
Technological strategies and trajectories of Hong Kong's manufacturing firms

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Abstract: Hong Kong's post-war catching up with economically advanced nations is well documented. Starting as a piece of 'barren rock', the island economy has emerged as the 'Mart of East Asia'. While there are numerous explanations for the success from neoclassical development economists, few studies have focused on the technological strategies and paths of Hong Kong's manufacturing firms, the chief economic actors. This paper attempts to interpret Hong Kong's economic success by examining its national innovation systems. More specifically, this paper investigates the technological catch-up paths taken up by Hong Kong's manufacturing firms. It will argue that manufacturing firms in Hong Kong in general took on imitative strategies. Their capability development routes are attributed partly to organisational learning and partly to Hong Kong's unique physical, political and cultural environments. Relying on three major imitative strategies, namely 'reverse value chain' strategy, 'reverse product life cycle' strategy and 'process capability specialist' strategy, manufacturing firms in Hong Kong were able to compete and survive in the global markets. Furthermore, by extending their competence in managerial and consultancy services, firms in Hong Kong evolved into regional coordinators.

Keywords: organisational learning; imitation; capabilities development paths; technological catch-up; Hong Kong.

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1 Introduction

In explaining the rapid growth of the four Asia Newly Industrialised Economies (NIEs) (Taiwan, Hong Kong, Singapore and South Korea), scholars tend to emphasise their common characteristics [1] while downplaying their differences in technological innovation patterns. Recent studies argue that these Asian latecomer economies engaged in quite different strategic approaches to industrial technological capability development [2]. In particular, Wong [3] highlights the alternative evolutionary paths for rapid technological catch-up by Singapore, South Korea and Taiwan, and contributes to our understanding of the nature of the 'East Asian miracles' [4]. This paper adds insight to the debate by focusing exclusively on Hong Kong, the smallest Asian Newly Industrialised Economy. The aim of this paper is to examine the technological catch-up paths taken up by Hong Kong's manufacturing firms. The paper begins by identifying the characteristics of innovation systems of Hong Kong. It then examines the factors that shape the unique Hong Kong's innovation system. Three major capabilities development paths of Hong Kong firms are subsequently discussed. This paper argues that latecomer firms in Hong Kong built up their capabilities through entrepreneurial learning. The technological development of these firms were constrained by their prevailing resource bases and in turn shaped by boarder innovation systems of the economy. The unique catch-up paths of Hong Kong's manufacturing firms shed light on the development policy for other latecomer economies.

2 Entrepreneurial learning, imitation and capabilities building

Firms in late industrialising economies can build up their capabilities through organisational learning and imitation, and hence alter their prevailing competitive advantages. Mathews and Cho [5,pp.72–101] refer to this process as 'technology leverage' in the sense that latecomer firms are able to acquire and adopt foreign technology within their own institutional settings in an effective fashion. Similarly, Yeung [6] argues that entrepreneurs are able to take proactive actions to overcome inherent problems and difficulties associated with international business activities. During the initial stage of the development, due to low level of absorptive capacity [7,p.128] and poor resource base, small firms in a latecomer economy can only conduct replication or pure copying. When firms notice a product or business pattern successfully launched by someone else, they will duplicate the activities if they think they can produce at lower costs (and hence sell at lower prices). In other words, they conduct what Kirzner [8] terms pure arbitrageurship on the (factor) price discrepancies. When multinational firms from advanced nations take advantage of cheap labour and land in latecomer economies by making foreign direct investment or subcontracting jobs to firms in developing economies, latecomer firms can then take the opportunity to learn from advanced firms. In other cases, latecomer firms can imitate foreign products by means of reverse engineering. Manufacturers in the small latecomer firms travel abroad, participate in international trade fairs or subscribe to professional journals for the purpose of searching for replicate opportunities [9,p.105]. After identifying a target, they may arrange to obtain a license to duplicate the product at home. Some of them may simply buy a unit of the new product and conduct reverse engineering. Given that latecomer firms cannot afford to purchase a license from original suppliers, which are common for

small firms, then closer scrutiny of how to produce the goods is impossible [10]. Yet, imitative firms are not directly concerned with creating a good likeness, but with achieving an economic success – preferably, an economic success at least equal to that of the original.

In their early stage of development, latecomer firms struggle to survive using their limited capabilities via replication or pure copying. As their capabilities improve, many of them are still content to follow the way behind the innovation leaders. They do not aspire to leapfrog nor attempt to keep up with innovators. In other words, they pursue a strategic followership [11]. Being a follower is less risky. Normally, imitation occurs when the market becomes established and the original venture has been accepted. As the market segments become clear, marketing research can easily analyse the consumption patterns of customers. Bolton [12] shows that Matsushita's low-cost strategy in the consumer electronics business was built upon being a second-mover. The company deliberately arrived late in the marketplace, waited and watched until the consumers accepted a rival's new product, then started to produce a large volume of standard products that it sold at lower prices [13].

