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Workforce Development in Hong Kong

Vivek WADHWA

Pratt School of Engineering, Duke University/

Harvard Law School

In many industrialized nations, key stakeholders frequently discuss whether the country has adequate talent to successfully compete in an era of rapid globalization. In the U.S., political and business leaders frequently express alarm at the aging engineering and scientific workforce. Declining enrollments in scientific fields in U.S. universities are juxtaposed against rapidly accelerating graduation rates of engineers and scientists in China and India. This disparity often leads to predictions of severe shortages of science and engineering workers in the U.S. and a loss of U.S. competitive edge unless science and engineering graduation rates can be lifted. Globalization is also causing disruptions in the U.S. workforce with the outsourcing of high-skilled jobs to India and China. Protectionists say the solution is to raise trade barriers and prevent outsourcing to save quasi-technical, skilled white-collar jobs.

Ironically, stakeholders in Hong Kong are having a similar debate. They feel Hong Kong needs to expand its graduation rates of engineers and scientists to provide the brainpower required for a push into R&D-intensive industries. There are also calls for Hong Kong to increase its investment in industrial and academic research with the assumption that more investment equates innovation. This research driven innovation would supposedly enhance competitiveness. However, Hart and Tien's research illustrated that as Hong Kong universities steadily increased output of science and technology graduates demand for the majority of scientific talent actually softened. The only talent shortages they found were at the managerial and executive levels and for R&D positions in select engineering specialties.

The Global Engineering and Entrepreneurship project at Duke University has been researching the effect of globalization on the engineering profession and on U.S. competitiveness. We have explored such topics as engineering education in India, China, and the U.S.; the

globalization of innovation and R&D; the impact of immigrants on the U.S. economy; and how globalization is impacting intellectual-property creation and entrepreneurial activity in the U.S.

We found that regularly cited graduation statistics for India and China were misleading and based on faulty comparisons. Our interviews with the executives of technology and engineering companies engaged in outsourcing R&D to India and China revealed that their primary motivation in moving operations abroad was not a shortage of engineers but lower cost and the proximity to growth markets. Furthermore, we found that the quality of engineering education in China and India was substandard for the purposes of many Western businesses.

Despite educational deficiencies, the outsourcing of R&D to India and China is gaining substantial momentum. In Hyderabad, India, companies like Satyam Computer Services and Hindustan Computers Limited are designing the interiors of a luxury jets, in-flight entertainment systems, collision control/navigation control systems, fuel inverting controls, and other key components of jetliners for American and European corporations. In New Delhi, Indian scientists are discovering drugs for GlaxoSmithKline. In Pune, Indians are helping design bodies, dashboards, and power trains for Detroit automakers—and soon may develop entirely outsourced passenger cars. In Bangalore, Cisco Systems, IBM, and other U.S. tech giants have made the Indian city their global base for developing next-generation telecom solutions used in tomorrow's intelligent cities.

China is already the world's biggest exporter of computers, telecom equipment, and other high-tech electronics. Multinationals and government-backed companies are pouring hundreds of billions of dollars into next-generation plants to turn China into an export power in semiconductors, passenger cars, and specialty chemicals. It is lavishly subsidizing state-of-the-

art labs in biochemistry, nanotech materials, computing, and aerospace. Within 15 years, China expects to be producing commercial aircraft to rival those of Boeing.

China is investing massively and has a top-down focus on achieving these feats. The Indian government is largely playing politics with its education system and has invested relatively little in infrastructure, education and basic research. Yet India appears to be moving ahead of China to become a global hub for advanced R&D in several industries despite the lack of government investment in workforce development or infrastructure. In trying to understand why India has been able to pull ahead, we learned that the Indian private sector has found a way to overcome deficiencies in its education system through innovative programs of workforce training and development. These have transformed workers with a weak educational foundation into R&D specialists (Footnote here to How the Disciple Became the Guru).

