

The Hong Kong Experience with Public Procurement for Innovation

By

Erik Baark and Naubahar Sharif
Division of Social Science
Hong Kong University of S&T

Abstract:

The key principles of HKSAR Government guidelines on procurement adhere to the general spirit of the World Trade Organization Agreement on Government Procurement. Moreover, the government has not been particularly keen to promote innovation, and it has only been during the last decade that explicit, but limited, innovation policies have come into existence. Nevertheless, some public organizations have found a need to use innovation to improve services and operational efficiency, and thus have launched projects that required innovation in both technology and management, and in which a strong hand in demand management was necessary for successful implementation. This chapter discusses the case of the Octopus Card project initiated in 1994 by the public Mass Transit Railway Corporation against a backdrop of procurement and innovation policy history in Hong Kong. The chapter describes how successful public procurement of an innovative RFID smart card system for transportation fees led to widespread diffusion and diversification of business activity related to RFID cards. The conclusion is that public procurement to support innovation can be successful in Hong Kong, and the effects of the current lack of active policies to encourage demand for innovation represents lost opportunities to enhance the competitiveness of the economy.

1. Introduction

Recently, stimulating innovation through the implementation of procurement policies from the ‘demand side’ has attracted increasing attention from policymakers and academics (cf. Aho et al., 2006; Cunningham, 2009; OECD, 2011; Iszak and Edler, 2011). The fundamental rationale for such a focus on public procurement policy lies in the idea that governments can both act as ‘lead users’ to stimulate innovation (von Hippel, 1986) and also improve the effectiveness of public services delivery through innovation. As ‘lead users’, governments can not only stimulate the potential for innovation through the articulation of demand (Edquist et al., 2000), but they can also help create domestic markets (and sometimes also international markets—an example of which we discuss below), reduce transaction costs for innovative solutions, facilitate the establishment of standards, act as exemplars encouraging private sector demand, and stimulate the effective diffusion of innovations (Edquist et al., 2000; Georghiou, 2006). There is considerable promise then, in public procurement policy as a tool for stimulating economic growth and for generating socially desirable innovations such as environmentally friendly technologies.

The Government of the Hong Kong Special Administrative Region (hereinafter referred to as ‘Hong Kong’, ‘the Government’, ‘HKSAR’, or the ‘HKSAR Government’) remains committed to following the guidelines provided by the World Trade Organization’s Agreement on Government Procurement (WTO GPA), and did not systematically enact policies to promote innovation until the return of the territory to the People’s Republic of China (PRC) in 1997. Hong Kong’s ostensibly *laissez-faire* economic policies have not utilised public procurement as an instrument of innovation promotion. Nevertheless, in some cases procurement on the part of public organisations has stimulated technological and organisational innovation, as we mention below.

In the remainder of this chapter we first describe, in section 2, the economic and policy background that informs our discussion of public procurement for innovation and then in section 3 discuss Hong Kong’s public procurement policy in its own right, with particular attention to the role of the Innovation Technology Fund (ITF). In section 4 we discuss public procurement as it relates to innovation and competition

policy. We follow this with a detailed description of the innovation-generating Octopus smart card project initiated by the Mass Transit Railway Corporation (MTRC). In section 5 we draw some lessons from the Octopus experience, followed by discussion of potential future developments regarding public procurement for innovation. Section 6 concludes the chapter by considering the broader implications of the foregoing discussion.

2. Hong Kong Special Administrative Region: Recent Economic Background

In recent years Hong Kong has made progress towards regaining its traditional position as the key transit point for the exchange of both goods and services between China and the international economy. Sophisticated and reliable intermediary services occupy a key role in maintaining this status, and Hong Kong's future apparently turns on the capacity of its intermediaries to maintain a considerable share of business within Asia and between it and the global economy (Meyer 2000: 247). As a trade hub linking China with global markets, Hong Kong's position in Asia has been unrivalled.

As we have noted, however, technological innovation has not been an important element of Hong Kong's developmental experience, and the few studies that have addressed the issue have emphasised the laissez-faire policies that have characterised the industrialisation process in Hong Kong (e.g. Hobday 1995). Hong Kong's entrepreneurs have been adept at exploiting available technology, but they have not generally carried out research and development (R&D) for the purposes of creating proprietary technology on their own (Davies 1999). Technological innovation has therefore only recently begun to attract serious attention in Hong Kong, when the government in 1998 launched a new strategy in pursuit of knowledge-intensive economic growth.