To compete and expand, firms cannot rely on pure replication strategies. In other words, sheer imitation cannot sustain growth. Firms need to improve their products and sell them at lower prices. As capabilities improve, these firms no longer limit themselves to those sectors where cheaper labour is an obvious advantage. They also look for profit opportunities through the introduction of improved products and the utilisation of more sophisticated technology from overseas. Learning by doing [14] and learning by imitating [15] are crucial in this regard. Imitative firms can attend a higher level of absorptive capabilities through learning. This is what Argyris [16, pp.7–38] referred to as "double-loop learning" [see also Mathews and Cho, note 5, p.83]. Learning theories suggest that human cognitive systems are able to process, code and store information in the memory so that they will be available on subsequent occasions if needs arise. But the use of information depends upon the situation that prompts individuals to anticipate that a certain kind of performance will lead to reinforcement [17, p.353]. Thus, cognitive systems can respond to the stimulus via a discrimination network. Although some people make naive responses when they organise their memories, many possess multidimensional, stimulus-discrimination networks and are able to make sophisticated responses [18, p.7]. People who frequently encounter certain stimuli or who receive impressive rewards for mastering a situation enrich their knowledge and move towards a higher level of integrative complexity. In this way, they improve their environmental maps and responses to stimuli. In short, organisational learning can lead to innovation.

Hence, the phenomenon in which latecomer firms catch up with first-movers can be explained by the fact that latecomer firms can turn initial disadvantages into sources of advantage [19, pp.77–79; 84–85]. Later, through organisational learning and imitation, they innovate. During the imitation process, manufacturers pick and choose different models and later combine them into a novel product. This means that imitators are no longer 'copycats' but innovative producers using the examples of others. At first, producers may struggle to imitate the contents of a certain product. But gradually they take a portion of a design from another product, and copy a little of the styles or functions of some others. Ultimately, this mixture becomes a single unique product scarcely recognisable as an imitation at all [20, p.353]. In Kogut and Zander [21] terms, they exhibit 'combinative capabilities in the sense that these firms are able to combine skills

and foreign technologies from different areas and produce some novel products (see also Mathews and Cho [5,p.84]). Explaining how the East Asian manufacturing firms learned to innovate in electronics, Hobday rightly notes that “latecomer innovation began with incremental improvements to manufacturing process. As competences were learnt, minor innovations to product designs were made and eventually, some new products were offered to the market” [22,p.1189]. In business history, it is well known that Japanese producers were not only able to copy other nation’s products, but were able to change and perfect them in such a way that the replicated goods became typical Japanese models [23,p.115]. Samsung in South Korea, Winbond in Taiwan and STG in Singapore are some of the successful examples in Asian NIEs [5,pp.71–72].

3 Capabilities development paths

We have argued that, through imitation and entrepreneurial learning, firms can build up capabilities and alter the competitive advantage of the firm. Latecomer firms will develop and adopt a particular imitative strategy according to their historical and cultural backgrounds. Given that then human mind is creative, therefore, what an agent learns and imitates is also indeterministic. Consequently, latecomer firms open up a unique technological track. Wong [2] observes five capabilities development paths for Asian imitative firms. Three of them are more relevant to the situation of Hong Kong.

3.1 Reverse value chain strategy: from OEM to OBM

In this imitative strategy, latecomer firms begin by mastering simple component assembly operations via an Original Equipment Manufacturing (OEM) arrangement [24]. After a period of time, these firms then move upstream to acquire product design capabilities to become Original Design Manufacturers (ODM) to end buyers, who now only need to provide the broad product requirements, leaving the design details to the ODMs. While many firms may remain to be an ODM, some will try to generate their own product ideas and become Original Idea Manufacturers (OIM) and/or selling under their own brand, *i.e.*, Own Brand Manufacturing (OBM). OIM differs from OBM in the sense that the former still sells under the brands of other established firms while the latter develops their own distinctive brand and often sells through their own distribution channels. In essence, this technological capability development strategy involves starting with developing process capabilities, followed by extension into product design capabilities and finally new product creation/branding activities. This is a reversal of the normal sequence of value chain activities pursued by large, sophisticated technological firms in advanced countries.