With an aging population and low fertility rates, Hong Kong requires more than new children to maintain its global competitiveness. Unlike Mainland China, Hong Kong does not have significant problems with its engineering or science education programs, or with the supply of talent. The solutions don't lie in the schools and universities. The solution is to upgrade the skill sets of the existing workforce. Therefore, we believe that the Indian experiences in upgrading its workforce may be relevant for Hong Kong. We also believe in combination with this, Hong Kong can build on its tradition of business and trading -- which is often called entrepreneurship. They key is to teach small businesses how to become mid-sized and large enterprises. In the following sections, we will detail what we learned from our interviews with Hong Kong companies in different sectors and provide observations about the skills available.

Workforce development in Hong Kong and engineering talent

To gain an understanding of the skill needs and workforce development practices in Hong Kong and the landscape for engineering talent, we interviewed the following domestic, multi-national, and Chinese companies in a diverse assortment of industries and spoke to several experts. Here we present the views of the interviewees. Note that most of the comments we have highlighted were echoed by a wide cross-section of people interviewed.

Opinions of some experts

Experts we interviewed include Alice (Miu Hing) Au, Managing Partner with Heidrick & Struggles, Thomas Goh, Partner with The Gallup Organization, Professor Alfred Ho, Executive Director of Academy of Management Consultancy, Professor Otto C. Lin, China CEO of Nansha Technology Enterprises Ltd., Charlie Y. Shi, Managing Partner of Omaha Capital China, Dr. Thomas S. K. Tang, Executive Director of Global Institute Tomorrow, and Cheah Chin Teik, President of Chin Teik Consulting Ltd.

We summarize their comments in the passages below. We believe these provide meaningful insights.

- While the Hong Kong Science Park may have some advantages in terms of intellectual property, Hong Kong does not have the ecosystem for R&D. R&D in China is centered in Beijing and to some degree Chengdu. Hong Kong managers tend to have greater breadth and scope and general managerial perspective because they have had greater exposure. However, Hong Kong has fewer senior managers in non-financial sector areas than Singapore. There are very few PRC Chinese general managers at senior levels, and Chinese managers tend to be more functionally oriented and lack non-technical skills

such as marketing and sales. The pipeline of Chinese managerial talent is improving but will take 10-20 years to develop.

- During the past 5 years, Hong Kong has reinvented itself as a gateway to China in financial services, hospitality, and other services industries. Young Hong Kongese are more globalized, well-connected, and speak better English than their parents but are also less willing to venture out than their parents were. Hong Kong companies traditionally do not spend on training and development because of historically high turnover. Hong Kong companies have become aware of the need to invest in training during the past 10 years. Shanghai companies are catching up to Hong Kong in terms of management knowledge, but they still lag in their ability to apply management knowledge. Hong Kong managers have had greater exposure to international business practices and global competition and are more adaptable, confident, and cosmopolitan than their Chinese counterparts. In addition, Hong Kong managers have experienced both periods of growth and setbacks and are therefore able to respond to a greater range of business scenarios. A typical Shanghai manager would focus on execution versus collaboration, while Hong Kong managers have stronger project management and communication skills. Hong Kong has a 10-year lead in terms of managerial capabilities, but PRC China will catch up quickly.

- Managerial training and development developed as part of business development in Hong Kong. Training and development units generally report to HR, and it is uncommon to have a director of training and development, reflecting the general level of importance of

training and development assigned by senior management. SME's play a particularly large role in Hong Kong, which has 680,000 SME's registered for a 3.5 million person workforce. Companies are easy to start, and most SME's are family owned businesses, which invest little in training and development. Foreign owned, large companies, and large government and non-governmental organizations are most likely to invest in training. However, high turnover makes many companies reluctant to invest in training. Few companies are engaged in R&D in Hong Kong, and most companies adopt existing technology and focus on low-cost production and reliability. Many local engineering graduates do not enter technical production or engineering as Hong Kong has shifted to a service economy, and the services sector is able to absorb this talent. Most engineer graduates prefer to work in product sales and marketing than in manufacturing.

