/edocs/pubdocs/en/wipo\\_pub\\_901\\_2018.pdf](https://www.wipo.int/edocs/pubdocs/en/wipo_pub_901_2018.pdf)

<sup>45</sup> WIPO, Patent Cooperation Treaty Yearly Review 2020, [https://www.wipo.int/edocs/pubdocs/en/wipo\\_pub\\_901\\_2020.pdf](https://www.wipo.int/edocs/pubdocs/en/wipo_pub_901_2020.pdf)

<sup>46</sup> WIPO, Patent Cooperation Treaty Yearly Review 2020, [https://www.wipo.int/edocs/pubdocs/en/wipo\\_pub\\_901\\_2020.pdf](https://www.wipo.int/edocs/pubdocs/en/wipo_pub_901_2020.pdf)

<sup>47</sup> WIPO, Patent Cooperation Treaty Yearly Review 2020, [https://www.wipo.int/edocs/pubdocs/en/wipo\\_pub\\_901\\_2020.pdf](https://www.wipo.int/edocs/pubdocs/en/wipo_pub_901_2020.pdf)

<sup>48</sup> WIPO, World Intellectual Property Indicators 2020, [https://www.wipo.int/edocs/pubdocs/en/wipo\\_pub\\_941\\_2020.pdf](https://www.wipo.int/edocs/pubdocs/en/wipo_pub_941_2020.pdf)

<sup>49</sup> Hong Kong LEGCO. (n.d.). *Legislative Council Panel on Commerce and Industry The Applied Research Fund*. The Legislative Council of the Hong Kong Special Administrative Region. <https://www.legco.gov.hk/yr16-17/english/panels/ci/papers/cicb1-415-1-e.pdf>

<sup>50</sup> *Hong Kong journal*. (n.d.). Carnegie Endowment for International Peace. [https://carnegieendowment.org/hkjournal/archive/2007\\_winter/4.htm](https://carnegieendowment.org/hkjournal/archive/2007_winter/4.htm)

<sup>51</sup> OHKF. (2019, December 10). *OHKF innovation and technology research report initiates to unleash Hong Kong's potential as an international research and development powerhouse*. OUR HONG KONG FOUNDATION. <https://www.ourhkfoundation.org.hk/en/media/32/science-tech-innovation/ohkf-innovation-and-technology-research-report-initiates-unleash>

including the Innovation and Technology Commission (ITC), the Research Grants Council (RGC) of the University Grants Committee (UGC), and the Food and Health Bureau, etc. However, there is insufficient coordination among these agencies, which often leads to resource overlaps and policy mismatches. In addition, the average processing time required by the ITC to approve projects from its five research centers may take 158 to 222 days, which substantially limits the R&D efficiency of organizations and private companies.

**3.1.3 Laissez-faire economic policies:** Basically, the reasons for the lack of willingness to implement the above-mentioned policies and fund management can be attributed to a fundamental reason, that is, the government has adopted laissez-faire economic policies in the past to foster Hong Kong's economic development. Taking into account the colonial history of Hong Kong as a trading center<sup>52</sup>, coupled with the government's long-standing aversion to active intervention in market mechanisms, this laissez-faire and positive non-intervention policy has resulted in a poorly-developed innovation system. After the handover, the government played a passive role in fostering Hong Kong to become an international market participant. Therefore, the diversity and scope of Hong Kong's innovation system has been dwarfed by that of many other small economies<sup>53</sup>. Singapore, for example, has been actively fostering technology development well before 1990. Since then, Singapore has continuously improved its long-term strategic positioning to enhance the R&D image of Singapore companies. Hence, improving the level and mechanism of innovation governance is the key to the successful implementation of R&D policies.

<sup>52</sup> Innovation Policy and the Limits of Laissez-faire: Hong Kong's Policy in Comparative Perspective. Front Cover. Dr Douglas B. Fuller. Palgrave Macmillan, 2010

<sup>53</sup> Shih C., Chen SH. (2010) On Reform of Hong Kong's Public Research Funding System. In: Fuller D.B. (eds) Innovation Policy and the Limits of Laissez-faire. Palgrave Macmillan, London. [https://doi.org/10.1057/9780230304116\\_6](https://doi.org/10.1057/9780230304116_6)





- 3.1.4 **The education system lacks STEM-oriented policies:** In addition to research investment, education investment is also an important factor in promoting innovation and technological development. However, several indicators reflect that Hong Kong's education may not be able to provide the community with suitable talents. In response to the full implementation of the New Senior Secondary Curriculum ten years ago, the performance of Hong Kong students in science subjects has been declining since 2012. Under the new curriculum, secondary school students have greater flexibility in choosing elective subjects, and Liberal Studies is also offered as a compulsory subject to cultivate their global vision and thinking. However, it is worth noting that the number of students in all science-related elective courses under the New Senior Secondary Curriculum has dropped sharply.<sup>54</sup> According to the test results of the Program for International Student Abilities (PISA) in 2018, which compared the academic performance of 15-year-old students in 79 economies, Hong Kong was ranked fourth in reading and mathematics, lagging behind Mainland China, Singapore and Macao<sup>55</sup>. Hong Kong's past performance in science has always been excellent, but its performance has plummeted since 2015. The result in 2018 marked the first time Hong Kong has fallen to fourth place in reading and mathematics, two places down since 2015, while it remained ninth in science. The trends reflected in the figures are worrying. The report shows that only 7.8% of students in Hong Kong have the highest scientific abilities (levels 5 and 6), which is only slightly higher than the OECD average level (6.7%). This is even more alarming. Other economies in the region have performed relatively well in these subject areas. For example, the proportion of students with the highest scientific abilities in Macao is twice that of Hong Kong, and the proportions of students with the highest scientific abilities in Singapore and Mainland China are respectively three times and four times that of Hong Kong students. From another perspective, comparing the total number of students, if 100 students are randomly selected from various places, 57 students in Mainland China will have better scientific abilities than Hong Kong students. Singapore has 27 students outperforming Hong Kong students; Macao has 22<sup>56</sup>. In addition, according to a survey conducted by the Hong Kong Federation of Education Workers in 2017, respondents from the education sector believed that 83.8% of students did not have enough training and support in science, technology, engineering and mathematics (STEM); 63.6% of teachers replied that they had no confidence in teaching STEM subjects to students. Given that Hong Kong had a good record in providing world-class education in the past, the government should strengthen its support for students and teachers in providing quality STEM education in order to reserve more talent pools for Hong Kong's technology industry, as well as contribute to the long-term development of the technology and innovation industries.

<sup>54</sup> PISA results 2018: Latest rankings show Hong Kong down two places to fourth in reading and maths, remain ninth in science. (n.d.). Young Post. <https://www.scmp.com/yp/discover/news/hong-kong/article/3069444/pisa-results-2018-latest-rankings-show-hong-kong-down>

<sup>55</sup> The Standard. (n.d.). HK students falling behind. <https://www.thestandard.com.hk/section-news/fc/4/214561/HK-students-falling-behind>

<sup>56</sup> OUR HONG KONG FOUNDATION (17 April 2020), Hong Kong students are backward in science and technology and need to strengthen applied education, <https://www.ourhkfoundation.org.hk/en/insight/1264/education-and-youth/%E6%B8%AF%E7%94%9F%E7%A7%91%E6%8A%80%E8%90%BD%E5%BE%8C-%E5%BC%B7%E5%8C%96%E6%87%89%E7%94%A8%E6%95%99%E8%82%B2>



## 3.2 Infrastructure: Insufficient Land Supply, Relatively High Opportunity Cost of Innovative Development

- 3.2.1 **Insufficient land supply:** With rising rents, some technology and innovation industries and logistics/warehousing industries that require land and infrastructure resources will not be able to support their operations in Hong Kong. In such context, the government predicts in “Hong Kong 2030+” that, overall, the long-term demand for economic land will reach 457 hectares, including market-driven (200 hectares) and non-market-driven (257 hectares) demands for economic land/space. However, the land supply is only about 200 hectares<sup>57</sup>. This may have huge consequences, because the shortage of economic land will endanger the development of enterprises, investment opportunities for industrial renewal, and will hinder Hong Kong's transformation into an innovative economy. Specifically, due to the obvious shortage of land for economic activities, the current high rents and high prices are expected to deteriorate in the long term and further weaken Hong Kong's competitiveness. Due to the continuing shortage of economic land and high operating costs, emerging industries that usually require cheap office and production space, especially innovative technologies and start-ups, may not be able to fully develop in Hong Kong. This will damage the structural transformation of Hong Kong's economy and negatively affect social mobility and employment opportunities for young people.
- 3.2.2 **Relatively high opportunity cost of innovative development:** With the rapid development of real estate development and financial services, office rent, salaries, service fees and other related resource expenditures are getting increasingly higher, which poses a huge challenge to participants in Hong Kong's technology and innovation industries. Hong Kong, for example, is the city with the highest premium office rent for the fourth year running<sup>58</sup>, 60% higher than Midtown New York and 75% higher than London's West End. According to Deloitte<sup>59</sup>, 74% of corporate executives believe that high costs are the biggest challenge for running new business in Hong Kong. Compared with the convenient and low-cost transportation in Mainland China, the cost of starting business in Hong Kong is still high. A noteworthy industry model is that most R&D companies will only setup their sales and communications offices in Hong Kong and transfer their research, testing, and manufacturing facilities to nearby economies to enjoy significant cost savings. For example, Hong Kong is now the world's second largest biotechnology financing center, but due to the high cost of developing emerging technologies in Hong Kong, only 15% of respondents in the Deloitte report believe that Hong Kong's biotechnology ecosystem is ideal for start-ups to innovate.

<sup>57</sup> Hong Kong SAR Government. (2018). Hong Kong 2030+. *Hong Kong 2030+*. [https://www.hk2030plus.hk/document/Consolidated%20Land%20Requirement%20and%20Supply%20Analysis\\_Eng.pdf](https://www.hk2030plus.hk/document/Consolidated%20Land%20Requirement%20and%20Supply%20Analysis_Eng.pdf)

<sup>58</sup> <https://www.joneslanglasalle.com.cn/en/newsroom/hong-kongs-central-tops-list-of-worlds-most-expensive-office-markets>

<sup>59</sup> *Empowering Innovation in Hong Kong*. (2019). Deloitte. <https://www2.deloitte.com/content/dam/Deloitte/cn/Documents/technology-media-telecommunications/tf/deloitte-cn-tmt-tf20-hongkong-2019-report-en-191107.pdf>

### 3.3 Culture: Insufficient Motivation for the Development of Technology and Innovation in the Private Market

- 3.3.1 **Insufficient motivation for the development of technology and innovation in the private market:** The private sector's support for innovation is one of the basic factors for accelerating technological development. However, Hong Kong's research results are mainly dominated by universities and other institutions, while industry-led R&D is rare. Survey results show that among its 10 peer cities, including Singapore, Beijing, Shenzhen, and Tokyo, Hong Kong was ranked second to last in terms of availability of private funding<sup>60</sup>, talents and pilot tests, and ninth in the Start-up Index, which measures the quality of Asia's entrepreneurial environment. Similarly, according to the study from Microsoft-IDC, only 55% of business decision-makers in Hong Kong regard innovation as an "essential" condition for improving business resilience<sup>61</sup>. Hong Kong companies have always been interested in growth and development. Unfortunately, private companies have a weak motivation to pursue cross-industry innovation. To make matters worse, under the influence of the 2019 Novel Coronavirus Disease (COVID-19), almost half of companies (48%) predict that their business models will lose competitiveness within five years<sup>62</sup>. The Hong Kong Investment Program of Alibaba Entrepreneurs Fund established a HK\$1 billion fund to invest in promising local start-ups. This is an encouraging start, and also reflects that Hong Kong has the potential to develop technology and innovation industries. The government should reassess and consider how to provide private companies with greater incentives to promote Hong Kong's technology and innovation industry culture.

<sup>60</sup> Deng, I. (2018, December 17). *Hong Kong start-UPS stymied by lack of innovation culture, survey finds*. South China Morning Post. <https://www.scmp.com/tech/start-ups/article/2178313/hong-kong-needs-cultural-change-if-its-catch-regional-tech-peers>

<sup>61</sup> Asia News Center. (2020, September 10). *A culture of innovation fuels business resilience and economic recovery*. <https://news.microsoft.com/apac/2020/09/10/a-culture-of-innovation-fuels-business-resilience-and-economic-recovery/>

<sup>62</sup> *Building Hong Kong as a global innovation hub – China business knowledge*. (2020, September 2). China Business Knowledge. <https://cbk.bschoo.cuhk.edu.hk/building-hong-kong-as-a-global-innovation-hub/>



### 3.4 Society: Conservative Attitudes Towards Technology and Innovation, Livelihood Issues, Political Chaos and Economic Recession

**3.4.1 Conservative attitudes towards technology and innovation:** Hong Kong has a sound financial system, a free and open economic system, a sound legal system, and the free flow of capital and information. These are all recognized advantages of Hong Kong. According to the University Grants Committee (UGC), the number of undergraduates studying science, technology, engineering and mathematics (STEM) subjects has been around 30% of the total for the past three years. If postgraduate (Master or PhD) figures are counted, around 55% of students studied STEM in the 2018-2019 academic year<sup>63</sup>. These figures represent the talent pool provided by local academic organizations for technology and innovation. However, the main problem is that STEM graduates may not be able to work in related fields after graduation. In addition to the plight and uncoordinated development of Hong Kong's R&D industries mentioned above, local graduates generally believe that compared with other strong economic pillar industries, there are fewer employment opportunities and low financial security for work in the science and technology field. Due to the general aversion of risk in society and imperfect talent system in frontier fields, Hong Kong graduates are more concentrated in financial services, real estate or trade-related fields when choosing jobs. Parental expectations and high living costs often prompt potential student entrepreneurs to move to careers with certain income security, such as banking or medicine. This has prompted Hong Kong's STEM graduates to hold a conservative attitude, and outstanding students with engineering and scientific training backgrounds are more inclined to apply for banking, professional legal services and management jobs. As Hong Kong's current technology and innovation industries fail to attract local graduates to build Hong Kong's talent pool and innovation ecosystem, those who aspire to work in science and technology will seek career opportunities outside Hong Kong.

**3.4.2 Livelihood issues:** According to the Hong Kong Poverty Situation Report 2019, the working poor population in Hong Kong comprises 501,900 people (more than 154,200 households).<sup>64</sup> With the increase of the poor population in Hong Kong, local talents are more inclined to accept high-paying jobs in banking and finance industries to improve their living standard, rather than jobs in technology and innovation that match their interests. In addition, some technology and innovation industries require job-seekers to obtain a master's degree or even a doctorate degree due to their high-tech nature. In this case, students will have to bear higher learning and living expenses, and may eventually give up the opportunity to pursue a career in technology and innovation. Although the government has established a Continuing Education Fund, the participation rate of continuing education in Hong Kong has been relatively low for many years. According to a survey conducted by the Census and Statistics Department in 2018, out of 3,689,100 economically active people, only 20.4% had participated in work-related training/retraining courses arranged by the employer and/or on their own within the 12 months before the survey.<sup>65</sup> As socio-economic issues are in crisis due to the impact of COVID-19, this will cause more instability in government governance and affect the coordination and implementation of technology and innovation industries related policies.