3.2 ‘Reverse product life cycle’ strategy: ‘late-follower’ to ‘fast-follower’

Another technological catch up path suggested by Wong [2] is “reverse product life cycle” strategy. This is a variant of the ‘reverse value chain’ strategy. In this path, latecomer imitative firms transform from late-followers to fast-followers in product markets, and eventually leapfrog over the established leaders. Latecomer firms start their businesses by producing relatively mature products, either under technology license from the leading companies or through imitative learning where technologies involved are not

proprietary. These initial products tend to be based on some outdated technologies and are usually targeted at the low-price market segments. This entry strategy allows the imitative firms to manipulate initial lower-cost advantage and take over the manufacturing of low-end products from the market leaders. By mastering the mature product and process technologies quickly, imitative firms move towards more sophisticated products and involving technologies that are closer to the leading edge. Over time, by learning, investing in R&D and following the development directions of the technological leaders, these latecomer firms narrow the technological gaps between themselves and the leaders. Quickly following the leader firms, some latecomer firms may even outperform the leaders.

In contrast to the 'reverse value chain route', firms pursuing this imitative strategy pursue product and process technological learning simultaneously. Moreover, latecomer firms need to be able to reposition their image as low-end, low-tech producer to high-quality, high-sophistication manufacturers over time. This is often a difficult task because this strategy requires significant continuous investment in distribution channel development and organisational learning.

3.3 Process capability specialist strategy

Instead of moving into the OBM business, which involves higher risk of marketing and high costs of brand developing, some imitative firms have chosen to become manufacturing specialists in the service of product developers. Rather than diverting resources in product technologies, they concentrate on improving their manufacturing capabilities in the latest process technologies that yield the best performance as governed by the market. A variant of this process specialist strategy is to expand the vertical scope of process capabilities until the latecomer firm takes over the entire supply chain responsibilities from the customers. Another variant strategy is that the latecomer firm concentrates on becoming the supplier of specialised niche components or process steps. In either way, the latecomer firm needs to constantly invest resources in process innovation to stay at the production frontier. To do so, latecomer firms need to focus on improving their operational performance. This can be done either through obtaining the latest process technologies available from external suppliers and incorporating them into production as soon as possible to reap the advantage of being an early adopter, or through in-house R&D to develop their own process know-how. Besides working closely with leading equipment and component suppliers, the firms also need to keep close contact with customers to anticipate future process requirements and to jointly develop customised solutions.

This strategy has several merits. Apart from avoiding the risk of commercialising new products, firms can prevent potential conflict of interest between themselves as manufacturers and buyers, thereby strengthening the loyalty of the buyers towards them. The ability of the process specialists to continuously innovate their production methods depends critically on the relationship with their end buyers. Only a close interaction with their customers enables them to gain intimate insights into current and future product requirements of their customers. Such supplier-buyer trust is difficult to develop if the customer perceives that the supplier poses a threat to vertically integrate forward in the future.

In what follows, the characteristics of the manufacturing firms of Hong Kong are presented. This is followed by an account of factors that have shaped the unique Hong Kong's innovation system. We shall also discuss and illustrate various capabilities development paths of Hong Kong's manufacturing firms. Finally, policy implications will be drawn from our analysis.

4 Hong Kong's manufacturing industry [25]

Hong Kong's industrialisation began in the early 1950s. After the Communists took over Mainland China in 1949, a large number of immigrants and refugees moved into the Colony. Many of them were entrepreneurs from Shanghai. They brought capital and skill with them and built Hong Kong's first spinning mill. The new textile industry expanded. In the early 1950s, there were only 26,300 workers in the textile industry employing about 35% of the total labour force in the manufacturing sector. By 1960, the employment rose to 61,800 [26,p.11]. Apart from the textile manufacturing, other industries such as metals, plastics, artificial flowers and wigs had also developed. During the period 1948–65, two-fifths of the Hong Kong labour force engaged in manufacturing activities. It was estimated that between 1950 and 1964, industrial output rose at an average of at least 3% per year. By 1967, there were more than 11,000 factories reported at the Labour Department [27,p.8].

A significant structural change in the economy was a substantial contribution of the manufacturing sector to the total product in the 1960s [28,p.8]. For the decade 1961–71, approximately half of the population were engaged in the secondary sector, contributing more than 37% of the economy's GDP. Ho [29,p.32] argues that this was due mainly to the expansion of the export-oriented manufacturing industries such as textiles, clothing, plastics and consumer electronics during the decades. The manufacturing gross output exhibited an impressive annual growth of approximately 45% in the decade 1973–83. High export growth rates were observed in the electronics industry in the 1970s, the watch and clock industries in the 1960s and 1970s, and the jewellery industry in the 1980s. Hong Kong's manufacturing activities peaked at mid 1980s. In 1984, the manufacturing sector employed 955,746 people and contributed 24.2% to the economy's GDP. By 1992, the major manufacturing industries, textile, clothing, electronics, watch and clocks, plastics contributed to more than 75% of the economy's export [30].