- There is a large supply of technical talent on the Mainland that is less expensive than Hong Kong graduates. China's entry into the WTO has forced many business sectors to open up, and Mainland Chinese managers are learning quickly and are better informed than they used to be. China has many bright people, many who have pursued overseas studies. Hong Kong young people have more international connections and language advantages but are more complacent than their Mainland counterparts.

- There are 8 universities in Hong Kong and five with strong engineering programs, which produce 10,000 graduates each year. The number of foreign students from Mainland China is increasing but most do not stay because of opportunities and family ties in the Mainland as well as the language barriers. Many engineering graduates enter design,

sales and services, and product development functions. Hong Kong has strengths in product development, logistics, and supply chain management and is the base for many company headquarters. Professional, legal, and financial services sectors are booming. In order for R&D to happen in Hong Kong, it requires a core group of corporate of industrial R&D people. The majority of Hong Kong's business people are traders and middlemen involved in commerce and services and do not see the value of investing in innovation. Hong Kong business people are very entrepreneurial but are short-term oriented.

- There is no meaningful R&D in Hong Kong, and most R&D in China is limited to copying technologies and business models. Family owned companies in Hong Kong are highly dependent on their founders and children in their quality of management. There is no culture of training, and in-depth processes do not exist. Top tier scientists do not return to China and prefer the working environment of the U.S. Investing in R&D in China is risky because there is a dearth of managerial skills required for successful R&D.

- Hong Kong's education system is focused on examinations and obtaining qualifications versus applying information, and does not encourage independent thinking. Training is similarly viewed as a stepping-stone for advancement, and many employees will leave once they are trained. SME's in Hong Kong are driven by profits and therefore invest little in training and development. As second and third generations of families that own SMEs obtain education in the West, they are bringing new managerial ideas to Hong Kong companies. Hong Kong graduates tend to have greater sophistication and ability to

apply knowledge than their Mainland Chinese counterparts but Hong Kong graduates also often lack communication and language skills.

- Hong Kong has strengths in financial services, sales and marketing, and hotel and tourism. Because the economy is doing well, Hong Kong does not feel the need for innovation. Many MNC's in Hong Kong invest significantly in training, and many individuals pursue part-time studies. Chinese companies are generally not interested in training and development and are focused on building and selling companies. However, individual demand for training is high as individuals know that they need to obtain knowledge and capabilities in order to compete.

Some data points from leading companies based in Hong Kong

Agilent Technologies

The best workforce development practices we observed in Hong Kong were at U.S.-based Agilent Technologies. Agilent produces test and measurement equipment for electronics, life sciences, and chemical analysis. The company's Asia headquarters and sales and marketing are based in Hong Kong, where the company has been operating for 20 years. The company performs no R&D in Hong Kong. Agilent has not pursued R&D in Hong Kong because the company has been unable to secure tax incentives or government subsidies. Agilent executives said that hiring technical people in Hong Kong is a challenge. Many top students are choosing to go to business school rather than engineering school, and many top engineering graduates opt for non-engineering jobs, particularly in the finance sector.

Agilent has sizeable R&D operations in Beijing and Shanghai, however. The company recruits from the top Mainland universities and says that Chinese graduates are great individual contributors and technically brilliant. However, these Chinese graduates lack project management, product marketing and product definition skills. Chinese-born students tend to be stronger academically and work harder, while Hong Kong students are more open to ideas, vibrant, and creative. The company sponsors a 90-day on-boarding program for most new hires. This includes company orientations as well as training online, in the classroom, and on-the job training for technical and soft skills. The program also includes a two-week overseas visit of factories. All new employees are assigned a mentor in the HR system, and these relationships last for one year. In the electronics group, engineers receive 4-5 weeks of ongoing development each year including 1 week of formal technical training, 10 days of technical online training, and 1-2 weeks of soft skills training. Managers receive 3-4 weeks of ongoing training each year. Agilent has a program for first-time managers, which includes classroom and online training modules received over the course of 6-9 months.