<sup>63</sup> *Revitalizing Hong Kong Economy*. (2019). PwC HK: PricewaterhouseCoopers Hong Kong. [https://www.pwchk.com/en/tax/publications/revitalising-hong-kong-economy\\_en.pdf](https://www.pwchk.com/en/tax/publications/revitalising-hong-kong-economy_en.pdf)

<sup>64</sup> The Government of the Hong Kong Special Administrative Region, the Hong Kong Poverty Situation Report 2019, [https://www.povertyrelief.gov.hk/chi/pdf/Hong\\_Kong\\_Poverty\\_Situation\\_Report\\_2019.pdf](https://www.povertyrelief.gov.hk/chi/pdf/Hong_Kong_Poverty_Situation_Report_2019.pdf)

<sup>65</sup> The Research Office of the Legislative Council Secretariat of the Hong Kong Special Administrative Region, Cultivate Local Talents, <https://www.legco.gov.hk/research-publications/chinese/1920rb03-nurturing-of-local-talent-20200601-c.pdf>

**3.4.3 Political chaos and economic recession:** Beginning in June 2019, a series of protests and social unrest led to conflict and violence that attracted global attention to Hong Kong, which led to a severe economic recession and hindered industrial activities. Due to social incidents, certain pillar industries such as retail, catering and tourism have been severely hit. Various large and successful events held in Hong Kong in the past have been postponed or cancelled, including the National Day Fireworks Display, the Hong Kong Tennis Open, the Hong Kong Food and Wine Tour and the Hong Kong Formula E-Prix, etc. This was followed by the global outbreak of COVID-2019, the closure of passes in 2020 and external uncertainties, which resulted in a 3.4% decline in the economy in Q3 2020 compared to the previous year, marking the fifth consecutive recession in a quarter.<sup>66</sup> This not only brought difficulties for start-ups starting business in Hong Kong, but also affected the business of industry leaders and corporate groups. Compiled by the Hong Kong Productivity Council (HKPC) in September 2020, the Standard Chartered Hong Kong SME Leading Business Index, sponsored by Standard Chartered Bank (Hong Kong), fell to 31.4 in Q4 2020, the lowest level since the index was first published in Q3 2012<sup>67</sup>. Although the government has launched three rounds of economic stimulus funds of HK\$22.5 billion from Q2 2020 to alleviate corporate operating conditions and reduce the risk of large-scale unemployment and recession, Hong Kong's economy has not shown any positive signs, and both businesses and citizens are focusing on reducing operating and living costs. In view of the difficult conditions of the political and economic environment, Hong Kong needs to work hard to develop the new economic growth area of technology and innovation industries and create a friendly innovation environment, so that the society can regain new impetus.

<sup>66</sup> *Gross Domestic Product and its major components, Hong Kong Economic Situation*. (n.d.). Hong Kong SAR Government. <https://www.hkeconomy.gov.hk/en/situation/development/index>.

<sup>67</sup> *HK small businesses struggle amid social unrest*. (n.d.). chinadailyhk. <https://www.chinadailyhk.com/articles/246/212/67/1571939419508.html>





# Chapter 4



Youthquake

and

Quarter-Life Crisis





## 4.1 Millennium Generation: The Growing Cornerstone

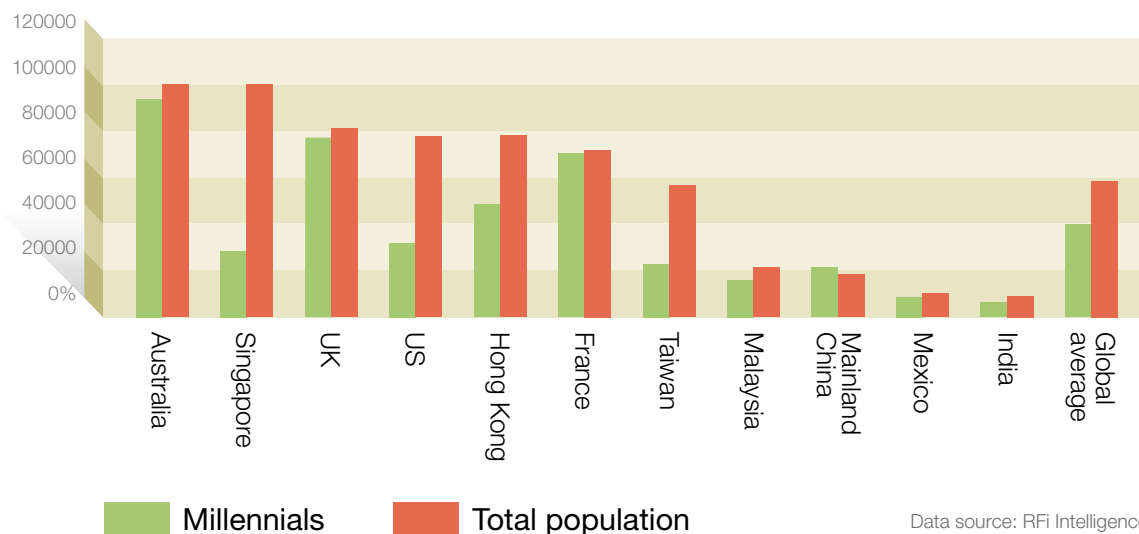
- 4.1.1 Millennials born between 1981 and 2000 (that is, around the age of 20 to 40) has become the largest demographic group on the planet and represents one in three people among the total populations of the world<sup>68</sup>. Given the specific social, political and technical background that have accompanied this generation, and the change that may bring by this generation, the word Youthquake which stands for “a significant cultural, political or social change arising from the actions or influence of young people” has become Oxford Dictionaries’ “Word of the Year 2017”<sup>69</sup>.
- 4.1.2 Average Economic Value (AEV) is a measure of economic capability, which refers to the total balance value of both funds in deposits and outstanding debts held with financial institutions, expressed in U.S. dollars<sup>70</sup>. Figure 4.1 lists the survey results of selected Asian, American and European economies. Overall, relative to the AEV of the entire population across all age groups, the AEV of millennials has reached 70%, which means that they are already a valuable group. In Hong Kong, this figure is 62%, which is below the world average. In this survey, there is only one economy whose AEV of millennials has surpassed the AEV of the entire population, that is Mainland China, which has reached 118.8%. This may be due to the rapid development of the technology and innovation industries in Mainland China and the strong support of the Chinese government for innovative enterprises.

<sup>68</sup> According to data from the US Census Bureau in January 2018.

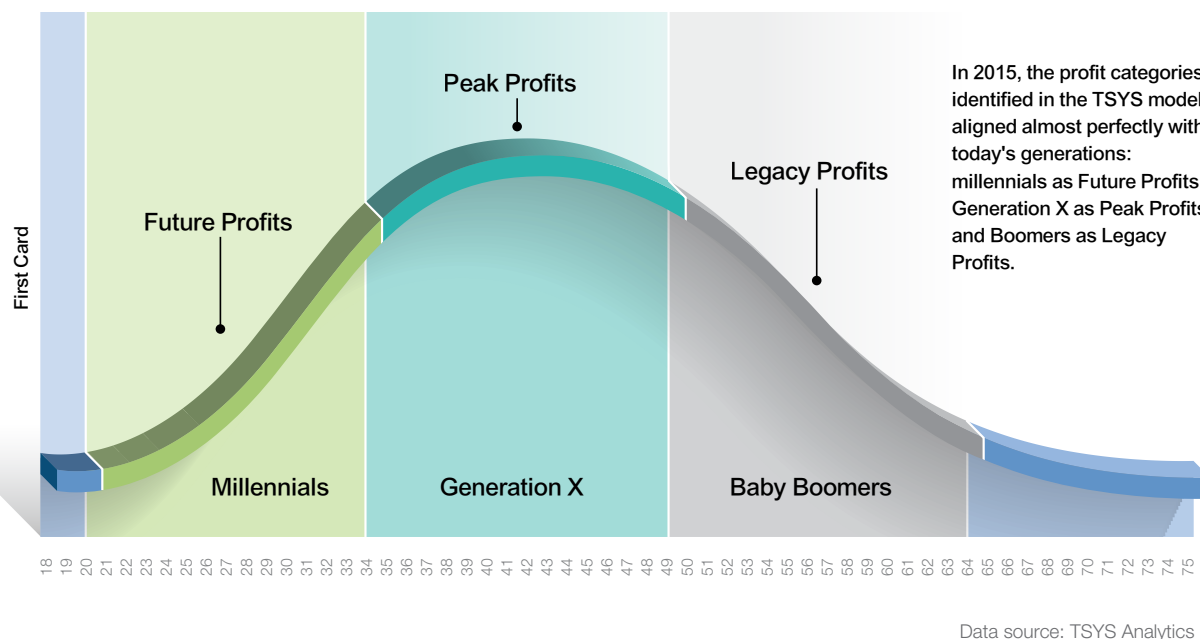
<sup>69</sup> Oxford Dictionary (2017), “Word of the year 2017 is ....”

<sup>70</sup> Rocky Scopelliti (2018) *Youthquake 4.0: A Whole Generation and The New Industrial Revolution*, Marshall Cavendish Business

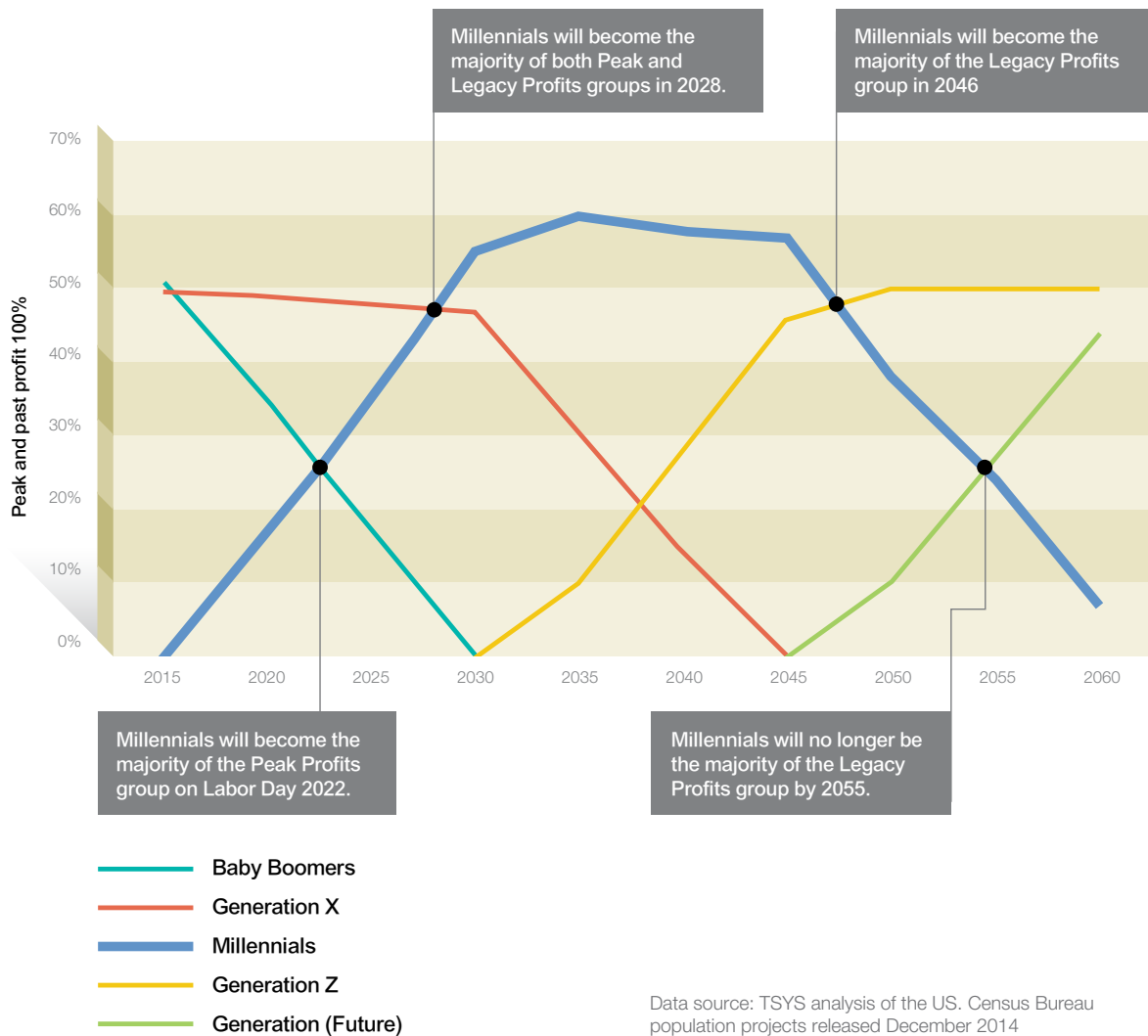


**Figure 4.1 Average Economic Value - Millennials vs. Total Population (USD)**

4.1.3 Figure 4.2 and Figure 4.3 show that between now and 2047, millennials will replace Generation X and become the backbone of economic activities. 2047 happens to be the last year of Hong Kong's current "One Country, Two Systems" scheme. Hence, this report will pay more attention to millennials.