Our point of departure for this chapter is the premise that Hong Kong is now entering a new economic development phase whereby it has to contend with the rising technological superiority of China, especially the rise in technological capabilities and sophistication of the Pearl River Delta region, with which Hong Kong enjoys close cultural and economic ties. If Hong Kong is to move onto a 'new plane' on which

innovation-driven policies are to succeed, public procurement must provide an important spur for development. To take this step successfully Hong Kong must overcome considerable mental, institutional, and organizational resistance to using government policymaking to play a direct role in influencing indigenous innovation.

In light of the return of Hong Kong to Chinese sovereignty and the Asian financial crisis of the late 1990s, the territory must further leverage its unique position as a gateway that provides high-value-added services to global production chains linking China to global markets. This task requires increasing the R&D intensity of many economic sectors and strengthening innovative activities in the private sector—all of which can be effectively aided by appropriate public procurement policies. While the Hong Kong government has adopted a more proactive approach to maintaining and further developing its competitiveness, public procurement for innovation has not commanded nearly enough attention.

Because of Hong Kong's success in competing primarily on the basis of cost, actors in Hong Kong, including most notably the colonial government, historically have not thought of innovation as a means to enhancing economic development. In fact, Hong Kong's manufacturing firms can trace their origins to the opportunistic exploitation of a geographic land-space by Mainland Chinese immigrants, particularly textile barons from Shanghai (fleeing the Communist regime), who transferred start-up capital and managerial expertise to the colony from the 1950s through the 1970s (Wong, 1988; Hollows, 1999). These Shanghai industrialists concentrated on low-cost manufacturing in the labor-intensive textile and clothing industries and relied on the British trading houses in Hong Kong, with their established links with international export markets, to export their products globally (Tsui-Auch, 1998: 9).

Technological sophistication had little to do with establishing Hong Kong's manufacturing firms. Over time, as these manufacturers began encountering labor supply and space limits, they found an escape route with the opening up of China that began in 1979. Hong Kong's entrepreneurs, because of their unique linguistic and cultural familiarity with the Pearl River Delta region and Guangdong province, could easily leverage the abundant labor and land resources there to offset the disadvantage of heightened labor costs, allowing them to continue their model of export-led growth

that featured minimal investment in R&D. Meanwhile, a successful model of Chinese business was flourishing vigorously in Hong Kong while controlling a large manufacturing base in Guangdong province.

This organizational model, featuring Chinese family businesses, superimposes a paternalistic management structure onto a network of social and economic relationships connecting firms of many sizes (Redding, 1990). In establishing and upgrading their organisational model, Hong Kong firms exploited their traditional strategies of imitation and followership while emphasising the development of organisational know-how rather than formal R&D for new product development. The bulk of R&D expenditure by private firms in Hong Kong is devoted to redesigning and improving existing products as well as to making them easier and cheaper to produce. In other words, process innovation has often taken precedence over product innovation in Hong Kong's industries.

This historical legacy left its mark on Hong Kong government policy. The Government's *laissez-faire* approach, which it described as 'positive non-intervention', focused primarily on creating the infrastructure needed to enable entrepreneurs to exploit market opportunities (Ma, 2011). While some view the image of Hong Kong as a puritanically *laissez-faire* champion as something of a myth, it largely held true until 1998 with respect to Hong Kong's innovation system, and it still appears to shape significant elements of the political context for industrial policy in the territory (Fuller, 2010).

Still, in spite of its reputation, Hong Kong has always controlled many crucial elements of the economy, including land supply, housing policy, and exchange rates. In financial markets—an area that is vital to Hong Kong's economic wellbeing—the government has introduced increasingly strict regulation in response to the recent economic crisis without hindering the expansion of Hong Kong's role as a major international financial center (Goodstadt, 2010). For example, Hong Kong has never allowed unrestricted allocation of land resources because the government has always monopolised land ownership and strictly limited the supply of land for sale. Moreover, that almost half of Hong Kong's population live in public housing built and administered by the Hong Kong Housing Authority (ironically advertised as the

epitome of laissez-faire policy in Housing Authority documents) shows that the Government has occasionally been more than willing to interfere in a sector of vital public interest (Smart, 2006). It is interesting to note that several decades of initiatives meant to privatise public housing have largely failed, and that the government seems to have at best a half-hearted interest in privatising public housing, even if similar initiatives in other countries have proceeded at a steady pace (Ho, 2004).

3. Public Procurement Overview

3.1. The World Trade Organisation's Influence on Government Procurement

Under its procurement policy the HKSAR Government, when buying goods and services, is guided not directly by the light of innovation, or even by the need to promote innovation per se, but rather by the twin policy objectives of achieving best value for money and fair competition, irrespective of the impact on innovation. Rather than being guided by innovation, then, Government procurement is based on the principles of public accountability (to the legislature and to prospective suppliers), value-for-money (taking into account in its tender evaluation not only competitiveness in price but also compliance with users' requirements, the reliability of performance, whole-life costs, and after-sale support, where applicable), transparency (to encourage better understanding amongst suppliers and contractors), and open and fair competition (all tenderers are provided with the same information as they prepare their bids).

