

REPORT

The Connected Harbour

How the Internet Is Transforming Hong Kong's Economy



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Contents

Preface	5
Executive Summary	6
The Hong Kong Internet Economy: A Snapshot	8
Borderless Business	8
Internet Anytime Anywhere	9
Mobile Netizens	9
The Internet's Ripples: GDP and Beyond	10
Internet GDP Calculated	11
Ring 1: Business and Consumer Economic Impacts	12
Ring 2: Higher Productivity	14
Ring 3: Broader Social Benefits	14
Internet Intensity	15
Hong Kong on the Global Stage	15
Elsewhere in the Region	17
Looking Ahead	18
The Great Transformation	19
From Fragrant Harbour to Connected Harbour	19
Reshaping Industry	22
The Entrepreneurial Hong Kong Small and Medium Enterprise	25
Different Sectors, Different Approaches	25
Distinct Motivations	26
Who Dares Wins	27
Foundation for Growth	32
Levers of Growth	33
Promising Future	35
Appendix: Methodology	36
Note to the Reader	39



Preface

The Internet has had a profound impact on Hong Kong's core industries, such as trade and financial services, and on the way people in Hong Kong live. Despite the fact that the Internet has become an integral part of Hong Kong's society, little research has been done to estimate the size and growth of the Internet economy.

In order to understand the nature and size of commercial activities on the Internet, Google commissioned The Boston Consulting Group (BCG) to prepare a series of independent reports across different countries and regions. Hong Kong is the first economy in the Asia-Pacific region to be the subject of such a report.

Both Google Hong Kong and BCG are pleased to present these findings in order to foster a better understanding of how the Internet helps power Hong Kong's economy and society.

BCG is responsible for the analysis and conclusions of this report, which have been discussed with Google Hong Kong.

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Executive Summary

Hong Kong has long been recognised as a leading international trade and financial centre, and is known to many as Asia's world city. Enabled by a superior infrastructure and an open and unrestricted online environment, Hong Kong has actively embraced the Internet. It is now indispensable to the territory's position as a global trading hub and is crucial for its future success as a leading world economy. This report aims to describe the contribution of the Internet to Hong Kong's economic vitality and social well-being.

In 2009, the Internet contributed an estimated HK\$96 billion to Hong Kong's economy—5.9 percent of Gross Domestic Product (GDP). The Internet economy's contribution to Hong Kong's GDP is on a par with that of the leading European Internet economies—the Nordic countries and the United Kingdom (around 6 to 7 percent)—and about twice as high as that of the less developed Internet economies in Central and Southern Europe.

- ◇ Roughly a third of Hong Kong's Internet economy is driven by consumption, which is evenly divided between spending on online shopping and consumer spending on access to the internet, including telecom services, hardware and software (such as personal computers and mobile phones).
- ◇ Another third comes from net exports of e-commerce and Internet-related hardware, reflecting Hong Kong's role as a trading hub in the global supply chain of information and communication technology (ICT) goods.
- ◇ The rest consists of government and private invest-

ment in Internet-related goods and services (such as hardware, software and network maintenance service).

However, the impact of the Internet on Hong Kong's economy and society is far greater than what is reflected in its contribution to the GDP figure. Online activities and rich information resources—such as business-to-business transactions, advertising, and free content—not only create unquestionable value through the online channel but increasingly play an important role in facilitating offline commercial transactions in the bricks-and-mortar world. As the value of these activities does not represent a final sale of a product or service, they are not captured by the GDP figure.

- ◇ Business-to-business e-commerce transactions—more important to and prevalent in Hong Kong than business-to-consumer transactions because of the territory's role as an international trading hub—accounted for HK\$61 billion in 2009.¹
- ◇ Online advertising—HK\$1.1 billion in 2009—is a critical element for successful Hong Kong businesses, and helps drive commercial traffic both online and offline.
- ◇ Social media—widely accepted by online users in Hong Kong—generate insightful and valued content and create benefits for a broad audience of consumers.

1. We have adopted the expenditure approach, which measures spending on finished goods and services, in calculating the Internet's contribution to GDP. Since the value of these intermediate business-to-business transactions is already included in the final sale of a product, business-to-business transactions are not included in the GDP number.

Hong Kong has a superior Internet infrastructure, driven by its unique high urban density and highly competitive telecommunications sector, resulting in high-speed and reliable Internet access that is affordable across the territory.

- ◇ The Hong Kong government places a strong emphasis on promoting fair competition in the telecommunications sector—it awarded licenses for network services to multiple industry players as early as 1995, thereby preventing a monopoly situation from developing.
- ◇ The high density of Hong Kong’s urban households, concentrated in high-rise buildings, enables telecom companies to build high-speed broadband infrastructure relatively cost effectively.
- ◇ High-speed Internet connections are widely available and affordable, making Hong Kong the third-highest-ranked economy in the world in the penetration of high speed optical technologies, after the Republic of Korea and Japan.

The Internet has transformed the trading industry, and empowered many others, especially small and medium enterprises (SMEs), fortifying Hong Kong’s competitiveness in international trade and finance.

- ◇ The territory’s competitive business setting, robust legal framework and open Internet environment has propelled web adoption and innovation in core industries.
- ◇ Leading companies in the trading sector have leveraged the Internet to enhance Hong Kong’s role as a vital link between mainland China and the rest of the world, seamlessly connecting with thousands of partners around the globe.

- ◇ With Internet adoption, companies in other core industries (such as financial services and tourism) and in the public sector have also brought evolutionary changes to their operations—broadening their customer base, enhancing efficiency and improving information sharing.
- ◇ Progressive SMEs that have truly integrated the Internet into their businesses consistently perform better in terms of sales growth and productivity.
- ◇ Web-savvy and entrepreneurial SMEs across multiple industries have successfully used social media and search-engine advertising to market to specific segments of customers at relatively low cost.

Looking ahead, we project that Hong Kong’s Internet economy will grow by 7 percent per year, faster than the forecasted GDP growth rate of 4 percent, reaching HK\$146 billion by 2015. Beyond GDP, business-to-business e-commerce will be one of the key drivers of growth benefiting from the momentum maintained by mainland China’s fast-growing export business.

- ◇ Consumption will be largely driven by the growing number of online shoppers in Hong Kong, who will continue to seek value-added products and services that they are unable to find offline as well as products and services that they can buy online but pick up offline.
- ◇ Mobile Internet is an emerging force that is expected to propel the territory’s Internet economy growth. We expect that targeted location-based mobile devices will change consumers’ behaviour and give rise to new business opportunities in advertising, banking, and retail.



The Hong Kong Internet Economy

A Snapshot

Hong Kong's superior telecommunications infrastructure and its open online environment are the foundations of the rapid development of its Internet economy. The Internet has brought transformative and evolutionary changes in Hong Kong's core industries, and has led to enduring changes in consumer behaviour.

In the trading business, Hong Kong acts as an important bridge in international trade between mainland China and the rest of the world. In 2010, 53 percent of Hong Kong's exports were shipped to China and 45 percent of the imports originated from China.² Hong Kong's financial services, logistics, and professional services companies leverage the Internet to provide value-added services that facilitate the flow of mainland China's export trade which strengthens the territory's position as an important re-export centre. In the financial services sector, the Hong Kong Stock Exchange is now the seventh largest in the world and the third largest in Asia, with a market capitalisation of about HK\$21 trillion as of the end of 2010.³ Companies listed on the Hong Kong exchange raised US\$61.2 billion in 74 IPOs in 2010, two of which were the biggest IPOs in the world, Agricultural Bank of China and AIA Group.⁴ Hong Kong's status as a global financial centre will be further strengthened by the plan to make Hong Kong an offshore Renminbi centre.

Hong Kong's connectivity with China and the rest of the world is also noteworthy beyond the trade and finance sectors. The territory is a premier tourist destination in Asia. In 2010, it attracted 36 million visitors—more than five times the local population—and HK\$213 billion revenue, equal to 12 percent of GDP.⁵ Mainland Chinese tourists are a major engine of tourist spending in Hong

Kong; they comprised 60 percent of tourists and brought in 70 percent of all money spent by tourists in 2009.

The core values, which enabled Hong Kong to flourish in trade, finance, tourism and other sectors, are a trusted rule of law, a laissez-faire approach, openness and equality. These values, crucial to nurture entrepreneurship and fair competition, create a healthy environment for the Internet economy to thrive. Leading companies in core industries in Hong Kong have employed the Internet to enhance their competitive advantage in the world arena.

In order to find out to what extent online tools strengthen Hong Kong's leading position, we looked at how companies and consumers embrace the Internet.

Borderless Business

Hong Kong's core industries—trade and finance—have extended their business boundaries with the help of the Internet.

Cross-border trading partners, for example, leverage the Internet to communicate in an efficient and cost-effective manner across time zones and along the entire supply chain. For instance, Li & Fung Limited, a global supply

2. Trade Surveys & Research Section, Census and Statistics Department.

3. Monthly data on domestic market capitalisation are available on the website of the World Federation of Exchanges. Market capitalisation of the Shanghai and Hong Kong Stock Exchanges are very close—both about HK\$21 trillion at the end of 2010. They exchanged rankings during the course of 2010.

4. Ernst & Young, "Year-End Global IPO Update".

5. Hong Kong Tourism Board.

chain manager, which operates with over 15,000 international suppliers and about 240 offices and distribution centres in more than 40 economies, relies on the Internet to enable efficient and cost effective information flows among its numerous trading partners.

In the brokerage sector, individuals can conveniently bypass traditional brokerage agents and obtain stock information and trade on their own, thanks to the Internet. Online bank portals in Hong Kong offer robust one-stop financial services to individuals and businesses—not only to those in Hong Kong but also to overseas retail investors. Foreign investors from all over the world can move funds, trade stocks, and monitor the stock market through their online bank accounts.

Internet Anytime Anywhere

Hong Kong is known as the “always on city” and its Internet behaviour mirrors this distinctive culture. With the combination of high-speed broadband and Wi-Fi hot spots, Internet users can access the Internet literally anywhere and at any time—and they do.

Hong Kong has one of the highest broadband penetration rates in the world—83 percent of households are connected to the Internet via high-speed broadband (and 34 percent of households are connected via FTTx technologies).⁶ Hong Kong also boasts more than 13,000 Wi-Fi hot spots—in shopping malls, restaurants, parks, ferry piers, and even on buses and the Airport Express. And some of these hot spots have upload and download speeds as high as 100 Megabits per second (Mbps).

Thanks to this robust connectivity and the desire to be connected, Hong Kong Internet users are a highly engaged group. Seventy seven percent use the Internet at least once a day.⁷ These survey respondents noted that they spend an average of 22 hours on the Internet each week—more than surveyed respondents in mainland China (19 hours a week) and in the United Kingdom (6 hours a week).⁸

Mobile Netizens

The fast-paced, on-the-go lifestyle of Hong Kong’s information-hungry generation has encouraged wide adoption of

mobile Internet access as a supplement to fixed Internet access. Five million of Hong Kong’s mobile users are 3G customers and one million are 2.5G customers. Smartphone penetration and the use of 3G mobile-access cards and tablets are rapidly increasing. Consumers who want to check real-time stock market information, play online games, or engage with friends on social media platforms while travelling can do so with the convenience of mobile devices.

Mobile “netizens” in Hong Kong use applications to enrich their daily lives—to find nearby restaurants (via “Openrice”), check the weather (via “My Observatory”) connect to friends (via “WhatsApp”), purchase movie tickets (via “Hong Kong Movie”), and play games (such as “Hong Kong Mahjong”).

Businesses, large and small, are also responding to this trend by developing bespoke mobile applications to attract new customers, provide better service to existing customers, and reinforce customer loyalty. Mass Transit Railway (MTR) Corporation has developed innovative mobile applications for subway riders—a journey planner that serves as a guide to facilities within subway stations as well as to landmarks within 500 metres of subway stations. Centaline Property has a mobile application that uses location-based technology to provide potential buyers with information on nearby properties. Forward-looking retailers are exploring innovative ways to use the mobile platform to engage with their customers through loyalty programmes and customer relationship management tools.

6. Office of the Telecommunications Authority (OFTA), Key Statistics for Telecommunications in Hong Kong, March 2011; Hong Kong: “The Facts—Telecommunications,” November 2010, gov.hk. FTTx is a generic term for any broadband network architecture that uses optical fibre to replace all or part of the usual metal local loop used for last mile telecommunications.

7. Census and Statistics Department, Thematic Household Survey Report No. 43, Household Survey on IT Usage and Penetration, December 2009, p. 86.

8. The Connected Kingdom: How the Internet Is Transforming the U.K. Economy, a report by The Boston Consulting Group, October 2010; China’s Digital Generations 2.0: Digital Media and Commerce Go Mainstream, a report by The Boston Consulting Group, May 2010.

