

# Internet and E-Commerce Development in Asian Tigers: A Comparison of Chinese Taipei and Hong Kong

## *Abstract*

Using historical analysis, the authors examine the determinants of Internet and e-commerce diffusion loci in Chinese Taipei (Taiwan) and Hong Kong. Structural and contextual factors such as seacoast locations, high emphasis on R&D and human capital development and rapid advancement in undersea cable technology favor Internet development in both economies. Hong Kong's history of formulating appropriate strategy to adapt to new situations, higher income and denser population explain its higher Internet penetration than Chinese Taipei. The vibrant semi-conductor and PC industries, an outcome of the macroeconomic linkages provided by the government, and the network of its companies with the Silicon Valley, on the other hand, are the critical factors that made Chinese Taipei a technology creator and a global leader in B2B e-commerce.

***Keywords: Hong Kong, Chinese Taipei, Internet, e-commerce, historical method***

## **Introduction**

Internet and e-commerce, despite their English speaking and western focused nature (Hedley 1999), are diffusing more rapidly in Hong Kong and Chinese Taipei (Taiwan) than in many Western and English speaking countries. A recent e-readiness ranking of the 60 main economies of the world by the Economist Intelligence Unit (EIU) puts Hong Kong and Chinese Taipei in the groups of “e-commerce leaders” (rank 13) and “e-commerce contenders” (rank 16) respectively. In terms of e-readiness, Hong Kong and Chinese Taipei are ahead of European countries such as Belgium, Italy, Spain and Portugal; English speaking countries such as New Zealand; and Asian "capitalist-readers" (Viksnins 2000) such as Korea and Japan.

Asia's share in worldwide e-commerce is estimated to rise from 5% in 2000 to 10% in 2004, and Hong Kong and Chinese Taipei are expected to account for a significant proportion of this growth (Lee et al 2001). Cognizant of such growth potential, many multinationals involved in e-business as well as venture capitalists are showing an increasing level of interest in these economies (Chan 2001).

A deeper and clearer understanding of the factors influencing the rapid growth of the Internet and e-commerce would help design appropriate e-commerce models to target consumers in these economies and also to formulate appropriate policies to accelerate Internet diffusion in other countries. While some studies have compared Internet diffusion in Hong Kong and Chinese Taipei

(e.g., Foster et al 2000), to our knowledge, no published study has made attempt to make a comparative analysis of Internet and e-commerce diffusion loci of these dynamic Asian economies. This paper attempts to fill this research gap by making a comparative analysis of the determinants of Internet and e-commerce diffusion loci in Chinese Taipei and Hong Kong.

We use historical methods to identify and analyze the causes of rapid Internet and e-commerce diffusion in Chinese Taipei and Hong Kong. Our approach is guided by the following two research questions: a) What factors led to Hong Kong and Chinese Taipei's rapid Internet and e-commerce development? and b) What factors are responsible for the difference in the Internet development loci of the two economies?

The remainder of the paper is organized as follows. In the following section, we provide a brief survey of the current stages of Internet and e-commerce development in Hong Kong and Chinese Taipei. This is followed by a brief discussion of the methodology used. Then, we attempt to identify and analyze various factors influencing Internet and e-commerce diffusion in the two economies. Next, we revisit the Internet development situation in Hong Kong and Chinese Taipei and provide some conclusions.

### **A brief survey of Internet and e-commerce development in Hong Kong and Chinese Taipei**

Table 1 provides a comparison of Hong Kong and Chinese Taipei in terms of some essential indicators related to Internet and e-commerce growth. Data triangulation from several sources indicates that B2C e-commerce is more developed in Hong Kong than in Chinese Taipei. A study conducted by Nielsen//NetRatings found that 55.5% of the population had Internet access in Hong Kong in July 2001 compared to 52.3% in Chinese Taipei. Similarly, iamasia (Interactive Audience Measurement Asia) found that 34% of the population used the Internet in Hong Kong compared to 31% in Chinese Taipei in the early 2001 (Asian Business 2001). By 2004, however, 61% of Chinese Taipei population is expected to use the Internet thanks to its vibrant semiconductor and PC

hardware industry<sup>1</sup>. In terms of gender composition, 44% of the Internet users in Hong Kong are women compared to 42% in Chinese Taipei<sup>2</sup>. In the early 2001, a larger proportion of Internet users shopped online in Hong Kong (13%) compared to Chinese Taipei (10%). Hong Kong's Internet users view 1123 pages per month and 63 pages per session compared to corresponding figures 618 and 55 respectively for users in Chinese Taipei<sup>3</sup>.