Starting from 1980, the pace of manufacturing growth contracted in relative terms. Its share in the total GDP declined from about 23.6% in 1980 to just only 5.2% in 2001. In 2003, total persons employed in manufacturing industries amount to only 17,883. This trend clearly indicates that a process of 'de-industrialisation' or 'hollowing out' occurred [31,p.336]. Contributing to this phenomenon was the rising labour and land costs in Hong Kong over time [32]. As a result, these industries used more capital-intensive inputs to substitute labour and/or relocated part of their production activities to Mainland China. The relocation strategy has made Hong Kong become the largest external investor in the Mainland since China adopted the open door policy in 1978. A survey by the Federation of Hong Kong Industries [33,p.14] reveals that 41% of the Hong Kong companies invested in the Pearl River Delta (Southern China), which accounted for nearly 50% of the total investment and 74.9% of the product finished or processed there. Each Hong Kong's firm, on average, employed 787 workers in the Delta region. At the end of 2001, Hong Kong's direct investment in the Mainland amounted to US \$108 billion, accounting

for 31% of Hong Kong's total direct investment. Hong Kong's direct investment remained largely in Guangdong, amounted to US \$52 billion at the end of 2001, equivalent to almost half of its total direct investment in the Mainland. The bulk of such investment belonged to industrial investment, involving primarily outward processing arrangements. In 2001, about five million Chinese workers in Guangdong worked for Hong Kong firms. This is 24 times the size of Hong Kong's own manufacturing workforce [34].

5 The national innovation system of Hong Kong [35]: imitation, unsophisticated technology and strategic followership

Hong Kong's manufacturing industry is characterised by a large number of small imitative firms whose activities are largely responsive to buyers' orders, especially to those from original equipment manufacturers or to subcontracting orders from either their larger counterparts or their peers [36,p.111]. In 1950, the average size of a firm was approximately 55 persons per establishment. The average size was reduced to ten persons per establishments in 2003 [34]. Earlier, Ho [36,p.112] rightly commented that:

“the average size of Hong Kong's industrial undertakings, which was small already by international standards had actually become smaller over a period of rising prosperity. The data clearly shows that Hong Kong's manufacturing sector has been dominated by small and medium establishments. The argument that the dominance of small and medium enterprises is only a characteristic of an early stage of industrialisation, and that they are deemed to decrease gradually as an economy industrialises does not seem to apply in Hong Kong”.

As will be argued, the declining average size has something to do with the technological development path.

Apart from small in size, manufacturing firms in Hong Kong were largely family businesses which made informal or oral trade agreements based on trust. They adopted a short-term view of production and took shortcuts to produce some noncapital-intensive and not too sophisticated commodities, with short gestation periods [37,p.25]. They did not make formal sales forecasts. Decisions were made on an *ad hoc* basis. When manufacturers considered adding new machinery to their plants, most of them expected a payback period on those investments of less than three years [38]. On the whole, manufacturers in Hong Kong did not make long-term production commitments. Instead, they rushed to the most popular products which had low value added and low profit margins but offered quick returns.

In the adoption of technology, Hong Kong's manufacturing firms in general were regarded as being followers and imitators rather than innovators [39]. Davies *et al.* contend that “Hong Kong's manufacturing industries traditionally are oriented towards incremental, rather than radical change, technological followership rather than leadership and cost reduction rather than product differentiation” [40,p.12]. In an earlier study of Hong Kong's manufacturing industry, Espy's survey reveals that manufacturers in Hong Kong adopted product strategies that were labour intensive and employed low level of technology, that did not require any design skills, and that aimed at mature products [41,p.50]. Most manufacturing firms in Hong Kong used mature or even obsolete production equipment and technologies to combine relatively cheap inputs to produce

goods designed by overseas customers. Yu's surveys (1995, 2000) reveal that in 1994, about 42% of the textile and garment firms simply copied exactly from other manufacturers while 44% of them copied from others but with some modifications [42]. Furthermore, 88% of the respondents did not use patent protection. Similar situation was also found in the electronics industry. About 62% of the electronics manufacturers copied and modified other products in the market while 18% of them copied exactly from other firms without any modification. In total, 80% of them pursued imitative strategies.

The smallness of the firms and their low capitalisation also mean that R&D was avoided [43,p.81]. A survey by the Hong Kong Government Industry Department and Census and Statistics Department [44,pp.84–88] reveals that 88% of manufacturing establishments in Hong Kong did not carry out R&D. In terms of R&D expenses, only 36% of the establishments spent 5% or more of their total annual revenue. About 42% of the establishments spent less than 5% of their annual revenue on R&D, and 22% of the establishments had no fixed R&D budget. Manufacturing firms in Hong Kong were not unaware of new manufacturing advances but they neither developed nor used them. Most often, new technology was rejected because of the perceived high costs. The industry did not have experience in innovation at the design, processing, or production stages of manufacturing [45,p.215].