The Internet's Ripples

GDP and Beyond

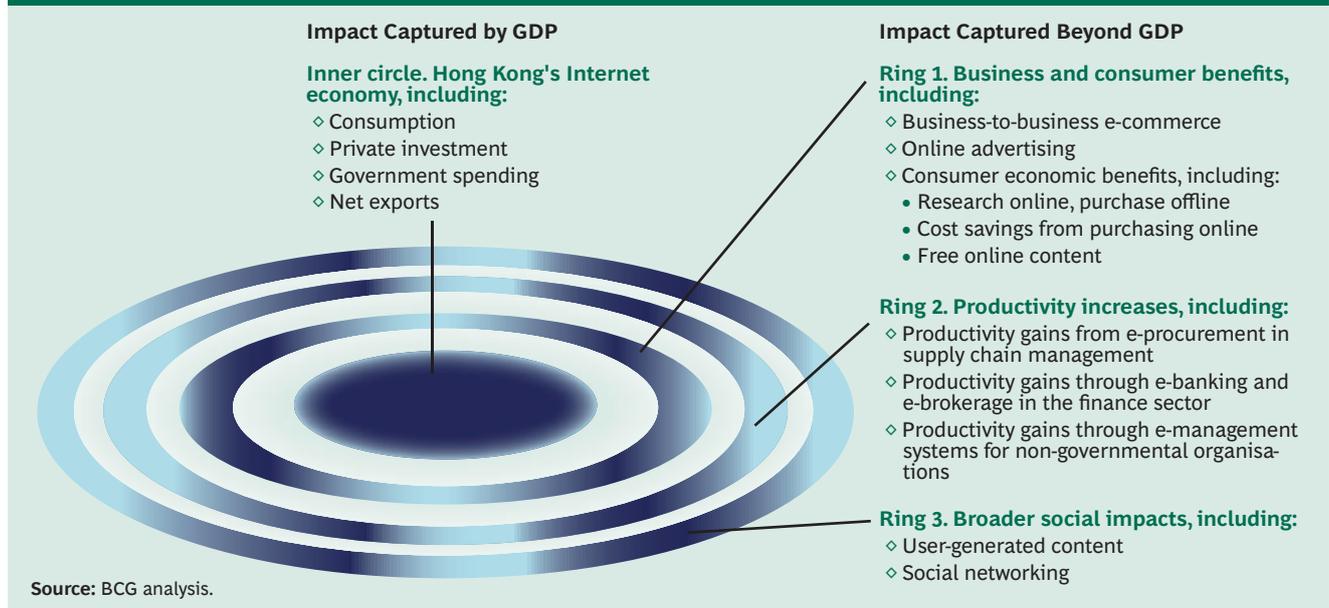
Today the Internet is deeply woven into the fabric of Hong Kong's economic and social life. To quantify the value of the Internet economy, we looked at readily apparent measures, such as how much consumers spend on Internet access, as well as less obvious ones, such as consumers' cost savings from researching purchases online before buying offline.

In conducting similar studies on other Internet economies, BCG developed a methodology for measuring the Internet's impact on GDP and beyond. We separated the Internet's economic impact into four key parts. The first part is its direct measurable impact on GDP. In addition

to this, the Internet has significant ripple effects through the rest of the economy that are not directly reflected in GDP calculations. For example, the Internet helps reduce transaction costs, unites buyers and sellers in a cost-effective manner on business-to-business e-commerce platforms, and speeds up procurement cycles. It also enables consumers to compare prices quickly and make more informed purchasing decisions. We have categorised these "beyond GDP" effects into three parts—business and consumer benefits, productivity increases, and broader social impacts—shown in the three outer rings of Exhibit 1.

We assess the direct measurable impact on GDP within

Exhibit 1. The Internet Has a Significant Impact on Hong Kong's Economy—GDP and Beyond



four categories—consumption, private investment, government spending and net exports. Consumption consists of measurable business-to-consumer transactions, which include purchases of Internet-related access equipment and services, online retail (such as buying a mobile application from an application store), and transactions that originate online but terminate offline (such as purchasing a pair of colour lenses from colorlens4less.com). Together, consumption and net exports constitute two-thirds of Hong Kong’s Internet economy. The remainder of the Internet economy is made up of private investment and government spending.

Ring 1 (business and consumer benefits) covers the significant economic benefits derived from business-to-business e-commerce (such as the revenues generated by online sourcing platform Global Sources), online advertising (such as AdWords, Google’s online advertising programme), and various online activities by consumers (such as the value of conducting online research prior to making offline purchases).

Ring 2 (productivity increases) covers the Internet’s beneficial effect on productivity across sectors and throughout the value chain. For example, the Internet speeds up procurement cycles, lowers transaction costs in the finance sector, and provides cost-effective management

tools for private and social service organisations.

Ring 3 (broader social impacts) covers the estimated social benefits of the Internet. These benefits include sharing user-generated content, such as blogs and discussion forums, social networking and photograph sharing. For example, the photo-sharing applications developed by Hong Kong start-up Stepcase brings friends together by enabling them to share photographs via social media on their mobile phones.

The impact of the Internet on Hong Kong’s GDP is driven by consumption and net exports, but the value derived from the ripple effects is more significant, especially when it comes to business-to-business e-commerce, a reflection of the territory’s role as a middleman connecting businesses around the world.

Internet GDP Calculated

In 2009, the Internet contributed HK\$96 billion, or 5.9 percent of GDP, to Hong Kong’s economy, compared with about 6 to 7 percent of GDP among the leading European Internet economies—the Nordic countries and the United Kingdom—and around 2 to 4 percent of GDP in Central and Southern European economies. (See Exhibit 2.) This

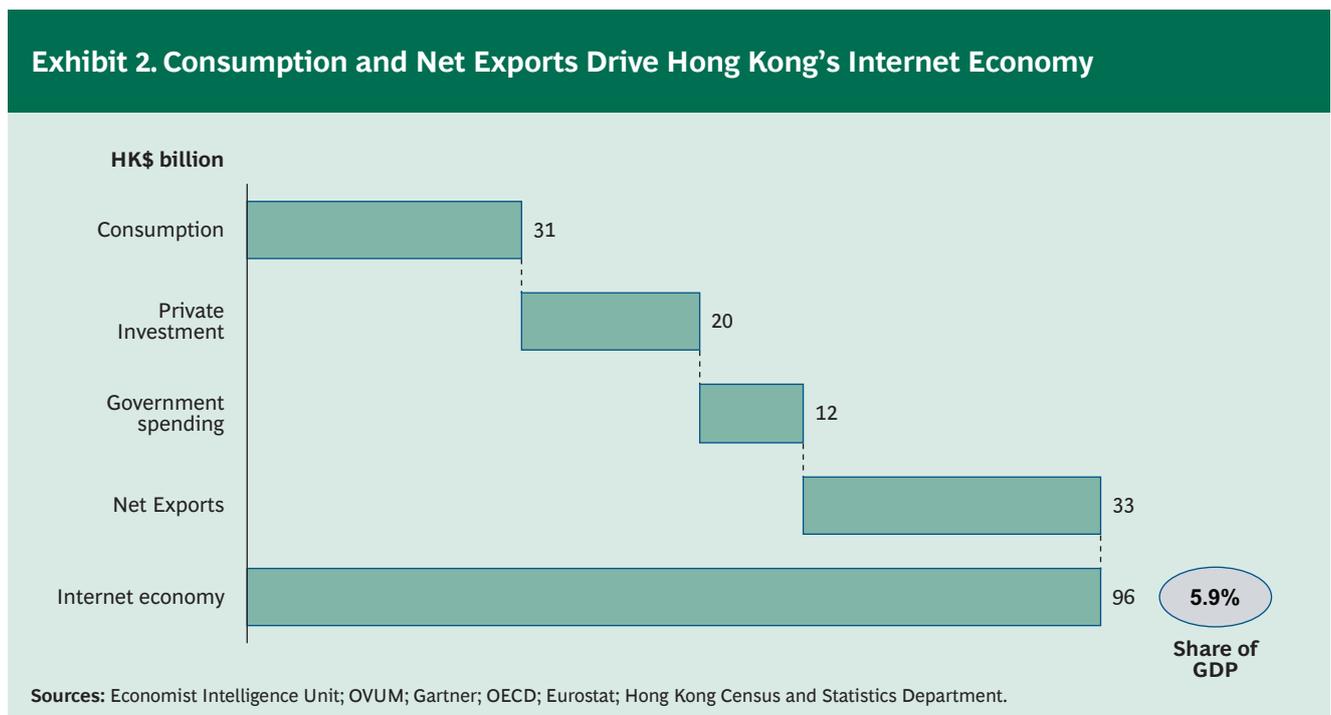


figure reflects a reasonably balanced contribution to GDP from individual online consumption, private and government investment in Internet-related infrastructure and projects, and net exports of Internet-related goods and services. (For information on how we measured the Internet's contribution to Hong Kong's GDP, see the sidebar "Three Ways to Skin an Economy.")

Roughly a third of Hong Kong's Internet economy is consumption, which is made up of consumer e-commerce (about HK\$16 billion) as well as consumer spending on devices to access the Internet and payments to Internet service providers (about HK\$15 billion). The fact that Hong Kong consumers spend about the same shopping online as they do to get connected online reflects both the shopping behaviour of local consumers and the high-tech Hong Kong environment. Online retail is not as prevalent in Hong Kong compared to the leading Internet shopping economies due to the convenience and popularity of traditional shopping in the city. However, there are signs of growth potential of online retail in Hong Kong, especially in channels that provide deep discounts or niche products that are not easily available in stores.

Another third of Hong Kong's Internet economy comes from net exports of e-commerce and Internet-related goods and services. As a trading hub and an entrepôt to mainland China, Hong Kong acts as an intermediary in trade. Large quantities of ICT goods (such as computers and mobile phones) enter Hong Kong from mainland China and are then re-exported to the rest of the world.

The remaining third of Hong Kong's Internet economy is made up of government and private-sector investment in Internet-related technologies—with a strong emphasis on building Internet infrastructure. For example, the government invested in mobile Internet infrastructure in order to provide free Wi-Fi service in public areas, and telecom companies are upgrading the mobile network in preparation for 4G technology and fibre-optic broadband networks.

Ring 1: Business and Consumer Economic Impacts

The beneficial ripple effects that businesses and consumers have obtained from the Internet may be even more significant than the Internet's impact on Hong

Kong's GDP—especially when it comes to the business-to-business advantages that are so important to the territory's role as an international trading hub. Business-to-business e-commerce and online consumer benefits—including greater awareness and engagement, better decision making, cost-saving transactions, and enhanced rapport—are all measurable, even if they are not directly factored into GDP.

Business-to-Business E-Commerce. Since 2004, B2B e-commerce in Hong Kong has grown 14 percent per year. In 2009, business purchases over the Internet amounted to HK\$61 billion. Hong Kong's competitive advantage as a trading hub comes from value-added services, such as matching buyers and sellers and managing supply chains and logistics. Hong Kong trading companies leverage the Internet to provide these services in a cost-effective manner. For example, Hong Kong-based Global Sources, a B2B trade information provider, delivers information on over 4.7 million products and more than 262,000 suppliers annually and generates more than 192 million sales leads annually. Global Sources and similar companies that enable and facilitate transactions on the Internet (such as payment and security services) comprise a significant segment of Hong Kong's Internet economy.

Consumer Awareness and Engagement. In 2009, companies in Hong Kong spent HK\$1.1 billion on online advertising—5 percent of total advertising spend. Whilst today, Hong Kong's online advertising is still in a nascent stage, it is growing at a 13 percent compound annual growth rate. We anticipate that by 2014, spending on online advertising in Hong Kong will have doubled.

Online advertising, such as Google's AdWords—an online advertising programme that includes keyword-based advertising, display advertising, and mobile advertising—presents the territory's businesses with a targeted, data-rich, and cost-effective way to engage customers. Small export businesses in Hong Kong can reach out to customers in different countries via online advertising platforms. As consumers spend more time online and mobile Internet penetration continues to rise, online advertising will become an increasingly important and cost-effective channel for delivering targeted messages to a wide audience of consumers.

Better Informed Consumers. We estimate that in 2009, the value of purchases researched online and made

Three Ways to Skin an Economy

There are three methods of calculating GDP, and none of them was designed with the Internet in mind. The output or production method measures the value created through the production of goods and services. The income method measures total income earned by individuals and companies. The expenditure method measures total spending on finished goods and services.

The output method is theoretically the best way to measure the Internet's contribution. It is how the contributions of most traditional sectors in the economy are calculated. But using this method would require looking at every transaction of every good or service produced in the Hong Kong economy and deciding whether it was "online" or "offline"—which is not practical with current data.

The income method has its own Achilles' heel in the many assumptions that would have to be made about the share of the income of traditional companies to be allocated to the Internet and the share of the income of multinational companies to be allocated to Hong Kong. Those assumptions would call into question the accuracy of the final calculation.

Although the expenditure method is also imperfect, we chose to use this approach because it reveals the contributions of consumers, businesses, and governments to the Internet economy and approximates the sum of the online components of all the other sectors. The expendi-

ture method is built on four pillars.

- ◇ *Consumption*: goods and services bought by households in Hong Kong over the Internet and consumer spending on accessing the Internet (both payments to Internet service providers and the cost of the relevant portions of devices)
- ◇ *Private Investment*: private companies' (such as telecom companies) capital investments related to the Internet as well as their investments in ICT goods and services
- ◇ *Government spending*: public ICT spending
- ◇ *Net exports*: online goods and services and ICT equipment exported less comparable imports

It is important to be clear about the assumptions folded into the Internet's HK\$96 billion contribution to the Hong Kong economy. Most notably, the full value of goods sold online is counted because it gives a sense of the importance of the Internet as a retail channel. Most online transactions, of course, terminate in the physical world, so they are not pure online transactions, but many of them might not have taken place without the Internet as a catalyst. Data on the "online" value generated at each link in the value chain is unavailable and estimating it would imply a false level of accuracy. (See the Appendix for more detail about the underlying assumptions.)

offline was HK\$28 billion,⁹ almost twice the size of the consumer e-commerce market. This represented 8 percent of total retail consumption, similar in magnitude to the U.K. (9 percent) and Sweden (11 percent), two leading Internet economies.