Table 1: A comparison of Chinese Taipei and Hong Kong in terms of several dimensions related to Internet and e-commerce development

	Chinese Taipei	Hong Kong
<b>EIU e-readiness ranking</b>		
2000 ranking	27	9
Business environment (out of 10)	8.13	8.52
Connectivity (out of 10)	5	8
2001 ranking	16	13
<b>Technology achievement index (UNDP 2001)</b>	NA	0.455 (rank 24 out of 72)
<b>Number of Internet users (July 2001)</b>	11.60 million	3.94 million
<b>No. of hosts under top-level domain</b>	424,209	98,183
<b>Percentage of households with one PC</b>	59	59
<b>Multiple PCs</b>	26	22
<b>No. of telephone main lines 2000 (Dec)</b>	13 million	3.9 million
<b>No. of mobile phones 2000 (Dec)</b>	17.6 million	5.3 million
<b>No. of ISDN subscribers (1998)</b>	8.76	15.3
<b>No. of Internet service providers (1999)</b>	15	49
<b>Language</b>	Mandarin Chinese (official)	Cantonese and English (both official)
Index of economic freedom <sup>4</sup>	2.10 (rank 20)	1.30 (rank 1)
No. of credit cards (million 1999)	8.06	13.1
GDP per capita (PPP) 1999, US\$	16,100	23,100
<b>GDP Composition (1997)</b>		
Agriculture (%)	3	0.1
Industry (%)	33	14.7
Services (%)	64	85.2
<b>Population (2000)</b>	22.2 million	7.1 million
<b>Land area (Km<sup>2</sup>)</b>	32260	1042

Sources: Asian Banker 2001 (<http://www.theasianbanker.com>), Budde 2001, CIA 2001, Cyber Atlas 2001, Foster et al 2000, Heritage Foundation (2001) <http://www.ebusinessforum.com>, UNDP 2001.

Rapid growth in broadband use is likely to bring a radical change in Internet usage pattern between the two economies. By mid-2001, the proportion of households with broadband penetration reached 40% in Hong Kong and 8% in Chinese Taipei<sup>5</sup>. Consumers in these economies exhibit a higher level of preference for mobile phones than their counterparts in Europe or America (Wilson 2001). The pervasiveness of mobile phones in these economies (Table 1) is likely to accelerate the

<sup>1</sup>See <http://www.ebusinessforum.com> (eMarketer: Taiwan's web explosion, April 13, 2001).

<sup>2</sup> See <http://www.ebusinessforum.com> (South China Morning Post: Online gender split evens up in Asia, July 5, 2001)

<sup>3</sup> See <http://www.ebusinessforum.com> (eMarketer: Can broadband save the banner ad?, May 8, 2001).

<sup>4</sup> Lower number indicates higher level of freedom.

diffusion of mobile e-commerce (m-commerce) in the future, which is still in nascent stage. An estimate suggests that by 2003 m-commerce will account for about half of \$900 million B2C e-commerce market in Hong Kong (Lawson 2000).

In B2B e-commerce, however, Chinese Taipei<sup>6</sup> is much more developed than Hong Kong. Managers in most Chinese Taipei companies have Silicon Valley work experience and possess the willingness and the ability to reengineer their companies to leverage the power of the Internet (Foster et al 2000). The U.S. know-how combined with Chinese Taipei entrepreneurship, engineering, and manufacturing skills give Chinese Taipei companies an edge (Tanzer 1998). Chinese Taipei companies adopted electronic interchange and the enterprise systems much earlier than Hong Kong based companies. The latter are small and medium sized enterprises (SMEs)<sup>7</sup>, and tend to focus on short-term profits and lack high-tech manufacturing capability, which led to slower speed of EDI and ERP adoption (Foster et al 2000).