On 20 May 1997, Hong Kong acceded to the World Trade Organization Agreement on Government Procurement (WTO GPA).¹ The key principles of the HKSAR guidelines on procurement adhere to the general spirit of the WTO GPA. According to the policy statement on the Government's official website, the administration is "committed to providing equal opportunities for domestic and foreign suppliers and service providers, participating or competing in Government procurement. This means that contracts for supplying goods or services to the Government of the Hong

¹ Prior to joining the WTO GPA, Hong Kong had been a signatory to the Agreement on Government Procurement negotiated under the General Agreement on Tariffs and Trade (GATT).

Kong Special Administrative Region are awarded through open, fair, competitive and transparent procedures. No favours. No discrimination” (Treasury Branch 2012).

The policy is further reinforced by the stipulations of the Basic Law of the Hong Kong Special Administrative Region of the People’s Republic of China (Article 110) and the Public Finance Ordinance. The government procurement process is therefore governed by the Stores and Procurement Regulations issued by the Financial Secretary under the Public Finance Ordinance. These Regulations are supplemented by Financial Circulars issued by the Secretary for Financial Services and the Treasury from time to time. The procedures laid down in these Regulations and Circulars are fully consistent with the provisions of the WTO GPA. The Stores and Procurement Regulations cover all stores purchased or acquired on behalf of the Government, excluding land and buildings, as well as services performed by contractors for and on behalf of the Government, including construction work and engineering services.

Within this framework, government procurement exceeding HK\$1.43 million in value for goods and general services and HK\$4 million in value for construction work and engineering services is normally conducted through open and competitive tendering procedures so as to achieve best-value-for-money. Limited or restrictive tendering procedures are, in line with WTO GPA provisions, permissible only under specified exceptional circumstances. In cases in which the nature of a contract (such as one that is time critical or one that requires particularly high levels of skill and proven reliability) dictates that tenders must be invited from qualified suppliers/contractors, selective tendering or prequalified tendering may be used.

According to Hong Kong Census and Statistics Department data, the Government spent HK\$142.924 billion on public procurement in 2009, representing 2.4% of GDP, HK\$146.966 billion in 2010, representing 2.8% of GDP, and HK\$149.553 billion in 2011, representing 1.8% of GDP. Therefore, while the dollar sums spent on public procurement have been increasing in absolute numbers, as a proportion of Hong Kong’s growing GDP public procurement has fluctuated and shown a net decrease. The main sectors involved in public procurement include the following: chemicals, electrical equipment, furniture, machinery, medical supplies, medicinal and pharmaceutical products, office equipment and computer hardware and software,

paper and wood products, photographic and audio/video equipment, road vehicles, scientific and laboratory equipment, telecommunications equipment, and textiles and garments.

3.2. The Innovation and Technology Fund Scheme

The abovementioned emphasis on best value for money tends to be interpreted as the “lowest price for proven technology” and therefore tends not to favor innovative solutions that have not been implemented elsewhere or have not been proven. This is a problem for innovation that is further compounded insofar as nearly all R&D projects that Hong Kong funds through such instruments as the ITF are designed to bring technology only to a pre-commercial stage—with the expectation that the technology would easily be licensed to local or overseas industries for commercialisation. Under such circumstances, innovations funded by Government have seldom reached a state at which they represent “proven” technologies, let alone the lowest-priced alternative.

In order to overcome this gap between innovative output and commercial application worthy of government procurement (or, for that matter, procurement on the part of private organizations), the ITF has launched a “Scheme for Production of Prototypes/Samples and Conducting of Trial”. This scheme aims to provide “follow-on” funding support for trials in public agencies of technology that has recently been developed under an ITF project grant. The ITF will then provide a further sum (equivalent to a maximum of 30% of the original ITF grant) for prototype production and trial. Applicants for this type of support must already have obtained the approval and support of a public sector organisation—a government department or an organisation such as the Mass Transit Railway (MTR) or the Hospital Authority. The funding is channeled via one of the five R&D Centers set up by the Government to promote innovation in selected sectors.