The Internet has had a notable impact on the retail sector in Hong Kong by facilitating better consumer decision making. Before the Internet became prevalent, consumers relied mostly on word of mouth—such as friends' experiences or referrals—before making purchases. Online research enables shoppers to compare prices and product features, read reviews, and make more informed purchasing decisions. In a 2010 survey of Hong Kong online users conducted by Synovate, more than 80 percent of respondents said that information obtained by using search engines influenced their purchasing decisions.¹⁰ Websites such as price.com.hk aggregate product information from

different stores in Hong Kong, so that consumers can pick the best deal online before purchasing offline.

Cost Savings. By comparing the differences in online and offline prices in major product categories (such as books, groceries, and consumer appliances), we estimate that, in 2009, the cost savings to consumers in Hong Kong from shopping online amounted to about HK\$1 billion. The recent rise of group-purchase websites in Hong Kong is likely to accelerate online discount shopping.

9. The value of purchases researched online and made offline is calculated using average spending per person in 36 product categories and IAB/ Google Consumer Commerce Barometer estimates of the proportions of people whose last purchase was researched online but purchased offline, derived from a survey of 2,000 households.

10. "The Keys to Successful Web Marketing," Support and Consultation Centre for SMEs, Trade and Industry Department, 28 February 2011.

Enhanced Consumer Rapport. Another important consumer benefit in Hong Kong is the wide availability of free online content, designed to establish rapport between customers and businesses. Many of the territory's companies, both large and small, develop free content on their websites in order to build an expert image, attract potential customers and to develop a loyal customer base. For example, Hiwave Dry Seafood utilises its website to build customer affiliation through the sharing of traditional recipes for soups and medicinal remedies based on their product suite.

Ring 2: Higher Productivity

The adoption of Internet applications by companies across multiple sectors in Hong Kong has had a material impact on daily business operational productivity—faster procurement cycles, lower sales transaction costs, and improved process efficiency.

Shortened Procurement Cycles. Traditionally, supply chain management companies in Hong Kong (for example, in the apparel industry) typically required between 90 and 120 days to locate suppliers and ship products. But with the use of web-based electronic data interchange (EDI)¹¹ and other Internet technologies, communication is faster and more convenient among multiple parties, there are fewer errors with regard to orders and product specifics, and some core business processes are automated and simplified. Today, with the widespread adoption of web-based technology by Hong Kong's leading sourcing companies, the procurement cycle has been reduced to as little as 40 to 50 days.

Reduced Transaction Costs. In the banking industry for example, the Internet has been used to lower transaction costs by empowering individuals to obtain readily available product information and conduct banking transactions online. An additional benefit is the reduced workload burden on local branches so they can focus on maintaining client relationships (such as wealth management for local investors) and supporting more complicated transactions like “bancassurance” products.

Improved Efficiency. Online tools can also help companies realise productivity gains through automation of internal processes and better information sharing. For example, the e-Care Elderly Home Management System

developed by the Caritas Information Technology Advancement Centre reduces paperwork and automates information flow in eldercare facilities, allowing the staff to focus on directly providing care.

Ring 3: Broader Social Benefits

The Internet has created broad social benefits to Hong Kong, such as free information including valuable user-generated content, such as product reviews and blogs, and closer relationships facilitated by social media and faster and cheaper methods of communications.

Any online user with the right know-how can produce content for the general public—often creating value for others. A 2010 survey by Hitwise revealed that 85 percent of online users in Hong Kong actively participate in social media—such as forums, blogs, and other online communities.¹² Baby-Kingdom.com, a Hong Kong-based online community site that offers parenting information, provides a good example. With 300 million messages in its database, Baby-Kingdom.com is one of the largest parenting resources on the planet. Members of the site contribute about 40,000 entries a day—on such topics as baby products, education, and domestic help—which benefit roughly 80,000 daily visitors, who, on average, read about 18 pages per visit to the website.

In Hong Kong, the number of Facebook users grew from about 1 million in 2008 to about 3.6 million in mid 2010—reaching a penetration rate of about 50 percent, which is above that in both the United States and the United Kingdom.

These social networking services have brought online users who share similar interests closer, and the user-generated content has created a “gift economy” and reciprocal altruism.

11. EDI is a technology used to transfer electronic documents or business data among trading partners.

12. “The Keys to Successful Web Marketing,” Support and Consultation Centre for SMEs, Trade and Industry Department, 28 February 2011.



Internet Intensity

The Internet is global, but not all economies have embraced it equally. In order to compare the depth and reach of the Internet in commerce and society around the world, we have created the BCG e-Intensity Index™.

The BCG e-Intensity index™ looks at three measures of Internet activity:

- ◇ *Enablement*: How well built is the infrastructure and how available is access?
- ◇ *Expenditure*: How much money are consumers and businesses spending online on e-commerce and online advertising?
- ◇ *Engagement*: How actively are businesses, governments, and consumers embracing the Internet?

The index balances enablement (which has a 50 percent weighting) against the two measures of usage: expenditure and engagement (each with a 25 percent weighting). Despite its assumptions and the inherent margin of error, such an index does help to show an economy's strengths and weaknesses, especially when one looks beyond the overall rating to the three underlying measures.

Hong Kong on the Global Stage

Hong Kong ranks among the world's top economies in the e-Intensity Index—just ahead of Singapore, on a par with the United States and Luxembourg, and somewhat behind the leading group (the Nordic countries, the Republic of Korea, Japan, the United Kingdom, and Germany). (See Exhibit 3.) Hong Kong's relatively high

ranking is driven mostly by its superior infrastructure, which offers speed, coverage, and affordability.

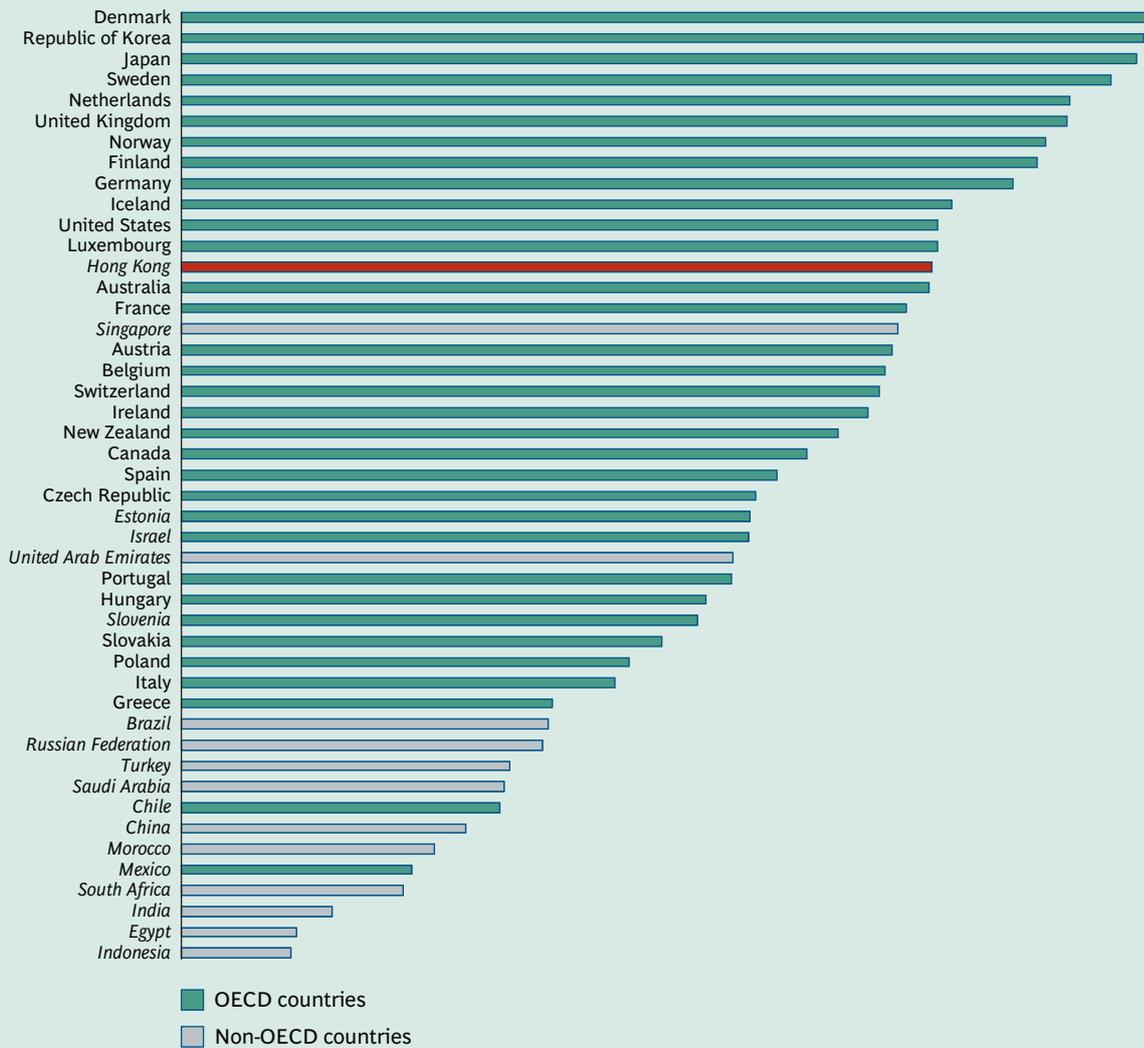
A closer look at the three underlying measures of the e-Intensity index—enablement, expenditure, and engagement—allows for a more detailed understanding of Hong Kong's strengths and weaknesses compared with those of other economies around the world and also with those of other leading economies in the Asia-Pacific region. (See Exhibit 4.)

Enablement. Hong Kong is the third-highest-ranking economy in the Asia-Pacific region (just behind Japan and the Republic of Korea) on the enablement sub-index, based on the number of broadband subscriptions, smartphone adoption, and average download and upload speeds. Hong Kong's average broadband speed (8,200 Kbps or Kilobits per second) is one of the fastest in the world and its broadband penetration ranks sixth worldwide.

Hong Kong's government places a strong emphasis on promoting fair competition in the telecommunications sector, granting licenses for network services to multiple industry players as early as 1995 and providing consumers with choice and affordability. The territory's high population density—about 80 percent of the people live in high-rise buildings on Hong Kong Island and the Kowloon Peninsula—has made it economically viable to install high bandwidth infrastructure with wide coverage. Fixed broadband prices are as low as HK\$99 (US\$13) per month for unlimited usage of broadband Internet service at 100 Mbps.¹³

13. "Communications, the Media and Information Technology," Hong Kong Yearbook 2009, <http://www.yearbook.gov.hk/2009/en/index.html>, Trade Economics.

Exhibit 3. Hong Kong Ranks High on the BCG e-Intensity Index



Sources: Eurostat; Information Technology & Innovation Foundation; Organisation for Economic Co-operation and Development; United Nations; MagnaGlobal; TNS; Akamai; speedtest.net; Ovum; Euromonitor; Forrester; eMarketer; National Bodies (Statistics Offices, Government Departments, Chambers of Commerce); International Advertising Bureau; Mastercard; BCG Analysis.
Note: Index is scaled so the geometric mean of OECD countries is 100. Italicized countries represent approximate positions.

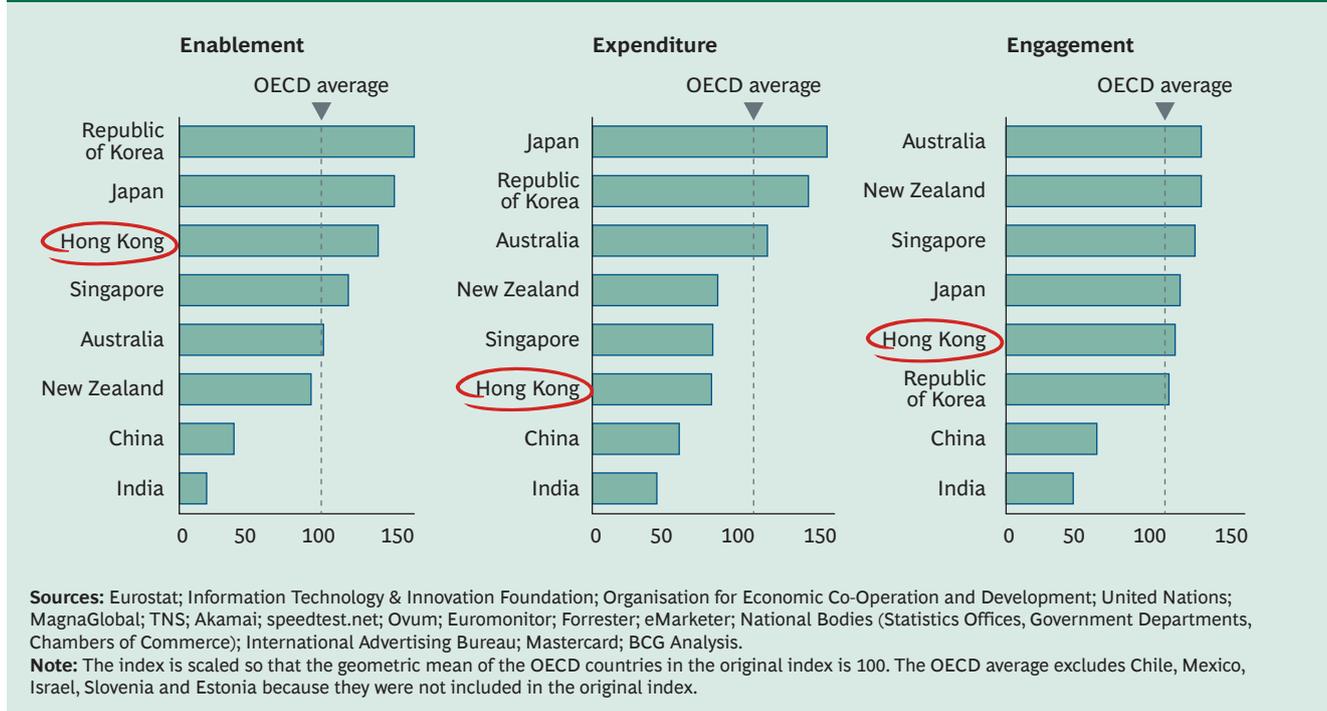
Expenditure. In general, economies in the Asia-Pacific region lag behind leading European nations and the United States on the expenditure sub-index. Within the Asia-Pacific region, Hong Kong is the sixth-highest-ranking economy in this area, but below the OECD average.