6 Factors that shaped the innovation system of Hong Kong

Firms in an economy exhibit differences in the choice of technological route from firms in another economy. The diversity in the national pattern of technological catch-up paths is expected since the firm's choice of technological development routes takes place within a specific national innovation system. In other words, the unique historical context of an economy shapes the national innovation system, which in turn forms the basis of incentives and technological learning by individual firms. In a more recent study, Yeung [46,p.30] argues that entrepreneurial actions are both facilitated and constrained by ongoing processes of institutional relations defined by the social and business networks, political-economic structures, and dominant organisational and cultural practices. Specifically, Wong [2] indicates four major factors that influence the national innovation systems of latecomer economies and hence, the latecomer firm's technological catch-up paths. The factors influencing the evolutions of the Hong Kong's national innovation systems are examined below.

6.1 Political factors

The way a firm grows depends on the backgrounds of the founders of latecomer firms. This includes their work experiences, educational backgrounds and socio-cultural values. For example, countries where the founders of firms are strongly possessed by nationalist conviction to catch up with other advanced countries are likely to devote more resources on technological catch-up than otherwise. Hong Kong's unique political environment was conducive to imitation strategies. The former colony was often regarded as a "borrowed place and borrowed time" [47]. Many businessmen who migrated from the Mainland China during 1949 are still in the mentality of a transitional resident. This is especially true for older generations who have painful experience of their properties and businesses being confiscated by the Communist China in 1949. To deal with political uncertainty,

business people in Hong Kong opted for guerrilla business strategies. They engaged in industrial activities with a short gestation period and low capital content. Ho [48,p.23] remarks that the short-term outlook of Hong Kong's manufacturers was a direct consequence of Hong Kong's unique situation. The tendency to look for the maximum gain in the shortest period of time implies that people were actively watching out for business opportunities and quick to respond to clues from external environment. The short-term perspective limits the scope of planning and the size of investment project. As a result, capital-intensive investments were avoided and R&D spending was kept to minimum level, if any.

6.2 Initial industrial structure

The initial industrial organisation structure of an economy, including the industry size, concentration pattern and experience of firms, can influence the amount and type of resources that firms can command for new technological learning. A significant fact about industries in Hong Kong is its volatility. Its growth history demonstrates the sensitivity of a small economy in which home demand is almost irrelevant and external factors have great effects [43,p.73]. Given this situation, business people are compelled to be alert to any change in world market. More importantly, the export-oriented character of Hong Kong's industry means that local production relies on orders from overseas and hence the prediction of future demand is more difficult. Ho [48,p.23] comments "responsivity is necessary for the economic well-being of Hong Kong because of the export oriented character of its economy". In this situation, the best business strategy is to take on an imitative followership, keep business small and avoid being involved in advanced technology. Furthermore, it is preferable to invest in machines within a very short payoff period, so that firms can better adjust to the changing market demand [49,p.216]. As a result, subcontracting was widely practised by Hong Kong manufacturers to tackle such fluctuations [29,p.121]. With minimal government assistance (see below), manufacturers in Hong Kong are prompted to devise the kind of survival strategies, which are compatible with their competitive position in the world market. The result is a flexible production strategy with a high level of sensitivity to change and uncertainty in a global system of subcontracting [50].

6.3 The structure of competition

A firm's development path is heavily shaped by the structure of competition. The existence of a large, protected local market for a temporary period may provide incentive for new product innovation to exploit the window of opportunity. On the other hand, a completely unprotected market may discourage a firm to take on an innovative strategy. Hong Kong is often regarded as the last bastion of *laissez-faire* by free market economists [51]. Though the Hong Kong government took responsibility in social services such as housing, education, health and land development, regulation in manufacturing industries was minimal. The government had deliberately restrained from subsidising or protecting any industry and allowed private enterprises function on their own. The government only assisted entrepreneurs to pick the 'right' industries by furnishing them only with a limited amount of consultancy facilities such as the Hong Kong Productivity Center and the Trade Development Council. This policy was subtly

coined by the Colony's former Financial Secretary, Sir Phillips Haddon-Cave, in 1978 as 'positive non-interventionism'. Without any government protection or assistance, Hong Kong firms struggled to survive entirely on their own. Chiu and Lui [52] refer to this development as 'unorganised industrialism'. As a result, heavy investments in capital machinery or sophisticated technologies were not observed.