The Scheme has been in operation for only a few years, so it is difficult to assess its overall impact on the diffusion of innovative technologies. But the Innovation and Technology Commission has listed three areas in which the approach appears to have been successful: Testing LED lighting in selected projects by the Highways

Department and the Housing Department; introducing an e-learning pilot scheme with the Educational Bureau; and developing radio frequency identification (RFID) technology for workplace automation and operational efficiency at the Customs & Excise Department, the Correctional Services Department, and Radio Television Hong Kong. In addition, a range of technologies have been tested for the Hospital Authority and the Hong Kong Council of Social Service, such as a handy device that community nurses use when on home visits and an RFID Tags and Management System for tracking newborn babies in hospital.

4. Public Procurement and Innovation Policy

4.1. Main Administrator of the Government's Procurement Policy

The Government Logistics Department (GLD) is Hong Kong's central public procurement agent. The GLD maintains a stock of essential items which it pays for from an advance account in the first instance and then recovers the costs later from end-users (when they draw the goods from the GLD). The GLD also purchases, through allocated bulk contracts, a wide range of items commonly used by Government departments and many non-government organizations. User departments can draw their requirements directly from the contractors against the allocated bulk contracts on an as-and-when-required basis and pay for the stores from their own accounts. The GLD remains the contracting party and provides contract administration services throughout the contractual period. The GLD further acts as the purchasing agent for specific stores and equipment required by user departments and a few non-government organizations. User departments rely on the GLD for expertise in sourcing, tendering, negotiations, and contract administration. Goods purchased by the GLD on behalf of user departments vary widely, and include aircraft for the Government Flying Service, electronic parking devices for the Transport Department, arms and ammunition for the Police, chlorine for water treatment plants, and even gases for medical and industrial purposes.

Construction services are procured by individual works departments that operate under the general supervision of the Development Bureau. The Development Bureau gives general guidance and technical advice on tendering procedures. Finally, services

procured by the Government also include financial and management consultancy services as well as other types of service contracts. Typical service contracts tendered by the Hong Kong Government apply to janitorial services, property management, management of parking meters, and operation of transport and waste management facilities.

4.2. Drivers of and Obstacles to Policy Developments

Two factors chiefly facilitate the development of public procurement policies in Hong Kong. The first is the signing of a closer economic partnership agreement with New Zealand. This agreement, which was signed on 29 March 2010 and came into effect on 1 January 2011, further opens up the public procurement market for both Hong Kong and New Zealand. The agreement, Hong Kong's first with a foreign economy, covers a wide range of areas of mutual interest, including government procurement. Chapter 12 of the partnership agreement sets out Hong Kong's commitments on government procurement (which are generally consistent with those under WTO GPA). The commitments apply to procurements by Government bureaus and departments for contracts of not less than 130,000 SDR for the procurement of goods and specified non-construction services, and not less than 5,000,000 SDR for construction services.²

The second, even more general, facilitator of public procurement in Hong Kong is the Independent Commission Against Corruption (ICAC). The ICAC was established on 15 February 1974, with the enactment of the Independent Commission Against Corruption Ordinance. The Commission is independent of the civil service and the Commissioner is answerable directly to the Chief Executive of the HKSAR. The ICAC is committed to fighting corruption through a three-pronged strategy of effective law enforcement, education, and prevention to maintain Hong Kong's status as a fair and just society. The ICAC comprises three functional departments: Operations, Corruption Prevention, and Community Relations. Within the Corruption Prevention department, the Commissioner has a statutory duty to examine the practices and procedures of government departments and public bodies and to secure

² SDR, or Special Drawing Rights, is an international currency unit set up by the International Monetary Fund. The current US dollar equivalent to 1 SDR is about US\$1.56.

the revision of methods of work or procedures, which may be conducive to corrupt practices. The ICAC conducts detailed studies of the practices and procedures of public sector organizations, and assists them in the effective implementation of corruption prevention measures. As of the end of 2010, nearly 3,400 reports had been issued by the ICAC. Of these, 72 were reported in 2010, with the reports covering areas such as law enforcement and public procurement. The ICAC ensures that public procurement policies in Hong Kong are fair, and that the policies are implemented without discrimination or the influence of corruption.

Ironically, some of the principles that guide the Government's procurement decisions (outlined earlier, in Section 3) hinder small and medium-sized enterprises (SMEs) from providing innovative solutions to the government. In particular, the Government's three principles of public accountability, value-for-money, and open and fair competition place SMEs at a disadvantage in the competition for public procurement contracts. The principle of being publicly accountable to the legislature and to prospective suppliers means that the Government is more likely than not to select providers of goods and services who can demonstrate a strong track record in their fields. Such a practice inherently discriminates against young, new, and innovative enterprises which are unable to demonstrate a strong track record. Indeed, if such companies have just started their operations, they have no track record at all.