Online retail in Hong Kong has to compete against a well-established bricks-and-mortar “shopping paradise”. As a result, the majority of online purchases made in Hong Kong are for niche, bespoke, not readily available products

and services—or for very good price deals. Examples of online retailers that have attracted Hong Kong consumers include porterhouse.com.hk, which offers imported, gourmet-restaurant-quality steak; and group-purchase websites, which offer discounts and other benefits (such as efficient delivery).

Engagement. Hong Kong earned a moderate score on the engagement sub-index, and ranked fifth among economies in the Asia-Pacific region. The sub-index

Exhibit 4. Hong Kong Scores Higher on Enablement than on Expenditure or Engagement



covers Internet adoption by businesses, consumers, and government.

Consumer engagement in Hong Kong is high. In 2009, 34 percent of the time consumers spent on the Internet was devoted to instant messaging, enjoying entertainment, and participating in social networking.¹⁴ Services such as instant messaging are particularly popular, with 53 percent of Internet users using them compared with 38 percent of Internet users in the United States.¹⁵

Government engagement in Hong Kong is also strong and on a par with that in other advanced economies in the world. Hong Kong's government is highly engaged with businesses and the public via online tools and channels. For example, in order to speed up transactions and to reduce costs, the government mandated that, as of 2006, all commonly used trade documents—such as the documents required to clear customs—must be submitted electronically.

In contrast to Hong Kong's consumers and government, its businesses are less engaged with the Internet. According to a government survey, just 50 percent of the

businesses in Hong Kong have websites. But that percentage does not reveal the complete story as the majority of registered companies in Hong Kong are in fact SMEs. Many of these traditional small businesses are reasonably profitable without the Internet and have not yet seen the need to build online capabilities. Many SMEs, however, understand the value of the Internet in terms of expanding geographic reach, attracting target customers, and enhancing efficiency.

Elsewhere in the Region

Several leading countries in the Asia-Pacific region, such as the Republic of Korea and Japan, have been actively pursuing the "Smart City" concept where investment in ICT infrastructure improves efficiency and enables

14. ComScore, "Top Content Categories by Percent Share of Total Minutes," August 2009.

15. China's Digital Generations 2.0: Digital Media and Commerce Go Mainstream, a report by The Boston Consulting Group, May 2010; Census and Statistics Department, Thematic Household Survey Report No. 43, Household Survey on IT Usage and Penetration, December 2009, p. 88.

further development of the economy and society. The Republic of Korea ranks first on the enablement sub-index in the region. More than 95 percent of Korean households are connected to high-speed broadband. Thanks to this world-leading Internet infrastructure, the concept of the digital home—in which all home and personal appliances are linked to a network—is widespread. A digital home boasts centralised control of lighting, HVAC (heating, ventilation and air conditioning) and home appliances, and it provides convenience, comfort and energy efficiency.

Japan received the highest score on the expenditure sub-index in the Asia Pacific region. In Japan, mobile online shopping is prevalent. In this highly advanced mobile phone culture, where 3G penetration has reached 96 percent, most Japanese prefer to access the Internet over their mobile phones rather than on their laptops. Smartphones facilitate not only online shopping, but also serve as boarding passes, membership cards, and credit cards.

The Republic of Korea and Japan both provide some inspiration to Hong Kong as it plans its Internet development, given both countries also enjoy advanced telecommunications infrastructure and a sizable, sophisticated online user population. PCCW, one of Hong Kong's leading telecom service providers, is developing a digital home solution similar to the one in Korea, which offers their customers the convenience of being able to connect and control both digital TV viewing and other digital multimedia devices centrally from the comfort of their arm chair. Cathay Pacific Airways, the flag carrier of Hong Kong, launched its mobile application for frequent travellers, which is supported in 28 countries and 9 languages. This mobile service includes not only

flight related information, such as a check-in function, flight schedules and status, but also city guides and loyalty membership information.

Looking Ahead

We anticipate that Hong Kong's adoption of the Internet will intensify in the near future, with mobile Internet access being one of the key driving forces. While in other parts of the world, smartphones are the tools of business road warriors and the playthings of fashion-conscious consumers, in Hong Kong they are already in the domain of the general populace. High smartphone penetration will boost mobile advertising overall, create a more targeted advertising medium, and serve to complement existing e-tailing activities. We also expect Internet penetration to grow as Hong Kong's government offers digital inclusion programmes to SMEs and those with low incomes and special needs.¹⁶ In addition, the number of online shoppers (up 15 percent annually from 2004 through 2009) will continue to grow—a trend driven by an increased desire for niche products and the popularity of cost-savings opportunities on group-purchase websites. The extraordinary growth in the popularity of these websites is illustrated by the number of shoppers on uBuyiBuy.com which grew almost 15-fold within its first nine months of operation.

16. In early 2009, for example, the government conducted an IT training programme for SMEs in order to enhance ICT adoption and build IT capabilities. The government also plans to inject HK\$6 million to fund the programme, which would create about 50 temporary IT training and advisory jobs. In early 2011, the Office of the Government Chief Information Officer announced the launch of the Internet Learning Support Programme to provide affordable computers and Internet access as well as complementary training and support services to students and their parents from low-income groups.



The Great Transformation

Hong Kong has long been recognised as one of the busiest international trading hubs in the world, a gateway to mainland China, and a premier financial centre in Asia with a well-established track record. The territory's unique and attractive business setting, robust legal framework and open Internet environment has propelled web adoption and innovation in core industries.

The Internet's contribution of HK\$96 billion to Hong Kong's GDP and HK\$61 billion B2B e-commerce in 2009 was largely produced not only by so-called Internet companies, but by a wide range of businesses, large and small, across all industries. Core industries and non-governmental organisations (NGOs) in the territory have employed the Internet in different ways—some producing revolutionary change, others evolutionary modifications. Today, the Internet has become indispensable to Hong Kong's economic and social life. (For more on the companies empowering Hong Kong's Internet economy, see the sidebar "The Engines of the Internet Economy.")

The Internet has left its mark on almost every industry it has touched, offering companies and the public sector the opportunity to draw upon five transformational levers:

- ◇ *Ameliorated Transparency and Connectivity.* The Internet has increased transparency in business dealings by sharing information on a real time basis and enhanced connectivity in cross-border transactions, from Hong Kong to overseas destinations and vice-versa.
- ◇ *Access to a Broader Customer Base.* Extending a company's geographic reach beyond their home market is especially important, because many of Hong Kong's

businesses need to look beyond its natural borders for additional business opportunities. The Internet provides an effective, low cost and convenient way to reach attractive overseas customers.

- ◇ *Enhanced Efficiency and Productivity.* The use of straightforward and cost effective Internet-based business management tools alters information sharing and resource allocation across supply chains.
- ◇ *Engaging Consumers.* Social media and mobile applications allow companies to expand the traditional communication boundaries and offer direct, frequent and targeted engagement with their customers.
- ◇ *Greater Connectivity between the Public and Private Sectors.* The Internet facilitates collaboration between government and private organisations—both offline and online, such as e-health programmes. In Hong Kong, e-government initiatives have been put in place to foster such collaboration.

Below we explore how the Internet has helped core industries in Hong Kong to sharpen their competitive edge, and how it has enabled the public sector to improve its service delivery.

From Fragrant Harbour to Connected Harbour

Historically, Hong Kong's economy grew out of the light manufacturing and textile industries—taking full advantage of the trusted entrepôt built on the waters of the Victoria harbour. With the rapid economic development of mainland China over the past 15 years, Hong

The Engines of the Internet Economy

Hong Kong’s Internet economy is powered by a group of “engine” companies. A relatively large proportion of them offer devices and services to end users for Internet access. The rest provide content and services (such as IT consulting), enabling technologies, platforms, and infrastructure to companies. Some are large multinational companies, while some are small local companies. Some focus on serving the Hong Kong population, while others have a global presence. Each of them is a small cog in the Internet engine—the Hong Kong Internet economy could not function without them.

We estimate that these companies together employ about 27,000 people in the territory and generate annual revenues of about HK\$60 billion, which represent the part of the ICT economy related to the Internet.

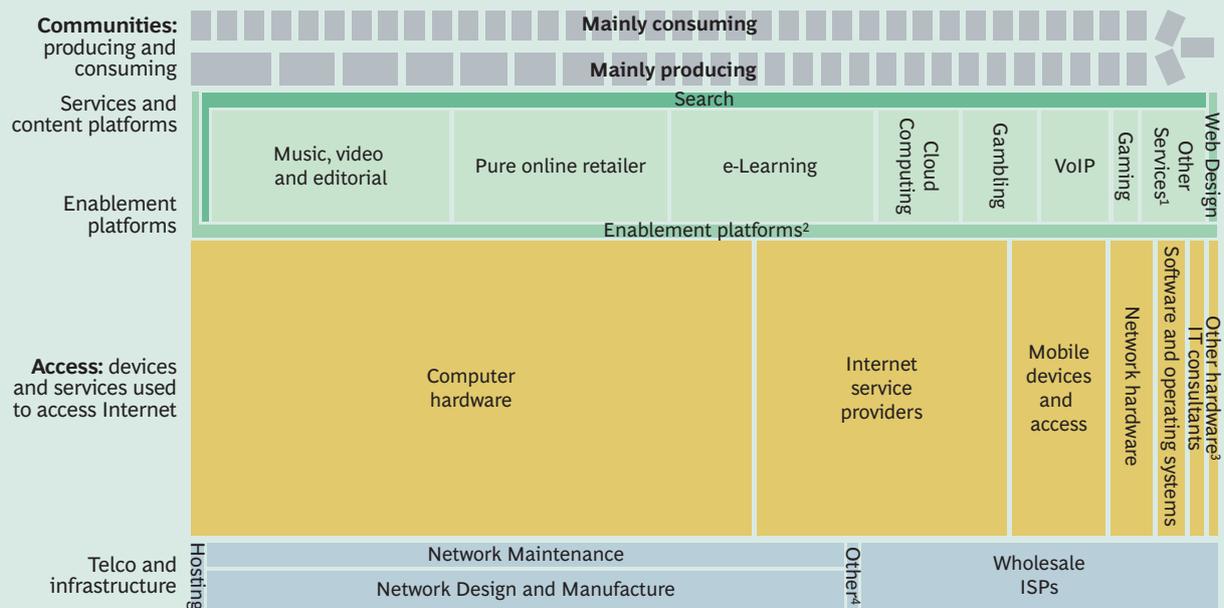
These companies are best described as a “stack”.¹ In IT, a stack is a set of layered software and hardware. Each layer

can be swapped out and can communicate with layers above and below it. At the bottom of the stack is the physical infrastructure. Each higher layer contains a related horizontal set of activities. When Internet companies are viewed in this way, five layers emerge. (See the exhibit “Hong Kong’s Internet Stack: The Engines Powering the Internet.”)

Telecommunications and infrastructure. Companies that build and manage infrastructure and optimise content delivery generate 15 percent of the employment and 13 percent of the revenue of the stack. These include major companies that build and maintain Hong Kong’s network, such as PCCW, Hutchison, and Wharf T&T.

1. For each segment of the stack, several methods were used to estimate revenues and revenues per employee, including bottom-up market sizing, external estimates, and top-down macro estimates.

Hong Kong’s Internet Stack: The Engines Powering the Internet



Sources: Gartner; Ovum, HK SAR Census and Statistics Department; EIU; IDC; Euromonitor; CMT, HK Jockey Club; ComScore; Forrester; HK Domain Name Registration Company; OFTA Vocational Training Council Manpower Survey; RTHK, annual reports; BCG analysis.

Note: The size of boxes is proportional to estimated revenues of companies in that part of the stack. Computer hardware, other hardware, mobile devices and access, network hardware, and software and operating systems do not contain re-exports.

¹Adult content, dating, aggregators, advertising agencies and social networking.

²Billing and payments, advertising networks and servers, analytics and metrics, verification and encryption.

³Game consoles and other Internet enabled devices.

⁴Domain name registration and trading, and mirroring and content management.

Access. This is the largest layer, accounting for almost 55 percent of the employment and just over 60 percent of the revenue of the stack. It includes companies that offer devices and services to access the Internet. More than 90 percent of the revenue comes from the 183 Internet service providers, large and small, that connect end-users to the Internet; and the suppliers and distributors of mobile and access devices, such as computer hardware and mobile devices. The remainder includes other network hardware, software, and operating systems; and IT consultants, such as Accenture and Oracle, who keep everything running.

Enablement platforms. This is a thin, but very important, layer, which includes companies in verification, encryption, billing and payments, analytics, and ad servers. Although these companies employ fewer than 500 people and have a combined annual revenue of under HK\$1 billion, these companies play an important role because they build trust in, and facilitate commerce and traffic across, the network. Both multinational companies (such as Verisign and PayPal) and Hong Kong-based companies (such as PPS and PayDollar) are in this layer. Hong Kong's e-commerce would grind to a halt without them.

Services and content platforms. The companies in this layer employ over 7,000 people and generate 25 percent of the total revenue of the stack. These companies provide services directly to end users. This includes content and entertainment providers—from large corporations with a global reach (such as TVB, RTHK, Commercial Radio, and PCCW's nowTV) to smaller, yet equally successful online gaming companies (such as Outblaze and 6waves). It also includes Internet services companies that help users navigate content online—such as search engines, aggregators, and portals.