Bank of China (Hong Kong)

Bank of China is a Mainland-based bank competing with domestic and foreign banks in Hong Kong. To remain competitive in this environment, Bank of China has focused on employee development to a degree that is unusual in China. The bank employs 200,000 globally and 13,000 in Hong Kong, including 156 managers in Hong Kong. Approximately 10% of these managers come from the Mainland, and the remainder is from Hong Kong. Of the bank's 17 departments, only four are headed by managers sent from the Mainland headquarters to Hong Kong. The bank's officer training program annually recruits 200-300 fresh graduates from the

top universities in China. In 2007, the program recruited 39 students from Hong Kong. Salaries are significantly higher in Hong Kong than in Mainland China

Training and development efforts have focused on increasing productivity which improved from HK$890,000 per employee in 1988 to HK$1.3 million in 2004. The bank spends 1.8% of total human expenses on training programs. Training expenditures have remained flat for the past three years and are determined by the company Board of Directors. General staff are required to undergo 30 hours of mandatory training each year in areas such as internal control, risk management, anti-corruption, and money laundering. The bank built a dedicated training center in Hong Kong in 2003. The training center has 30 full-time staff and offers 1,100 courses in technical, soft, language, computer, and vocational skills.

In Hong Kong, the bank conducts 80,000 man-days of training each year. That equates to roughly a week of training per employee. Actual training per staff employee averaged 28 hours in 2007. Managers are required to undergo 40 hours of mandatory training each year. In 2007, managers averaged 68 hours of training. Participants in the Management Training (MT) program undergo two months of full-time classroom training led by internal trainers and managers. The MT program is a three-year program, which begins with an 18-month rotational program. MT program trainees are also assigned mentors.

China Netcom Hong Kong

China Netcom Communications is a state-owned telecommunications provider. CNC is a full-service provider in Mainland China but focuses on wholesale customers (international operators) in Hong Kong. CNC has never hired fresh graduates and always hired experienced employees (usually in their 40s) in order to reduce training costs. For junior level staff, the

company looks for candidates with three years of experience. The company has found that despite positive economic conditions, it often receives very senior applicants for relatively junior positions. CNC offers no training in Hong Kong.

Because of the large number of unemployed college graduates, attracting talent is not a major issue for state-owned companies. Employees who join state-owned companies still expect to remain for life, and SOE's do not face competition to retain employees. Employees who have worked for SOE's enjoy security and lack the international experience required to obtain jobs with international companies.

Clover Group International Limited

Clover Group is an intimate apparel manufacturer founded in Hong Kong in 1956 by Andy Lau, a Chinese immigrant. The company has 10,000 employees in China and 13,000 worldwide. Clover's 250 employees in Hong Kong are involved in merchandising, product development, human resources, and finance. The company says labor costs in Mainland China are one-tenth of those in Hong Kong. Operational managers come from Mainland China while general managers are mostly from Hong Kong. Turnover in sales and management is relatively low, while attrition in human resources is higher due to a booming market for HR professionals. Turnover is also high in Clover's merchandising group, measuring 25-30% annually. To improve retention, Clover sponsors work-life balance and recreational activities such as classes for stress management. It also sponsors social responsibility initiatives and has invested in enhancing managerial skills.

The company rents a building devoted to training, and workers receive 40 hours of technical training to develop multiple skill sets. This requirement is part of the ISO 9000

certification process. The company's existing managers often have good technical skills but lack supervisory and people skills. The company recently signed a $4 million 3-year training and development contract with an external provider targeted at managers and last year completed $1.4 million in training. The first phase focused on Hong Kong and included 20+ supervisors. The second phase will be rolled out in China and the third phase in Cambodia. The company conducted competency assessments and focus groups to identify skill gaps and training needs, has done succession planning, and has enhanced its on-boarding program and social responsibility initiatives. The company would like to require at least 20 hours of training for managers.