## **Methodology**

We use historical methods to understand the forces influencing Internet development in Hong Kong and Chinese Taipei. Historical methods entail two stages: research design and historical analysis (Smith and Lux 1993). The research design phase includes question framing and selecting research procedures. The starting questions to be addressed are mentioned in (a) and (b) above. Secondary data analysis, library research, and online search are used to address the above questions.

The second stage – historical analysis – entails investigation, synthesis and interpretation. In the investigation phase, we isolate the factors leading to the rapid Internet and e-commerce development in the two economies and the difference in their diffusion loci. In the interpretation phase, epistemologically, we are interested in identifying and analyzing three levels of causes of the rapid Internet diffusion in the two economies: deep structural, contextual, and triggering causes. We are also interested in the interaction of the causes or the “causal complex”(Fischer 1970).

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<sup>5</sup> See <http://www.emarketer.com>

<sup>6</sup> Bickers (2000) describes Chinese Taipei as a "b2b e-commerce frenzy".

The principal product of such historical analysis is an understanding of the organizational, individual, social, political and economic circumstances that led to the current stages of Internet and e-commerce development in Hong Kong and Chinese Taipei. The structure of causes uncovered by this study provides valuable lessons for the Internet and e-commerce sectors of advanced as well as developing economies of the Asia-Pacific region.

### **Factors impacting the diffusion of Internet and e-commerce in Hong Kong and Chinese Taipei**

Geographical factors such as location, climate, population size and density play important roles in the economic development as well as the Internet and e-commerce growth. In a quantification of the contributions of geography to a nation's performance, Sachs et al (2001) found that coastal regions and those near navigable waterways are far richer and more densely settled than interior regions. Similarly, nations in tropical climatic zones are likely to be poorer than those in temperate zones. In case of Hong Kong and Chinese Taipei, location in navigable waterways and in tropical zones tend to produce opposite effects on income level – but the former overwhelms the latter<sup>8</sup>.

Rapid development in undersea cable technology has further increased the importance of a seacoast location in the information age. Undersea cables are more appropriate for capacity expansion<sup>9</sup> and also fare much better than satellites in longevity and security dimensions. Thanks to such development, from 1988 to 1998, the proportion of transoceanic messages and data carried by undersea cables increased from 2 to 80 percent (Mandell 2000).

Hong Kong is the most densely populated economy in the world and there are only a few economies that have higher population density than Chinese Taipei. It is a much easier task to wire a densely populated tiny island like Hong Kong in comparison to other giants such as Mainland China and India, which partly explains Hong Kong's rapid Internet development.

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<sup>7</sup> Over 90 percent of Hong Kong's businesses are SMEs (Foster et al 2000).

<sup>8</sup> For instance, among the 28 economies categorized as high income by the World Bank, only Hong Kong, Singapore and Chinese Taipei are in the tropical zone, which represent only 2 percent of the population of the high-income regions (Sachs et al 2000).

Although structural factors such as seacoast location and higher population density favor Internet and e-commerce development in Hong Kong and Chinese Taipei, several other factors such as small size, lower bandwidth (compared to North American and European countries) and Eastern and non-English speaking culture tend to produce opposite results. Some studies suggest that economies like Hong Kong and Chinese Taipei, despite high degree of e-business readiness, are too small to maintain any e-retailers (BCG 2000). The effect of small population size on e-commerce development is likely to be mitigated with the sharp reduction of tariff and non-tariff barriers and WTO members' agreement in not imposing customs duties on electronic transmissions (WTO 1998). Since Hong Kong is already a WTO member and Chinese Taipei is expected to get the WTO membership soon, e-retailers located in these economies can sell their products virtually anywhere in the world and vice versa.