Companies that run social networking sites are gaining importance in this layer. It also includes companies that offer other services, such as VoIP and video conferencing. The value of the services and content platforms provided by these companies exceeds the revenue they bring in because many are available to end users for free.

In several European countries studied by BCG, pure online retailers is the largest and dominant block in this layer. Not only is online shopping less popular in Hong Kong, but a smaller proportion of e-commerce in Hong Kong is conducted by pure online retailers. At the same time, many bricks-and-mortar retailers are leveraging the Internet as an additional channel or as a promotional tool.

Communities. These are individuals who both utilize and produce Internet content and services through social networking and other means.

Stacks are interoperable, modular, and open. These characteristics encourage the innovation and competition at the heart of the Internet's development.² Interoperability and openness lower barriers to entry and encourage participants in the stack to build upon the creative efforts of others. Modularity encourages competition among players within a layer. Were the Internet vertically integrated, it would be hard to imagine a comparable level of innovation or growth. In the accompanying exhibit, the size of the blocks corresponds to the amount of revenue produced by the companies within them.

2. The Internet stack is the subject of a forthcoming book by Philip Evans, a BCG senior partner and co-author of *Blown to Bits: How the New Economics of Information Transforms Strategy* (Boston: Harvard Business School Press, 2000).

Kong's position as a leading Asian trading hub has strengthened to provide supply chain management solutions which facilitate the flow of capital, information, goods and services between mainland China and the rest of the world. For example, retailers from the United States seek out Hong Kong supply chain management companies for end-to-end sourcing solutions, and suppliers from mainland China look to Hong Kong as the middleman in selling their products. The territory's role in international trade has evolved and matured to one of "connecting" business partners on the global stage—Hong Kong has become the go-to city to find business partners.

The Internet has played an instrumental role in this transformation. Trading companies are leaders in terms of Internet adoption in Hong Kong. Historically, companies in supply chain management and logistics were receiving a huge volume of large orders. While the number of orders soared, the size of each order decreased because retailers did not want to maintain large inventories. This increase in transaction volume and the essential exchange of accompanying information necessitated adopting ICT. Many trading companies in Hong Kong now act as bridges between manufacturers in the Asia-Pacific region and retailers in the United States and Europe. They use web-based EDI, e-mails, video confer-

Li & Fung: A Conductor in a Trading Symphony

Li & Fung Limited has been in the trade business since its establishment in 1906, and now it is a Hong Kong-headquartered multinational export group. Over the past two decades, Li & Fung has become a successful conductor in a “trading symphony”.

Li & Fung’s core competency lies in its thorough know-how of orchestrating its trading partners—sellers in emerging countries and buyers in developed countries—around the world. Though the company is not in the technology business, Li & Fung was listed as one of the top 40 IT companies in the world by Wired magazine.

For example, in 2009, Li & Fung completed the rollout of its vendor portal, designed to enhance communications

between the company and all its suppliers. With transparency among multiple parties along the supply chain—such as logistics, vendors, and customers—Li & Fung is able to optimise global sourcing resources at a lower cost. Through this kind of technology, Li & Fung has created “harmony” between suppliers and buyers. Suppliers benefit from the best practice sharing from the “conductor” to enhance their capabilities. Buyers, who are mainly retailers, benefit from Li & Fung’s active management of their supply chains. By reducing the delivery cycle time of the finished products, retailers’ inventory holdings and costs can be reduced. The shortened delivery cycle also makes it possible for retail companies to respond more quickly to market trends and, consequently achieve higher prices or enjoy better margins.

encing, and other technologies to streamline information flows and maintain around-the-clock communication with their partners—reducing the cycle time between an order received and goods shipped.

Pioneering trading companies, such as Li & Fung Limited, have leveraged the Internet and ICT tools to transform themselves from pure procurement agents to providers of value-added supply chain management solutions. Li & Fung is able to orchestrate all partners along the supply chain (no matter where they are based in the world). By leveraging the power of the Internet, Li & Fung is able to integrate real-time data on the cost and movement of goods and devise the optimal deployment of resources in order to deliver goods from a global network of factories to retail stores and warehouses around the world. (See the sidebar “Li & Fung: A Conductor in a Trading Symphony.”)

Looking ahead, we expect that mainland China, the second largest trading economy in the world, will continue to grow its export sector. Hong Kong’s unique geographic position and close relationship with the Pearl River Delta will lead to greater collaboration and a likely source of growth in B2B e-commerce in the years to come.

Reshaping Industry

While the Internet has revolutionised the trading industry

in Hong Kong and transformed many of the leading companies in the sector, its impact on other industries has been more evolutionary. (See the sidebar “Commercial Radio: Out-of-the-Box Expansion.”)

Realising Branchless Banking. The banking sector is one of the territory’s leaders in Internet adoption with online banking now the norm—and whilst it is not intended to replace or lead to the demise of the physical branch, the nature of customer touch points and basic banking services has fundamentally changed forever.

The availability of secured online stock trading has seen a shift from traditional brokers to high street banks and also driven diversification in the Hong Kong and overseas investor base. As of December 2009, 67 percent of individual investors in Hong Kong traded online—up from 39 percent in 2007.¹⁷ Hong Kong’s online stock-trading platform and the large number of financial products have also attracted investors from outside Hong Kong—especially from mainland China, who now account for 15 percent of the online investor base.¹⁸ Online stock-trading platforms offer many conveniences: individuals can get real-time quotes, read market analyses, mobilise funds, execute trades, and manage their portfolios from a single website. The median market value of the stockholdings

17. Retail Investor Survey 2009, conducted by the Hong Kong Exchanges and Clearing Limited (HKEx).

18. Online Banking in Hong Kong 2008, Datamonitor.

of online traders in Hong Kong is significantly larger than that of investors who do not trade online—HK\$150,000 compared with HK\$100,000.

The year 2000 marked the first e-IPO in Hong Kong—for the MTR Corporation. At the time, the underlying concept was to eliminate long queues of investors. The multiple benefits offered by e-IPOs are now clear: the e-IPO platform is available 24/7; it is secure, convenient, and eco-friendly; and it enhances processing efficiency. In the 2010 e-IPO of the Agricultural Bank of China, roughly 35,000 orders were processed in one hour—hundreds of times more efficiently than would otherwise have been possible. By the end of 2010, more than 40 percent of the IPOs in Hong Kong were e-IPOs.¹⁹

Visit Hong Kong: Playing the Perfect Host. More recently, businesses and organisations in the tourism and retail industries have been actively piloting the use of Internet and mobile technology to enrich the travel experience of visitors to Hong Kong.

The Hong Kong Tourism Board (HKTb) is actively using the Internet to promote Hong Kong’s tourist spots and to make experiences more enjoyable through free MP3 audio guides and mobile applications for visitors. Mobile guides to approved “Hong Kong style” food spots and fine restaurants (“where to go and what to eat”) enable tourists to conveniently sample the local cuisine and avoid potential bad experiences. Building on this success, HKTb plans to utilise cutting-edge technology later this year to launch a mobile application using “augmented reality”—when tourists focus their phones on landmarks, buildings, or restaurants, a description will appear on screen.

Hong Kong retailers are also leveraging the Internet to stimulate spending by mainland Chinese tourists. For example, a number of retailers have set up online stores on a new Hong Kong travel-guide portal (114.com.hk) where mainland Chinese tourists can place orders (such as for dried seafood) before they depart on their trips and pick up their purchases when they arrive. In the first two months of its operation, 230,000 mainland Chinese signed up as members of this website. Another example is a Hong Kong shopping mall (Plaza Hollywood) that has partnered with a mainland group-purchase website (tuan.qq.com) to sell bus tickets, at group discount rates, to attract mainland Chinese visitors to the mall.

Delivering “E-efficient” Public Service. The public sector in Hong Kong has taken great strides in deploying Internet solutions to increase operational efficiency, enhance convenience, and to deliver higher quality services to the territory’s public.

The government has undertaken many e-initiatives, as outlined in its Digital 21 Strategy. E-health is one of the more prominent examples where the uniqueness of Hong Kong’s environment has allowed the Hospital Authority (HA) to pilot concepts and solutions that would not be feasible elsewhere in the world. Through a pioneering effort to establish a robust electronic health-records system across the territory, the HA has been enhancing information sharing not only among public hospitals but also between public and private hospitals and clinics in the field. The use of web-based electronic health records has led to greater efficiency and productivity due to the

19. Hong Kong Exchanges and Clearing Limited

Commercial Radio: Out-of-the-Box Expansion

Companies can grow in imaginative or new directions by embracing the Internet. For example, Commercial Radio increased its audience and enhanced its revenues by expanding its business from radio broadcasting to include online multimedia (covering news, videos, and more). In addition, it expanded its reach overseas.

In 2008, Commercial Radio launched the Hong Kong Toolbar—the world’s first content-oriented multimedia interactive application. Thanks to peer-to-peer technology, Commercial Radio is able to deliver radio programmes to

a large overseas audience without sacrificing audio quality. The toolbar automatically updates itself to stream the latest news, high-quality videos and movie trailers. Since its launch, roughly 2.6 million people have downloaded the Hong Kong Toolbar—67 percent of them in Hong Kong, 18 percent in mainland China, 5 percent in the United States, and 2 percent in the United Kingdom. During that same time, the annual revenue generated by the Hong Kong Toolbar has increased 100 percent per year.

time saved by the ease of locating and managing patients' records. The sharing of electronic health records with private hospitals and practitioners via the Internet reduces the burden on the public health system, which keeps most patients' records, and increases the efficiency and quality of care.

Non-profit social-welfare organisations are also taking notable steps to increase efficiency through the Internet. The Easy Home Services programme, for example, conducted by the Senior Citizen Home Safety Association, is Hong Kong's first Internet interface for providing household services—cleaning, grocery shopping, and care of the elderly. The Internet has transformed the time

consuming process of matching requests for assistance with available part-time employees, dispatching employees to assignments, and monitoring employees' performance. As a result, the six full-time employees of Easy Home Services process 4,000 requests per month, on average. Customers benefit from this efficiency and from the flexibility of being able to request a service online at any time of day or night.

Leading companies in Hong Kong's core industries have greatly transformed their businesses by embracing the Internet. We anticipate that the wave of change in these industries will continue, contributing further to the Internet economy and Hong Kong's society as a whole.

The Entrepreneurial Hong Kong Small and Medium Enterprise

Small and Medium Enterprises, defined as companies with fewer than 100 employees, account for 50 percent of Hong Kong's economy and provide 60 percent of the territory's private sector employment (altogether more than 1.2 million jobs). They range from multi-generation family businesses to high-tech start-ups, from local corner shops to businesses with a global footprint. (See the sidebar "Faces of the Internet.") Over the past 20 years, the nature of SMEs in the territory has shifted from a focus on manufacturing to one of export-driven and service-oriented as the positioning of Hong Kong changed. Today, roughly 30 percent of SMEs are in the import and export sector and 25 percent are in the wholesale and retail sectors.

Many of the entrepreneurial SMEs in Hong Kong have seized the opportunities afforded by the Internet to grow their businesses through geographic expansion, targeted marketing, and efficiency enhancements. For example, Lee Heng Diamond Group, a three-generation family diamond and jewellery business, created a website (MBlife.com) in 2004 that offers "design-it-yourself" jewellery and an ever-changing catalogue of jewellery products. It successfully expanded its business to mainland China, Australia, Canada, and the United Kingdom using the Internet. Choi Fung Hong, a wholesaler of soap and skin-care products, opened its bricks-and-mortar store in 1995. Since then, it has expanded into a successful beauty-products retail business, with outlets in Hong Kong and Guangdong, China. It now sells online (choi-fung.com)—offering discounts exclusively through its online channel in order to reach targeted local and overseas customers directly. Spoilt.com.hk, an innovative online retailer that sells "gift experiences"—such as recording your own music CD or taking a ride with a

professional formula-racing driver—actively uses web analytics to gain a better understanding of web traffic and page views on a real-time basis in order to build its product portfolio to match its customers' interests.

To understand why and how SMEs have embraced the Internet in Hong Kong, BCG conducted a survey in early 2011 of more than 500 SMEs.²⁰ To ensure that our sample accurately represents Hong Kong's economy and the SME community, we aligned the number of survey participants with the industry distribution. We categorised survey respondents into three groups: "high-Web" businesses that market or sell goods or services online (58 percent), "low-Web" businesses that have a website or social-networking site (20 percent), and "no-Web" businesses that do not have a direct online presence (22 percent).