Citrix Systems

Citrix Systems, a multi-national software company based in Fort Lauderdale, Florida, builds software for hardware virtualization and secure remote access software products. Citrix employs 5,500 in 100 offices around the world including 50 sales and support staff in Hong Kong. Company executives say that Hong Kong suffers a shortage of skilled human resources personnel. Most junior and middle level human resource managers have moved up through administrative functions and have traditionally reported to finance. While there have been efforts to set up human resource Master programs and to offer strategic human resource management courses, Citrix management believes human resource management capabilities of the Hong Kong workforce are still limited. Human resource issues are not a priority on the agenda of managers who are busy and overworked. The learning environment in Hong Kong companies is highly transactional, and employees are given tasks with little coaching or mentoring. In recent years, executive coaches have become very popular as some companies, particularly in the finance sector, have recognized the need to train and develop managers.

Dragonchip, Ltd.

Dragonchip was founded in 2001 with four employees and currently has 13 employees. The company designs semiconductor applications for use in remote controls and low power hand-held devices. The company does design in Hong Kong and leverages outsourcing to manufacture in China. Dragonchip only hires experienced employees. Training and development is primarily done through on-the-job training. The founders spend approximately 20% of their time training employees.

Esquel Group

Esquel Group is the world's largest premium shirt maker and is a vertically integrated company. Equel's businesses include cotton seed R&D, cotton cultivation, spinning, weaving, assembly, accessories, and a small but expanding retail brand. The Group has production facilities in China, Malaysia, Vietnam, Mauritius, and Sri Lanka, and a network of branches servicing key markets worldwide. Esquel manufactures for some of the world's best known brands, including Tommy Hilfiger, Hugo Boss, Brooks Brothers, Abercrombie & Fitch, Nike, Lands' End and Muji, and major retailers such as Marks & Spencer, Nordstrom and Jusco. The company has 47,000 employees with 33,000 based in China and Hong Kong. Esquel Group says it is the leader in its apparel industry leader in terms of training and development. It spends less than $2 million annual, or 1% of payroll costs on training. The company plans to increase this figure in the near future.

First-time supervisors receive 5 days of training, and supervisors receive 2 weeks of ongoing development each year. Supervisors manage approximately 70 employees. Supervisors are trained in communication skills, technical skills, grievance management, meeting

organization, and other managerial skills. First-time middle managers undergo 3 days of intensive training on different aspects of management including communication, presentation, and reporting. Many, but not all, senior managers undergo training and development. The general manager of the accessory group, for example, spends 10 days each year on training and development. The company is aiming to build Esquel University by 2011 and to make it compulsory for all senior managers to spend time training. The company does not have a systematic executive education programs. However, four years ago the company began to provide education sponsorships for executive MBA programs and technical training such as Six Sigma.

Gold Peak Industries (Holdings)

Gold Peak is a family-owned publicly listed company in Hong Kong. The company's core products are batteries, GP lighting, crystal products, and high-end loudspeakers. The company is not developing any significant new technologies. They are involved in product design but not R&D. Gold Peak recruits engineers from China, back-office finance, human resource, and IT staff from Hong Kong, and product designers from Hong Kong and the United Kingdom. The company has 20 design employees in Hong Kong and 15 design employees in London. The company recruits radio frequency engineers from universities in the Guangdong area. Among these universities is Southeast University located in Guangzhou and close to Gold Peak's office in Shenzhen. Local graduates are more willing to come to Shenzhen that graduates from Beijing, Shanghai, or other regions.

The company has faced challenges in recruiting high quality candidates in both China and Hong Kong. As manufacturing companies have moved from Hong Kong to Southern China, fewer Hong Kong graduates have entered manufacturing, and Hong Kong lacks middle

managers between their 30's and 40's with technical know-how and experience in manufacturing. Senior managers in their 50's and 60's moved up the corporate ladder at Gold Peak through a series of manufacturing positions. However, Gold Peak managers feel that today most Hong Kong graduates seek to enter financial services or other sectors.