6.4 Cultural factors

The Chinese culture has also exerted influences on Hong Kong's business development through family values. Hong Kong is said to be propelled by a large number of dynamic small Chinese family businesses. Wong [53] argues that the Chinese entrepreneurial familism "has led to the evolution of a system of subcontracting, under which the production process is broken up into multiple independent parts. This enhanced Hong Kong's industry flexibility and responsiveness to external market fluctuations". The reliance on family and the exclusion of outsiders for senior management positions have important effects on the shape and size of business organisations. Such reliance makes it relatively difficult for Chinese enterprises to grow large as large firms are usually eventually split into smaller firms so as to follow the Chinese practice of divisible inheritance. Redding [54,p.109] concludes that this kind of Chinese culture, namely familism, facilitates business initiation but impedes a higher level of coordination necessary for the growth of the individual firm to a large scale [55,p.191]. Familism initiates incremental innovation, a typical feature of Hong Kong's industrialisation, but is not conducive to technological breakthrough.

7 Technological trajectories of Hong Kong's manufacturing firms

Due to the influences of the Chinese culture, small open economic structures, nongovernment intervention policy and other historical factors, firms in Hong Kong follow a technological trajectory different from firms in other latecomer economies. In general, firms in Hong Kong pursued a strategy of imitative followership in the technological development path. There are three major catch up paths that can be observed in the industrial sector of Hong Kong [56].

7.1 From OEM to OBM: the 'reverse value chain' strategy

Ernst and O'Connor [57,pp.67,88] observe that the Asian NIEs at first supplied finished products to foreign firms. Later, they marketed the products under their own brand name. Local suppliers started out with simple products and gradually worked their way up to more sophisticated items, moving from customer label products to own label products. According to Wong [58], this OEM-ODM-OBM migration strategy has been particularly typical in Asian computer companies that started as making PC clones or manufacturing key components of computer systems. They later became the providers of the system designs. Some might eventually develop their own brand and market distribution channels. In Hong Kong, such strategy is not observed in PC production but in the textile and garment industries. Tak Sun Alliance Ltd. serves as a good example. The company was traditionally involved in customer label garments (equivalent to OEM in the electronics industry) that were made only against confirmed orders. Through the

manufacture of customer label garments, the firm learnt and became competent in producing the product ranges. Involvement in customer label garment making provided the firm with sufficient technical knowledge in brand development. In 1977, the company created its own label garments, 'Cherry', and distributed them in the USA and subsequently, the Netherlands. In 1991, approximately 90% of the company's products sold in the USA and 71% of those sold in Europe were own label garments. The own label garments business contributed to nearly 70% of the company's total turnover. Moving away from customer label garments to own label garments reflected the improvement in the firm's capability. The Tak Sun case also illustrates how firms in the Asian NIEs attempt to catch up with world fashions. In fact, Hong Kong garment manufacturers have moved up-market into fashion garments [59,p.143]. They were in the upper 30% of the price range for clothing on sale in the USA. Clothing designed by Diane Freis, Judy Mann, Jenny Lewis, Ragence Lam, Eddie Lau and William Tang command a premium in world fashion markets. It is believed that local designs are as good as Japan's and much better than the USA' [60,pp.179–180].

7.2 'Late-follower' to 'fast-follower': 'reverse product life cycle' imitation strategy

As manufacturing firms in Hong Kong learn from multinationals, some of them improve and modify their own product, undertake some innovation, establish their own brand, and more importantly, sell improved models at lower prices so as to compete with multinationals. They start as a late-follower and become a fast-follower. Often their performances may even threaten the original suppliers in advanced countries. Two successful products of VTech, namely educational toys and telecommunication equipment, can be used to illustrate how manufacturers in Hong Kong compete with the US/European producers. In 1982, Texas Instruments Ltd. of the USA successfully created three popular electronic educational toys that teach children spelling, conversation and numbers. Each sold for US \$35. Once they appeared in the market, VTech immediately imitated the production and more importantly, combined all three functions into one called 'Play Tech' and sold for only US \$30. The products soon undersold Texas Instruments and monopolised 60% of the US market [61]. This case illustrates the advantages of being a latecomer in exploiting commercial potential [57,p.40]. Another successful example is cordless telephones. Before VTech, the market sold the standard 49 MHz models. VTech improved the design and supplied first digital 900 MHz cordless telephone with better sound quality and reliability. As a result, the company seized 70% of the US market. In 1993, the company manufactured cordless phones for Phillips and Alcatel in Europe and AT&T in the USA as well as its own brands [61,p.9].

Another example is Goldlion (Far East) Co. Ltd. Founded by Mr. Tsang Hin-Chi, an immigrant from Mainland China, Goldlion Company had been principally engaged in the production and marketing of men's apparel such as ties and shirts. Since its establishment in 1968, the company had developed into one of the largest manufacturers of men's apparel. Tsang attributed the success of his company to the strategy of 'borrowing ideas from overseas', which is widely adopted by Hong Kong's manufacturers. He implemented this imitative strategy through his four quick principles, namely 'quick design, quick sampling, quick production and quick marketing'.