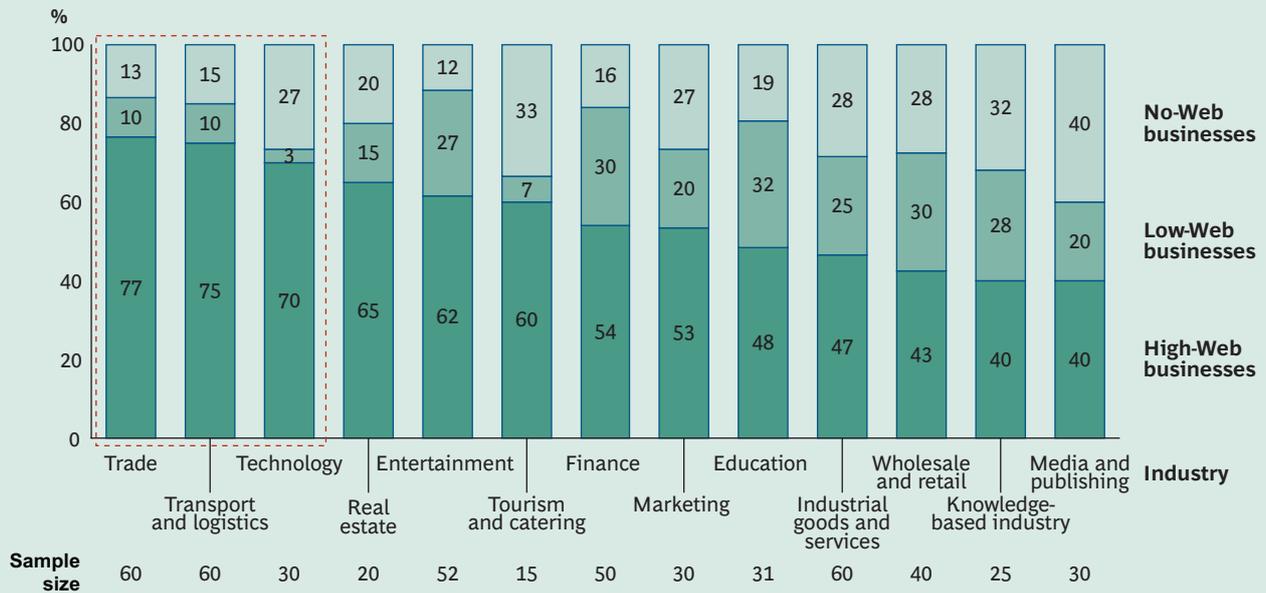
Our findings indicate that SMEs in different industry sectors have employed the Internet in quite different and sometimes innovative ways, and its impact is correspondingly diverse—more transformative in some sectors and less so in others.

Different Sectors, Different Approaches

Our survey reveals that SMEs in the trade sector (imports and exports), the transport and logistics sector, and the technology sector are frontrunners in terms of Internet adoption. (See Exhibit 5.) Roughly three-quarters of the SMEs in these sectors are high-Web businesses (77 percent of those in trade, 75 percent of those in transport and logistics, and 70 percent of those in technology). This is

20. BCG conducted a telephone survey of executives at more than 500 SMEs in December 2010 and January 2011.

Exhibit 5. SMEs in the Trade, Transport, and Technology Industries Have the Highest Levels of Internet Use



Sources: BCG survey of 503 SMEs; BCG analysis.
 Note: Some totals do not add up to 100 because of rounding.

not surprising in light of the Internet’s pivotal role in connecting trading partners and end consumers. Many SMEs in the trading community also use web-based EDI and other IT applications (such as web-based ERP systems) in their daily operations.

In contrast, the Internet is not as widespread in the domestic wholesale and retail sectors, given the popularity and convenience of bricks-and-mortar shopping in Hong Kong. Fewer than half (43 percent) of our survey respondents from the wholesale and retail sectors are high-Web businesses.

Distinct Motivations

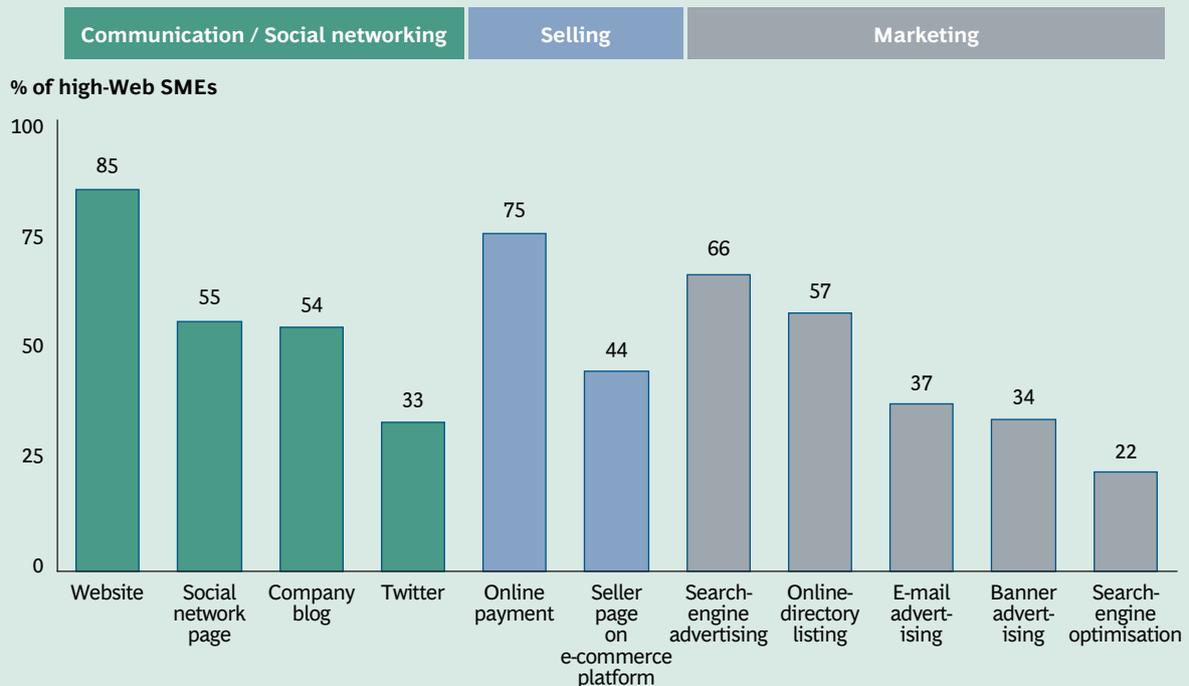
Borderless Business. A number of SMEs have taken advantage of the online channel to expand their footprint internationally—to conduct borderless businesses without having a physical presence outside Hong Kong. More than 50 percent of respondents cited expanding their business to include international customers as the main benefit provided by the Internet. Jet Navy Collection, for example, has been an exporter and manufac-

turer of laptop and mobile-phone accessories in Hong Kong for more than 10 years. The company expanded its business via its online channel and is now selling customised products to clients in Australia, Eastern Europe, and Japan.

Targeted Marketing. Web-savvy SMEs use the Internet for targeted marketing to specific age groups or consumers with certain interests through social media and search-engine advertising—especially those in the wholesale and retail sector. (See the sidebar “A Clear and Colourful Vision.”) More than half of the high-Web respondents to our survey have a social network page (55 percent) or run a company blog (54 percent). (See Exhibit 6.) Typically, these companies set up a webpage on Facebook or Twitter, where they update product information and receive feedback from consumers. Given that Facebook “groups” have similar backgrounds and interests, social media is helping these SMEs target specific age groups and build customer loyalty through one-to-many (company to consumers) and many-to-many (consumers to consumers) communication.

An even higher percentage of high-Web respondents (66

Exhibit 6. High-Web SMEs Actively Network, Sell, and Market Online



Source: BCG survey of 503 SMEs (58 percent of which were high-Web businesses); BCG analysis.
Note: Percentages represent the share of businesses that actively use the Internet to engage in each category.

percent) use search-engine advertising to target consumers with certain inquiries. One reason for its popularity is that search-engine advertising typically employs a “pay-per-click” payment arrangement, which has lowered the entry barrier to marketing. Take the example of ReadyFlowers.com, a Hong Kong-based global online flower and gift store. It relies heavily on the Internet to attract customers, especially through search-engine advertising. ReadyFlowers.com has many competitors in each of its locations. It has a unique cachet in that its business is truly worldwide.

Online/Offline Synergies. Other SMEs employ the Internet not only to build their online business but to supplement their offline business. Hiwave Dry Seafood, for example, uses its website to bring more customers into its bricks-and-mortar store and to reach beyond its older in-store customer base (mainly homemakers) to sell to new categories of younger online customers (white collar workers and the younger generation). (See the sidebar “Traditional Recipe for Online Success.”)

However, there are many SMEs that do not have a presence on the Internet—even those that are aware of the benefits of Internet adoption. The common barrier for “no-Web” SMEs, according to 39 percent of no-Web respondents to our survey, is that they do not have employees with Internet capabilities in their organisations.

Who Dares Wins

Our survey shows that the territory’s SMEs that have embraced the Internet have seen significant and often material benefits. High-Web businesses—which more actively use their websites, online payment, and search-engine advertising—have stronger performance than low-Web or no-Web SMEs in terms of sales growth, cost savings, and productivity gains. (See Exhibit 7.)

Sales Growth. SMEs use the Internet to effectively target, engage, and transact with customers and suppliers—about 80 percent of high-Web SMEs and 62 percent of

A Clear and Colourful Vision

T Tyler Tai started his wholesale exporting business in Hong Kong in 2001 primarily focused on “traditional” products, such as gifts and bags. A year later, responding to customers’ demands, he launched an online coloured lens business: colorlens4less.com. Almost a decade later, he created his own private label coloured lenses and, through the development and enhancement of his website and creative online tools, expanded his customer base from only businesses to now include consumers. The coloured lens business grew from 30 percent to 90 percent of Tai’s business portfolio.



In its first five years, the average number of orders received by colorlens4less.com increased from one a day to more than three hundred a day—and revenue grew three hundredfold. With the help of the Internet, Tai’s three full-time employees were able to manage the huge increase in orders as his business quickly grew.

The Internet is at the core of Tai’s business strategy and proposition. He actively uses search-engine marketing to attract new customers, which, for the most part, are

directed to his website by Google, Yahoo, and other search engines. Tai maintains distinct websites in different countries in order to cater to local tastes and to leverage search-engine optimisation techniques—meeting different keyword requirements so that colorlens4less.com appears as the top search result for its targeted consumers. He maintains Facebook and Twitter pages to engage customers and to collect feedback—an-

other key to the success of his business. Further, Tai services retail customers around the world with the help of the Internet; today 70 percent of colorlens4less.com customers are from the United States and Canada. He employs web-based communication tools to quickly respond to customer inquiries from all parts of the globe. In short, the Internet has been the key enabler for the company’s annual 100 percent revenue growth over the past few years.

Looking ahead, Tai plans to extend his coloured lens business into European markets and is exploring opportunities to expand into related product categories, such as artificial eyebrows.

Traditional Recipe for Online Success

H Hiwave Dry Seafood is the online store of a three-generation family business that sells dried seafood and traditional Chinese medicine in Sai Kung, a small fishing village in Hong Kong. In 2008, responding to the increasing popularity of online shopping and the potential for growth, the company opened its online storefront, which has brought new vigour to a traditional Chinese business.

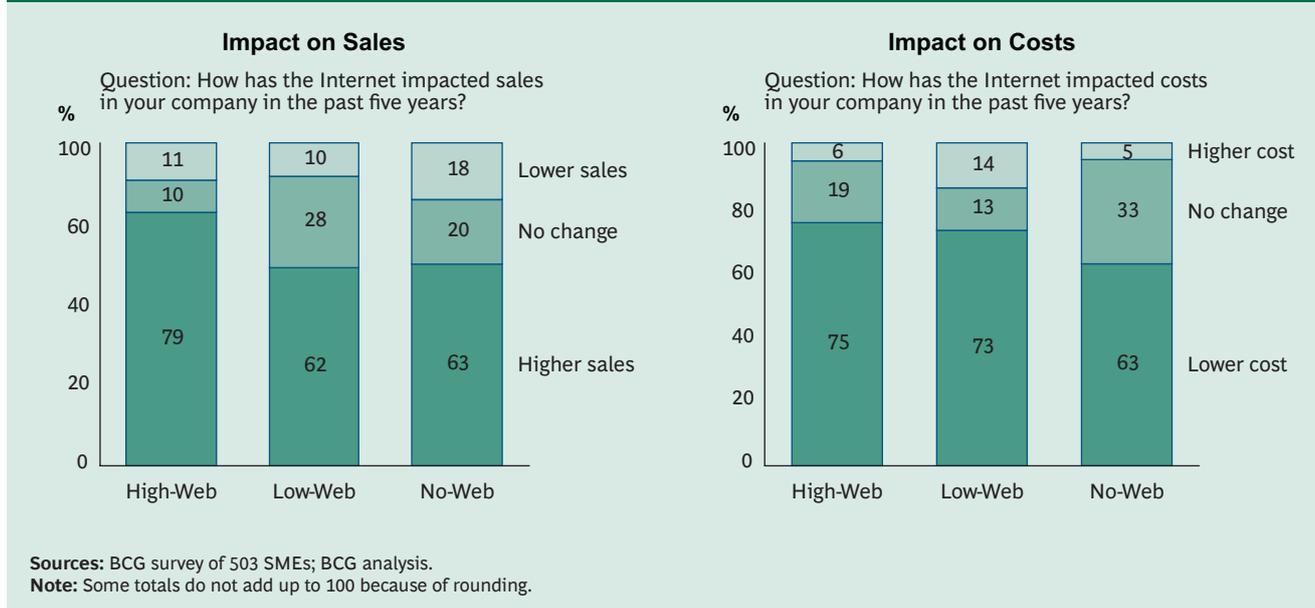


Hiwave has successfully used its website to expand into completely new customer segments in Hong Kong and beyond. Traditionally, its bricks-and-mortar store served customers over the age of forty who live in Sai Kung. With its website, Hiwave has successfully attracted a much broader range of customers—both in terms of age and location. It now serves a much younger group of customers

across Hong Kong and the world. Today, around 60 percent of Hiwave’s online business comes from overseas orders—mainly from the United States, Australia, and Europe, where high quality traditional Chinese medicine and dried seafood are in demand but not easily found.

The launch of its online store has not only expanded the business’ customer base—and extended its reach internationally—interestingly it has also attracted new customers to the physical store. The Hiwave website is rich in free content that informs site visitors about traditional Chinese customs, such as how to prepare Chinese soups or traditional wedding rituals and gifts. These educational materials have led to greater customer interest and affinity with the business.

