



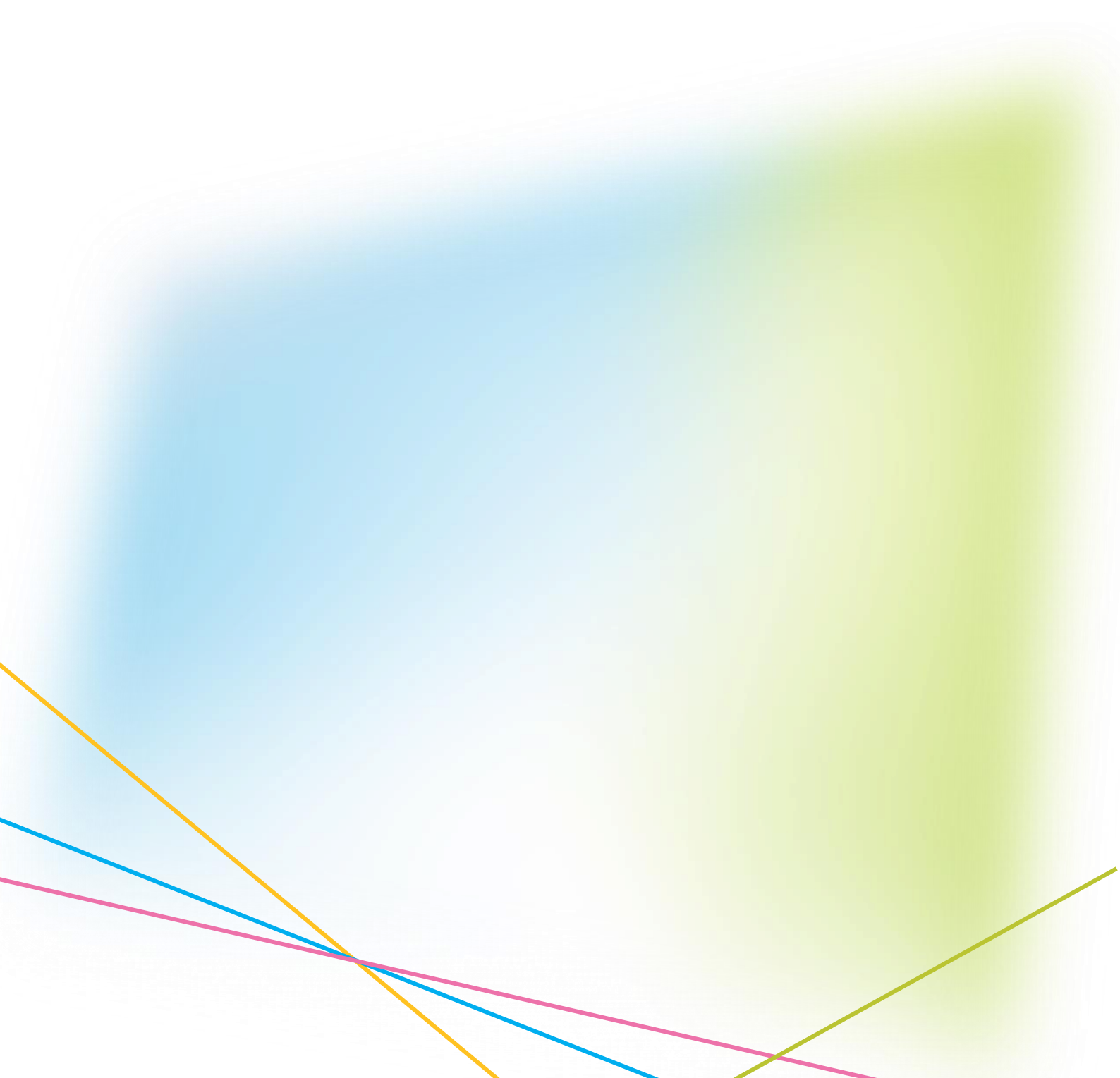
Manpower Update Report Innovation and Technology Sector 2024



ACKNOWLEDGEMENT

The Innovation and Technology Training Board (ITTB) would like to express its gratitude to the focus group members for their valuable time and insights on the manpower situation in the innovation and technology (I&T) sector.

Special thanks go to CPJobs and CTgoodjobs which shared with us their database of job vacancies. The views of focus group members and ITTB members as well as information from major recruitment websites formed an integral part of this report.



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Introduction

Background

The Innovation and Technology Training Board (ITTB) of the Vocational Training Council (VTC) is appointed by the Government of the Hong Kong Special Administrative Region (HKSAR). According to its Terms of Reference, the ITTB is responsible for determining the manpower demand of the sector, assessing whether the manpower supply matches manpower demand, and recommending to the VTC the development of Vocational and Professional Education and Training (VPET) facilities to meet the assessed training needs.

To reflect the dynamics of the manpower situation, the ITTB conducts one full manpower survey every four years,

supplemented by two manpower updates. Following the full manpower survey in 2022, two manpower updates will be conducted in 2024 and 2025.