The company says it would hire more Hong Kong managers if they were available because of their high levels of integrity, flexibility, business sense, and language skills. Gold Peak's experience is that Mainland Chinese managers perform well as supervisors and junior managers but have trouble functioning effectively as senior managers and top executives. The company launched a management trainee program in 2005. The program recruits trainees from top universities in Hong Kong, including Hong Kong University and University of Science and Technology, and from top universities in southern China. The program is aimed primarily at developing local talent in China to take advantage of lower salaries, and to fulfill business needs on the Mainland. The program also aims to counter-balance the lack of candidates in Hong Kong. During 2008 Gold Peak hired 5 graduates in Hong Kong and 25 in China as part of this program. The company's staff in Hong Kong is stable, but turnover in China is much higher. The company pays at slightly above the median and does not have any specific retention initiatives. Gold Peak executives say the company spends 1% of payroll expenses on training and development and has no plans to increase this investment.

iASPEC Services

iASPEC is an IT consulting and software services firm headquartered in Hong Kong. The company was founded in 1998, launched its Shenzhen operations in 1992, and currently has 300 employees. The company recently moved to Zhuhai from Shenzhen due to rising costs. iASPEC says it has stopped hiring project managers from Hong Kong and hires Chinese project managers

who are less expensive and more effective because they are able to spend more time with employees, have a better understanding of client needs, and have superior language and cultural skills. iASPEC's team leaders and resource managers are based in China, and its technology architects are based in Hong Kong. Company executives say that, while China produces large numbers of engineering graduates, they are not comparable in terms of skills or quality to Hong Kong graduates. Challenges with Mainland China graduates include reluctance to disagree with authority, fear of confrontation, inability to compromise, and lack of willingness to work out differences.

Noble Group

Noble Group is a commodity supply chain management and trading company headquartered in Hong Kong. The company was founded in 1987 by a UK businessman and is one of the few global commodity businesses in Hong Kong. The company has grown from 1,000 employees in 2004 to over 10,000 employees in 2008. These numbers include 5,000 crew members on ships, 3,000 employees in facilities, and 2,000 employees in offices. The pool of experienced talent in commodities trading is small, and Noble Group competes with investment banks and hedge funds for top talent. The company uses strategies such as looking for less experienced talent and providing greater incentive pay to attract talent. Recruits for its training programs are Undergraduates and Masters graduates with 0-2 years of experience. Only 20% of trainees are from Hong Kong, China, and Singapore.

The company says Chinese graduates have greater ambition, drive, and willingness to work than their Hong Kong counterparts. Both Hong Kong and Chinese graduates have weaker English language and cultural skills than their U.S., European, and Latin American counterparts. The company has also developed a customized executive education program in conjunction with

INSEAD. The program is targeted for all managers from first-line manager and above who range in age from 28-54. First-line managers are typically in their late 20's. The program consists of three 1-week modules held in the two INSEAD campuses in France and Singapore, and in a Hong Kong location. The program culminates with trainees presenting an actual action proposal to the executive board. In addition, the company conducts management skills training sessions in which 12 selected managers from across Europe spend a day of training discussing case studies and participating in role play exercises using real situations and led by an external consultant. A similar program is held in Argentina, and the company plans to implement a similar program in Asia.

ON Semiconductor

ON Semiconductor is a Motorola spin-off headquartered in Phoenix, AZ. ON has 10,000 employees, 5,700 of which are located in Asia, including 200 in Japan, 300 in China, 1,500 in Malaysia, and 89 in Hong Kong. ON does not hire fresh graduates in Hong Kong, and hiring is concentrated at the strategic and senior manager level. The company says that Hong Kong still has good engineering schools, but the popularity of engineering and the quality of applicants has decreased significantly in recent years due to the lack of innovative and challenging engineering positions in Hong Kong. Top graduates enter financial services rather than engineering fields. Hong Kong managers tend to be more cosmopolitan, are less internally focused and have greater exposure to MNC business practices and Western education than their Chinese counterparts.

