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HUAWEI IN CANADA: CAN IT BECOME A TRUSTED PLAYER?

Huawei Technologies Ltd., a privately held[1] Chinese company that in two decades rose to become one of the world's largest telecommunications equipment makers, was no stranger to exploring new markets. By the time it entered the Canadian market in 2008, it had established a presence in Asia, Russia and Africa for more than 10 years, and had captured key European markets, including Germany and the United Kingdom. It came to Canada as a full-fledged multinational, ranked third in the global mobile equipment market, whose customers included 36 of the world's 50 largest telecom operators.

Huawei eased into the Canadian market with a "glocalization" strategy, marketing itself as a Canadian company with tested global credentials. Within six months of establishing its first Canadian office, Huawei was co-awarded, with rival Nokia Siemens Networks, high-speed network infrastructure contracts with Telus and Bell Mobility, two of the three largest telecom operators in Canada.[2] Sean Yang, president of Canadian operations, then announced a five-year, C$80 million R&D investment focused in Ottawa, followed by initiatives to build strong, local mobile and cloud-technology research partnerships with customers and universities. The company continued to procure major equipment and service contracts from regional and national operators. In 2011, it launched a new headquarters in Ontario, established two more offices in the country, and increased its staff from 70 to 450, nearly half of whom were involved in research and development. Ottawa's mayor welcomed Huawei's efforts to make Canada one of its global, strategic R&D hubs. The Chinese multinational was well on its way to becoming a primary player in Canada's telecommunications industry.

However, in October 2012, the US Congress released a report claiming potential national security risks associated with Huawei's products, and recommended a ban on the company's equipment. Soon afterwards, the US, Australian and Indian governments excluded Huawei from bidding on government projects and asked private companies to follow suit. With growing concerns over national security, Huawei faced the prospect of losing potential project deals in North America. What could Yang do to reaffirm Huawei's commitment to the

[1] The company is 99% owned by employees under a stock option plan. Sevastopulo, D. (27 February 2014) "Huawei pulls back the curtain on ownership details", *Financial Times*, http://www.ft.com/ (accessed 27 December 2014).

[2] RCR Wireless (10 October 2008) "Bell Canada, Telus to Deploy HSPA by 2010", http://www.rcrwireless.com/20081010/wireless/bell-canada-telus-to-deploy-hspa-by-2010 (accessed 24 July 2014).

Penny-Frances Lau prepared this case under the supervision of Dr. Mary Han and Dr. Nikhil Celly for class discussion. This case is not intended to show effective or ineffective handling of decision or business processes.

Ref. 15/554C

Canadian market? How could Huawei make use of its global credentials and vested interest in Canada to re-establish itself as a trusted player in the market? Most importantly, what could Huawei do to sustain its market leadership position in both Canada and the world?

China's Trade Relations with Canada

China and Canada began diplomatic relations as early as the 1970s, but it was only after China's entry into the World Trade Organization in 2001 that the countries established trade ties. In 2005, the two formed the Strategic Working Group, jumpstarting the process of closer economic cooperation. Canada, a resource-rich nation, and China, an emerging nation with growing consumption needs and export capacity, were eager to complement one another through bilateral trade. Canada was also a major exporter of natural resources and agricultural products, with more than 75% of its exports going to the US. Bolstering exports to China could ease its dependence on its southern neighbor.

The Chinese government in 2002 began encouraging domestic enterprises to develop market presence overseas and acquire market resources outside China. "Going abroad", as the policy was known, was incentivized by Chinese enterprises' need to gain market experience and obtain advanced technology and natural resources globally. The policy of expanding to a global customer base also alleviated the overcapacity problem faced by many Chinese manufacturing industries. The government-directed move was facilitated by increased regulatory approvals of overseas business activities, easing of foreign exchange controls, and acquisitions financed by state-owned banks. The policy, along with China's escalating energy demands fueled by rapid urbanization and economic growth, also led to some high-profile acquisitions. In 2013, Chinese state-owned oil company CNOOC acquired Canadian counterpart Nexen for US$15 billion, the biggest Chinese foreign-takeover deal to date.[3]

Between 2004 and 2013, Chinese exports to Canada more than doubled to C$52.7 billion. Radio, television and telecommunications equipment exports grew sevenfold, becoming the second largest export category with an annual total of C$3.4 billion.[4] The two countries sought to double bilateral trade to C$60 billion by 2015, focusing on agriculture, natural resources, machinery and equipment.[5] Canada's top exports to China included iron, copper, chemical wood pulp, coal and lumber.