**Figure 4.2 TSYS Portfolio Profitability Model, 2015<sup>71</sup>**

<sup>71</sup> ROLFE Alex, *Strategies and insight for banks looking to engage millennials*, Mobile Payments World, 2016-07-20, <https://www.mobilepaymentsworld.com/strategies-insight-banks-looking-engage-millennials/>

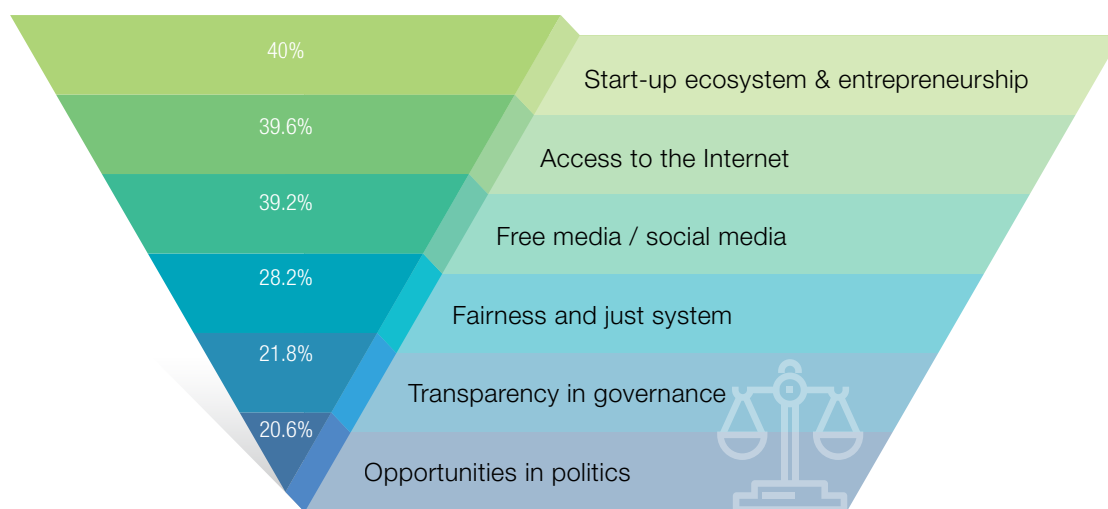
Figure 4.3 Peak and Legacy Profits Population Over Time (By Generation %) <sup>72</sup>

<sup>72</sup> ROLFE Alex, *Strategies and insight for banks looking to engage millennials*, Mobile Payments World, 2016-07-20, <https://www.mobilepaymentsworld.com/strategies-insight-banks-looking-engage-millennials/> Accessed on 06/10/2020

## 4.2 Portraits of Millennials

- 4.2.1 Millennials were born and grew up in the era of digital revolution that began in the 1980s. They have developed into the most educated, diverse, media-baptized and connected generation. They are now shaping the 21st century, and will propel the Fourth Industrial Revolution by sparking the next technological boom <sup>73</sup>.
- 4.2.2 According to the survey, most young people are optimistic about the impact of technology and innovation: 78.6% of people believe that technology is “creating jobs” rather than “destroying jobs” (21.4%) <sup>74</sup>.
- 4.2.3 The Third Industrial Revolution has enabled millennials universal access to the Internet, which provides them with a new and decentralized way to express their values, creativity and entrepreneurship. According to the survey, “What are the most important factors contributing to youth empowerment in your country?”, the World Economic Forum (WEF) got the following results (Figure 4.4):

**Figure 4.4 What are the Most Important Factors Contributing to Youth Empowerment in Your Country? (N = 22,493) <sup>75</sup>**



Data source: World Economic Forum

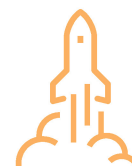
<sup>73</sup> Rocky Scopelliti (2018) *Youthquake 4.0: A Whole Generation and The New Industrial Revolution*, Marshall Cavendish Business

<sup>74</sup> QRIUS *This is what millennials want in 2018* <https://qrius.com/millennials-want-2018/> Accessed on 06/10/2020

<sup>75</sup> Source from the World Economic Forum

- 4.2.4 Millennials has become more engaged with the world around them, and more socially conscious, economically considered and environmentally informed as a result of decentralization. An entrepreneurial sprite, the Internet, the free and social media, are three pillars of empowerment. The Internet has empowered both themselves and others to link instantly to the world around them.
- 4.2.5 Research reports show that millennials are deeply affected by social injustices. They believe that the status quo should be challenged. Millennials use their careers as an extension of their personal values and ideals. They tend to work in an environment that produces positive changes in society, and their attitude towards business is the same. Millennials see work as part of their lives, rather than separate from their lives. This is closely related to millennials' self-determination. What millennials pursue is not a work-life balance, but work-life integration.
- 4.2.6 According to a survey by the World Economic Forum, the sense of purpose / impact on society is the second most important criteria right after salary / financial compensation <sup>76</sup>. This may explain why millennials have been attracted to emerging organizations that have a transformational purpose when choosing employers. Table 4.1 lists some of these organizations <sup>77</sup>:

**Table 4.1 Examples of Transformational Emerging Organizations**



Organizations	Massive transformational purpose
Google	"Organize the world's information"
Singularity University	"Positively impact one billion population"
Uber	"To make transportation as reliable as running water, everywhere for everyone"
Ant Group	"To collaborate with local partners through technology transfer, to make service more accessible"
Amazon	"To be earth's most customer-centric company, where customers can find and discover the lowest prices"

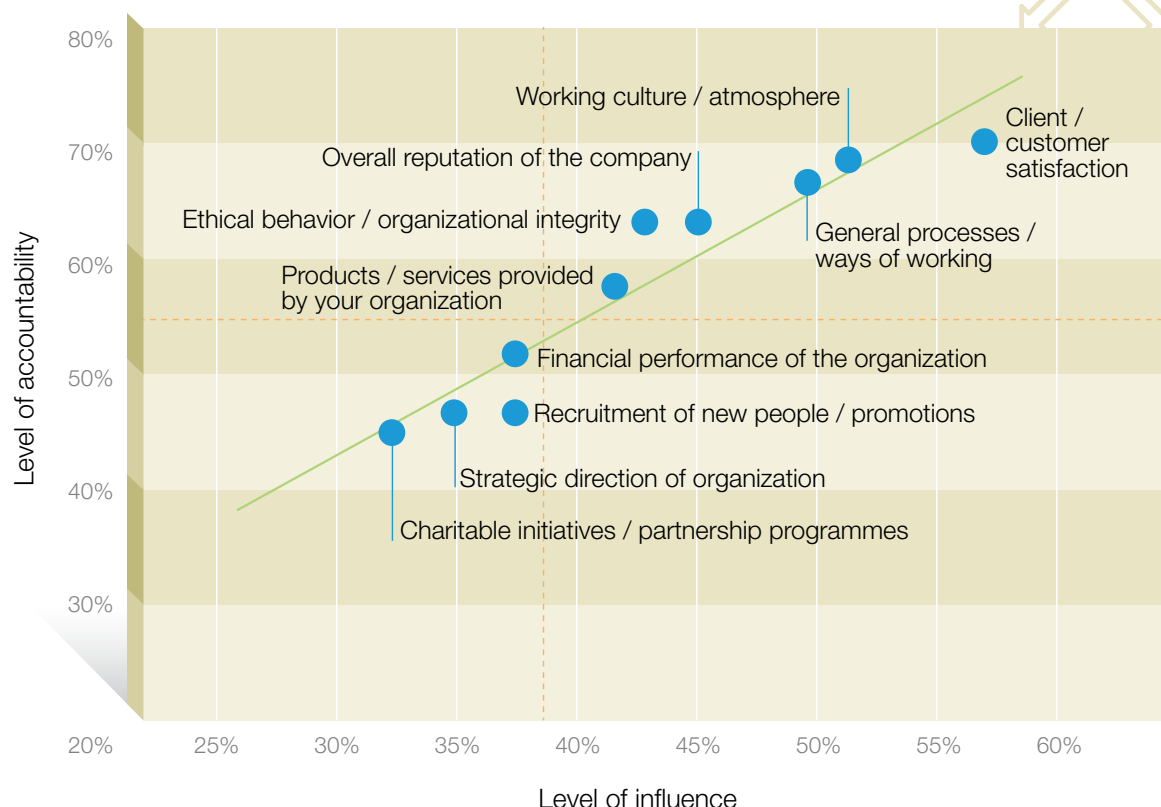
<sup>76</sup> World Economic Forum, *Global Shapers Survey 2017*

<sup>77</sup> Rocky Scopelliti (2018) *Youthquake 4.0: A Whole Generation and The New Industrial Revolution*, Marshall Cavendish Business



4.2.7 In the meantime, millennials believe that their influence on the strategic direction of the organization and charitable initiatives is negligible (Figure 4.5), and that may explain why they regard the start-up ecosystem and entrepreneurship as the most important means of empowerment. That can also explain why millennials have been attracted by the start-up community and technology organizations. In developed economies, about 54% of millennials have started or plan to start their own business, while 27% have already been self-employed <sup>78</sup>.

**Figure 4.5 Millennials' Perception of Influence and Responsibility** <sup>79</sup>



4.2.8 Given the outstanding characteristics of millennials, they have become target by government in more and more countries and regions. The Global Talent Competitiveness Index (GTCI) found that countries are competing globally to grow better talents, attract the talents they need, and retain those who contribute to competitiveness, innovation and growth. The top ten countries are Switzerland, Singapore, the United States, Norway, Sweden, Finland, Denmark, the United Kingdom, the Netherlands and Luxembourg. The top ten cities are Zurich, Stockholm, Oslo, Copenhagen, Helsinki, Washington D.C., Dublin, San Francisco, Paris and Brussels <sup>80</sup>. While encouraging young people to go to Shenzhen for development, Hong Kong should also cultivate and attract outstanding talents.

<sup>78</sup> Deloitte (2017) *Millennials and wealthy Management. Trends and challenges of the new clientele.*

<sup>79</sup> Source: <https://www2.deloitte.com/lu/en/pages/about-deloitte/articles/millennial-survey-making-impact-through-employers.html>

<sup>80</sup> Global Talent Competitiveness Index (2018) "Talent diversity to fuel the future of work".

## 4.3 Quarter-Life Crisis

4.3.1 The quarter-life crisis is a crisis “involving anxiety over the direction and quality of one’s life” which is most commonly experienced in a period ranging from a person’s early twenties up to their mid-thirties<sup>81</sup>.

4.3.2 According to a study involving 2,000 British Millennials, 60% have suffered from quarter-life crisis, 53% have struggled to cope with financial pressure, 26% have faced career problems, 22% have difficulties in purchasing a property, and 25% are troubled by finding satisfactory relationships<sup>82</sup>. According to the study, it takes an average of six months for millennials to recover from the crisis. However, as Dr. Robinson pointed out in the report, “there were two sides to a quarter-life crisis ..... They’re often feared as periods of difficulty and distress, but in my experience, they can also be times of openness, curiosity and growth.”

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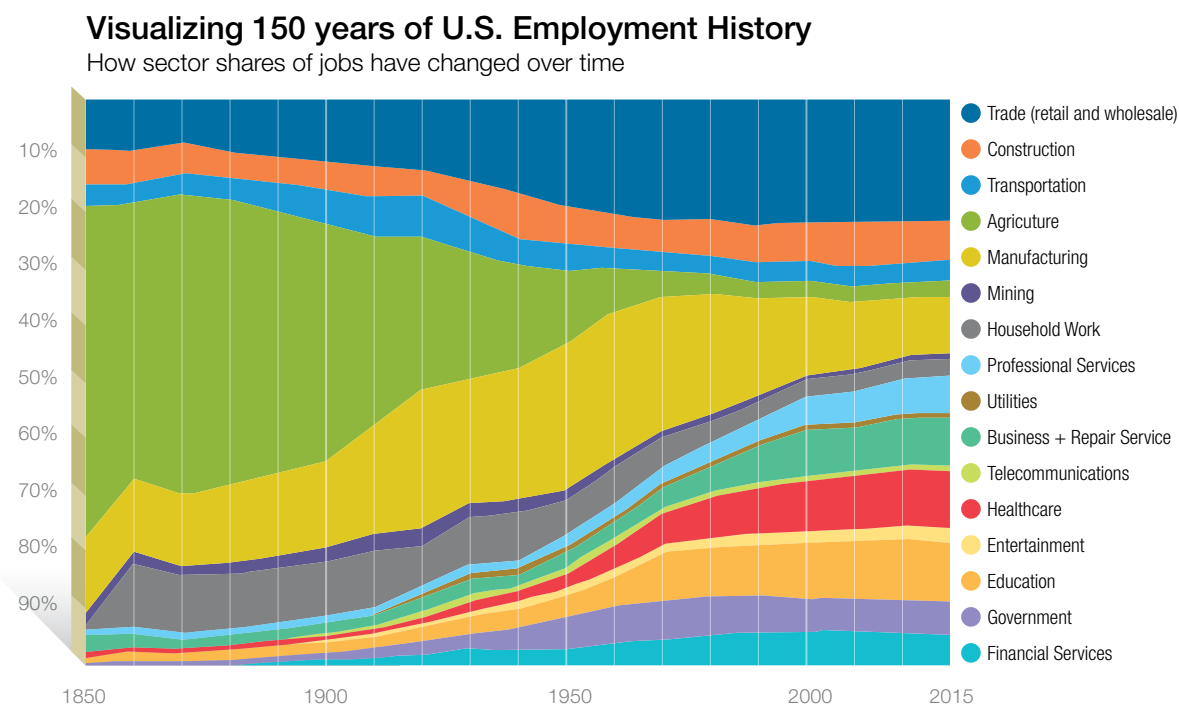
<sup>81</sup> [https://en.wikipedia.org/wiki/Quarter-life\\_crisis](https://en.wikipedia.org/wiki/Quarter-life_crisis)

<sup>82</sup> The Independent (March 2018). “More than half of Millennials are having a “quarter-life crises” as they worry about being successful”.



- 4.3.3 From 1850 to 2015, the most significant change during the 165 years included decline in the importance of agriculture, manufacturing and mining although other industries grew during the same period (Figure 4.6). History shows that the labor market will adapt to changes in labor demand brought about by disruptive technological progress. According to McKinsey, by 2030, 8-9% of labor demand will be from occupations that have never existed before.

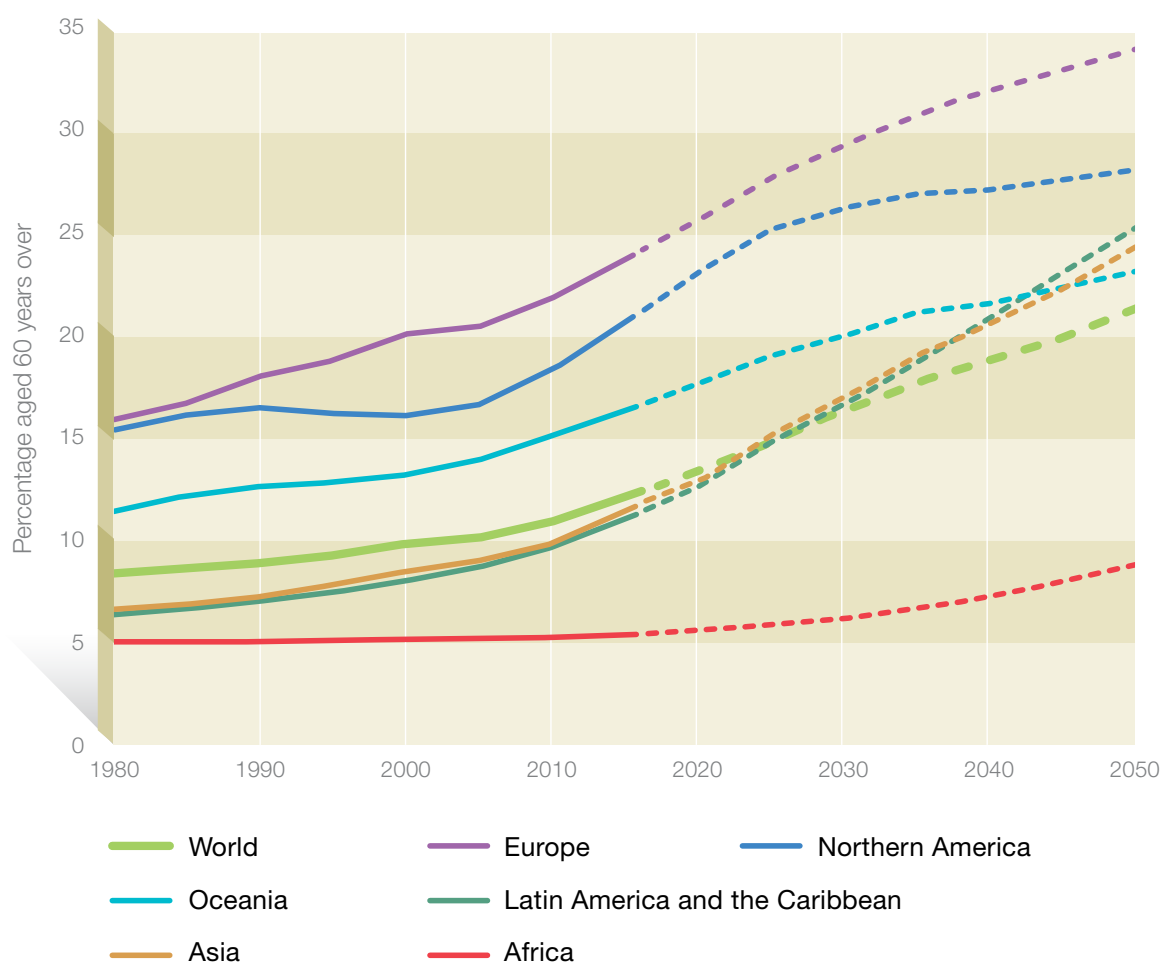
**Figure 4.6 Evolution of the Employment Structure in the United States (1850-2015)** <sup>83</sup>



- 4.3.4 Human life expectancy increases by 2 years every 10 years, while company life expectancy is rapidly decreasing. In the 1920s, Fortune 500 companies had a lifespan of 60 years, but now this is only 10 years. In the next 10 years, 40% of Fortune 500 companies will no longer exist.