The 2024 Manpower Update comprises:

- (a) a focus group meeting to gather views from industry experts on the latest developments in the innovation and technology (I&T) sector, manpower situation and training needs, recruitment difficulties, and proposed measures to address the challenges faced by the sector; and
- (b) desk research to analyse job advertisements related to the sector.

Objectives

The objectives of the manpower update are:

- (i) to examine the latest trends and developments in the sector;
- (ii) to explore the job market situation and training needs;
- (iii) to identify the recruitment challenges; and
- (iv) to recommend measures to address the training needs and to ease the problem of manpower shortage.

Methodology

Overview

This update report aims to provide qualitative descriptions of recent developments in the sector through the information obtained from the focus group meeting, supplemented by relevant quantitative data on recruitment advertisements obtained from desk research.

The focus group meeting in hybrid mode, i.e. face-to-face and online, was conducted on 21 August 2024. Members had in-depth discussions on topics set out by the Working Party on Manpower Survey of the ITTB. The discussions at the meeting were recorded and transcribed to facilitate analysis.

Focus Group Meeting

The focus group was formed through the engagement of industry experts to understand the latest trends and development of the manpower, training needs and recruitment difficulties in the sector. Members participating in the focus group are seasoned industry practitioners from the I&T sector, representing:

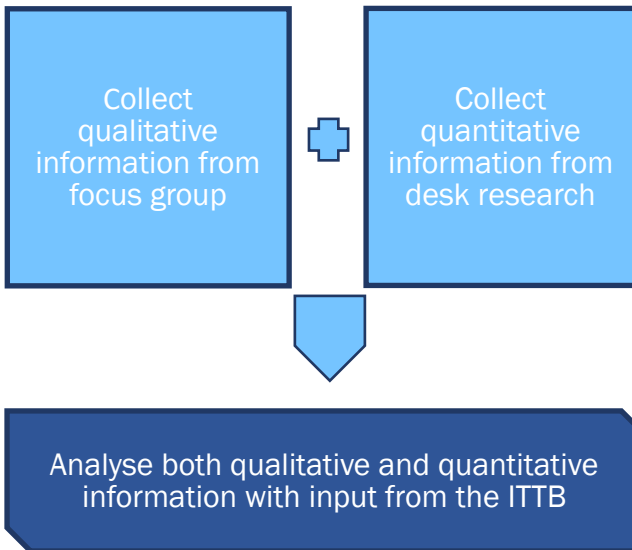
- (i) IT products and services suppliers;
- (ii) IT sales and marketing services;
- (iii) financing, insurance, real estate and business services sector / community, social and personal services sector / transport and storage services or communications services sector / manufacturing sector;
- (iv) IT system integration sector or IT solution service provider;
- (v) innovation products and services;
- (vi) research and development centre / education and training;
- (vii) Hong Kong Science and Technology Parks Corporation; and
- (viii) Hong Kong Cyberport Management Company Limited.

Desk Research

The desk research was conducted between August 2023 and July 2024 to collect job advertisements in the I&T sector from major online recruitment portals through an employment information system. The collected information was mapped against the list of related companies under the Hong Kong Standard Industrial Classification. After eliminating duplicated records, over 60,000 recruitment records were captured during the research period.

Data Analysis

The analysis consists of the following three steps:



Limitations

As this is not a full manpower survey, the findings and recommendations drawn from the focus group meeting are more qualitative in nature and the report focuses mainly on the analysis of manpower trends.

The information on job advertisements was collected from major recruitment portals and the Labour Department. Other channels, such as head hunting for managerial positions, recruitment through social media platforms or industry referrals, were not covered. Since the data collected is a snapshot of a particular period without reference to any historical data, this can only serve as reference information supplementary to the findings of the focus group meeting.

Findings

Factors Affecting the Development of the Innovation and Technology Sector

National Strategies

National strategies play a crucial role in shaping the development of Hong Kong's I&T sector. The Central People's Government has affirmed Hong Kong's significant role as an I&T centre in the "Outline of the 14th Five-Year Plan for National Economic and Social Development of the People's Republic of China and the Long-Range Objectives Through the Year 2023" ("the 14th Five-Year Plan"). The HKSAR Government's alignment with national strategies underscores its commitment to integrating Hong Kong into China's broader I&T development framework, positioning the city as a vital hub in the Guangdong-Hong Kong-Macao Greater Bay Area (GBA).

The Hetao Shenzhen-Hong Kong Science and Technology Innovation Co-operation Zone is one of the major co-operation platforms in the GBA under the "14th Five-Year Plan". This platform serves as a convergence point for the Northern Metropolis and the Guangdong-Shenzhen I&T corridor, facilitating intensive collaboration between the two places. Aligning with national strategies not only enhances Hong Kong's I&T capabilities but also fosters cooperation across borders.

Government Policies and Support

The HKSAR Government has undertaken concerted efforts to shape and enhance its I&T ecosystem actively, recognising the pivotal role of technology in driving economic growth and improving quality of life. To chart Hong Kong's path towards becoming an international I&T centre, the Government formulated a comprehensive "Hong Kong I&T Development Blueprint" in December 2022. This blueprint outlines a clear development path and strategic planning for Hong Kong's I&T development over the next five to ten years, focusing on enhancing the I&T ecosystem, promoting digital economy development, and establishing closer integration with the Mainland's innovation initiatives.