Exhibit 7. The More Deeply SMEs Embrace the Internet the More Benefits They Reap



low-Web SMEs reported that integrating the Internet into their businesses has led to higher sales. SMEs that actively adopted the Internet also reported high revenue growth (25 to 50 percent growth rate) over the past three years, which mainly came from an increased number of customers (due to overseas expansion via their websites), a more diversified product portfolio (via comprehensive online research), and higher price premiums (via niche online product offerings).

Cost Savings. Online tools have lowered the cost of marketing, distribution, and communication—75 percent of high-Web and 73 percent of low-Web users that use online tools reported cost savings over the past five years. Interestingly, 63 percent of no-Web SMEs also reported cost savings because of the Internet. Even though these no-Web SMEs do not have websites, 42 percent of them have leveraged cost-effective online directories to market or sell their products.

Productivity gains. Eighty percent of high-Web and 70 percent of low-Web survey respondents reported improvements in productivity associated with Internet use over a five year period, compared with about 48 percent of

no-Web respondents. The productivity gains included efficiency enhancements, human error reduction and supply chain visibility. In the case of high- and low-Web SMEs, increased productivity was accompanied by an increase in job creation—about 50 percent of high-Web respondents reported hiring employees due to business expansion, compared with 23 percent of low-Web respondents.

Looking ahead, survey respondents anticipate that they will embrace the Internet more actively to realise additional economic gain. Of the high-Web SMEs, 40 percent expect their online sales to triple by 2015. The Hong Kong government has placed great importance on assisting the SME community through its digital inclusion programmes, which provide web training and affordable access to software solutions. Industry associations are promoting Internet adoption by SMEs including through funding and subsidies to help recruit in-house ICT talent and e-commerce capability-building programmes. With continued and expanded efforts along these lines—especially those designed to help no-Web companies overcome their IT challenges—we expect that an increasing number of SMEs will turn to the Internet in order to enhance their competitive edge.

Faces of the Internet



Porterhouse: Prime Quality Steaks Online

This Hong Kong online retailer sells high-quality prime steaks imported from the United States and Australia. In its first year of operation, it experienced exponential growth and expanded its product selection to include quality sustainable seafood, pork, chicken, sausages, wine, and cooking utensils. The majority of orders are repeat purchases from loyal customers living in Hong Kong, while new customers discover Porterhouse via word-of-mouth marketing. Porterhouse has built its image as an expert in its field by providing personalised services and free educational content (including a guide to steak and recipes). And, as a pure online retailer, it has effectively reduced the high cost of a Hong Kong storefront to zero.

Pictured: Clayton Parker, cofounder

Year founded: 2010

Number of employees: 5



YesAsia: Delivering Asian Entertainment

YesAsia is a Hong Kong-based online retailer that sells Asian entertainment products, such as music, videos and magazines. It has successfully leveraged the Internet to sell niche products to its target customers—Asian students who are studying in countries with limited access to Asian pop culture. To facilitate information access and order placement for its worldwide customers, YesAsia has tailored its website for different cultures through the localisation of languages, content, design, and product offerings. Since 2006, it has leveraged its retailing expertise in the entertainment field to expand its offerings, which now include Asian fashion, at YesStyle.com.hk. With smart usage of search-engine advertising, social media, and the provision of free content (such as product reviews and fashion advice) these websites have built a loyal customer base and attract 2.4 million unique users per month.

Pictured: Joshua Lau, founder and CEO

Year founded: 1998

Number of employees: 150



CITAC: Efficiency-improving Web-based Solutions

Caritas Information Technology Advancement Centre (CITAC) is the IT division of Caritas, a charity founded by the Catholic Diocese of Hong Kong. Its web-based solutions, which are available to Caritas as well as other social service organisations, government departments, and SMEs in Hong Kong, are designed to raise efficiency and effectiveness in service delivery. CITAC has also created electronic clinical-information systems for two private Caritas hospitals, an award-winning e-Care Elderly Home Management System that reduces paper work in eldercare facilities, and an online platform that speeds the dispatch of Auxiliary Medical Services and Civil Aid Services members. In addition, it has created a mobile reporting system and a centralised, real-time database for the Hong Kong Marathon, so that organisers can keep track of injuries to runners. CITAC also has scaled up its web-based technology to enable under-IT-resourced non-profit organisations to provide better service delivery.

Pictured: Alan Young, Principal Information Officer

Year founded: 2001

Number of employees: 30



Stepcase: Mobile Photo Sharing

This mobile Internet start-up saw a potential business opportunity given how much people enjoy taking photographs and sharing them with their friends. It leveraged the social networking phenomena and the rise of mobile Internet in Hong Kong to seize it. Their photo applications for mobile devices gained popularity instantly with more than 2 million downloads of its photo-sharing app across Asia. The recent launch of Phototreats was downloaded more than 200,000 times within nine days of its posting. Stepcase's goal is to expand its photo community, to improve photographers' experiences (from taking photographs to sharing photographs), and to stimulate interest in photo-sharing applications.

Pictured: Leon Ho, founder

Year founded: 2008

Number of employees: 6



Green Tomato: Full Spectrum of Mobile Applications

Green Tomato Ltd., a mobile-solution consultancy, specialises in developing mobile-platform solutions, mobile content, mobile communities, and mobile applications for multinational corporations across the Asia-Pacific region. The increase in smartphone penetration and in mobile Internet access has driven Green Tomato's business growth. Its innovative solutions and ideas have touched 3 million mobile phone subscribers through more than 150 wireless application protocol (WAP) services and 70 mobile applications since its founding. Two of its most popular cross-platform applications are Hong Kong Movie, which enables moviegoers to purchase tickets and browse comprehensive movie information (such as synopses, movie reviews, show time schedules, and real-time available seating) and TalkBox Voice Messenger, which gives users an instant voice messaging experience.

Pictured: Sunny Kok, CEO

Year founded: 2003

Number of employees: 100



Outblaze: Building an Internet Business on the Cloud

Outblaze Ltd. is one of the pioneers in cloud computing services in Hong Kong and the first company to offer fully hosted multilingual communication services for online communities. In 2009, the company provided services to more than 75 million users across 480,000 unique domains. After selling its messaging division, Outblaze has shifted its focus from B2B services to web-based B2C products, such as smartphone games and "edu-tainment" applications, computer and videogame titles, social media applications and software. Today, the company's products and services are "liked" by millions of Facebook users.

Pictured: Yat Siu, CEO

Year founded: 1998

Number of employees 150

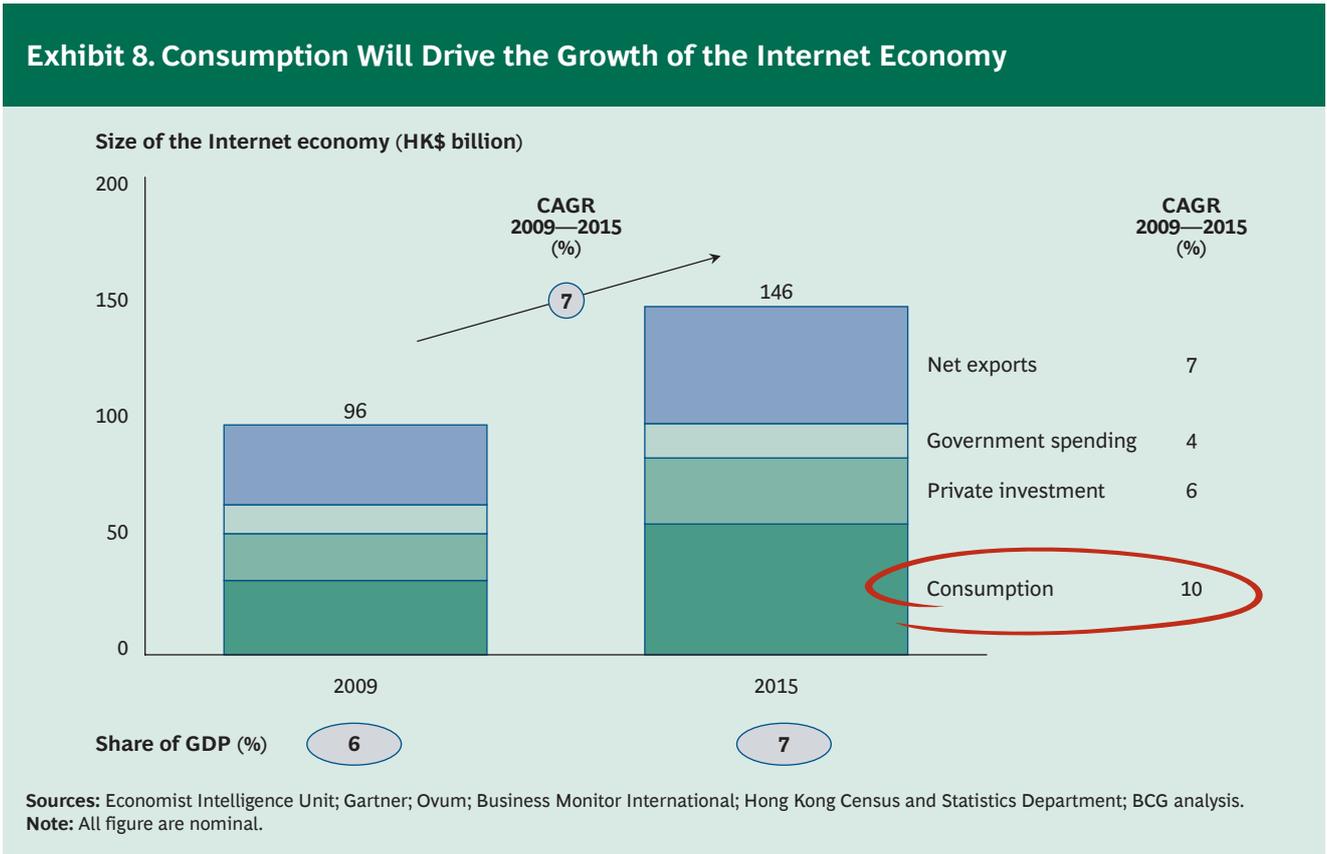
Foundation for Growth

We estimate that, between 2009 and 2015, Hong Kong's Internet economy will grow by about 7 percent per year—contributing 7.2 percent of GDP in 2015, up from 5.9 percent in 2009. (See Exhibit 8.) The anticipated growth rate of the Internet economy is considerably faster than Hong Kong's forecasted GDP growth rate of 4 percent.²¹

Our prediction is based on projections of several trends.

The most significant are increased consumer spending on online shopping and deeper mobile penetration, both of which are expected to drive online consumption. Also important to the Internet economy's growth will be growth in net exports and in private and government investments in Internet-related software, hardware,

21. All GDP growth rates discussed in the report are nominal—that is, economic growth, including inflation.



services, and infrastructure. (See the sidebar “Assumptions of Future Growth.”)

We expect that the desire to find a good deal or to buy something unique will draw more and more consumers online, and this will be a major growth driver of the Internet economy in Hong Kong. While buying online will not be a substitute for shopping in bricks-and-mortar stores, we foresee significant growth in online purchases because of the many benefits of shopping online that offline shopping cannot provide as easily: niche products, customised services, and bargains that are not available in stores. The group buying wave has already hit Hong Kong with over 30 websites offering daily discount deals of up to 90 percent, thus enriching the e-commerce platform of the territory.

With double-digit growth in spending on mobile devices and mobile Internet access anticipated to 2015 in Hong Kong, mobile Internet activity will be an emerging force in the Internet economy’s growth. The rising popularity of smartphones and Hong Kong’s robust infrastructure will enable a host of mobile business opportunities. Companies, large and small, are beginning to take advantage of the mobile platform that enables direct one-to-one connections with target customers for advertising, banking, ticket reservations and sales. Mobile-apps developers have experienced triple-digit growth over the past couple of years. The expansion of this segment of the Internet economy will provide Hong Kong with strong growth momentum.

Levers of Growth

How fast the Internet economy grows—and the extent of its contribution to the territory’s commerce and society—will be determined by how quickly and boldly Hong Kong businesses, government and individuals act to capture the opportunity. The key to unleashing the growth potential lies in the following factors.

◇ *Growth in Business-to-Business E-Commerce.* The robust growth in mainland China’s exports offers additional business opportunities for Hong Kong companies both large and small. It is important that Hong Kong’s middlemen continue to enhance their role—migrating from catalogue providers or customised sales portals to become end-to-end service consultants who offer

“thicker” connections with suppliers and sellers around the world, thereby creating more value.

◇ *Maintaining Openness.* Openness has been a cardinal strength of the territory’s Internet development, driving innovation and inclusiveness. Hong Kong, a city that champions free market principles and has a robust legal system (particularly with respect to intellectual property rights), is well positioned to maintain the openness of the Internet, thereby fostering innovation, and encouraging deeper participation in the Internet economy.

◇ *Maturing of Mobile Internet.* As smartphones, e-readers, and tablets become increasingly popular, the amount of time Hong Kong consumers are connected to the Internet will grow. These mobile devices will also change consumer behaviour—mobile phones are now used not only to make calls and send and receive e-mails but also to check stocks, search for information, and update one’s status using social media. Businesses that are able to leverage the mobile channel can benefit from, among other things, more targeted marketing, increased sales, and enhanced customer-relationship management.

◇ *SME Online Engagement.* Given that SMEs make up a major portion of the business sector in Hong Kong, it is important that the government and the business community work together closely to help them get online and realise the benefits of “going digital.” The willingness of the territory’s SMEs to adapt their business models in order to capture new online opportunities is crucial to the development of the Internet economy. Businesses can learn from the success of Baby-Kingdom.com, a free-content provider that transformed into a web-development and marketing firm, which now provides a full spectrum of Internet-related services to clients throughout the Asia-Pacific region.