<sup>83</sup> Source: <https://www.visualcapitalist.com/visualizing-150-years-of-u-s-employment-history/>

**Figure 4.7 Percentage of Population Aged 60 Years or Over for the World and Regions, 1980-2050** <sup>84</sup>



4.3.5 Exploration during adolescence (finding one's own interests), then becoming an independent producer (creating jobs through entrepreneurship rather than finding jobs), then creating a combination of identities (portfolio people) can summarize how this generation adapts to changes in society and can reinvent themselves.

4.3.6 Alter conducted a comprehensive study about millennials in the US. According to the study, in addition to climate change which has been the most concerned issue by the millennium worldwide according to survey by the World Economic Forum, millennials in the US has three following concerns <sup>85</sup>.

<sup>84</sup> Source: United Nations (2015). World Population Prospects: The 2015 Revision.

<sup>85</sup> Alter, C. (2020) *The Ones We've Been Waiting for: How a New Generation of Leaders will Transform America*, Viking.

- 4.3.7 The first is high tuition debt. Due to the rapid growth of tuition fees and the means of paying tuition fees through debt, student loans carried by millennials are almost four times that of their parents. The total debt burden of the American students has reached US\$1.6 trillion, with most of which being owed by the younger generation<sup>86</sup>. The average student loan debt in the United States in 2016 was US\$37,000 per person<sup>87</sup>. It is said that the younger generation spends 18 years preparing for the increasingly competitive university admissions, then spends the rest of their lives to pay off the debts.
- 4.3.8 The second is poor financial situations. According to a study<sup>88</sup>, the wealth of millennial-led households is 34% less than that of the older generation at the same age. In 1990, when the median age of the baby boomers was 35, this generation already owned more than 20% of the wealth of the United States. When Generation X reached the median age of 35 in 2008, their accumulated wealth was less than 10% of the American wealth. Although millennials in the United States have not yet reached 35 on average in 2018, their wealth accounts for only 3% of the wealth of the United States<sup>89</sup>. As a result, compared with previous generations, it is difficult for this generation to own a house or car.
- 4.3.9 The third is insufficient medical insurance. In the past two decades, the employment market has undergone tremendous changes. When millennials look for work, they are usually in the Gig Economy, which means irregular working hours and no benefits. Between 1989 and 2011, the proportion of graduates covered by health insurance provided by employers was halved.
- 4.3.10 Because of the above three concerns, the American millennials tend to support government-run health care, student debt relief, affordable housing, and government's urgent action on climate change. They advocate democratic socialism to a certain extent<sup>90</sup>, shifting from the requirements for production and consumption to the requirements for sharing and caring<sup>91</sup>.
- 4.3.11 "Young people now are more socially liberal than young people in the past. Their views on key values such as concerns over the climate emergency, support for investment in public services rather than privatization are fundamental values that will stay with people into later life."<sup>92</sup>

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<sup>86</sup> Schwab, K. (2020), "The World We Leave Them", *Time*, 3 January, pp. 44-45.

<sup>87</sup> Rocky Scopelliti (2018) *Youthquake 4.0: A Whole Generation and The New Industrial Revolution*, Marshall Cavendish Business

<sup>88</sup> Alter, C. (2020) "Youthquake: American politics is still defined by the values and priorities of baby boomers. But not for long", *Time*, January 3, pp.34-39.

<sup>89</sup> Schwab, K. (2020), "The World We Leave Them", *Time*, 3 January, pp. 44-45.

<sup>90</sup> Alter, C. 2020 "Youthquake: American politics is still defined by the values and priorities of baby boomers. But not for long", *Time*, January 3, pp.34-39.

<sup>91</sup> Schwab, K. (2020), "The World We Leave Them", *Time*, 3 January, pp. 44-45.

<sup>92</sup> Baker, A (2020), "Global Youth in Revolt", *Time*, 3 January, pp. 42-43.

## 4.4 Facing the Future

- 4.4.1 There is no reason to feel pessimistic. Many companies are rethinking their role in society. In August 2019, the CEOs of more than 180 leading companies in the United States signed the Business Roundtable's new statement of corporate purpose, committing to creating economic opportunity for all of their stakeholders: customers, employees, suppliers, communities and shareholders<sup>93</sup>.
- 4.4.2 For example, JPMorgan Chase invested US\$200 million in Detroit, where it has been in business for more than 85 years. As a result of their efforts, the city has created small businesses, good job opportunities and affordable housing. Other examples include United Technologies, which invested US\$1.3 billion through its Employee Scholar Program and helped workers earn more than 40,200 degrees.
- 4.4.3 In Hong Kong, we have seen many young people face the same youthquakes and quarter-life crises. The difficulties of upward mobility, financial pressure, etc. have also tormented millennials in Hong Kong. If Hong Kong's millennials lose their hope for the future for various reasons, it is definitely not a good thing for Hong Kong's future.
- 4.4.4 The experience and research of the international community reminds us that although Hong Kong's millennials face drastic challenges, the social issues can be solved if the government, corporation and the society can move forward with a pragmatic approach. For example, when JPMorgan Chase decided to move its Asia Pacific headquarters from Central to Kwun Tong, it conducted an in-depth study on the local community in Kwun Tong. Kwun Tong is one of the most polarized districts in Hong Kong. Located on the south side of Kwun Tong MTR station is the newly built central business district (CBD), and the north side of Kwun Tong MTR station is one of the most disadvantaged groups in Hong Kong. The study provided many constructive suggestions for how JPMorgan Chase can provide appropriate support to the disadvantaged groups in Kwun Tong<sup>94</sup>.
- 4.4.5 "The future promise of any nation can be directly measured by the present prospects of its youth<sup>95</sup>." Governments, companies, and society are all responsible for paving the way for the younger generation (especially millennials) so that they can fully develop themselves. A well-developed Millennium Generation will bring prosperity to society. Innovation and technology should be one of the ways to lead millennials towards a bright future.

<sup>93</sup> Dimon, J. (2020), "How to Save Capitalism", *Time*, 3 January, pp. 56.

<sup>94</sup> MIT Hong Kong Innovation Node (2020), *Kowloon East: Inclusive Innovation & Growth*.

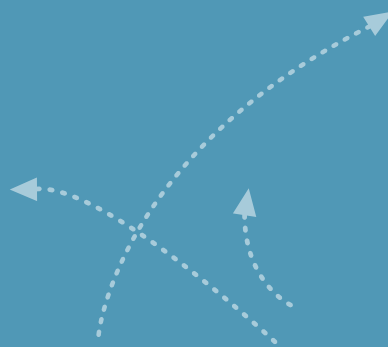
<sup>95</sup> John E. Kennedy, 35th President of the United States.



# Chapter 5



## Upward Social Mobility



## 5.1 The Impact of Technology and Innovation on Social Mobility

- 5.1.1 Before analyzing how technology and innovation would affect social mobility, we should first introduce the concept of social mobility.
- 5.1.2 Social mobility refers to one's movement through the social hierarchical ladder<sup>96</sup>. According to the World Economic Forum, social mobility includes two dimensions: intragenerational, which measures an individual's movement between socio-economic classes; and intergenerational, which measures a family group's movement between the classes, in the span of at least one generation. In order to make quantitative and tangible measurement, this can be sub-divided into income mobility, education mobility and occupational mobility. Mobility can also be directional, such as upward, which is the desired outcome the government expects. The following table shows the explanation of the aforementioned terms:



**Table 5.1 Different Types of Social Mobility**

Intragenerational mobility	The ability for an individual to move between socio-economic classes within their own lifetime <sup>97</sup> . For example, if individuals in poverty succeed in reaching middle-class income levels by obtaining high-paying jobs, this is considered an example of intragenerational mobility.
Intergenerational mobility	The ability of a family group to move up or down the socio-economic ladder across the span of one or more generations <sup>98</sup> . For example, if the son has more income than his parents, this is an example of inter-generational mobility.
Income mobility	It means moving across different income class <sup>99</sup> .
Education mobility	It means the change in educational attainment <sup>100</sup> .
Occupational mobility	It means moving across different occupations, which is a proxy of socio-economic class <sup>101</sup> .
Upward mobility	This means rising to a higher decile (10%) in the social income distribution curve <sup>102</sup> .
Downward mobility	This means falling to a lower decile (10%) in the social income distribution curve <sup>103</sup> .

<sup>96</sup> "Social Mobility | Definition, Examples, & Facts". 2020. *Encyclopedia Britannica*. <https://www.britannica.com/topic/social-mobility>.

<sup>97</sup> World Economic Forum. (2020) *"The Global Social Mobility Report 2020 Equality, Opportunity and a New Economic Imperative"*, pp. 9.

<sup>98</sup> World Economic Forum. (2020) *"The Global Social Mobility Report 2020 Equality, Opportunity and a New Economic Imperative"*, pp. 9.

<sup>99</sup> LegCo Secretariat (2015) *"Social mobility in Hong Kong"*, Research Brief Issues No.2 2014-15, pp.2.

<sup>100</sup> LegCo Secretariat (2015) *"Social mobility in Hong Kong"*, Research Brief Issues No.2 2014-15, pp.4.

<sup>101</sup> LegCo Secretariat (2015) *"Social mobility in Hong Kong"*, Research Brief Issues No.2 2014-15, pp.6.

<sup>102</sup> Economic Analysis and Business Facilitation Unit (2016) *2015 Study on Earnings Mobility*, pp. 4.

<sup>103</sup> Economic Analysis and Business Facilitation Unit (2016) *2015 Study on Earnings Mobility*, pp. 4.

## 5.2 Technology and Innovation Enhance Upward Social Mobility

5.2.1 Multiple studies have shown that technology and innovation are the main driving forces for upward mobility in today's society. Research data in the United States shows that the use of technology and innovation has widened the wealth gap among high-income groups. The wealthy people engaged in high-tech jobs have increased their wealth at a significantly faster rate than those engaged in non-technological categories<sup>104</sup>. On the other hand, Finnish research data<sup>105</sup> shows that inventors engaged in technology and innovation not only significantly increase their wealth, but also allow everyone up and down the work team to have a rapid and outstanding increase in income. This is even more obvious in the short term. This fully shows that technology and innovation not only brings wealth to innovative talents, but also has an accompanying effect that can increase the overall income of society. As can be seen from Figure 5.1, compared with ordinary companies, technologically innovative companies are more capable of driving low-skilled employees to increase income<sup>106</sup>. This proves that the technology and innovation industries is more capable of driving the upward mobility of society as a whole.

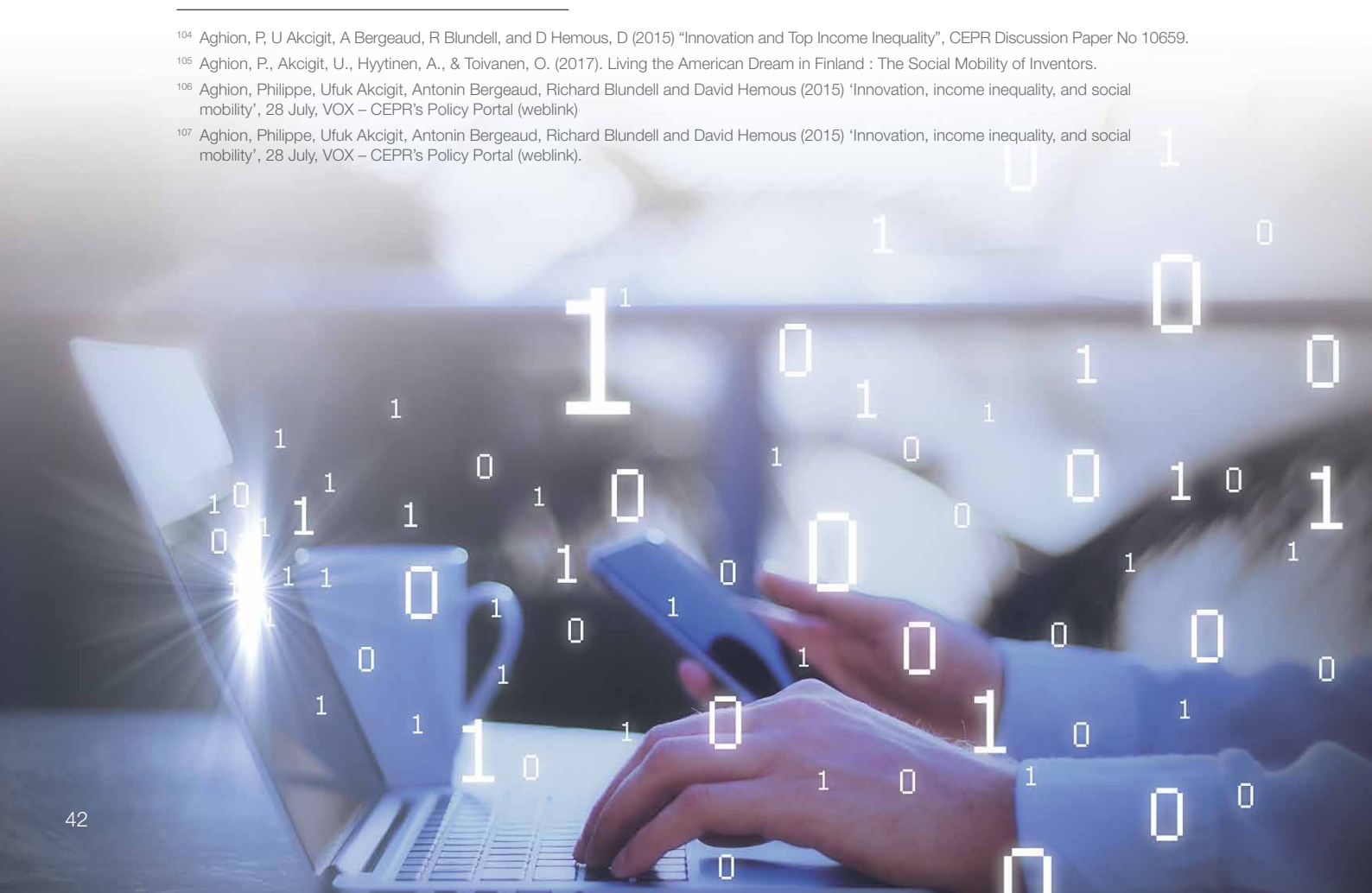
5.2.2 Past research results have shown that the income of parents is closely related to the income of children. If the parents' income is high, their children are more likely to become high-income earners, and vice versa. But this phenomenon does not apply to inventors of innovative technologies<sup>107</sup>. In this group, the influence of the parents' generation disappears, and how much achievement can be achieved depends entirely on the individuals themselves. Although innovative inventors are not yet the highest-income group, they are the most likely to break through the boundaries of the original social class and become the new upper class, thereby realizing upward social mobility.