To support the implementation of the blueprint, the Government is investing in critical infrastructure projects. Notably, the Northern Metropolis and the AI Supercomputing Centre (AISC) in Cyberport aim to provide essential infrastructure and resources to advocate I&T development, meeting the growing demand for computer power in research and development and related sectors while fostering industry development.

Furthermore, the Government has implemented various funding schemes and incentives under the Innovation and Technology Fund to cultivate the I&T environment and nurture technology talents, ensuring Hong Kong's competitiveness in the global technology landscape and its ability to address local challenges through technological advancements.

In parallel, the local startup ecosystem has witnessed increased vibrancy, which is supported by the Government and a growing presence of both public and private investments. In 2023, Hong Kong ranked second globally and first in Asia on the Emerging Ecosystems ranking¹.

Through collaborative efforts, the Government is establishing a robust foundation for sustainable growth in the I&T sector in Hong Kong.

Hong Kong's Unique Position and Distinctive Advantages

Hong Kong benefits from its unique position and distinctive advantages by fully capitalising on national support and its own established systems under the "One Country, Two Systems" principle. This unique position enables Hong Kong to leverage its close ties with the Mainland while retaining its status as a global financial and I&T hub, positioning it as a super-connector to bridge between China and international markets. Hong Kong's involvement in national strategies such as the GBA and the Belt and

Road Initiative further enhances its intermediary role.

The combination of Hong Kong's low and competitive tax system, robust legal framework, strong intellectual property protections, and strategic geographical position creates an environment highly conducive to I&T development. By leveraging these advantages, Hong Kong is well-positioned to solidify its role as a premier I&T hub within the GBA and beyond, driving economic growth and technological advancement.

Advancement of Emerging Technologies and Talent Development

Hong Kong has made significant strides in the development of emerging technologies, particularly in key sectors such as artificial intelligence (AI), robotics, biotechnology, and smart city solutions. This progress is supported by targeted government initiatives to optimise organisations' workflows as well as attract talent and investment in these high-growth areas, ensuring that Hong Kong remains competitive in the global I&T landscape.

The recent surge in emigration from Hong Kong has resulted in a notable drain of talent, particularly among young professionals. In response to these trends, the Government has implemented various talent attraction initiatives to enrich the local workforce and introduce a diverse array of skills. Notable initiatives include the Top Talent Pass

¹ <https://startupgenome.com/article/emerging-ecosystems-ranking>

Scheme (TTPS), the Immigration Arrangements for Non-local Graduates (IANG), and the Vocational Professionals Admission Scheme (VPAS), collectively enhancing the talent pool necessary for driving I&T advancement.

In recent years, there has been a significant emphasis on enhancing STEAM (science, technology, engineering, art and mathematics) education at all levels. The Government has increased subsidies for schools and universities to cultivate a culture of innovation and entrepreneurship among students, further supporting the development of skilled professionals equipped to meet the demands of a rapidly evolving I&T landscape.

Geopolitical Shifts and Competitive Landscape

The shifting geopolitical landscape has impacted Hong Kong's I&T ecosystem, presenting challenges to its ability to maintain its competitive edge. The escalating tensions between the United States and China have undermined Hong Kong's status as a geopolitical neutral zone. This is exemplified by the imposition of trade restrictions on China, particularly in the technology sector.

Regional dynamics within Asia further shape the competitive landscape for I&T. Countries like Singapore, South Korea, and Taiwan actively pursue similar technological and innovation objectives, often utilising favourable policies to attract talent and investment. Given this regional competition, it is imperative for Hong Kong to

adapt and innovate to maintain its position as a leading I&T hub.

Competitive Advantages of Hong Kong's Educational Institutions

Hong Kong is home to several internationally renowned universities, with five of them ranked among the world's top 100. These institutions offer high-quality education and research opportunities, creating an environment conducive to innovation. These top-tier institutions enhance the region's ability to attract local and international talent, especially in today's increasingly globalised world and knowledge-based economy.

Moreover, Hong Kong's educational institutions actively pursue the internationalisation of their campuses, striving for a diverse student body that includes a significant proportion of non-local students. This approach not only promotes cross-cultural awareness but also helps retain talented graduates who can contribute to the local labour market.

Higher education institutions in Hong Kong play a crucial role in driving research and development initiatives. They serve as hubs for blue-sky thinking and applied research, facilitating discoveries that can lead to technological advancements. These institutions are increasingly focusing on collaboration with industries to ensure that research outcomes align with market needs, thereby enhancing the practical application of innovations.

Manpower Demand

Focus Group

With reference to the trends and development of the sector, views of the focus group on anticipated changes in manpower demand were collected. Principal jobs related to AI, cloud infrastructure, data analytics, cybersecurity and machine learning are considered to be in high demand. Relevant job titles include but not limited to AI Developer, Cloud Developer, Data Scientist, Machine Learning Engineer and Cybersecurity Analyst. Companies are increasingly turning to AI for productivity improvement and process automation. The demand for data analytics skills is rising in response to the growing prominence of big data and machine learning. Increased demand for cybersecurity talent is expected to be driven by a newly proposed cybersecurity legislation in 2025. The demand for tech-savvy professionals continues to grow in Hong Kong.