◇ *Incubating Internet Start-Ups.* Hong Kong is a city full of entrepreneurial spirit, but compared with other industries, such as trade, wholesale and retail; there are a fewer number of high-tech or Internet start-ups. Organisations such as Hong Kong Science and Technology Parks and Cyberport have established incubation programmes to promote entrepreneurship and innovation in territory’s up and coming high-tech businesses. The funding, training, and infrastructure provided by

Assumptions of Future Growth

Our estimate that Hong Kong's Internet economy will grow 7 percent annually between now and 2015 is based on several assumptions about consumption, private investment, government spending, and net exports.

Consumption. Consumption is likely to grow by up to 10 percent annually until 2015. This growth rate is predicated on two assumptions. First, the percentage of Hong Kong consumers who shop online will grow from 28 percent in 2009 to 43 percent in 2015. This assumption is based on a conservative estimate using data from an annual government survey (conducted between 2004 and 2009) of the percentage of online users who shopped online during the preceding 12 months. If the growth rate in consumers' online spending continues at this rate (and if consumers' online spending remains at 15 percent of their total retail spending each year), then increased online consumption would contribute an additional HK\$15 billion to Hong Kong's Internet economy. (See the exhibit "Online Shopping Is a Major Consideration in Growth Predictions.") The second assumption is that annual spending on mobile devices and mobile Internet access will grow by

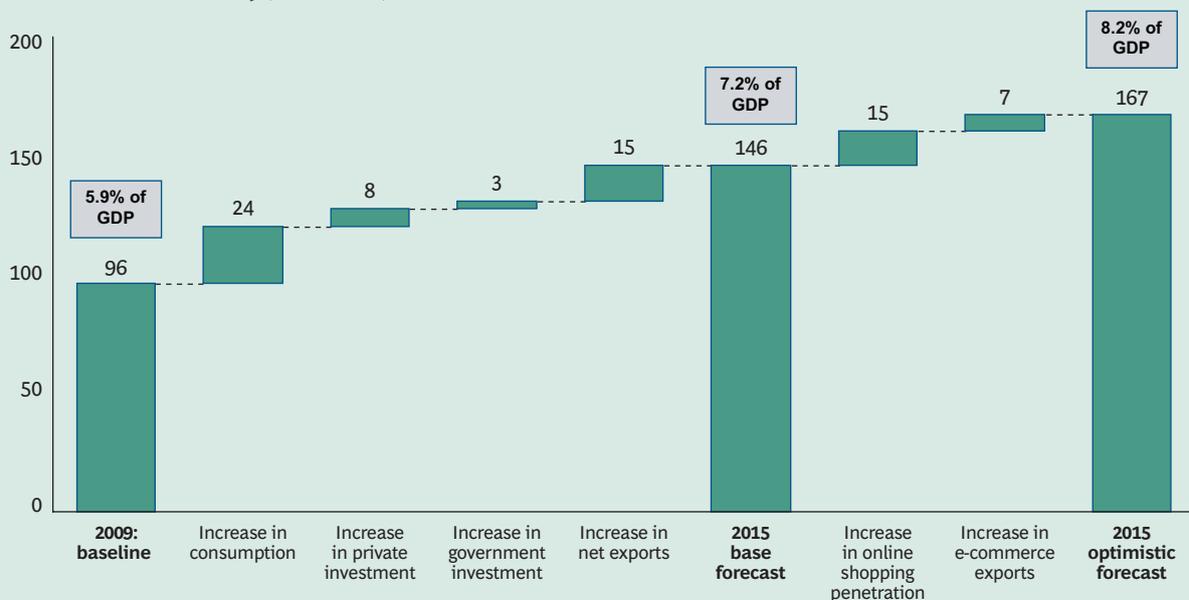
19 percent and 17 percent, respectively, through 2015. We also anticipate that with the increasing sales of smartphones in Hong Kong, mobile Internet usage will continue to rise.

Private Investment. We forecast that private investment in the Internet will grow by about 6 percent annually until 2015. The main driver for growth will be investment by private companies in hardware and software; we forecast the latter to grow at 9 percent annually. Investment by telecom companies is projected to grow by 5 percent, driven by continued investment in advanced technologies, such as 4G technology.

Government Spending. We project that government spending on computer hardware, software, IT services, and telecommunications will grow by 4 percent annually until 2015. This is based on the view that government spending on the Internet is maintained at a more or less constant percentage of GDP, and therefore it will continue to grow at the same annual rate as Hong Kong's overall GDP (currently 4 percent).

Online Shopping Is a Major Consideration in Growth Predictions

Size of Internet economy (HK\$ billion)



Sources: Economist Intelligence Unit; Gartner; Ovum; Business Monitor International; Hong Kong Census and Statistics Department; BCG analysis.
Note: All figures are nominal.

Net Exports. Hong Kong plays a significant role in the electronic goods' global supply chain. We anticipate that its imports and exports of ICT goods will grow 7 percent annually until 2015—that is, at the same growth rate as world GDP. We explored both a “base case” and an “optimistic” scenario for 2015. In our “base case” prediction, we assume that e-commerce imports and exports will roughly parallel domestic online spending in Hong Kong.

In our “optimistic” scenario, which assumes that business adoption of the Internet will increase and that businesses will more fully leverage the Internet to grow, we expect to see more Hong Kong businesses selling to overseas markets via the online platform. As China will be a major driver of demand for e-commerce exports, Hong Kong's exports of e-commerce will grow faster than its imports.

these incubation programmes are essential to resource-constrained, high-potential start-up ventures. The success of both these programmes and the start-ups they incubate will contribute to the growth of Hong Kong's Internet economy.

- ◇ *Hong Kong as a Data Centre Hub.* The territory's superior telecommunications infrastructure coupled with a well-established legal system and stable political environment has attracted many multinational corporations to locate their data centres in Hong Kong. In 2011, Hong Kong's government allocated funds to facilitate the development of advanced data centres (green data centre and cloud data centre) to strengthen the territory's position as the location of choice in the Asia-Pacific Region. Continued investments by Hong Kong's private sector and government will boost the territory's Internet economy.

Promising Future

Developments in the Hong Kong Internet economy over the past decade have defied imagination, but the opportunities ahead appear even more promising and exciting. Companies, large or small, have already started to invest in the Internet technologies and skills necessary to capture the next wave of e-commerce opportunities and the emerging mobile Internet. The Hong Kong government continues to invest astutely and encourage businesses and consumers to engage in the Internet economy via digital inclusion programmes; to take steps to ensure the quality of, and access to, Internet infrastructure; and to remove barriers to business transformation. As we look ahead to 2015 and beyond, we see Hong Kong striving towards a more innovative, open and connected Internet economy.



Appendix

Methodology

The assumptions and analyses that form the basis for this report are outlined below.

GDP

The *expenditure method* of calculating GDP measures total spending on finished goods and services. Assumptions outlined in the main report are not repeated here.

Consumption. Online spending includes spending on most goods and services. We checked our estimates against the IAB Europe/Google Consumer Commerce Barometer survey and household expenditure data. Spending on access includes consumers' payments to fixed and mobile Internet-service providers, a relevant proportion (based on time spent online) of consumer spending on interface devices (such as computers or mobile phones), and consumer spending on infrastructure devices (such as wireless routers). Our estimates are based on research reports and data from Euromonitor, Gartner, the Office of the Telecommunications Authority of the Hong Kong Special Administrative Region (HKSAR) government, the Census and Statistics Department of the HKSAR government, and Ovum.

Private Investment. We included a relevant proportion of fixed and mobile telecom investments, where the spending is related to building, maintaining, and facilitating broadband services. We included a portion of private investments in hardware, software, telecom equipment, and installation and development services by looking at the proportion of corporate-owned computers that have an Internet connection and of employees using an Internet connection, as well as expert interviews. Finally, we included all private investments in telecom equipment.

Estimates are based on research by Gartner, the Census and Statistics Department of the HKSAR government, and telecom companies.

We did not include an estimate for internally developed software, even though it probably represents a significant element of Internet-related capital expenditure, because too many assumptions would have been necessary.

Government Spending. We estimated public spending on ICT, including hardware, software, telecommunications, and support services, based on research by Gartner, the Census and Statistics Department of the HKSAR government, and internal estimates.

Net Exports. We estimated exports of e-commerce based on imports of e-commerce in major destinations (for example, the United Kingdom and mainland China) and imports based on the online traffic of foreign e-commerce websites available from comScore. We estimated imports and exports of ICT equipment based on data from the Census and Statistics Department of the HKSAR government.

GDP Growth

We estimated growth of consumption by projecting online consumer spending and spending on access. The consumer spending estimate is based on projections of the percentage of Internet shoppers, the total retail spending per person, and the percentage spent online. The access spending estimate is based on projections of the number of broadband subscriptions and the cost per subscription.

Estimates of growth in investment are based on forecasts by the sources used to build the baseline estimate.

e-Intensity

The overall international and regional indices are formed as a weighted mean of three sub-indices: enablement, engagement, and expenditure. The engagement sub-index is formed as an equally weighted mean of three further sub-indices: businesses, consumers, and government. All of the sub-indices are then formed as weighted means of several underlying metrics. (See the exhibit “BCG e-Intensity Index™.”)

Data are not available from the same source for every single metric and country for the international index. Where possible, we impute the missing data through regression, using metrics which are strongly correlated. For some metrics for countries without an OECD data set, imputation does not produce robust results. In these cases we calculate a score using aligned metrics from alternative data sources. We then transform these scores to align with the scale of the original index, using data points for countries that appear in both sources. This allows us to

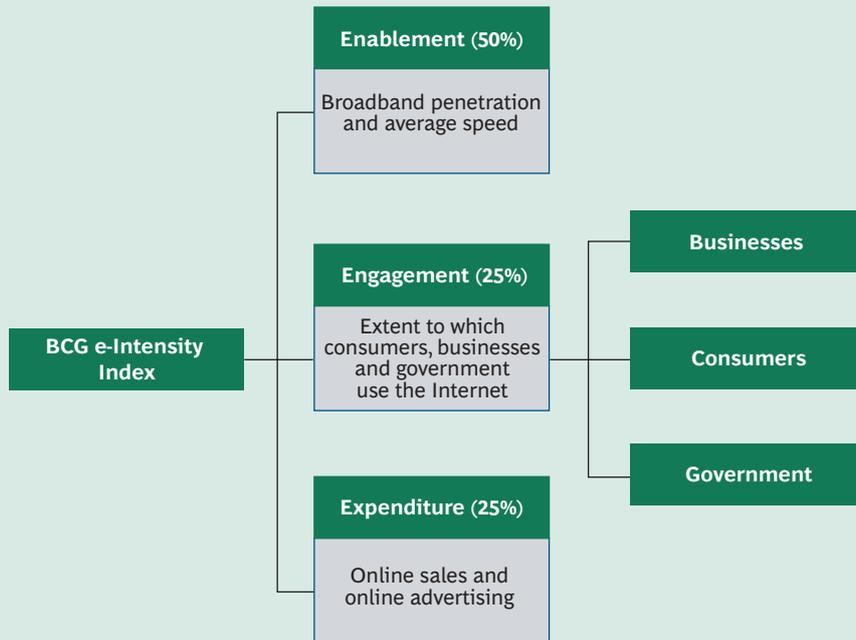
approximate the position of countries without an OECD data set on the international index.

We transformed the data so that the indices would measure proportional differences in data. To ensure intuitive interpretation, we then transformed the indices and scaled them so that a reference value—the geometric mean of each index—was set to 100.

We also tested how sensitive the country rankings were to changes in the weights and choice of metrics by carrying out a Monte Carlo simulation using random weights and variables. The inter-quartile ranges were very small when a metric was randomly omitted.

The index is somewhat sensitive to different weightings. In each iteration of the Monte Carlo simulation, the weight of each of the metrics and sub-indices was randomly modified. The inter-quartile range for each country was small, but there were groups of countries with similar mean scores and overlapping inter-quartile ranges. For example, the analysis shows that the ranking for the Netherlands, the United Kingdom, and Finland cannot be easily distinguished.

BCG e-Intensity Index™



Description of sub-indices and sample metrics
<p>Development of Internet infrastructure. Metrics include:</p> <ul style="list-style-type: none"> ◇ Broadband penetration (fixed and mobile) ◇ Average broadband speeds
<p>Extent of Internet use by businesses. Metrics include:</p> <ul style="list-style-type: none"> ◇ % of businesses that use the Internet ◇ % of businesses with a website ◇ % of businesses buying online
<p>Extent of Internet use by consumers. Metrics include:</p> <ul style="list-style-type: none"> ◇ Internet users / population ◇ % of population that use the internet for communications, banking, gaming, shopping, etc
<p>Extent of Internet use by government. Metrics include:</p> <ul style="list-style-type: none"> ◇ UN online service scores for availability of basic information, extent to which public can perform public service transactions online ◇ Extent of Internet access in schools
<p>Prevalence of Internet commerce. Metrics include:</p> <ul style="list-style-type: none"> ◇ Online retail as a % of total retail ◇ Online advertising as a % of total advertising

Source: BCG analysis.



Note to the Reader

Acknowledgements

This work would not have been possible without the support of the many people who contributed their time, knowledge, and access to data to the BCG team. We have relied extensively on many industry experts, government officials, and business executives in Hong Kong, including the respondents to our survey. They have been open in sharing their reflections on the impact of the Internet and providing valuable feedback on the analysis and conclusions in this report. It has been exciting to see that the topic has stimulated high levels of interest and engagement across such a wide spectrum of professions and backgrounds.

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