All of this conspires to favor large, well-established companies (which are more likely to be less innovative and more prone to organisational inertia). The principle of value-for-money has a similar impact because of its emphasis on the reliability of performance, whole-life costs, and after-sales support. Such features are often not demonstrable by younger, innovative companies that nevertheless may possess the capacity to meet the government's procurement demands. Furthermore, smaller enterprises are unlikely to possess in-house testing and manufacturing facilities that further raise the cost of producing their otherwise innovative products. Consequently, basing their tenders on price alone makes them less competitive as compared with larger, incumbent firms. Finally, the principle of open and fair competition, while laudable on paper, can in fact be a hindrance when it comes to nurturing local innovation and R&D. If Microsoft is treated on an equal footing as a newly emerging software startup entrepreneur in Hong Kong, it is easy for the larger, international

player to command a greater market share (at the expense of the local enterprise) even though the spillovers of selecting the local enterprise may be far greater and the positive knock-on effect incalculable if the local company is chosen in favor of the international player.

4.3. Competition Policy

There is no international standard or consensus as to what is the best approach to achieve competitive advantage for enhancing economic efficiency and the free flow of trade. Many economies operate under competition laws, but they differ widely in terms of scope of control, enforcement mechanisms, and remedies. Other economies, meanwhile, are free of legislative influence altogether. Whether or not it makes sense to have a competition law depends heavily on the characteristics, development history, motives, and socio-economic background of a given economy. For Hong Kong, a small, externally oriented economy, which is highly competitive and free, the Government has, for a long time, seen no need to enact an all-embracing competition law. That said, in order to maintain overall consistency in the application of its competition policy, the Government has provided, since 1998, an over-arching competition policy framework through its competition policy statement. That statement has been, until now, reinforced with sector-specific measures. A closer look at the Statement of Competition Policy (promulgated in May 1998) shows that the principles stated—minimising interference with market mechanisms, maintaining a level playing field, fostering confidence in system fairness, and reducing uncertainty—are the underlying features of Hong Kong’s general economic policy, whether or not competition is promoted or hindered. To that end, the principles embodied in the Statement and Hong Kong’s approach towards anti-competitive practices in general should have no impact on public procurement for innovation. Even in terms of practices the Statement intends to restrict, it is clear that public procurement for innovation is minimally impacted. Among the business practices that the Statement suggests warrant further examination are price fixing (increasing purchasing costs), bid-rigging, sales and production quotas (which increase costs and reduce choice and availability to purchasers, impairing the economic efficiency of free trade), joint boycotts (which deprive boycott targets of supply or choice), and

unfair or discriminatory standards among members of a trade or professional body (which deny newcomers a chance to enter or contest in the market).

If innovative firms have been treated unfairly in competition for government procurement contracts, the Statement should protect them. Yet in practice it is not so much that the incumbents who typically receive government contracts play unfairly or overtly discriminate against smaller (or local) players, but rather that some combination of their size, track records, and familiarity with government requirements means that newcomers find it difficult to make inroads into the public procurement sector. Indeed the Statement clearly says as much: “the Government further recognises that scale of operation or share of the market per se does not determine whether a business is anti-competitive or not. The determining factor is whether a business, through abusing its dominant market position, is limiting market accessibility and contestability and giving rise to economic inefficiency or obstruction of free trade to the detriment of the overall interest of Hong Kong. Each case has to be examined on its own”. While all this may seem entirely fair and justified on paper, in practice public procurement for innovation is not promoted by the Government’s competition policy. Nowhere does the pursuit of economic efficiency—the overriding theme in the Government’s stance towards competition—leave room for promoting innovation through public procurement policies.

Since the formulation of the Statement, the Competition Policy Advisory Group (COMPAG) developed, in 2003, a set of guidelines to supplement the Statement in order to provide objective benchmarks and principles by which to assess Hong Kong’s overall competitive environment, define and tackle anti-competitive practices, and ensure consistent application of Hong Kong’s competition policy across sectors. Furthermore, in 2006 a Competition Policy Review Committee, appointed by the Government to make recommendations to COMPAG on the future direction of competition policy in Hong Kong, recommended that a new law with a clearly defined scope be introduced to tackle anti-competitive conduct in all sectors. This was followed by a public consultation from November 2006 to February 2007, after which a public consultation paper detailing proposals for a competition law was published in May 2008. A formal Competition Bill was introduced to the Legislative Council for approval on 14 July 2010, and discussions are underway to pass the bill into binding

law before the legislature's summer recess in July 2012. It remains to be seen whether the law, if it passes, will have any impact on the promotion of innovation through public procurement policies. If the Statement, introduced 14 years ago, is any indication, it seems highly unlikely that the Competition Bill, in whatever form it takes, will influence public procurement for innovation positively.