Desk Research

Out of the relevant recruitment advertisements captured in desk research, the following top ten principal jobs with the highest number of vacancies were identified:

- 1) Head of IT (including CIO, IT Director, IT Manager, MIS Director, MIS Manager, IS Director, and IS Manager) (20.9%)
- 2) Programmer (including Software Developer, Software Engineer, Application Developer, Web Developer, Full-Stack Developer, Front-end

Developer, Back-end Developer, and Embedded Software / Firmware Developer) (15%)

- 3) Systems Analyst (6.2%)
- 4) Analyst Programmer (including Programmer Analyst) (5.9%)
- 5) Business Analyst (4.8%)
- 6) Project Manager (including Project Director, PMO Manager, Project Leader / Lead, and Scrum Master) (4.3%)
- 7) Data Scientist (including Data Science Specialist, Data Engineer, Data Analyst, Chief Data Officer, and Business Intelligence Specialist) (3%)
- 8) Network Engineer (including Telecommunications Engineer, Network Architect, Network Officer, Network Consultant, and Network Specialist) (2.6%)
- 9) IT Sales Representative, IT Marketing Representative (including Sales Engineer, Account Manager, and Marketing Specialist) (1.5%)
- 10) Systems Architect (including IT Architect, Software Architect, Application Architect, Solutions Architect, Network Architect, and Technical Architect) (0.9%)

Comparison with Previous Manpower Survey / Update

According to the 2022 full manpower survey, the top ten principal jobs with the highest number of vacancies were as follows:

- 1) User Support (including Help Desk Representative, and Call Centre Technical Support) (14.5%)

- 2) Programmer (including Software Developer, Software Engineer, Application Developer, Web Developer, Full-Stack Developer, Front-end Developer, Back-end Developer, and Embedded Software / Firmware Developer) (13.1%)
- 3) R&D Researcher, R&D Scientist, and R&D Engineer for Research and Development Sector (Non-IT related) (7%)
- 4) R&D Researcher, R&D Scientist, and R&D Engineer for Research and Development Sector (IT related) (6.4%)
- 5) R&D Researcher, R&D Scientist, and R&D Engineer for IT Sector (6.4%)
- 6) Service Technician (5.7%)
- 7) Analyst Programmer (including Programmer Analyst) (5%)
- 8) Systems Analyst (5%)
- 9) IT Sales Representative, and IT Marketing Representative (3.5%)
- 10) Service Engineer (including Field Service Engineer, Field Engineer, Managed Service Engineer, and Customer Engineer) (3%)

Besides, findings revealed in the 2021 manpower update indicated the top five principal jobs with the highest number of vacancies as shown below:

- 1) Programmer / Analyst Programmer / Software Engineer (24%)
- 2) User Support / User Co-ordinator (9%)
- 3) Sales Representative / Marketing Representative / Account Manager / Product Promotion Representative (7%)
- 4) IT Architect / Business Analyst (6%)
- 5) System Analyst (6%)

In comparison to previous years' manpower survey and update, recruitment advertisements have indicated a consistent distribution in the top ten principal positions. Programmer, Systems Analyst and Analyst Programmer (27.1%) have remained the most sought-after positions in the market over the years, while positions related to general IT management (20.9%) have shown a notable increase in desk research results between August 2023 and July 2024.

The demand for Programmers and Systems Analysts remains high, driven by rapid technological advancements and increased digitalisation across various industries. Conversely, the surge in general IT management positions may be attributed to a wave of emigration among managerial personnel in recent years.

Training Needs

Focus Group

The following skills as corresponding training needs have been identified in the I&T sector:

Technical skills

- Artificial Intelligence
- Cloud Infrastructure and Computing
- Cybersecurity
- Data Science and Analytics
- Machine Learning

Soft skills

- Design Thinking
- Leadership and Project Management
- Collaboration and Communication
- Entrepreneurship
- Negotiation and Pitching
- Business Analysis

Desk Research

In addition, the advanced technologies, related job titles, and required emerging skills and knowledge identified from the advertisements are summarised in the following table:

| Advanced Technology | Related Job Titles | Required Emerging Skills and Knowledge |
|-------------------------|---|---|
| Agile | <ul style="list-style-type: none">● Scrum Master● Agile Coach● Agile Project Manager● Agile Delivery Lead | <ul style="list-style-type: none">● Agile Certified: Professional Scrum Master II (PSM II), Advanced Certified Scrum Master (A-CSM), PMI Agile Certified Practitioner (PMI-ACP), Project Management Professional (PMP), Projects IN Controlled Environments (PRINCE II)● Experience with Agile methodologies, such as Scrum or Kanban, as well as Waterfall project methodologies● Experience in using Confluence, Jira, and Clarity for mobile / digital projects and related tools adoption |
| Artificial Intelligence | <ul style="list-style-type: none">● Generative AI Specialist● AI Strategist● AI Architect● AI Developer● AI Engineer● AI Algorithm Engineer / Researcher● AI / NLP Algorithm Engineer / Developer | <ul style="list-style-type: none">● Generative AI tools such as Artificial Intelligence-Generated Content (AIGC), Midjourney, ChatGPT, ChatGLM, transformers, NeRFs, generative adversarial networks (GANs), stable diffusion● Knowledge of OpenAI usage, Application Programming Interface (API) and Langchain● Knowledge of prompt engineering, particularly in text and image format |