Prosten Technology Holdings

Prosten was founded in Hong Kong in 1988 as a hardware trading company. Prosten has revamped its business model several times to focus on artificial intelligence research and

developing mobile music search systems for customers such as China Unicom. The company currently has HK$83 million in revenues and 170 employees. Prosten hires almost exclusively in China. The company had 70 managers in Hong Kong in 2000 and 2001 but currently has only 11. Prosten hires all of its managers from the Tsinghua University MBA program. Finance, legal, sales, and administrative staff are plentiful and easy to hire. However, competent technical managers are difficult to find in China. Chinese engineers are technically strong but lack the experience to manage complex projects with multiple teams and layers, according to Prosten executives.

Retaining technical staff is challenging. The company faces a significant threat in its mobile music search business from Baidu, Google, and Yahoo. These companies pay high salaries for top talent and are constantly hiring away engineers from smaller competitors. Hong Kong engineers have somewhat better engineering skills than their Mainland China counterparts. However, Hong Kong does not have the labor to support complex software development. The region's emphasis on financial services means that, while Hong Kong has many data processing department support managers, it does not produce skilled software developers.

Engineering Graduates – Declining Quantity and Quality?

Our interviews revealed that companies had difficulty hiring skilled engineering talent in Hong Kong for R&D tasks. This is consistent with the findings by Hart and Tian, which show the expanding the supply of science and engineering (S&E) talent in universities has not met industry needs and has not resulted in a boom in R&D jobs in Hong Kong. Several business executives said that technical quality of graduates from Hong Kong universities had actually declined over the last decade as admission standards were lowered in an effort to increase the number of engineers. At the same time, executives we spoke with claimed that Hong Kong locals had lost interest in studying engineering or those who did preferred careers in finance upon graduation. While engineering seems to be less attractive to Hong Kong graduates, Mainland Chinese students are filling the void and the companies we interviewed had no problem locating R&D and more technical jobs on the Mainland while keeping HR, strategy, or business-oriented jobs in Hong Kong.

Where Do the Engineering Graduates Go?

Clearly Hong Kong has expanded its output of engineering graduates but they have not gone into R&D jobs. Globally, financial services has traditionally offered the highest salaries and attracted the best talent from various fields, including engineering. This has also appeared to be true in Hong Kong. As a result, semiconductor companies such as ON Semiconductor do not hire fresh graduates to do circuit design in Hong Kong. Instead, these firms are expanding their R&D in India and China. Similarly, in the software industry, companies like Prosten say that R&D is not possible in Hong Kong due to the lack of software engineers. This forced Protsen to move R&D to the mainland. At the same time, local companies say they have a very hard time attracting and retaining Mainland Chinese engineers to Hong Kong. These transplants see greater

opportunities on the Mainland and prefer to return home. Hong Kong graduates could go to the Mainland for technical jobs but considering the comparatively lower salaries it is not a surprise that many choose not to make the move. Most multi-nationals who hire engineers in Hong Kong hire them for jobs in sales and marketing instead of R&D. In the United States, Japan and Europe, engineers moving into sales and marketing jobs is usually a later-stage development in the career lifecycle. Because this happens earlier in Hong Kong, it creates further disincentives for students to study engineering, which they understand they are unlikely to use in any real capacity.

The Issue: Demand not Supply

Seeking to boost the output of engineering graduates does little to address the core problem of lack of demand for science and engineering graduates in Hong Kong. While the government had hoped that increasing the supply of engineers would spur job creation, in fact on the Mainland and in India the reverse has happened: a shortage of talent and a surplus of jobs (demand) fueled expansion in engineering graduates. The comparative supply advantage of the Mainland influenced Hong Kong companies to move more of the few existing science and engineering jobs to the Mainland where better engineers could be hired more cheaply. The lack of good engineering jobs in Hong Kong also make it harder to retain Mainland talent, who see less of an engineering career path in Hong Kong. As a result, Hong Kong engineering graduates who remain in technical disciplines often leave Hong Kong for the U.S., Europe, and Mainland China. When they decide to become entrepreneurs and start companies, they are doing this in other countries.