Unavailability and higher cost of leased fiber connection are other barriers in Asia. The Asia-Pacific region – home to 60% of the world population – accounts for only 12% of the total worldwide bandwidth (Frontline.net 2001). Intra-regional leased fiber connections in Asia are more expensive than connections to Europe and North America. For instance, in 2000, the cost of a 155 Mbps leased fiber connection between Japan and Hong Kong was \$1 million per month, compared to \$882,000 between Japan and the U.S. and \$142,000 across the Atlantic. Likewise, a 155Mbps connection between Chinese Taipei and San Francisco cost 11 times as much as that between New York and London (Lawson 2000). ISPs in these economies have to pay for the full cost of leased lines to Internet backbones in the U.S. which makes Internet access more expensive (Petrazzini and Kibati 1999).

Moreover, since the bulk of software, interfaces and web content is in English which is not the native language of these countries, they are at a relative disadvantage in Internet and e-commerce adoption. Being an ex-British based economy, the bilingual society of Hong Kong fares much better

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<sup>9</sup> This is mainly because of "Improved optical fibers, dense wavelength-division multiplexing (DWDM), enhanced

than Chinese Taipei on the English language dimension. In fact, English is one of the official languages in Hong Kong whereas Mandarin is the only official language in Chinese Taipei (CIA 2001). However, the rapid decline in English language content on the web and availability of software and interfaces in other language has reduced the importance of English language skills in Internet and e-commerce development<sup>10</sup>.

“Western focused” and “English speaking” characteristics of the Internet as explained above require higher level of effort for a given level of Internet and e-commerce development in Asia than in Western and English speaking countries. Several barriers need to overcome to move into information economy and such barriers. Braudel (1980) argues that movement from one to the next of each of the economic activities – road transport, sea transport, mercantile activity, industrial development, banking, information revolution – must be “shown to correspond to a break in the barrier, to an obstacle overcome” and not to have “sprung into being through a series of ruptures” (p.88). There are similarities as well as difference in the ways governments, organizations, and consumers respond to such discontinuities in Hong Kong and Chinese Taipei.

Entrepreneurial people, innovative business models of the enterprises involved in e-commerce, and the governments' effective macro-economic policies are the factors that are overcoming the barriers to Internet and e-commerce caused by the interactions of several structural and contextual factors mentioned above. E-retailers in Chinese Taipei have developed new business modes to cope with such problems as low credit card penetration (Table 1) and consumers' concern about security issues. For instance, e-commerce companies in Chinese Taipei are using different payment and delivery options to overcome the problem of security. E-commerce companies have made cooperative arrangement with the 7-Eleven convenience store, according to which products ordered

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electronics supporting higher transmission speeds, and the incorporation of more strands in each cable" (Mandell 2000).  
<sup>10</sup> English language content on the www was 85% in 1998 (Nunberg 2000), 80% in 1999, 68% in 2001 (GlobalReach 2001) and will be 50% in 2003 (Nua 1999). Likewise, by early 2001, Chinese became the fourth mostly used language on the www.

online can be delivered to the customer's nearest 7-Eleven and paid for over the counter either with cash or credit (Lee et al 2001). Books.com.tw, a B2C site, has already started offering such service, and expects a significant increase in its book sales. Such a model is different from those used by B2C companies in the U.S. such as Amazon.com.

Hong Kong's entrepreneurial culture has a long history of adapting its strategies to changing circumstances (Jessop and Sum 2000). The rule of law, lack of trade barriers, low taxes, simple system for the licensing of businesses, protection of private property laws, and the world's "freest banking environment" have contributed to Hong Kong's development as a major trading port and financial center of East Asia (Heritage Foundation 2001). Heritage Foundation has described Hong Kong as the world's freest economy for seventh consecutive year in 2001. Chinese Taipei<sup>11</sup> is not as free as Hong Kong. Considering barriers to international trade, for instance, Chinese Taipei government has listed 991 product categories that require relevant authorities' approval for import and another 279 that require import permits (Heritage Foundation 2001). Moreover, its banking sector is tightly regulated.

In recent years, Hong Kong's manufacturing trajectory – organizing low cost manufacture in cheaper Asian locations – became unsustainable because of steep increase in labor and land cost in those locations and competitive challenge from Japanese companies (Berger and Lester 1997). The best alternative for Hong Kong in such situation is to climb the "technology ladder" by producing higher value-added goods domestically (Jessop and Sum 2000). It has taken several initiatives such as "Digital 21", citywide broadband implementation, and the new Cyberport to climb the technology ladder.