| Advanced Technology | Related Job Titles | Required Emerging Skills and Knowledge |
|---------------------|--|--|
| | | <ul style="list-style-type: none"> ● Hands-on experience in AI-enabled software products such as Large Language Models (LLM), machine learning (ML), Natural Language Processing (NLP), AIGC, Data Science, and Anything as a Service (XaaS) solutions and services ● Proficiency in Python, C/C++, PyTorch, Tensorflow, Numpy, Scikit Learn, and algorithm development using Python ● Knowledge of API aggregation, AIGC screening analysis, and other aspects related to AI applications |
| Blockchain | <ul style="list-style-type: none"> ● Blockchain Analyst ● Blockchain Developer ● Blockchain Engineer ● Blockchain Researcher ● Crypto System Analyst | <ul style="list-style-type: none"> ● Knowledge of blockchain-related programming languages, such as Solidity, Vyper, Go, Javascript, Python, and Rust ● Familiarity with mainstream Ethereum blockchain networks and frameworks, such as Ethereum, Polygon, and Hyperledger Besu with the capability to maintain blockchain systems ● Knowledge of programming skills and proficiency in Java / Solidity ● Knowledge of developing blockchain smart contracts and conducting contract audits |
| Cloud Computing | <ul style="list-style-type: none"> ● Cloud Architect ● Cloud Engineer ● DevOps Engineer ● AWS DevOps Engineer ● Azure DevOps Engineer ● Cloud Infrastructure Engineer ● Cloud Architect | <ul style="list-style-type: none"> ● Experience with cloud architecture patterns / concepts, such as containerisation, eventual consistency, auto-scaling, multi-tenancy, serverless and strangler ● Familiarity with Azure Cloud Solution Architecture (DevOps, API Management) and Microservice Architecture (Azure Kubernetes Service (AKS), Pivotal Container Service (PKS), OpenShift) |

| Advanced Technology | Related Job Titles | Required Emerging Skills and Knowledge |
|---------------------|---|---|
| | <ul style="list-style-type: none"> ● Azure Architect ● Azure Solution Architect | <ul style="list-style-type: none"> ● Other certifications such as Kubernetes (Certified Kubernetes Administrator (CKA) / Certified Kubernetes Application Developer (CKAD)) or The Open Group Architecture Framework (TOGAF) certification ● Knowledge of agile working methods and the application of Continuous Delivery / DevOps methodologies, including concepts such as Everything as Code and Continuous Everything ● Knowledge of implementing and supporting cloud services, monitoring services, cloud backup services, and site recovery services ● Knowledge of designing or implementing on-premises Private Clouds, such as Azure Stack Hub or Azure Stack HCI ● Certifications from major cloud providers: <ul style="list-style-type: none"> • Azure Certification • Amazon Web Services Certification • Google Cloud Platform Certification • Alibaba Cloud Professional Certification |
| Cybersecurity | <ul style="list-style-type: none"> ● Cybersecurity Analyst ● Cybersecurity Engineer ● Cybersecurity Architect ● Cybersecurity Specialist / Consultant ● Cybersecurity Lead ● IT Security Engineer | <ul style="list-style-type: none"> ● Knowledge of regional security regulations, such as the Chinese Cyber Security Law (CSL), Data Security Law (DSL), Personal Information Protection Law (PIPL), and Cross Border Data Transfer (CBDT) ● Possession of the following professional certifications: <ul style="list-style-type: none"> • Certified Information Systems Security Professional (CISSP) • Certified Information Systems Auditor (CISA) |

| Advanced Technology | Related Job Titles | Required Emerging Skills and Knowledge |
|---------------------|--------------------|---|
| | | <ul style="list-style-type: none"> • Certified Information Security Manager (CISM) • Certified Cloud Security Professional (CCSP) • The Organisation for Security and Co-operation in Europe (OSCE) • Offensive Security Exploitation Expert (OSEE) • OffSec Certified Professional (OSCP) • Offensive Security Web Expert (OSWE) • Systems Security Certified Practitioner (SSCP) • Certified Secure Software Lifecycle Professional (CSSLP) • Certified Chief Information Security Officer (C-CISO) • Certified Ethical Hacker (CEH) • GIAC Incident Handler (GCIH) • GIAC Certified Forensic Analyst (GCFA) • GIAC Penetration Tester (GPEN) • GIAC Exploit Researcher and Advanced Penetration Tester (GXPN) • GIAC Exploit Researcher and Advanced Penetration Tester (GXPN) • GIAC Web Application Penetration Tester (GWAPT) • GIAC Certified Forensic Examiner (GCFE) • GIAC Intrusion Analyst (GCIA) • AWS Certified Security • Microsoft Azure Security Technologies M-AZ 500 |