4.4. A Successful Case Study of Procurement for Innovation: Octopus Cards

One of the most prominent examples of innovation grounded in public procurement in Hong Kong is the development and diffusion of the Octopus card system. The Octopus card is a rechargeable, contactless stored-value smart card that is used by 95% of people in Hong Kong aged 16 to 65 for traveling, shopping, and dining without the inconvenience of coins. It has become the world's busiest smart card system for payment of transportation and other costs, with the system handling over 11 million transactions a day, valued at over HK\$110 million (Octopus Holdings Limited, 2012). The system has evolved into a business that facilitates monetary transactions not only for public transportation but also for retail sales and services, self-service facilities like vending machines, and access control systems in schools and residential blocks.

The development of the Octopus card was initiated by the MTRC in 1992. The MTRC was a public corporation owned by the Government (subsequently privatised in October 2000 with its listing on the Hong Kong Stock Exchange, but with a majority of shares still held by the Government), which operated a network of underground and aboveground urban rail lines in Hong Kong. It had already implemented a system of recirculated magnetic plastic cards for pre-payment of tickets on the MTR lines, including a stored-value card to which it was possible for customers to add value. However, the study undertaken in 1992 indicated that a contactless smart card would provide an appropriate platform for convenient and effective payment of transport fees. The emerging technology of RFID chips and the promise of smart card systems (which had been successfully tested technically in otherwise unsuccessful attempts by banks and credit card agencies to use contactless cards for payment transactions) provided the impetus to develop a new, dedicated card system for public transportation.

In order to implement the development and procurement of the new smart card, the MTRC persuaded a range of public and private transport operators in 1994 to form a joint venture company, Creative Star Limited, which became responsible for awarding development contracts and subsequently the operation of the Octopus system. The five transport operators that joined this venture were the MTRC, the Kowloon-Canton Railway Corporation, the Kowloon Motor Bus Company, Citybus, and New World First Bus. The first two were corporations owned by the Government, while the last three are private firms. From the beginning, this project was thus a public-private partnership in which the government was active in promoting the development and use of a new technology (Taraszkiewicz, 2009).

Creative Star Limited, which was renamed Octopus Card Limited in 2002, issued a contract valued at US\$55 million for the development of the system to the Australian firm ERG Limited, a company that designs and implements integrated automated fare collection systems, now owned by VIX Technology. ERG Limited software engineers cooperated closely with engineers from Hong Kong transport corporations in designing the physical and software dimensions of the system (Li, 2008). These tasks included the design of the smart card, card readers, add-value machines, and the information and communications system that runs the service on a computer center and a clearing house system. The contract for the production of the Octopus smart cards that contained the integrated circuits was subsequently awarded to Sony and Mitsubishi Corporation (Chau and Poon, 2003). The system underwent extensive development and testing during a three-year period and was finally launched in September 1997, with 3.5 million cards prepared for the initial launch.

It is interesting to note that the MTRC—at that time wholly owned by the Hong Kong Government—ensured that there would be a major captive market for the card from the moment it was launched. On the one hand, the cost of car ownership in Hong Kong is so high that the vast majority of the population relies on public transportation to get to work. On the other hand, the MTRC created demand by mandating that all current holders of magnetic strip stored-value cards, which had grown significantly in popularity, had to exchange their current magnetic strip cards with new Octopus smart cards within a window of a few months. This direct-conversion approach left regular

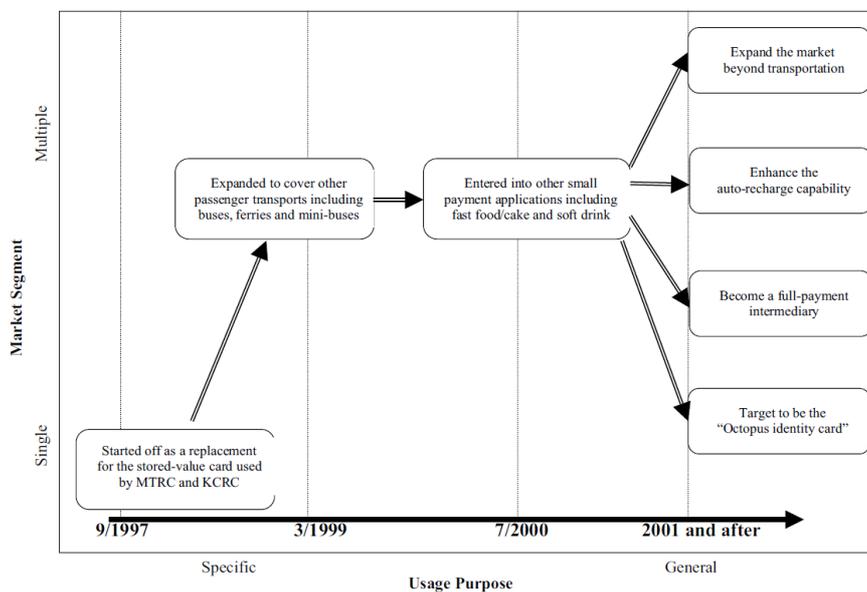
users with no alternative but to buy a new card quickly; however, the approach also happened to create a run on the cards since many people wished to own several cards (Chau and Poon, 2003). The card also became extremely popular because it could be utilised on trains as well as other forms of public transport such as busses and ferries (it is not uncommon for many in Hong Kong to complete a trip by travelling on a combination of public transport services such as bus and MTR). Because it is contactless, the card reduced the time taken to enter the MTR railway stations significantly and thus facilitated the flow of passengers, which was especially evident during rush hours.