Specifically in the tie market, France and Italy possess many first class designers and supply world markets with ties of new designs and styles. Goldlion sent its staff overseas and adopted these new designs by paying licence fees. In the Hong Kong factory, new designs were rapidly modified into Goldlion's products and then put into mass production. In this way, Goldlion could guarantee a quick supply of new styles. Hence Tsang's 'four quick operations' enabled his company to catch up with world fashions. In 1994, Goldlion supplied the markets with 20,000 different colour designed ties. Tsang also adopted the idea of counter sales from some famous foreign brands operating in Hong Kong and established 'The Goldlion Counters'. 'The Goldlion Counters' were counters selling Goldlion's products within department stores. They had a standard design and layout in accordance with the company's specification. After succeeding in Hong Kong, the company established extensive regional distribution networks in Mainland China, Taiwan, Indonesia, Singapore, Malaysia and Thailand.

7.3 The 'no-brand-one-niche-product' strategy: process capability specialist strategy

Many Hong Kong manufacturing firms has adopted the process specialist route. Termbray Electronics Company is a typical example. The expansion of Termbray did not rely on the manufacture of a diverse range of branded products. On the contrary, it focused on the strategy of producing no-brand-one-niche products. With years of experience in the production of printed circuit boards, Lee Lap, the owner of Termbray, in 1981, decisively invested \$5 million to relocate his entire manufacturing plant to Tsuen Wan, one of the Hong Kong's new industrial areas, to produce more complex printed circuit boards. The new plant occupied a total floor area of 30,000 square feet, employed 400 people, and produced high precision double-sided printed circuit boards for sale to a number of customers including Atari and Commodore. In 1983, the company even ceased the production of its own brand name products in order to concentrate on printed circuit boards and OEM products. In conjunction with the technological development in the computer industry that demanded more sophisticated high precision printed circuit boards, the company commenced the manufacture of multilayer printed circuit boards in 1984. On the success of printed circuit boards business, Lee's remark is worth noting: "I can never make computers like Commodore or IBM, but I can make printed circuit boards for them better than many other producers". By 1991, the company's total turnover in printed circuit boards amounted to HK\$165.85 million, with an operating profit of HK\$26.8 million. By 1994, the more advanced printed circuit boards were manufactured in Hong Kong while those competitively priced printed circuit boards were made in China. This case shows that Hong Kong manufacturers at first learnt to make niche products and later produced them in the low cost regions so that they could compete in international markets.

Another similar success is S.Megga Telecommunication Ltd. The company also relied much upon OEM business. In the late 1970s, when cordless telephones became popular in the USA, Leung Ray-Man, the owner of S.Megga, started to penetrate this market. At that time, cordless telephones were largely monopolised by Japanese producers. In 1981, S.Megga successfully produced its first cordless telephone. Although initially, the selling prices of these products were marginally higher than other local firms, when compared to Japanese products, the products were still cheaper. Hence, S.Megga's telephones were able to enter the US market via OEM arrangement. In 1982,

after obtaining an approval from Federal Communications Commission of USA, the company sold cordless and feature telephones in the USA, Europe, and Australia. In the following year, the company manufactured and sold 'Telehelper 1600' memory diallers and 'Telehelper 600' speakerphones to the AT&T for distribution in the USA under AT&T's brand name. In the same year, the company designed cordless telephones known as the 'Nomad' series for the AT&T Group. Sales to AT&T grew dramatically from approximately HK\$69 million in 1984 to HK\$475 million in 1991. S.Megga became the major supplier of cordless telephones to AT&T. In 1990, the company received the 'OEM Quality Excellence Gold Award' from AT&T. In 1991, it even sold cordless telephones with answering machine features to JVC, despite the fact that JVC was once a major supplier of cordless telephones.

8 Extending existing capabilities: Hong Kong firms as regional coordinators

With limited resources and a relatively simple technological base, manufacturing firms in Hong Kong in general take on the route of non-innovative strategies. They avoided those sophisticated technological strategies which they possessed no competitive advantages. After a half-century of involving in OEM business and dealing with foreign firms, most Hong Kong firms have acquired knowledge in managerial coordination. They find that they can earn rewards through providing services to foreigners and serve as international coordinators. As mentioned, Hong Kong firms have been content to be an OEM for foreign companies for years. However, this does not mean that they have to be actually involved in the physical production. After receiving contracts from foreign buyers, these firms could re-subcontract some parts or all production processes to other firms in developing economies such as Indonesia, Thailand, Malaysia, Vietnam and even Russia and African countries. In the 1980's, rising labour costs and rentals as well as intense competition from firms in other developing countries threatened the survival of manufacturing firms in Hong Kong. Following the China's Open Door Policy in 1979, a lot of Chinese firms in Hong Kong rapidly took advantage of their affinity origins [62] and much lower costs in Mainland China, and conducted spatial profit arbitrageurship. By relocating or subcontracting labour-intensive activities to the other low cost regions, while keeping offices in Hong Kong as coordinating centre, these manufacturing firms have gradually evolved into trading firms [63]. In some extreme cases, firms might have no production site in Hong Kong at all. They simply maintained an office in Hong Kong for administrative purpose and subcontracted all jobs to other factories in developing countries from the orders they received. They specialised in venture creation, international marketing, outsourcing, and coordinating [64,p.472]. They earned rewards by providing their managerial and marketing knowledge to foreign buyers and sellers [65]. Hence, firms in Hong Kong in its modern form are coordinators of transnational production [66,p.8]. This explains the phenomena that, despite possessing only unsophisticated technologies, Hong Kong evolves into one of the wealthy economies in Asia.