| Advanced Technology | Related Job Titles | Required Emerging Skills and Knowledge |
|-----------------------|---|---|
| | | <ul style="list-style-type: none"> ● Knowledge of industry frameworks and standards, such as ISO 27001 Lead Implementer (LI) / Lead Auditor (LA), ISO 27005 Risk Manager (RM), ISO 22301 LI / LA, Escal Institute of Advanced Technologies (SANS), The National Institute of Standards and Technology (NIST), and Control Objectives for Information and Related Technology (COBIT) ● Familiarity with the major market solutions and technologies of Endpoint Security |
| Data Science | <ul style="list-style-type: none"> ● Data Scientist ● Data Engineer ● Data Analyst ● Chief Data Officer | <ul style="list-style-type: none"> ● Statistical analysis tools and machine learning languages, ideally Python and Spark ● Big data tools, such as R programming language, Hive, Hadoop, Spark, as well as query languages like Structured Query Language (SQL) and NoSQL ● Data visualisation tools, such as QlikSense, Tableau, and PowerBI ● Understanding and experience with statistical models and machine learning algorithms, such as forecasting, classification, clustering, and optimisation algorithms ● Knowledge of Google Cloud Platform (GCP) or Amazon Web Services (AWS) platforms |
| Digital Entertainment | <ul style="list-style-type: none"> ● 2D&3D Animator / Game Artist ● Unity Developer ● 3D Visualiser ● Game Developer ● Interactive Software Engineer | <ul style="list-style-type: none"> ● Knowledge of site functionality, interaction, site architecture, user interfaces, and navigation ● Proficiency in 3D and 2D visualisation software, such as 3Ds Max, Blender, Maya, Photoshop, illustrator, and Unity |

| Advanced Technology | Related Job Titles | Required Emerging Skills and Knowledge |
|--------------------------|--|---|
| | <ul style="list-style-type: none"> ● Unity3D Developer / Unity Multiplayer Framework Developer ● 3D Vision Engineer | <ul style="list-style-type: none"> ● Experience with various types of games and interactive 3D simulation and application: Motion Tracking, Augmented Reality (AR), Virtual Reality (VR), Mixed Reality (MR), Sports Games, Touch Screen Puzzles, Photobooth, etc. ● Knowledge of motion tracking technology such as Kinect, RealSense or TUIO ● Understanding of mobile game development and its limitations |
| Financial Technology | <ul style="list-style-type: none"> ● FinTech & Innovation Manager ● Software Engineer - FinTech ● FinTech Developer | <ul style="list-style-type: none"> ● Knowledge of developing trading platforms for stocks, foreign exchange, and cryptocurrencies ● Knowledge of front-end development and programming languages, such as React.js and Next.js ● Knowledge of back-end development and programming languages, such as Node.js, Java, and Python ● Familiarity with various web integration patterns and security measures ● Knowledge of Natural Language Processing (NLP), encompassing text classification, named entity recognition, sentiment analysis, and language generation ● Experience in building mobile applications using Flutter, specifically with the Business Logic Component (BLOC) |
| Internet of Things (IoT) | <ul style="list-style-type: none"> ● IoT Architect ● IoT Engineer | <ul style="list-style-type: none"> ● Knowledge of Beacon technology, Bluetooth Low Energy (BLE), and IoT technology ● Knowledge of Long Range (LoRa) and other wide-range protocols, such as Radio Frequency Identification (RFID) and Near Field Communication (NFC) |

| Advanced Technology | Related Job Titles | Required Emerging Skills and Knowledge |
|---------------------|--|---|
| | | <ul style="list-style-type: none"> ● Understanding of backend system and mobile app development |
| Robots | <ul style="list-style-type: none"> ● Robotics Engineer ● Mechatronic Engineer ● Automation Engineer (Mechatronics / Mechanical / Electrical) Engineer ● Control Engineer (Robotics System) | <ul style="list-style-type: none"> ● Knowledge of sensor data preprocessing, machine learning, computer vision, Natural Language Processing (NLP), simultaneous localisation and mapping (SLAM), and path planning algorithms ● Knowledge of wired (UART, I2C, RS485, CAN) and unwired (TCP/HTTP/RTSP) communication ● Knowledge and skills in the following areas: <ul style="list-style-type: none"> • Robot Operating System (ROS), automation development, system integration, control, and sensor fusion • Mechanical and/or electrical hardware design and prototyping • Proficient programming experience related to robotics, automation, and AI, including but not limited to Radiology Information System (RIS), Open Source Computer Vision Library (OpenCV), TensorFlow, and PyTorch • AI algorithm implementation and application experience, particularly in computer vision and reinforcement learning |

Recruitment Challenges

Due to the market's keen competition, some employers have experienced difficulties in the recruitment process. The difficulties are

summarised and related to some of the following factors:

Talent Shortage

The evolving technological landscape has exacerbated an acute talent shortage, particularly in technical roles, where organisations face challenges in identifying qualified candidates with expertise in emerging technologies such as AI and data science. Enterprises in Hong Kong are struggling with a limited supply of skilled talent, with numerous companies reporting staffing challenges in recent years. The rapid pace of transformation within the tech industry has left companies struggling to find people with the requisite skill sets to address both current and future challenges.

This shortage is further compounded by the decreasing working-age population and emigration of professionals, as they pursue opportunities abroad in search of better work-life balance and higher salaries.