During this time, China also became the second-largest trading partner with both the US and the European Union. But more entrenched trade relations invited dumping and subsidies accusations against Chinese firms. Canada, the US, Mexico and the European Union filed the greatest number of complaints against China with the World Trade Organization.[6] In May 2013, fresh claims of Huawei being an unfair player resurfaced after a European Union trade official said Huawei received cheap loans from Chinese state-owned banks, distorting the playing field, and accused the company of dumping.[7] The accusations pointed to the government-owned China Development Bank, which had a record of providing financial

[3] Guo, A. and Van Loon, J. (24 July 2012) "CNOOC Buys Nexen in China's Top Overseas Acquisition", *Bloomberg*, http://www.bloomberg.com/news/2012-07-23/cnooc-to-buy-canada-s-nexen-for-15-1-billion-to-expand-overseas.html (accessed 12 December 2014).

[4] Industry Canada, Government of Canada, https://www.ic.gc.ca/ (accessed Dec 12 2014).

[5] Rabinovitch, S. (25 June 2010) "China Seeks to Double Trade with China", *The Globe and Mail*, http://www.theglobeandmail.com/report-on-business/economy/china-seeks-to-double-trade-with-canada/article1373870/ (accessed 13 December 2014).

[6] Statistics, International Trade and Market Access Data, World Trade Organization, http://www.wto.org/ (accessed 13 December 2014).

[7] Reuters (18 May 2013) "EU Cites Chinese Telecoms Huawei and ZTE for Trade Violations", http://www.reuters.com/article/2013/05/18/us-trade-eu-idUSBRE94H03J20130518 (accessed Dec 13, 2014).

backing to many state-owned companies for overseas expansion and acquisition, and had offered Huawei's potential customers US$30 billion in buyer's credit.[8]

Competition in the Network Equipment Industry

Network equipment providers like Huawei engaged in two business segments: they sold telecommunications equipment and offered services for building and maintaining telecommunications networks. Network equipment vendors were of two types. One supplied equipment mostly to telecom operators, the other mostly supplied enterprises. Most large companies pursued a mix of both businesses, with varying degrees of revenue focus generated from each segment [see **Exhibit 1**]. Cisco Systems, a California-based company, was the largest vendor in the enterprise market, owning 45% of the total US$50 billion market share.[9] Others, like Huawei, relied heavily on selling to telecom operators and, specifically, to mobile network carriers. Ericsson was the biggest comprehensive player across all sectors until Huawei assumed this position in 2012. Larger players each had their own strengths in different market subsets. Ericsson, for example, was a dominant player in Long-Term Evolution networks deployment.[10] Cisco Systems held a majority in the Ethernet switch market, and French-based Alcatel-Lucent led the small cell market.[11]

The industry underwent consolidation after the dotcom bubble burst in 2000, most notably with the merger of Alcatel and Lucent, and the joint venture between Nokia and Siemens Communications. The last major shakeup took place in 2009, when Canada's Nortel Networks went into bankruptcy after years of financial woes and the plummeting value of acquisitions made at the height of the dotcom bubble.[12] Its business was eventually split and taken up by Ericsson, Avaya Inc. and Ciena Corp. Big players became mega players with more focused product lines as they disposed non-core assets and acquired smaller players.[13] The number of major players was reduced to Huawei, Ericsson, Cisco, Alcatel-Lucent and Nokia-Siemens. These six largest players made up 80% of the global market.[14]

Telecom Operators

Telecom operators, or carriers, were often geographically bound by their country of operation. Each country typically had a handful of big national carriers and up to a dozen smaller ones. On a global scale, the aggregate number of major carriers was in the hundreds. Carrier spending on network infrastructure often indicated a market's growth potential. Such spending was governed by the need to upgrade technology, networks, coverage and capacity, all of which was vital to competing for customers on the basis of network quality, customer service and price. Subscriber growth, financial health and other economic conditions also affected capital spending.

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[8] Hu, K. (25 February 2011) "Huawei Open Letter", http://pr.huawei.com/en/news/hw-092875-huaweiopenletter.htm#.VJAZHMnubEc (accessed 16 December 2014).