Digital 21 is a collaboration between the Information Technology and Broadcasting Bureau (ITBB) and the Information Infrastructure Advisory Committee (IIAC). It is a "package of

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<sup>11</sup> The rank of Chinese Taipei in terms of economic freedom index was 20 in 2001 (see table 1).

initiatives through which Government, business, industry and academia can work together"<sup>12</sup>.

Similarly, the \$2 billion Cyberport project<sup>13</sup> has already attracted many investors. By November 2000, 15 leading IT and IS companies such as Cisco Systems, CMGI, Hewlett-Packard, IBM, Microsoft and Oracle signed letters of intent to become anchor tenants and over 175 other companies registered interest in becoming tenants in the Cyberport<sup>14</sup>.

Despite some market interventions, the Chinese Taipei government has provided effective "macroeconomic linkages" (Wade 1990) that have been critical in transforming Chinese Taipei from one of the poorest economies in the world in the 1960s to its current level. The state enterprises supplied and controlled primary materials and provided selective protection and tax exemptions and rebates, which boosted its competitive advantage in IT products. These activities resulted in Chinese Taipei's viable market economy with strong effects in technology upgrading, manufacturing growth, and export promotion (Wade 1990). Chinese Taipei took measures to guide enterprises into more complex activities and reduce their dependence on technology imports. Measures were also taken to ensure that firms develop innovative capabilities that are more flexible, more responsive to markets and much more broadly spread in the economy (UNDP 2001). Such "guided capitalism" was able to influence the microeconomic activities at the firm level (Tsai 1999). Consequently, companies based in Chinese Taipei have become the largest or the second largest direct foreign investor in every country in Southeast Asia and China (Chen and Lee 2001).

Chinese Taipei is the world's third largest IT hardware player behind Japan and the US and the world's largest supplier of LAN cards, monitors, mouse devices, PC motherboards, notebook PCs, scanners, and other PC products. In fact, the household PC penetration rate is higher in Chinese Taipei than in Hong Kong (Table 1). Since computer and telephone are the prerequisites to use the Internet and e-commerce, Chinese Taipei's higher PC penetration rate is one of the

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<sup>12</sup>See <http://www.lowtax.net/lowtax/html/hongkong/jhkecom.html>

<sup>13</sup> Cyberport is intended to be a cluster of large IT firms and smaller support companies, backed by broadband telecommunications, media labs, high-speed computers, multi-media equipment and studios.

important factors that explain the relatively small gap between Hong Kong and Chinese Taipei in Internet diffusion, in spite of the much larger gap in the per capita GDP of the two economies.

These macroeconomic linkages were also able to attract a huge amount of venture capital (VC), which created a virtuous circle of IT development. In fact, Chinese Taipei has been "Asia's capital for venture investment activities" (Chen and Lee 2001). The US experience shows that availability of VC is a critical factor for the success of e-commerce. The annual investment into new ventures from about 170 VC funds registered for special government benefits, and an additional estimated 300 not seeking government incentives as well as from foreign-based players, is estimated to be \$20 billion in Chinese Taipei (Chen and Lee 2001).

Chinese Taipei's two major tech hubs – Taipei and Hsinchu – are the other significant outcomes of the macroeconomic linkages that are playing a critical role in its Internet and e-commerce development. To attract technologists back from Silicon Valley, Chinese Taipei government set up Hsinchu Science Park, Chinese Taipei's "Silicon Valley", in 1980 and offered various tax breaks and a promise that they would not be interfered with (Micklethwait 1997). In the Wired magazine's rankings of the 46 major locations in the world that matter most in the new digital geography, Taipei and Hsinchu scored 13 and 11 respectively (out of the maximum possible score of 16) which compares with Hong Kong's score of 9<sup>15</sup>.