Competition for Skilled Workers

The global race for talent has intensified competition among technological hubs worldwide. Companies in Hong Kong compete not only with local firms but also with international organisations. Other regions and countries have implemented more favourable migration policies designed to attract and retain skilled professionals, thus amplifying the tendency of the local workforce to pursue career opportunities outside of Hong Kong.

Perception of the Industry

Hong Kong has long sought to establish itself

as a global financial hub. In this context, I&T professionals are often perceived as possessing lower prestige compared to their counterparts in the business sector, a perception underscored by disparities in compensation, social status and career prospects. This prevailing mindset has resulted in I&T professionals often being regarded as occupying supporting roles within organisations.

Furthermore, there exists a lack of awareness among young talent regarding the opportunities available within the I&T sector. In contrast to other industries offering clearer pathways for career advancement and professional development, individuals may perceive I&T roles with comparatively restricted career advancement prospects, thereby diminishing their appeal.

Recommendations

In response to the evolving landscape of I&T and its future development, the following measures involving the joint efforts of various stakeholders, including the Government, training institutions, employers, and graduates / employees, are recommended:

Government

Nurturing Talent

Fostering collaborations among the Government, industry, and training institutions is crucial for developing curricula of I&T programmes that align with industry needs. This collaborative approach can involve co-developing I&T programmes that emphasise both technical and soft skills necessary to ensure workforce readiness and cultivate a high-quality local talent pool.

The Government should take a steering role in integrating education, technology and talent development. The establishment of the Committee on Education, Technology and Talents, as promulgated in the Chief Executive's 2024 Policy Address, will help ensure that educational development aligns fully with the strategic needs of Hong Kong, the GBA and the Nation as a whole.

The Government should continue to invest resources to help educational institutions elevate their education qualities as well as infrastructure and facilities to attract non-local students to

study and pursue their career development in Hong Kong. Through the Northern Metropolis University Town initiative, more projects in joint programme, research and exchange among local institutions, Mainland and overseas institutions are anticipated to enhance the region's educational landscape.

The Government's initiative to advance the development of Universities of Applied Sciences in Hong Kong further nurtures talent in applied science fields.

Fostering an I&T Ecosystem and Culture

In order to transform public perceptions of the I&T sector, the Government should foster an innovative ecosystem by cultivating a dynamic culture of innovation within communities. This can be accomplished through engaging communities in educational programmes that promote digital literacy and raise awareness of emerging technologies. Furthermore, promoting participation in innovation and technology events will encourage collaboration across various sectors, thus enhancing the overall innovation landscape.

Emphasising an I&T culture by encouraging students to pursue STEAM education is also crucial. Moreover, the Government should support initiatives such as hackathons and collaborative research projects involving industry professionals with diverse backgrounds, contributing to nurturing local talents.

Establishment of Clear Progression Pathways

The establishment of clear progression pathways within the I&T sector necessitates collaborative efforts between the Government and industry stakeholders. Developing well-defined career pathways for various roles is essential. By enhancing the Qualification Framework specific to the I&T sector, the skills and qualifications required at each level will become more transparent for both students and practitioners. This clarity will enable individuals to better understand how to advance their careers, ultimately contributing to a more skilled workforce.

The Government's initiative to build a campus for the Hong Kong Institute of Information Technology (HKIIT) is poised to further enhance the clarity of these progression pathways. By creating a dedicated educational environment focused on I&T, this initiative will facilitate the development of clear career pathways for students, helping them comprehend the skills and qualifications required at different stages of their professional journey.

Embracing Collaboration with the Mainland

The Government should embrace the collaborative advantages with cities in the GBA by implementing a coordinated division of labour and utilising complementary strengths to address Hong Kong's developmental limitations and global challenges. Initiatives such as infrastructure development, financial cooperation, and digital connectivity can facilitate the movement of people, goods, capital, technology and information across the region, thereby bolstering economic integration within the region and overcoming Hong Kong's developmental bottlenecks. Hence, Hong Kong should leverage its role as a super-connector in which the Government creates an environment conducive to embracing both international and Chinese standards or solutions, while nurturing local talent to meet global demands.

Enhancement of Technology Transfer

Implementing policies designed to enhance technology transfer between training institutions and industry and to support the commercialisation of research and development outcomes are recommended. Such initiatives may include providing incentives for collaborative projects between research organisations and enterprises, fostering effective partnerships and facilitating knowledge exchange.

Increasing investment in research and I&T industries is essential to support the translation of research outputs. The Government has announced plans to launch the Research Matching Grant Scheme and the I&T Industry-Oriented Fund, along with the setting up of joint funds investing in start-ups in the 2024 Policy Address, promoting the development of Hong Kong's I&T in an industry-oriented manner.

Training Institutions

Curriculum Alignment with Industry Needs

Collaborating with technology companies ensures that educational programmes align with current industry demand. Ongoing engagement between training institutions and employers facilitates the timely updating of curricula, ensuring that graduates are well-prepared to meet the challenges posed by technological innovation and enhancing their readiness for industry demands.