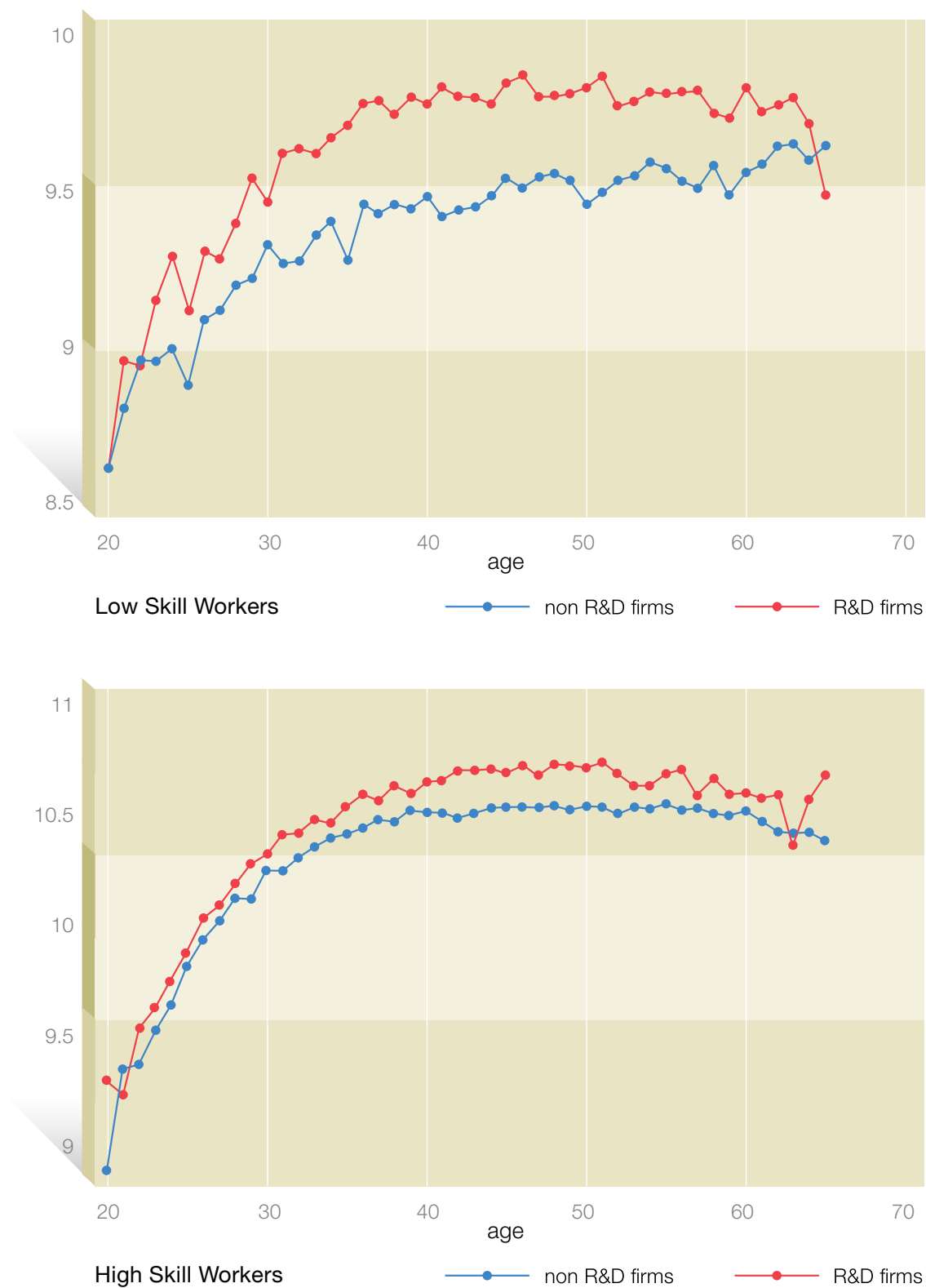
<sup>104</sup> Aghion, P, U Akcigit, A Bergeaud, R Blundell, and D Hemous, D (2015) "Innovation and Top Income Inequality", CEPR Discussion Paper No 10659.

<sup>105</sup> Aghion, P., Akcigit, U., Hyytinen, A., & Toivanen, O. (2017). Living the American Dream in Finland : The Social Mobility of Inventors.

<sup>106</sup> Aghion, Philippe, Ufuk Akcigit, Antonin Bergeaud, Richard Blundell and David Hemous (2015) 'Innovation, income inequality, and social mobility', 28 July, VOX – CEPR's Policy Portal (weblink)

<sup>107</sup> Aghion, Philippe, Ufuk Akcigit, Antonin Bergeaud, Richard Blundell and David Hemous (2015) 'Innovation, income inequality, and social mobility', 28 July, VOX – CEPR's Policy Portal (weblink).



**Figure 5.1 Average Salary Records by Age and Skill Level**

Data source: Aghion, Philippe, Ufuk Akcigit, Antonin Bergeaud, Richard Blundell and David Hemous (2015) 'Innovation, income inequality, and social mobility', 28 July, VOX – CEPR's Policy Portal

- 5.2.3 Innovation is undoubtedly defined relative to old technologies. Technological innovation in each field will inevitably bring disruptions, and even devastating effects, to the existing production technologies and rules. But on the other hand, new technologies and new inventions also bring new driving forces to the economy and create jobs that did not exist before. Therefore, the destruction caused by innovation is also called creative destruction. Creative destruction is “a process of sudden change in industrial production which continuously innovates the original production mode from the inside, destroys the old structure, and develops a brand-new mode of production on this basis<sup>108</sup>.” Under Schumpeter’s growth framework, the continuous emergence of innovators continues to challenge and destroy the original production methods, while also opening up new areas, injecting new energy, and creating diversified economic growth possibilities. Technological innovation marks the coexistence of destruction and creation. Some old job opportunities disappear from people’s sight, harming the interests of some working people, but on the other hand, it means more new job opportunities and a higher economic growth rate<sup>109</sup>. The answer to whether job opportunities created by technology and innovation are greater than those destroyed can be determined on a research data related to the United States<sup>110</sup>. The data shows that the higher the proportion of creative destruction in a society, the smaller the difference in education level of people in the society. Since there is a positive connection between education and social mobility, we can infer that, as a whole, creative destruction can enhance social mobility<sup>111</sup>.
- 5.2.4 In fact, in regions where the technological level is at the “frontier”, in other words, more advanced regions, the role of innovation in promoting productivity growth is particularly obvious. As a city at an advanced level of development, the Hong Kong government must introduce various favorable policies which promote technology and innovation to increase social mobility and promote economic growth. Only when Hong Kong society can let the next generation see the hope of upward mobility can Hong Kong have a bright future<sup>112</sup>.

<sup>108</sup> Schumpeter, Joseph A. (1942) *Capitalism, Socialism and Democracy*. Cambridge, MA: Harvard University Press.

<sup>109</sup> Aghion, Philippe and Akcigit, Ufuk and Howitt, Peter, (August 2015). *The Schumpeterian Growth Paradigm*. Annual Review of Economics, Vol. 7, pp. 557-575, 2015, Available at SSRN: <https://ssrn.com/abstract=2640070> or <http://dx.doi.org/10.1146/annurev-economics-080614-115412>

<sup>110</sup> Aghion, P. & Antonin, C. (2018). *Technical Progress and Growth since the Crisis*. Revue de l’OFCE, 157(3), 65-66 . <https://doi.org/10.3917/reof.157.0055>

<sup>111</sup> Chetty R., N. Hendren, P. Kline and E. Saez, (2014). “Where is the land of opportunity? The geography of intergenerational mobility in the United States”, The Quarterly Journal of Economics, 129(4): 1553-1623.

<sup>112</sup> [org/10.3917/reof.157.0055](https://doi.org/10.3917/reof.157.0055)

## 5.3 Social Mobility in Hong Kong

- 5.3.1 Although Hong Kong is an economically advanced city, its social mobility is far from satisfying. In the past few years, many government agencies in Hong Kong, including the Legislative Council, have conducted a series of statistics and studies on social mobility in Hong Kong, analyzing social mobility from the perspectives of family income, education level, career change and intergenerational mobility. The following are several important findings:
- 5.3.2 As Hong Kong's economy has stagnated in recent years, its income mobility has declined rather than improved. The income mobility of a society depends on economic growth. Hong Kong's economic growth has not performed well in the past decade, and the decline in economic growth has had a negative impact on income mobility. During the period from 1970 to 1996, Hong Kong's economy benefited from the reform, opening up and successful economic transformation of Mainland China, and transformed from a manufacturing economy to a service economy, with an average annual GDP growth rate of 6.6%, and a gross income growth as high as 139%. However, from 1997 to 2013, due to a series of external shocks and lack of growth engines, the annual average growth rate of Hong Kong's GDP fell to 3.5%, and the cumulative income growth was only 14%<sup>113</sup>. To make matters worse, due to turbulence brought about by large-scale social movements and the impact of COVID-19, Hong Kong's economy has continued to decline since the second half of 2019. Given that Hong Kong's latest GDP growth rate is only 2.9%, this means that Hong Kong's income mobility will decline further. As Hong Kong's economy and industrial structure have not changed significantly at present, it is expected that the income growth of Hong Kong residents will shrink further<sup>114</sup>.

<sup>113</sup> LegCo Secretariat (2015) *"Social mobility in Hong Kong"*, Research Brief Issues No.2 2014-15, pp 2-3.

<sup>114</sup> FocusEconomics. *"Hong Kong Economy - GDP, Inflation, CPI and Interest Rate."* FocusEconomics | Economic Forecasts from the World's Leading Economists, January 2, 2014. <https://www.focus-economics.com/countries/hong-kong>.





5.3.3 The growth of educational mobility does not help promote social mobility: In order to speed up Hong Kong's transition to a knowledge-based economy, the Hong Kong government has substantially increased the number of tertiary education places, allowing more Hong Kong students to enter tertiary education institutions and obtain higher academic qualifications while mastering more knowledge. Theoretically speaking, these young people with higher academic qualifications can engage in more technical jobs and get better pay after graduation. Educational mobility has long been the most effective method for the upward mobility of young people in Chinese society. However, the reality is not as good as expected. Government data show that the proportion of tertiary students to the population in 2016 has increased significantly to 32.7% from 11.3% in 1991. However, after careful analysis, many of the increased degrees are self-funded associate degrees<sup>115</sup>. The starting salary of these associate degree graduates is much lower than that of government-sponsored university degree holders. This means that for a large number of nominally tertiary graduates, although they have received "extra education", it is not helpful in improving their income level<sup>116</sup>. In fact, even regular government-sponsored college students are less likely to move upward from a good job after graduation. In general, in each category of tertiary education, namely associates degrees, undergraduates and postgraduates, the 5-year upward mobility rate of 2001 / 02 graduates is better than that of 2006 / 07 graduates<sup>117</sup>.

On the other hand, occupational demographic data shows that the improvement of education level cannot effectively assist tertiary graduates to set foot in positions suitable for their majors. It is not easy to improve one's social situation through occupational mobility. Although the number of management and professional service positions has increased by 16% in the past ten years and accounted for 39% of the working population by 2011, these high-paying jobs were filled by experienced, second-in-command professionals; in other words, there are a limited number of high-paying management and professional services positions, and even if they are increasing, those positions are being filled by the next rung of employees with equally rich experience<sup>118</sup>. In terms of occupational mobility, the mobility of the young generation has declined: taking the sales and service industries with low technical requirements and low salaries as an example, in 2016, 35.6% of young people aged 15-24 in Hong Kong were engaged in sales and service industries, compared to only 21% in 1996<sup>119</sup>. The above figures show that educational mobility in Hong Kong cannot actually ensure occupational mobility. Although young people are more educated than the previous generation, they cannot obtain high-paying jobs for them to effectively achieve upward mobility.

<sup>115</sup> LegCo Secretariat (2015) "Social mobility in Hong Kong", Research Brief Issues No.2 2014-15, pp. 5.

<sup>116</sup> LegCo Secretariat (2015) "Social mobility in Hong Kong", Research Brief Issues No.2 2014-15, pp. 5.

<sup>117</sup> Financial Secretary's Office (2016) 2015 "Study on Earnings Mobility", pp. 12-13

<sup>118</sup> LegCo Secretariat (2015) "Social mobility in Hong Kong", Research Brief Issues No.2 2014-15, pp. 6.

<sup>119</sup> Chan, Oswald. "Fixing Social Ladder for Hong Kong Youth." China Daily, August 27, 2018. <https://www.chinadailyhk.com/articles/131/242/53/1535340475392.html>.

5.3.4 Intergenerational mobility: In terms of intergenerational mobility, there is a correlation between the income of parents and the next generation. This means that there are obstacles in achieving intergenerational upward mobility. Vere's research found that in 2008, if the income of parents in Hong Kong is 10% higher than the average income of their peers, the income of their children is expected to be 4.2% higher than the average income of their peers. Since the Hong Kong government is unwilling to forcibly redistribute income through taxation policies <sup>120</sup>, the intergenerational mobility of Hong Kong society is far lower than that of developed European countries. Although the average intergenerational mobility has improved in recent years, the intergenerational wealth transfer of high-income groups is still obvious <sup>121</sup>.

All the above studies have shown that although the younger generation has significantly improved their educational level over the previous generation, they have encountered huge obstacles in moving to the upper class of society. The biggest reason for this is Hong Kong's over-reliance on traditional economic drivers <sup>122</sup>.

To solve this, the government must promote a series of policies related to technology and innovation development to create more new upward mobility ladders for the younger generation, thereby breaking the stagnant social hierarchy. Compared with the previous generation, most young people are more willing to embrace new technologies and are more able to adapt to technological changes. The new opportunities brought by technology and innovation can help young people develop upward and create more opportunities for social mobility.

<sup>120</sup> Vere, J. (2010) *Special topic enquiry on earnings mobility*, pp. 32.