The Missing Middle – Hong Kong's Declining Competitive Edge

As manufacturing companies have moved from Hong Kong to Southern China, fewer Hong Kong graduates have entered manufacturing. Senior managers in their 50's and 60's moved up through the manufacturing ranks, while most Hong Kong graduates now enter financial services or other sectors. As a result Hong Kong lacks middle managers between their 30's and 40's with technical know-how and experience in manufacturing.

Hong Kong's workforce had had significant advantages over China in managerial capabilities, including linguistic, cultural, and social skills, as well as in flexibility and creativity, and a stronger sense of rule of law. A greater exposure to Western business practices has also been very helpful as it has given Hong Kong managers a better footing for dealing with foreign partners. The resulting situation is a downward spiral of technology talent fed by the exodus of manufacturing, which in turns reinforces the loss of technology talent. Because there are fewer opportunities for engineering graduates, Hong Kong is unable to grow technical managerial technical talent. It is experiencing a hollowing out of its technical managerial talent and Hong Kong's competitive advantage in managerial capabilities for technical or manufacturing enterprise is quickly disappearing or, in the case of most technology products, has already largely disappeared.

Recommendations for Hong Kong

To compete globally, Hong Kong needs to compete on its strengths – which include its global outlook, western orientation, rule of law, intellectual property rights, entrepreneurial workforce, and professional management skills. The country needs to focus on strengthening what has provided it with advantages to date. Improvements are needed in the area of workforce

development. Further, it is necessary to take workforce development beyond an orientation in financial services to new fields like advanced R&D. To turn Hong Kong into an R&D hub and compete more effectively with Mainland China for science and technology jobs and enterprise, Hong Kong must provide the incentives for students and workers in the existing workforce to learn these skills. Augmentation of these skills, in turn, will help create more jobs in these areas. In other words, create the demand and facilitate education, rather than starting by trying to increase supply. The best way of doing this is to foster greater technology entrepreneurship and create hubs of technical activity.

Additionally, education and training in growing small-business to mid-sized and large businesses will facilitate growth. And the country can import entrepreneurs from countries like the U.S. from which skilled workers are increasingly leaving in frustration with U.S. immigration policies.

Here are some recommendations:

1. Make workforce development a strategic national priority and differentiator. Hong Kong's workforce needs to evolve from its orientation in financial services and trading to technology and science research and development. Additionally, Hong Kong must provide incentives and mandates for its industries to upgrade its workforce to better prepare it for the new competitive landscape. Larger companies provide training only in cases where they have to. In small and mid-sized companies, there is virtually no incentive for employers to provide training to staff. National policies need to provide standards for training and development and reward employers with tax-credits and other financial incentives.

2. Teach entrepreneurship at all levels. Trading and starting businesses is an integral part of Hong Kong's culture, but building high growth business requires a high level of education and training. The country should set up training centers to impart these skills.
3. Make Hong Kong a sanctuary for skilled immigrants from the U.S. and Europe. In the U.S. alone, there are over 1 million skilled workers and their families waiting for permanent resident visas. An opportunity exists to attract a segment of these who are ready to start technology companies to Hong Kong.
4. Develop better linkages between successful entrepreneurial émigrés from Hong Kong and fledgling local entrepreneurs. Create a mentoring network by which local startups can obtain mentoring and advice from others who have achieved global success. A successful model for the government to study is The Indus Entrepreneurs (TiE) a mentoring group founded by successful Indians in Silicon Valley. These entrepreneurs actively mentor startups in the U.S. and their home countries. AnnaLee Saxenian also documented the ties which successful Taiwanese had established with their homeland (Saxenian 2006).

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