Training institutions should enrich learning outcomes and encourage problem-solving and innovation through project-based learning. This approach bridges the gap between theoretical knowledge and practical application by connecting classroom learning to real-world contexts. Such exposure deepens students' understanding of how academic concepts apply beyond

the classroom, making learning more impactful.

Strengthening Internship Opportunities

Establishing partnerships with local businesses, including small and medium enterprises (SMEs), to develop comprehensive internship programmes is essential for providing students with valuable real-world experience in technology-driven environments. These robust internship initiatives should be designed to immerse students in practical work settings, allowing them to apply theoretical knowledge gained in the classroom to real-world challenges. By collaborating with industry leaders, training institutions can ensure that these programmes are aligned with current market demands and technological advancements. Such experiential learning opportunities enhance students' technical skills and improve their employability upon graduation by equipping them with practical insights and professional networks. These partnerships can foster a culture of mentorship, where experienced professionals guide interns, aims at enriching the educational experience and preparing a skilled workforce for the evolving landscape of the I&T sector.

Expansion of Vocational Training Programmes and Their Promotion

There is a pressing need to develop more vocational training programmes that provide hands-on experience in technology-related fields. The establishment of the HKIIT can play a pivotal role in cultivating a skilled workforce ready to address the demands of the I&T sector. By establishing this specialised training institution, parents and students will better understand the career prospects within the sector, thereby fostering a gradual shift in perception that prioritises I&T as one of the fundamental components of Hong Kong's development.

Provision of Reskilling and Upskilling Programmes

Reskilling and upskilling programmes are essential for equipping the workforce to adapt to rapid technological advancements and shifting market demands. Training institutions can play a vital role by developing tailored programmes that align with the specific needs of individual companies, effectively addressing the competencies required in the workplace.

Reskilling and upskilling programmes not only enhance the employability of individuals but also cultivate a more agile and responsive workforce capable of navigating the complexities of a

dynamic I&T landscape. Training institutions can provide short courses or bite-sized learning that align with today's learning patterns. By equipping employees with the necessary skills to meet evolving challenges, these programmes contribute to both individual career growth and organisational resilience, fostering a culture of continuous improvement and adaptability within the industry.

Provision of Soft Skills Training

In an era characterised by ongoing collaboration and a heightened emphasis on customer engagement, technical expertise alone is no longer adequate. Strong interpersonal skills are now equally essential for IT professionals, who must effectively convey complex technical concepts to non-technical stakeholders. Soft skills training, including negotiation, entrepreneurship and pitching, can empower IT professionals to articulate ideas clearly and convincingly and navigate discussions adeptly. The provision of entrepreneurship training is crucial for developing entrepreneurial competencies and nurturing entrepreneurial talent.

Employers

Investing in Employee Development

Continuous learning is necessary in the fast-paced I&T environment.

Employers should encourage a culture of lifelong learning within the workplace and invest in upskilling programmes that encompass technical training and soft skills development. Providing resources and incentives for employees to engage in professional development is crucial for helping them stay abreast of the latest advancements.

Employers can leverage Government funding initiatives such as the New Industrialisation and Technology Training Programmes (NITTP), the Vplus Creative Industries Subsidy Scheme, and the Continuing Education Fund to enhance their competitiveness in talent and innovation development.

Offering Attractive Remuneration Packages

In a competitive labour market, providing appealing remuneration packages is essential. Employers should consider offering competitive salaries alongside additional benefits, such as flexible working arrangements, remote work options, bonuses, profit-sharing plans and housing subsidies. Flexibility in work hours and formats has become increasingly important as employees prioritise achieving a better work-life balance.

The mobile workforce has become increasingly prevalent in recent years. Employers should formulate human resource strategies that support a versatile and mobile workforce, unencumbered by physical work locations. Companies that effectively integrate a mobile workforce can eliminate geographic barriers, thereby

expanding their ability to recruit and retain a larger talent pool.

Co-creating Partnerships with Training Institutions

Co-creating partnerships between companies and training institutions, including internship programmes and joint research projects, significantly enhance students' practical experience and employability. Companies can implement internships that offer hands-on training in emerging technologies, project management, and other essential domains.

Additionally, these partnerships enable companies to collaborate with training institutions on joint research projects that address specific technological challenges or explore innovations. Such partnerships can yield valuable insights while offering students the opportunities to apply their theoretical knowledge in practical contexts.

Graduates and Employees

Embracing Lifelong Learning

Professionals must take the initiative to pursue continuous education opportunities through formal coursework, in-service training, or self-directed learning in emerging technologies. Graduates and employees can utilise Government funding schemes to upskill and reskill throughout their careers, ensuring

competitiveness in a rapidly evolving job market. This commitment to ongoing education enhances technical competencies and fosters adaptability and innovation, positioning professionals to effectively respond to industry shifts and integrate new technologies into their work.

Adaptability to Emerging Technologies

To effectively navigate the dynamic I&T environment, graduates and employees should stay informed by regularly following industry news, participating in seminars / webinars, and engaging with industry leaders on social media platforms to remain aware of emerging trends. Furthermore, obtaining hands-on experience through projects or internships involving cutting-edge technologies can significantly enhance employability by providing practical skills that are increasingly valued in the workforce.