Needless to say, the Octopus card's introduction led to considerable savings in transaction costs for the transport companies, since 60 tonnes of coins were previously collected and counted on a daily basis, which represented as much as 0.8% of company revenue. Without the presence of a major captive market in the early stages of the use of the card, it is doubtful that a consumer base large enough for the convenience of the cards to have such an impact, much less for the benefits to extend beyond the MTRC, would have been attained by any other service provider—public or private.

After its initial success as a transportation fee payment option, Octopus Holdings Limited has sought to extend the range of services offered, moving into the business of micro-payments and identity cards. It secured a license to operate as a deposit-taking company (more or less equivalent to banking) from the Hong Kong Monetary Authority in 2000, installed Octopus readers in more than 10,000 retail outlets from over 4,000 service providers—representing a wide range of sectors such as fast-food chains and restaurants, convenience shops, and supermarkets—and thus became a payment intermediary for a wide range of transactions. The company has also developed an automatic recharge system linked to bank or credit card accounts, which provides a safe option for the convenience of adding up to HK\$250 from such accounts if the amount on a card runs into debit. In other words, the Octopus card is becoming an extremely popular version of an e-cash system—in a market in which other major e-payment operators such as Mondex and Visa Cash have struggled to reach a significant customer base.

While the innovativeness of the Octopus smart card was firmly grounded in public procurement efforts, its subsequent diffusion can be attributed to the benefits of its being appreciated by consumers, which in turn has led to other public and private service providers joining in to offer their services with payments made via the card. Octopus-related innovations have included not merely the technical artifacts of cards and readers but also the development and diffusion of an advanced information and communication system to support safe and rapid payment transactions. The search for innovation has extended to business models that have fundamentally altered the micro-payment environment for consumers in Hong Kong. The Octopus card is, for instance, increasingly used for identification purposes and selective access systems. Several major hotels issue Octopus cards that are not only coded as keys for entry to hotel rooms, but which also carry a small sum making it ready for use (and re-charging) on transportation lines and in micro-payment shops. The gradual evolution of the Octopus system and its usage is depicted in Figure 1.

Figure 1: A Chronology of the Development of Octopus Services



Source: Chau and Poon (2003)

Equally noteworthy is that these innovations have led to a new sector for the export of services from Hong Kong. Since 2003, Octopus has successfully assisted relevant authorities in The Netherlands and Dubai to develop and implement smart card

systems. Octopus is also helping transportation authorities in Auckland, New Zealand build a multi-modal ticketing system for public transport.

Another possible consequence of the success of the Octopus system is that innovation of a range of logistic systems using RFID technology has become extremely popular in both public and private organizations in Hong Kong. Thus the Hong Kong Hospital Authority decided in 2007 to test a system using RFID technology as a means for facilitating asset tracking and management of medical devices at the point of care, in order to improve patient safety and service quality. The project helped design three systems for trials using mostly mature RFID technology:

- Passive RFID to further facilitate stocktaking of equipment in operation theatres
- Active RFID to enable real-time tracking of medical devices in wards
- Active RFID to streamline the capturing and reporting of high-value assets in hospitals

An evaluation of the active RFID system used in wards indicated that a nurse would need only 12 seconds to locate a tagged medical device on the ward, as compared with a half an hour to several hours or even days of searching the paper record system or searching for the equipment by physically moving through the ward. Active RFID was also preferred for its proven user-friendliness and tag capability (Hong Kong Hospital Authority, 2010).