Available from: <http://hub.hku.hk/bitstream/10722/127842/1/Content.pdf?accept=1> [Accessed October 2020].

<sup>121</sup> Peng, C., Yip, P. S. F., & Law, Y. W. (2019). *Intergenerational Earnings Mobility and Returns to Education in Hong Kong: A Developed Society with High Economic Inequality*. *Social Indicators Research*, 143(1), 133-156. doi:<http://dx.doi.org.lib.ezproxy.ust.hk/10.1007/s11205-018-1968-2>

<sup>122</sup> LegCo Secretariat (2015) "Social mobility in Hong Kong", Research Brief Issues No.2 2014-15, pp. 10.

# Chapter 6



Develop Technology  
and Innovation  
Industries and Foster  
Upward Social Mobility



## 6.1 The Goal and Path of Hong Kong's Development of Technology and Innovation

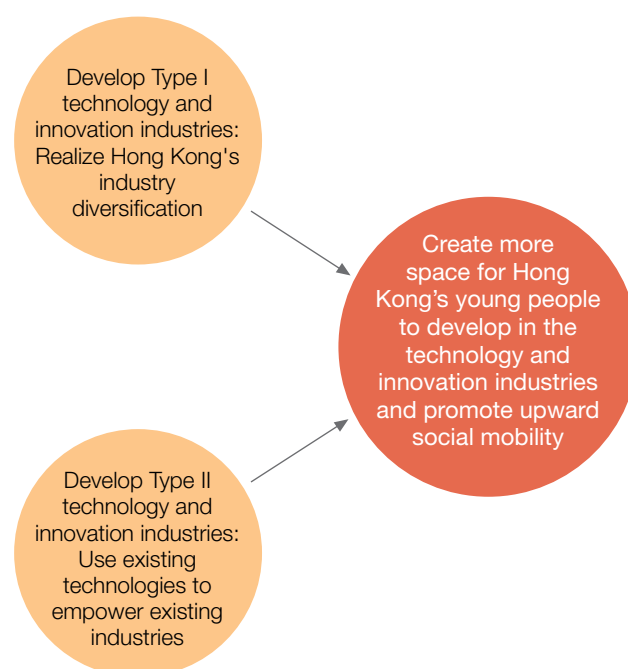
- 6.1.1 Since the handover of Hong Kong in 1997, the society has been paying attention to the development of technology and innovation. However, both the government and the industry have consistently adhered to “Input Thinking”. The focus of their attention is mainly on the input of resources, and it is not very clear what goals should be achieved in the development of technology and innovation industries.
- 6.1.2 This “Input Thinking” means that when promoting the development of innovation and technologies, attention is only paid to the input of financial resources, while the goals and effects of these financial resources is ignored. The dominant idea of this kind of thinking is that the more input, the more output, but practice has proved that this idea is not necessarily correct <sup>123</sup>.
- 6.1.3 The social movement in Hong Kong in 2019 have drawn people's attention to the young generation in Hong Kong, and whether the society has provided enough development space for the young generation has become a thought-provoking issue. In fact, the analysis on global millennials in Chapter 4 of this report shows that “youthquakes” and even quarter-life crisis are common challenges faced by young people in many countries and regions in the world, while Chapter 5 points out that the development of technology and innovation industries is one of the effective ways to solve the upward social mobility. Therefore, this report uses “Output Thinking” as the framework and sets the creation of development space and the promotion of upward social mobility for Hong Kong's young people as the goal of developing technology and innovation industries, and then retroactively infers and reviews the corresponding technological industry development strategy on the basis of clear goals.

<sup>123</sup> Xu, Y., and Yu, C. (2009) *Innovated by Hong Kong*, HKUST Business School: Hong Kong.



- 6.1.4 “Output Thinking” believes that the economic competitiveness of enterprises and countries depends on the success of the innovation process. Therefore, when promoting technology and innovation, all factors that affect the success of the innovation process should be considered comprehensively. In addition to financial resources, these factors also include the efficiency of using these resources. Simply put, “Output Thinking” believes that successful innovation includes, in addition to inputs, effective output-oriented management in the innovation process <sup>124</sup>.
- 6.1.5 To promote the development of technology and innovation industries so as to provide young people in Hong Kong with upward mobility opportunities, there are two paths to follow: one is to develop emerging technology and innovation industries and achieve industrial diversification; the other is to use existing technology to empower existing industries and improve their competitiveness. Both paths can provide entrepreneurial and employment opportunities related to technology and innovation. In other words, Hong Kong can provide young people with development space by promoting the development of the Type I and Type II technology and innovation industries.
- 6.1.6 The Type I technology and innovation industries refers to industries that aim to develop cutting-edge technologies and corresponding technological products and services. These products and services can be tangible technological products or intangible intellectual property rights and solutions. The Type II technology and innovation industries refers to a variety of industries that use existing technological achievements, such as artificial intelligence and the Internet of Things, to improve technology, optimize processes, add value to products, reduce costs, expand markets, etc., thereby enhancing the efficiency and profitability of the industries. The Type I technology and innovation industries and the Type II technology and innovation industries are essentially different, so no matter the relevant stakeholders, the required policy support, or the ecosystem, there are significant differences <sup>125</sup>.
- 6.1.7 The goals and related paths of Hong Kong’s development of technology and innovation are shown in Figure 6.1.

**Figure 6.1 The Goal and Path of Hong Kong’s Development of Technology and Innovation**



<sup>124</sup> Xu, Y., and Yu, C. (2009) *Innovated by Hong Kong*, HKUST Business School: Hong Kong.

<sup>125</sup> Xu, Y., “Classification of Technology and Innovation Industry – Edited Keynote Presentation at the 30th Communication Forum of the Japan Society of Information and Communication Research”, *Journal of Information & Communication Research*, 31, 4, 2014, 32-35

## 6.2 Encourage Large Foreign Technology Companies to Settle in Hong Kong

- 6.2.1 Although the public sector plays a key role in providing sufficient resources to support innovation, in the long run, the engagement of the private sector is equally important to enhancing local innovation capabilities. However, 98% of the private sector in Hong Kong are small and medium-sized enterprises (SMEs) with less than 50 employees, which limits Hong Kong's innovation capabilities in two ways.
- 6.2.2 First of all, due to their small scale, SMEs lack internal resources for innovation and R&D (for example, capital, advanced technology), and cannot afford to bear the risks of developing technology and innovation. Second, as pointed out by Ji Peiran from Hong Kong X Tech (interview on 23 November 2020), it is unrealistic for college students to start a business immediately after graduation, and few succeed. Young people usually need to work in large technology companies for a period of time. After they have a certain understanding of the industry, they can start their own businesses to increase their success rate. Unfortunately, there are basically no such large companies in Hong Kong.
- 6.2.3 Due to the above two reasons, Hong Kong urgently needs to attract large overseas technology companies to set up research centers in Hong Kong, so as to establish and improve Hong Kong's innovation ecosystem. In this regard, Hong Kong can learn from the policies of countries and regions such as Ireland, Singapore and Israel.
- 6.2.4 Many of the world's most innovative and research-intensive small economies attract a large number of multinational companies. These multinational companies account for a large proportion of the local industry's R&D expenditure and are a catalyst for innovations in host economies. Table 6.1 is a comparison of the performance of Hong Kong, Ireland, Israel, and Singapore in attracting foreign R&D investment. Table 6.2 is a comparison of the above several economies in stimulating R&D investment in R&D centers.
- 6.2.5 Table 6.1 and Table 6.2 clearly show that Hong Kong is not aggressive enough in attracting overseas technology companies when comparing to Ireland, Israel and Singapore. Existing policies should be reviewed more actively, and the experience of the above economies should be taken into account to attract large overseas technology companies to develop in Hong Kong.



**Table 6.1 Comparison of Performance in Attracting Foreign R&D Investment**

	Ireland	Israel	Singapore	Hong Kong
<b>Proportion of R&amp;D expenditure of overseas companies in 2016</b>	63.3% <sup>126</sup>	49.2%	40% (2001) <sup>127</sup>	NA
<b>Proportion of government R&amp;D expenditure in 2016</b>	25.8%	11.1%	38.9%	47% <sup>128</sup>
<b>Technology cluster</b>	Yes ICT, life sciences, financial technology	Yes ICT, cyber security	Yes Life sciences, financial technology, precision engineering	In development Healthcare, artificial intelligence, robotics
<b>Competitive advantages</b>	Attractive tax system Talents from all over the EU	Proximity to Europe, Africa and Asia Hi-tech talents	Robust intellectual property system Rich diversity of international talents	Gateway to the GBA International finance center
<b>Industry-academy cooperation</b>	Industry-academy joint program	Industry-academy joint program (e.g., Magnet Consortium)	Company Lab @ University Program	Internship program applicable to ITF-funded R&D projects
<b>Employment support</b>	Employment grant	Employment grant training subsidy <sup>129</sup>	Skilled qualification program (two-year visa)	Research talent center (Quick talent recruitment channel)
<b>R&amp;D facility incentives</b>	Capital grants, tax credits for R&D buildings	Co-financing pilot program	Joint investment	Provide the Easy Landing Scheme for Cyberport for multinational companies
<b>Policy effectiveness</b>	In the past ten years, the activities of foreign R&D centers have increased by 144%.	Multinational companies operate more than 320 research centers <sup>130</sup>	As of 2016, 29% of global innovation centers are located in Singapore	A total of 2 multinational companies have rented offices in Cyberport according to the Easy Landing Scheme <sup>131</sup>
<b>Multinational companies set up R&amp;D centres</b>	Dell, Intel, etc.	Microsoft, Google, Apple, etc.	Dyson, Expedia, L'Oreal, etc.	Huawei (Noah's Ark Lab)

<sup>126</sup> <https://www.cso.ie/en/releasesandpublications/er/ie/innovationinirishenterprises2016/>

<sup>127</sup> <https://www.adb.org/publications/do-foreign-companies-conduct-rd-developing-countries>

<sup>128</sup> <https://www.scmp.com/news/hong-kong/hong-kong-economy/article/2146381/hong-kong-tech-minister-defends-citys-rather-large>

<sup>129</sup> <https://investinIsrael.gov.il/HowWeHelp/downloads/RESEARCH%20AND%20DEVELOPMENT%20CENTERS.pdf>

<sup>130</sup> <https://investinIsrael.gov.il/HowWeHelp/downloads/RESEARCH%20AND%20DEVELOPMENT%20CENTERS.pdf>

<sup>131</sup> <http://www.legco.gov.hk/yr19-20/english/panels/ci/papers/ci20200616cb1-738-3-e.pdf>

**Table 6.2 A Comparative Study of Incentives for R&D Investment in R&D Centers**


	Tax credit	Cash grant	Reduced / preferential tax rate	Tax deduction	Incentives for withholding income tax	Patent-related incentives	Other financial support	Eligible for EU Horizon 2020 funding	Accelerated depreciation of R&D assets	Tax exemption	Cash back
Ireland	✓	✓	✓			✓	✓	✓	✓	✓	
Israel		✓	✓	✓	✓	✓	✓	✓			
Singapore		✓	✓	✓	✓	✓					
Hong Kong		✓		✓							✓

Data source: *Worldwide R&D Incentives Reference Guide 2020*, Ernst & Young, 2020

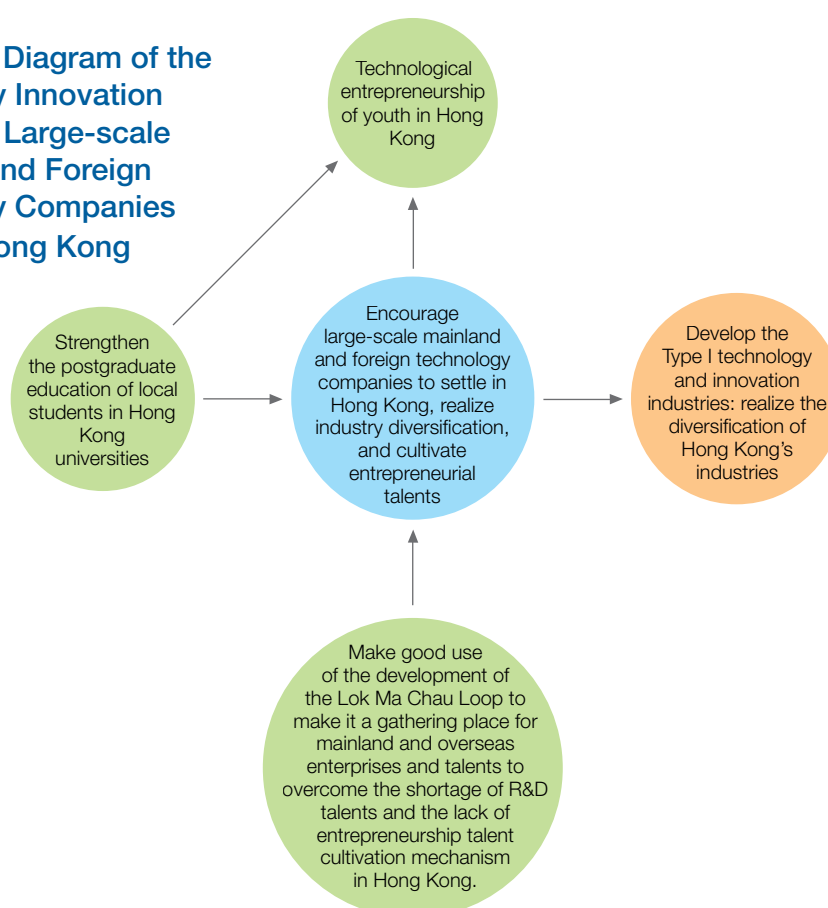
6.2.6 At present, the main difficulty in attracting large technology companies to develop in Hong Kong is the problem of talents. First of all, since Hong Kong has no universal retirement protection after graduation, young people in Hong Kong have to share the financial burden of their families and enter the job market, giving up the opportunity to pursue further study in postgraduate courses, which makes them less competitive in both the development of the Greater Bay Area and the employment of science and technology companies in Hong Kong. The Hong Kong government urgently needs to increase economic incentives to attract local university graduates to study postgraduate courses. In the long run, it must solve social issues such as universal retirement protection and provide a benign environment for Hong Kong to train local senior research talents.

6.2.7 Secondly, technology companies have to recruit talents from overseas, mainly mainland talents, when there is a shortage of local talents. However, many families of talents who come to Hong Kong to develop through the government's talent schemes are still in Mainland China, and the motivation for developing in Hong Kong alone is not high. In addition, companies recruiting overseas talents must also recruit local employees proportionally<sup>132</sup>. Therefore, many technology companies, especially large companies, are facing substantial difficulties in recruitment. For example, Huawei's Noah's Ark Lab planned to recruit 1,000 researchers, but currently there are fewer than 400.