9 Policy implications

Like most latecomer firms, Hong Kong's manufacturing firms have pursued imitative strategies in their technological development and involved mostly in mature consumer products. However, unlike South Korea, manufacturing firms in Hong Kong have not developed into large vertically integrated firms. Neither have they followed Taiwan's computer firms, which have penetrated the world markets with more sophisticated technologies. The technological base of Hong Kong's manufacturing firms has remained weak over time, though Hong Kong in the 1990s has become a high-income economy. Without any assistance from the government, Hong Kong's manufacturing firms have utilised their own established capabilities and remained small in size. They have maintained flexibility and alert to profit opportunities. Through international subcontracting, Hong Kong's firms have served as regional coordinators. In this way, firms in Hong Kong can survive in the global markets.

Hong Kong's unique technological development paths shed light on other learning economies. Firstly, we observe that Hong Kong's development path take a similar route as other three Asian NIEs (Singapore, South Korea and Taiwan) in the sense that firms in Hong Kong also adopted imitative strategies. However, they also differ from the other three Asian NIEs in the specific imitative routes. Our analysis clearly shows that there is no one definite path for firms' capability development. Whether a firm can learn and successfully acquire foreign technologies depends on firm's cultural, historical and economic backgrounds [67]. In this sense, import of foreign technologies to enhance a nation's capabilities has to make reference to the absorptive capacity of the learners. Otherwise, a forceful transplant of foreign technologies for domestic uses may enhance economic chaos. The failure of the Self-strengthening Movement during the late Ching Dynasty in Imperial China serves as an excellent example.

Secondly, our analysis highlights the significant of entrepreneurial learning and imitation in capabilities building. This study argues that relying on OEM business and learning from early industrialised nations can be useful development strategies. More specifically, through OEM business, small-scale production, international subcontracting and product imitation, which are largely dependent on foreign firms, manufacturing firms in developing economies are able to compete in world markets and later catch up with economically developed nations. The imitative strategy therefore should not be downgraded as noncreative [68]. At the initial stage, producers have to imitate and compete on low labour costs. After a period of learning by doing, they might be able to master technical knowledge and move to a higher level of learning, where new designs are possible. Improved models with lower selling prices are the competitive edge of latecomer producers. In this regard, multinationals making direct investment in developing countries to take advantage of lower production costs can benefit developing economies because latecomer firms can take the opportunity to imitate and learn foreign technologies.

Thirdly, facing competition from other developing economies, most mainstream economists have advised latecomer firms in Asia to upgrade their technologies [69]. However, statistics shows that in the late 1980s, ventures in Hong Kong were still in technologically simple areas such as backing retail clothing franchises, rather than sophisticated technological schemes (Rafferty 1991,p.191). This result is not surprising if we apply our capabilities approach to the problems. Apart from upgrading technologies, there are other measures which manufacturing firms can consider. As this study has

already revealed, many manufacturing firms in Hong Kong relocated their production or subcontracted their jobs to other low costs countries, and became regional coordinators. They now specialise in providing managerial and consultancy services to foreign firms. This is how Hong Kong firms can survive. Yet we are not arguing that upgrading manufacturing technology is unproductive. The point we want to iterate is that there are many development paths. Upgrading hardcore scientific technologies is only one of the many solutions.

Finally, the growth experiences of the Asian latecomer firms reveal a various degree of government involvement in the industries [70]. It ranges from heavy promotion of manufacturing industries by the South Korean government, to a very low degree of intervention of industry by the Hong Kong government. In between the two extremes, the Taiwanese government guided its industry, while the Singaporean government provided incentive for giant multinational firms to lead its industrialisation. With different degree of government involvement, all four Asian NIEs succeed in catching up with economically advanced nations. Therefore, the role of government during the process of technological catch-up is not a debate between the government intervention and free market mechanism. Instead, as Rodan [71,p.89] argues, it would be more fruitful to investigate the different ways in which states and markets are inter-related and how both government and private enterprises can work consciously work together towards specific goals [72]. A combination of competent government policies and dynamic private learning firms can give rise to success.

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