5. Lessons and Future Developments

Given the context of the prevailing ideology that informs policies for innovation and procurement in Hong Kong, it is difficult to imagine that government procurement will be re-designed to encourage innovation in the near future. It is possible to designate this state of affairs as a “no policy” scenario, but to some extent this misrepresents the situation because there are plenty of policy statements that define the scope of support for innovation and procurement—it is just that these policies explicitly focus on institutions and instruments that are designed to support the *supply* of innovation and the most competitive bids for procurement. For example, ITC programs designed to support innovation are directed towards funding of R&D

projects that are considered to be of particular potential benefit to Hong Kong, thus supplying technologies or other intellectual property for private or public organisations to implement; the demand arises primarily from the advice received from academic and private industry representatives in committees or R&D center boards that select projects for funding.

In this sense, the funding of application-oriented R&D by the ITF represents “procurement” of innovative technologies, even if these technologies are expected to be commercialised by private firms. The government is also funding the development of infrastructure—physical infrastructure as well as consultancy services—for the commercialisation of innovations in incubation facilities or high-tech industrial estates, such as the Hong Kong Science and Technology Park (Sharif and Baark, 2011). In the case of the Digital 21 Strategy, a programme specifically set up to enhance Hong Kong’s development on the information and communications technology (ICT) front, ostensibly catering to the evolving needs of the Government, businesses, and the general public and sustaining Hong Kong’s strengths as one of the world’s most competitive economies, key statements mention innovation only in terms of “leveraging our technology infrastructure” and “continued investment in R&D”.³ The procurement of ITC services by the Government is part of an overall initiative that is intended to enhance the development of cyber services (Zhao, 2011), and annual government expenditures on ITC have grown from HK\$910 million in 1993-1994 to HK\$4,729 million in 2011-2012. Nevertheless, the guidelines for government ITC industry support remains focused on reliable outsourcing of services, promotion of Hong Kong as a data center hub, and providing funding and infrastructure, without explicit objectives related to the promotion of innovation (Office of the Government Chief Information Officer 2012).

In contrast, public procurement for innovation would normally rely on measures designed to support *demand* for innovation and long-term benefits derived from public expenditures. The absence of such policies in Hong Kong does not preclude public organisations from becoming actively engaged in support of innovation, as the example of the Octopus card demonstrates. The point is, rather, that such examples

³ The Digital 21 Strategy was launched by the HKSAR Government in 1998, and has been updated in 2001, 2004, and most recently in 2008. See HKSAR 2012.

represent cases that exist in a “grey zone” where the influence of government policies is diluted because semi-public organizations like the MTR have greater freedom to pursue their goals for technological development and improvement of services. Several other semi-public organisations in Hong Kong have been quite strongly committed to implementing the best technology available and even promote innovative solutions. In addition to the MTR, the Hong Kong International Airport Authority has also participated in the early design and piloting of systems using RFID tags for baggage that has led to important manpower savings, productivity improvements, and overall service enhancement (Nguyen, 2009).

In the future, it is likely that public organisations such as the MTR and the Hong Kong International Airport will continue to explore innovative solutions to enhance their services, and universities and research institutes will continue to pursue R&D with public support to generate innovation. It is difficult to determine, without counterfactual evidence, whether current Government policies discourage, or at least fail to encourage, innovation through public agency. However, the cases discussed in this chapter indicate that there is a clear potential for innovations, providing extensive externalities that bring economic benefits and strengthen technological capabilities and competitiveness, undertaken through procurement by public organisations. In our view, the lack of explicit policies and support for such innovation is likely to represent lost opportunities for strengthening Hong Kong’s industries and services.

6. Conclusion

The preceding discussion shows that the policy environment for innovation and the professed laissez-faire ideology permeating the Government have provided limited scope for utilising public procurement policies designed to stimulate innovation. Hong Kong has not explicitly employed such procurement policies to create demand-side incentives for innovation among firms in Hong Kong (or elsewhere, for that matter).

Nevertheless, some public organizations have used innovation to improve services and operational efficiency, and thus (inadvertently) launched projects that required innovation in both technology and management. In many of these cases a strong hand

in demand management was necessary for successful implementation. The case of the Octopus project demonstrates several interesting and successful aspects of innovation supported by public procurement. Moreover, the project has led to a diversification of services that has generated its own commercial momentum in Hong Kong and overseas, where innovation has enjoyed sustained success. Projects undertaken by the Hong Kong Hospital Authority employ similar technologies—partly with support from a scheme designed by the ITF to support pilot prototype production and testing—although these initiatives operate on a decidedly smaller scale than that of the Octopus card.

We conclude then by arguing that public procurement to support innovation can be successful in Hong Kong, and it is a pity that the Hong Kong Government so easily ignores the obvious advantages that such demand management could provide in many similar areas and economic sectors.

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