<sup>132</sup> [https://www.itc.gov.hk/en/doc/techtas/leaflet\\_techtass\\_eng.pdf](https://www.itc.gov.hk/en/doc/techtas/leaflet_techtass_eng.pdf)

- 6.2.8 The development of the Lok Ma Chau Loop has provided favorable conditions for attracting large overseas technology companies to develop in Hong Kong. First of all, the Loop is close to Shenzhen. If policy permits, mainland scientific and technological talents do not need to apply for entry to Hong Kong through talent schemes. They only need to apply for a relatively simple working visa to work in companies in the Loop, and settle their families in Shenzhen to live like ordinary Shenzhen citizens, so there is no need to worry about living in two places. In this way, large overseas companies no longer face challenges in talent recruitment, and at the same time continue to enjoy preferential policies such as low tax rates for companies registered in Hong Kong and the convenience of free flow of funds.
- 6.2.9 Secondly, the development of large-scale technology companies in the Loop will help young Hong Kong residents employed in these companies to familiarize themselves with the operation of technology companies, gain insight into the development of the industry, and start up their own businesses when the time is right.
- 6.2.10 The development of the Loop is very important to the long-term development of Hong Kong's technology and innovation industries. In particular, the presence of overseas technology companies will make it possible to diversify Hong Kong's industries. This will play an important role in providing employment opportunities for local youth and cultivating local technological entrepreneurial talents. It may not be an extravagancy to claim the Loop as the last opportunity for the development of Hong Kong's technology and innovation industries. It is recommended to set up a brand-new management company, adopt brand-new strategic thinking, and echo the Science Park and Cyberport to jointly promote the development of Hong Kong's technology and innovation industries.
- 6.2.11 Figure 6.2 shows a schematic diagram of the science and technology innovation ecology formed by encouraging large-scale mainland and foreign science and technology companies to settle in Hong Kong.

**Figure 6.2 Schematic Diagram of the Technology Innovation Ecology of Large-scale Mainland and Foreign Technology Companies Entering Hong Kong**



## 6.3 Increase Support for Type II Technology and Innovation Industries

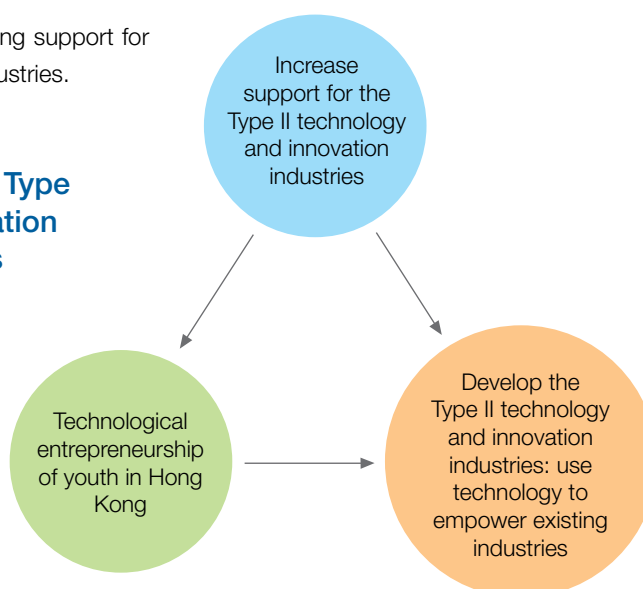
6.3.1 From the perspective of innovation economics, through the development of Type II technology and innovation industries, the production efficiency and dynamic efficiency of Hong Kong's existing enterprises will be improved through innovative technologies, while at the same time also providing a market for the development of Type I technology and innovation industries.

6.3.2 The previous successful case of Hong Kong's development of Type II technology and innovation industries should be the Octopus Card service, which was co-operated by the MTR, Kowloon-Canton Railway, KMB, CityBus and Hong Kong Ferry. Octopus card provides a revolutionary operation process transformation for public transportation agencies and provides passengers with a new experience that saves time and effort. As Octopus card has been adopted in more and more industries, and technology has been transferred throughout more and more countries and regions, Octopus Cards Limited has become an independent technology company providing electronic payment solutions engaged in Type I technology and innovation industry.

6.3.3 The emergence of technologies such as the Internet of Things, artificial intelligence, big data, cloud computing, robotics, and 5G provide opportunities for Hong Kong to enhance the competitiveness of existing industries. Compared with Type I technology and innovation industries, which focuses on the development of technology, the development threshold of Type II technology and innovation industries, which focuses on applying solutions, is lower. By promoting the development of Type II technology and innovation industries, huge demand for existing and emerging Type I enterprises and start-ups in Hong Kong will be created. The government's approach to encouraging the Type II technology and innovation industry is mainly to provide existing industries with more incentives for technological transformation and upgrading, such as providing tax concessions for expenditures on technological upgrading of existing enterprises. Technology vouchers previously launched by the government were a good practice, and can be further improved and expanded. Services such as "Industry 4.0" - Smart Enterprise provided by the Hong Kong Productivity Council should also be helpful in promoting the Type II technological innovation. It is a feasible arrangement to use the Hong Kong Productivity Council as the engine promoting the development of Type II technology and innovation industries in Hong Kong.

6.3.4 Figure 6.3 shows the benefits of increasing support for the Type II technology and innovation industries.

**Figure 6.3 Increase Support for the Type II Technology and Innovation Industries and Its Effects**



## 6.4 Stimulate and Promote Knowledge Transfer in Hong Kong's Universities

- 6.4.1 University is an important link in the national or regional technology and innovation system. The universities in Hong Kong rank among the best in the world in terms of research, but they are lackluster in terms of knowledge transfer. One of the reasons for this is that Hong Kong lacks large technology companies, so it is difficult to form an organic industry-academy-research ecosystem.
- 6.4.2 The position of Cambridge University in scientific research is undisputed, but it had not made much special achievements in knowledge transfer. After AstraZeneca announced the establishment of a global R&D Centre near Cambridge in 2014, it has quickly promoted the knowledge transfer of Cambridge University in biotechnology. The Cambridge Biomedical Park is currently the largest bioscience and medical research base in Europe. The development of the biological park has also promoted the development of scientific research. More than 20% of the Nobel Prize winners in medicine and chemistry worldwide are from Cambridge <sup>133</sup>.
- 6.4.3 In view of the successful experience of cooperating with large technology companies such as AstraZeneca Pharmaceuticals, Cambridge University is currently actively promoting China's Huawei to build a R&D center in a technology park near Cambridge. Huawei announced on June 25, 2020 that the first phase of its campus project in Cambridge has been approved by the local government. The investment scale is expected to be 1 billion pounds (approximately US\$1.2 billion) and it will bring more than 400 jobs. After completion, it will become the headquarters of Huawei's overseas optoelectronics business <sup>134</sup>. Cambridge University expects Huawei to become another bright spot in the commercialization of science and technology by bringing the same effect in electronics and communication technology as AstraZeneca does in biotechnology

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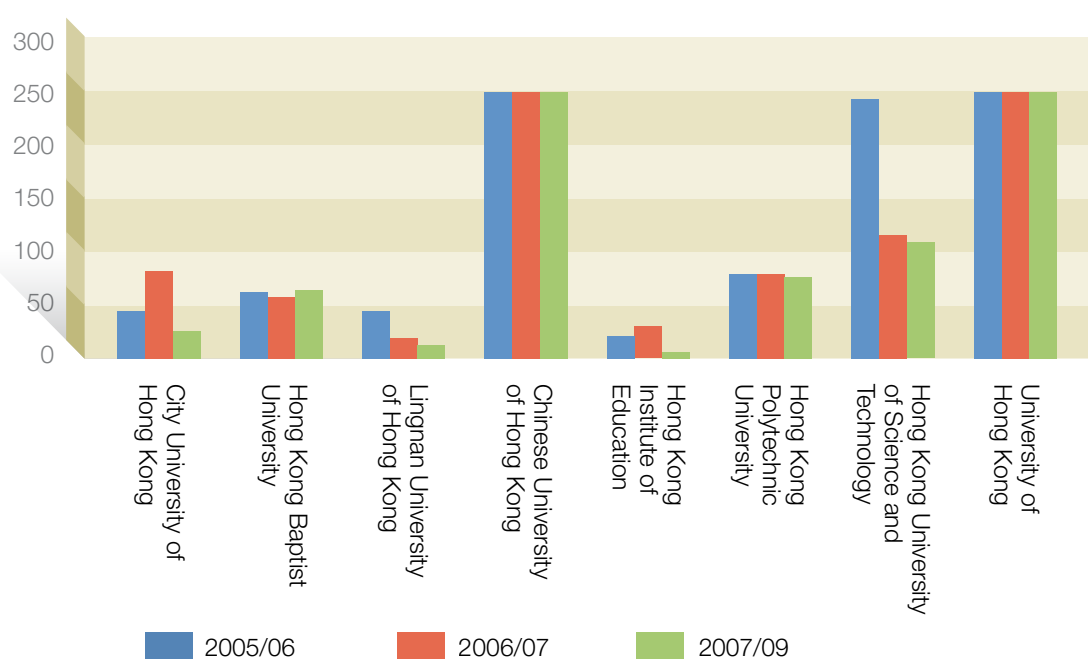
<sup>133</sup> <https://baike.baidu.com/item/劍橋科技園>

<sup>134</sup> <http://finance.eastmoney.com/a/202006261534008817.html>



- 6.4.4 There is no doubt that if the Lok Ma Chau Loop can successfully attract R&D centers of large multinational companies to relocate, it will certainly promote the transfer of science and technology from major universities in Hong Kong.
- 6.4.5 Another aspect of promoting knowledge transfer in Hong Kong's universities is to create a culture of knowledge transfer. The government's matching fund may play an important role in this aspect.
- 6.4.6 At present, the Hong Kong government matches university self-raised funding. Depending on the amount of donated funding raised by the university, the government will match the same amount of funding. The purpose of matching fund is to promote a donation culture that supports education in society. This program has indeed played an important role in the past. A matching fund of hundreds of millions of HKD is allocated every year, which has greatly promoted the trend of donations from society to universities.
- 6.4.7 However, if we take a closer look at the direction of the matching fund, we will find that most of the funds have gone to the two universities with the longest history and the most alumni; and those universities with short history and insufficient alumni network cannot benefit similarly. To certain extent, the matching fund becomes a reward for history, rather than a reward for the university's current contribution to the society.
- 6.4.8 Figure 6.4 shows the matching fund situation of Hong Kong's tertiary institutions in 2005/06, 2006/07 and 2007/08.

**Figure 6.4 The Fund Matching Situation of Hong Kong's Tertiary Institutions in 2005/06 to 2007/08 (HK\$ million)** <sup>135</sup>



<sup>135</sup> <http://www.ugc.edu.hk/eng/doc/ugc/stat/19.pdf>



6.4.9 Government matching fund is not available every year. Table 6.3 shows the fundraising situation of universities in 2018 / 19 and 2019 / 20. Due to social unrest and the COVID-19 epidemic over the past two years, the donations received by universities in the two years were averaged. It is not difficult to see that if the government continues to provide matching fund, the situation will be similar to the past.

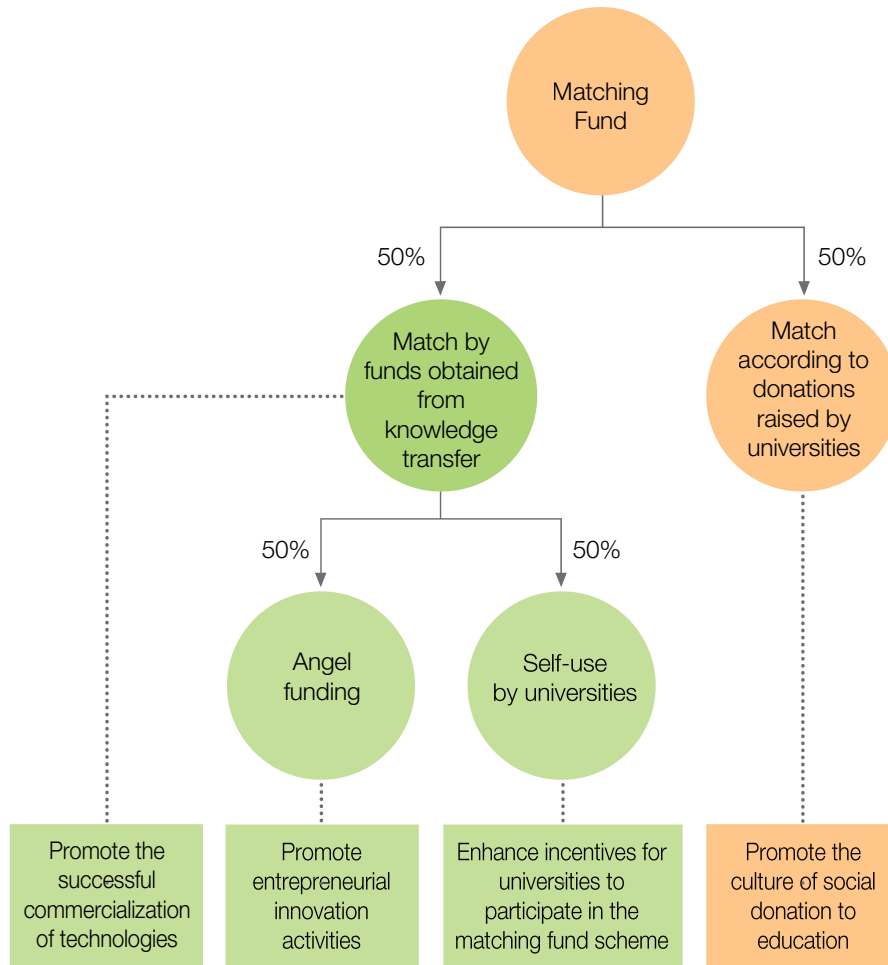
**Table 6.3 The Amount of Donations Received by Hong Kong's Tertiary Institutions in 2018 / 19 and 2019 / 20 <sup>136</sup>**



	2018/19	2019/20	Average
Chinese University of Hong Kong	760,000,000	1,308,000,000	1,034,000,000
University of Hong Kong	440,000,000	1,230,000,000	835,000,000
Hong Kong University of Science and Technology	62,000,000	740,000,000	401,000,000
Hong Kong Polytechnic University	240,000,000	390,000,000	315,000,000
City University of Hong Kong	48,370,000	380,000,000	214,185,000
Hong Kong Baptist University	81,280,000	310,000,000	195,640,000
Lingnan University of Hong Kong	26,000,000	204,000,000	115,000,000
Education University of Hong Kong	52,070,000	120,000,000	86,035,000

6.4.10 In this regard, we propose to activate the use of resources through policy adjustments, introduce “output thinking”, and divide the matching fund into two parts. Fifty percent of the funds should follow the current method and be matched according to the donations raised by universities to continue to promote the culture of social donation to education. The other 50% should be matched according to the financial income of universities’ technology transfer to promote the commercialization of scientific and technological achievements. This part of the matching fund should be further divided into two parts: half of which should be used as an angel fund to promote entrepreneurship and innovation activities of scholars and college students, the other half of which should be used by universities autonomously to strengthen incentives for universities to participate in the matching fund scheme.