The "macroeconomic linkage" provided by Chinese Taipei government influenced IT diffusion in Hong Kong as well. The currency depreciation from 1986 onwards and the rising cost of land and the high standards set by the government's Labor Law forced some Chinese Taipei manufacturing firms to divert their investments to cheaper locations (Jessop and Sum 2000). Obviously Mainland China was the most attractive destinations. Chinese Taipei, however, lacked direct contact with the mainland since 1949 and a sensible strategy for the Chinese Taipei

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<sup>14</sup>See <http://www.hongkong.org/ehongkong/ehongkong.htm>

<sup>15</sup> There are only 7 hubs in the world with higher scores than Taipei; 17 hubs with higher scores than Hsinchu and 30 hubs with higher scores than Hong Kong.

companies was to establish commercial links with the mainland through Hong Kong (Foster et al 2000). In fact Hong Kong is serving as a bridge, a channel, and a window between China and rest of the world, not just Chinese Taipei. Chinese Taipei companies brought not only money and manpower in Hong Kong but also the latest technology.

An economy's natural and physical capitals cannot contribute much unless the country invests in human capital<sup>16</sup>. Human capital continues to be important in the information age. Chinese Taipei and Hong Kong have put high priority on human capital development. They emphasize technology-oriented curricula at higher levels and try hard to attract scholars and researchers (UNDP 2001). For instance, Tanzer (1998) reports that engineers in Chinese Taipei Semiconductor companies have been earning as high as \$500,000, which is very high given that Chinese Taipei's per capita GDP is less than half that of the U.S. Thanks to such measures, these economies have a huge pool of skilled engineers and deep technological and industrial bases, which are prerequisites for e-commerce development.

The Chinese Taipei government, however, has been surprisingly slow in enacting e-commerce laws. An analysis of Asian economies in terms of their adoption of digital and electronic signature (DES) puts Chinese Taipei at the basic level 1 whereas Hong Kong is at the advanced level 3 (Kshetri and Dholakia 2001). In Chinese Taipei there is no formal legislation to recognize DES. Hong Kong has laws to recognize DES and also legal provisions for the functioning of certification authorities. DES are being extensively used in Hong Kong. By early 2001, Hong Kong courts relied upon electronic records for more than 50 cases (Canham 2001). The absence of appropriate e-commerce laws is hampering online transactions in Chinese Taipei. The legislature in Chinese Taipei, however, is considering new laws to regulate E-commerce (Einhorn et al 1999).

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<sup>16</sup> Studies suggest that human capital accounts for about two-third of the wealth of a nation (UNDP 1995).

## **Revisiting Internet and E-commerce Development in Hong Kong and Chinese Taipei**

Higher per capita income, strategic location, higher population density, multicultural bilingual

society with entrepreneurial culture and better e-commerce laws explain Hong Kong's better performance in B2C e-commerce. Chinese Taipei's macroeconomic linkages that are able to penetrate effectively to the firms' microeconomic policy and the link of its managers with Silicon Valley companies, on the other hand, explain the better performance in B2B e-commerce. For the given level of per capita GDP difference between the two economies, however, the gap in B2C e-commerce between Hong Kong and Chinese Taipei is relatively very small.

### **Discussion and Conclusion**

An important contribution of this paper is to identify and analyze the factors influencing the rapid growth of the Internet and e-commerce in Chinese Taipei and Hong Kong. Our analysis indicates that the factors driving the development of the Internet and e-commerce in the two economies are quite different. Despite much higher per capita GDP of Hong Kong compared to that of Chinese Taipei, there is relatively very small gap in B2C e-commerce<sup>17</sup> between the two economies and in B2B e-commerce Chinese Taipei is more developed than Hong Kong. The fact Chinese Taipei is a creator of technology whereas Hong Kong is only a user explains this phenomenon.

The causes of Internet and e-commerce diffusion identified in this paper, however, are not "detachable, isolable, homogeneous, independently operative, and hence susceptible of being added to or subtracted from the causal complex" (MacIver, 1964, p.94). Put differently, they cannot be "individually analyzed and assessed" (Fischer 1970, p.179). Not all the factors identified in this paper can be exported to other countries. Some "exportable" factors include government's macroeconomic linkage, higher emphasis on human capital development and the formulation of right strategy that fits to the changed circumstances.

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<sup>17</sup> Past studies have found that income is one of the most important predictors of Internet and e-commerce growth (e.g., Hargittai 1999).

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