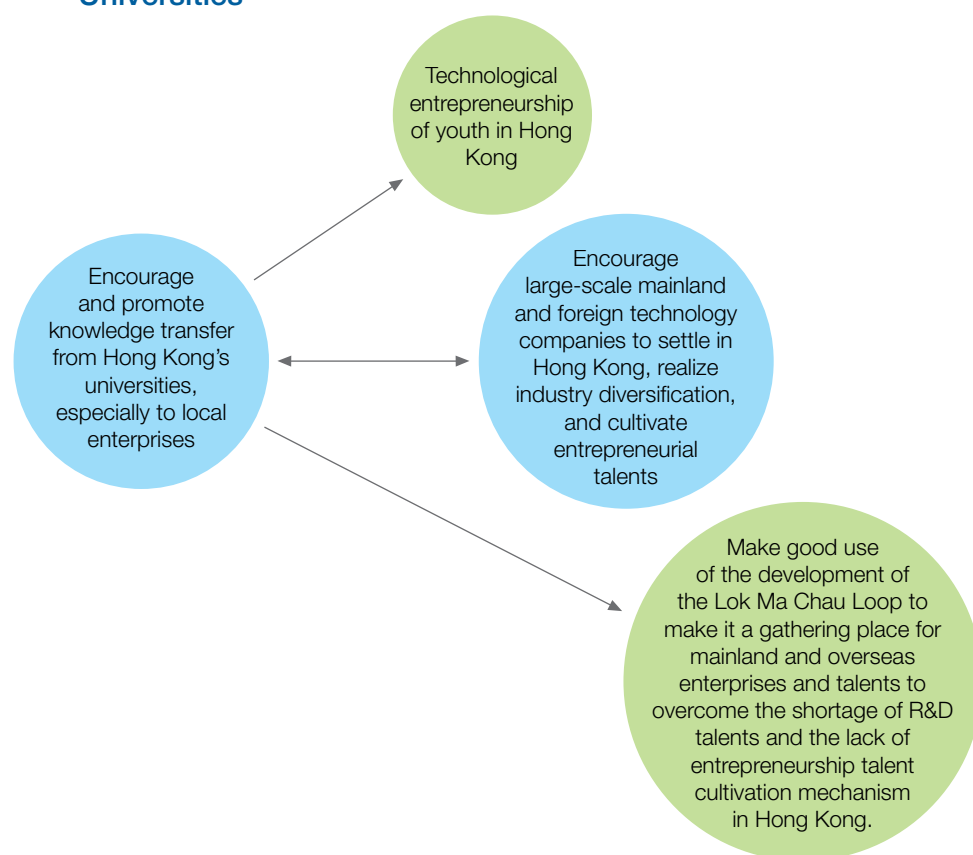
<sup>136</sup> Refer to the annual report of each institution

**Figure 6.5 Distribution Method of University Matching Fund**

- 6.4.11 The financial income derived from knowledge transfer mentioned here shall not only include the income from the transfer of intellectual property rights such as patents, but also the income of all contract research and consulting projects. In addition, in order to encourage universities to lean towards local companies in Hong Kong, the income from technology transfer to local companies can be multiplied in matching. For example, by transferring one HKD to a general enterprise, one HKD can be matched; by transferring one HKD to a local enterprise, three HKD can be matched.
- 6.4.12 We believe that the reformed matching fund will inevitably mobilize universities, especially those with a shorter history, to promote technology transfer and strengthen the enthusiasm of cooperation with the industry. In addition, angel funds will promote the enthusiasm of scholars and college students to innovate and start businesses. Among them, the better projects will be invested in by venture capital funds and become the new force of Hong Kong's Type I technology and innovation industries. With this positive interaction, the ecological environment of Hong Kong's technology and innovation will be greatly improved. More importantly, the government does not need to spend a penny more to well leverage the whole.

6.4.13 The promotion of technology transfer from Hong Kong's universities, combined with the development of the Loop, is bound to attract large overseas technology companies to settle in Hong Kong. The settlement of large overseas science and technology enterprises in Hong Kong will in turn provide incentives for the knowledge transfer of Hong Kong universities. In addition, the promotion of knowledge transfer will also provide a steady stream of projects for young people in Hong Kong to start their businesses in science and technology. Figure 6.6 shows the innovation ecology created by promoting knowledge transfer in universities.

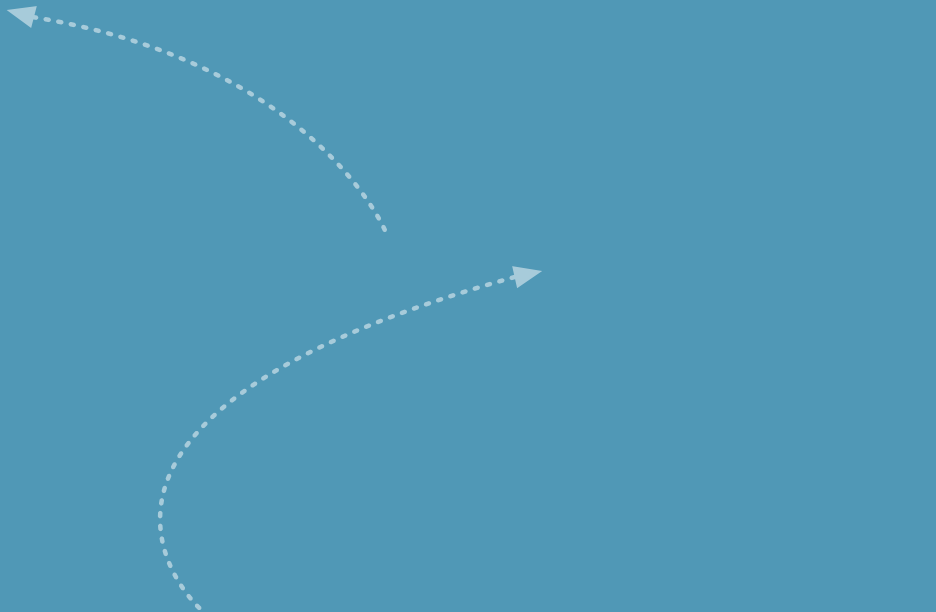
**Figure 6.6 The Innovation Ecology Created by Promoting Knowledge Transfer in Universities**





# Chapter 7

## Conclusions



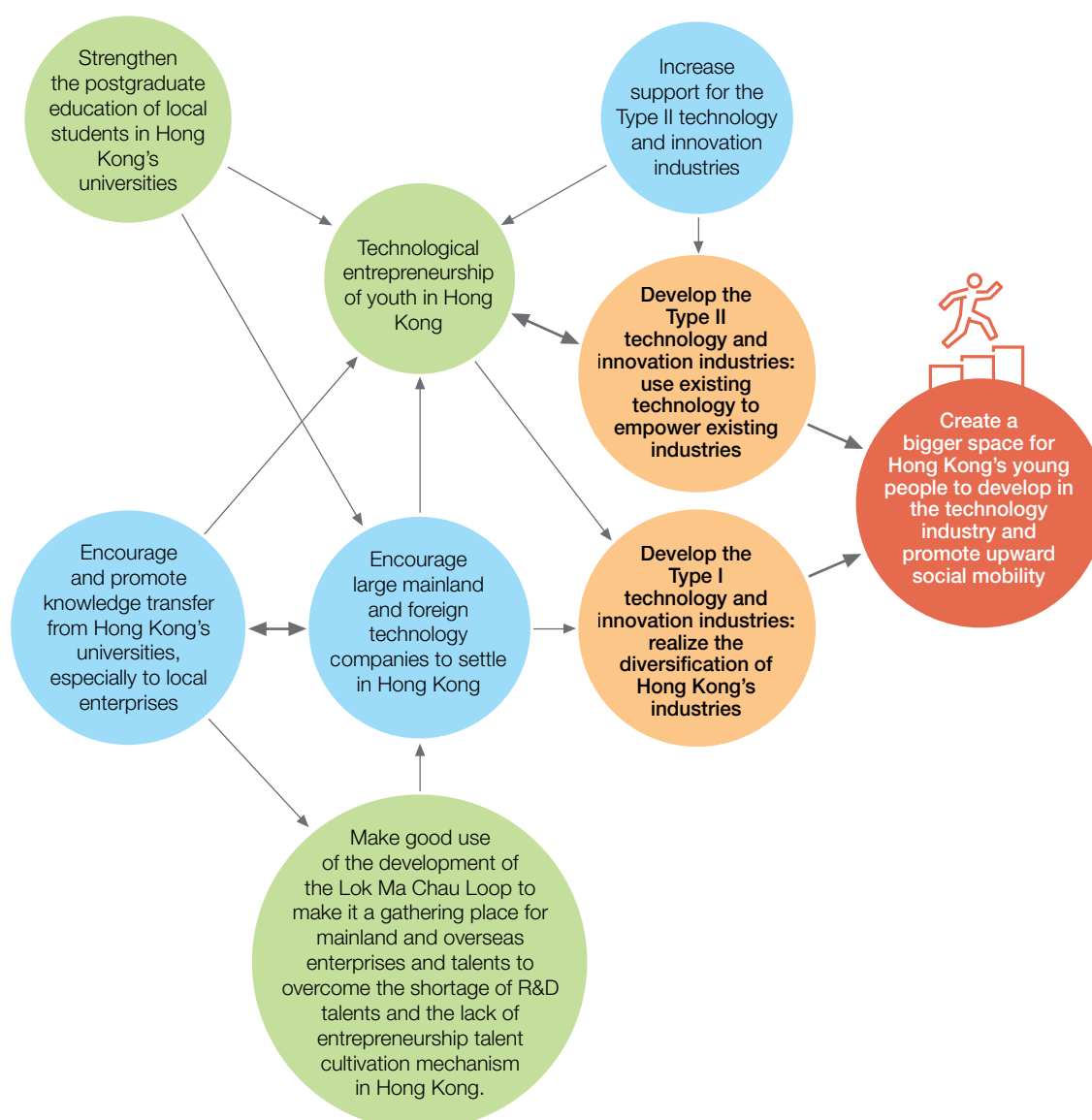
- 7.1** The development of Hong Kong's technology and innovation industries is no longer a new topic. However, after experiencing the social unrest of 2019 and the severe COVID-19 epidemic since 2020, Hong Kong is facing the problem of how to start again. At this moment, it is timely and necessary to conduct a review on how to develop Hong Kong's technology and innovation industries and rethink its development with new mind.
- 7.2** Starting from "output thinking", this report clearly states that the goal of Hong Kong's development of technology and innovation industries is to "create greater space for the development of Hong Kong's young people in technology and innovation industries and promote upward social mobility." It then points out the path of Hong Kong's development of technology and innovation industries and puts forward corresponding policies.
- 7.3** This report believes that Hong Kong should achieve industrial diversification and use existing technologies, such as artificial intelligence, to empower existing industries by promoting the development of both Type I and Type II technology and innovation industries, so as to provide young people with technology and innovation-related entrepreneurship and employment opportunities, and ultimately create space for the realization of social upward mobility.
- 7.4** In order to promote the development of Type I technology and innovation industries and achieve industrial diversification, Hong Kong urgently needs to attract large overseas technology companies to set up research centers in Hong Kong, henceforth build and improve Hong Kong's innovation ecosystem and cultivate local technological entrepreneurial talents. In this regard, Hong Kong can learn from the policies of countries and regions such as Ireland, Singapore and Israel.
- 7.5** Problems such as the shortage of talents encountered by large overseas technology companies in Hong Kong can be solved by the Lok Ma Chau Loop's technology park. It may not be extravagant to claim the Loop as the last opportunity for the development of Hong Kong's technology and innovation industries. It is recommended to establish a brand-new management company and adopt brand-new strategic thinking to turn the Loop into a high-tech park that can attract talents from all over the world, comparable to the Cambridge Innovation Park.
- 7.6** In addition to the development of emerging technology and innovation industries, the development of Type II technology and innovation industries, so as to enhance the production efficiency and dynamic efficiency of Hong Kong's existing enterprises, will also play a decisive role in enhancing Hong Kong's long-term competitiveness, while also creating demand for local technology companies. It is recommended to review the role and functions of the Hong Kong Productivity Council to make it able to play a leading role in promoting the development of Type II technology and innovation industries in Hong Kong.
- 7.7** The atmosphere of knowledge transfer in Hong Kong's universities has not been strong enough. If large technology companies can relocate their R&D center to Hong Kong, they may promote knowledge transfer in Hong Kong's universities, as AstraZeneca's R&D center near Cambridge University helped make Cambridge the world's premier biotechnology park.



**7.8** This report also recommends the introduction of “Output Thinking”; the government should match the income derived from knowledge transfer of universities to promote the commercialization of scientific and technological achievements. This part of matching fund should be further divided into two parts: half of which should be used as an angel fund to promote entrepreneurship and innovation activities of scholars and college students, while the other half of which should be used by universities autonomously to mobilize the incentives for universities to participate in the matching fund scheme, and promote the enthusiasm of knowledge transfer.

**7.9** Through the above suggestions, it is envisaged that a goal-oriented, Output-Thinking ecosystem can be formed in Hong Kong to promote the development of Hong Kong’s technology and innovation industries (Figure 7.1).

**Figure 7.1 A Goal-oriented Hong Kong Technology and Innovation Industry Ecosystem with Output-Thinking**



**7.10** This project is coordinated by the Education and Technology Department of the Liaison Office of the Central People's Government in the Hong Kong Special Administrative Region (LOCPG), funded by the Research Department of the LOCPG, and managed by the Beijing-Hong Kong Academic Exchange Center. Thanks to Jiang Jianxiang, Director of the Education and Technology Department of the LOCPG, Mr. Liu Zhiming, former Inspector of the Education and Technology Department of the LOCPG, current Managing Director of Beijing-Hong Kong Talent Exchange Center of the Ministry of Science and Technology of the People's Republic of China, other relevant officials from both the Education and Technology Department and the Research Department of the LOCPG, as well as Mr. Hsu Hoi Shan, President of the Beijing-Hong Kong Academic Exchange Centre for their guidance and help. We would also like to thank people from all walks of life in Hong Kong for their help and support, especially Dr. David Chung Wai-keung, Under Secretary of the Innovation and Technology Bureau of the Hong Kong Special Administrative Region, Dr. George Lam, Chairman of the Board of Hong Kong Cyberport Management Co., Ltd., and Professor Witman Hung, Principal Liaison Officer for Hong Kong, Shenzhen Qianhai Authority, Mr. Ji Peiran, CFO of Hong Kong XTech, and other community and industry leaders who accepted our interviews and shared their insights. Finally, Yu Chun's participation in this research as a volunteer, together with Kacie Chan, Kris Lai, Justin Tso, Katie Wong, and Ying Wong's participation and contributions at different stages of the project, are highly appreciated.

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This report only stands for the viewpoints of the authors instead of that of any institutions.

The release of the report coincides with the release of the central government's "Fourteenth Five-Year Plan", which sets out to build Hong Kong into an international center of innovation and technology, and includes the Loop, along with Qianhai of Shenzhen, Nansha of Guangzhou and Hengqin of Zhuhai, as one of the four major cooperation platforms among Guangdong, Hong Kong and Macao. We hope that this report can serve as an inducement, and bring different ideas and inspirations to promote Hong Kong's technology and innovation!