[9] Machowinski, M. *Infonetics Research* (July 2013) "Enterprise Networking and Communication: Vendor Leadership Scorecard".

[10] Soper, M. and Antlitz, Chris. (22 March 2013) "Ericsson Leads the LTE Marke by a Wide Margin", *Fierce Wireless*, http://www.fiercewireless.com/press-releases/ericsson-leads-lte-market-wide-margin-rivals-huawei-zte-and-samsung-will-ga

[11] Telecom Lead (29 July 2014) "Alcatel-Lucent Leads Small Cell Equipment Market in 2013" http://www.telecomlead.com/telecom-statistics/alcatel-lucent-leads-small-cell-equipment-market-2013-abi-research-52142 (accessed 16 December 2014).

[12] Austen, I. (14 January 2009) "Nortel Seeks Bankruptcy Protection", *New York Times*, http://www.nytimes.com/2009/01/15/technology/companies/15nortel.html?_r=0 ; Tedesco, T. (14 January 2012) "Nortel Trail to Open Old Wounds", *Financial Post*, http://business.financialpost.com/2012/01/14/nortel-trial-to-open-old-wounds/?__lsa=94e9-536a (accessed 7 January 2015).

[13] IBM Institute for Business Value (2007) "And Then There Were Few" http://www-935.ibm.com/services/us/gbs/bus/pdf/gr-gbe03135-usen-nep.pdf (accessed 2 Aug 2014).

[14] Accenture (2012) "Networking Equipment Providers: Restoring Investor Trust". p.3.

From 3G to 4G

Mobile telecommunications technology shifted every few years. Online video traffic, mobile phone applications and the need for constant Internet connection drove the demand for mobile broadband. Carriers were always looking for advanced technologies and more efficient use of bandwidth resources to satisfy the rising need for on-the-go connectivity, larger data volumes and multimedia usage. Third-generation mobile technology (3G) had been the industry standard since the early 2000s until the introduction of fourth-generation technology, also known as 4G or Long-Term Evolution (LTE), the name of a common 4G standard. Some operators upgraded to a network "in-between" 3G and 4G to ensure a smooth transition to higher-speed networks in the future. Upgrading and building next-generation networks were major investments for telecom operators, and therefore choosing appropriate vendors to deploy and build these networks were important decisions. Some operators shared networks to reduce infrastructure costs.

Huawei and its competitors also offered "managed services" to help carriers manage their operations and business support systems. These services, often packaged as a full-solutions approach, included improving network efficiency, offering software solutions, monetizing services tiered by data usage, network maintenance and billing solutions. [15] Carriers increasingly saw outsourcing "managed services" as a way to reduce operations spending,[16] especially when better control over network quality in shared networks was needed. Carriers also wanted to monetize their growing subscriber base and increased traffic. Between major network upgrades, operators continued to demand capacity improvement and coverage expansion.

With network infrastructure and maintenance costs becoming a growing expense, carriers demanded that vendors offer lower-cost products and services at higher efficiency levels, squeezing vendor profit margins.[17] The increasing use of open network standards also shifted the trend from proprietary networks to "off-the-shelf, common hardware and software solutions from independent vendors." [18] This, together with the introduction of price competitive players such as Huawei and ZTE Corp, made competition stiffer, especially in European markets where operators curbed spending and even delayed network overhauls, further straining profit margins.[19]

Within the mobile communications market, carriers pocketed most of the growth in data traffic, while the equipment market was expected to increase at a mere 4% annually to reach US$101 billion in 2016. The upside was the carrier services market, which was forecast to increase 12% annually to US$165 billion in 2016.[20]

Huawei's Chinese Roots

Ren Zhengfei, a former engineer in the Chinese People's Liberation Army, founded Huawei in 1987 with a small starting capital of Rmb 21,000 to sell telephone switches to corporate users. At the time, Chinese telecommunications equipment makers possessed little

[15] Nokia Siemens Networks (2012) "Annual Report".
[16] Accenture (2013) "Evolutionary Trends in the Operations of CSP Networks". p.6.
[17] IBM Institute for Business Value (2007) "And Then There Were Few", p.4.
[18] Ibid.
[19] Mawad, M. (1 November 2013) "Alcatel Cost Cuts Help Combes Show Network Maker Can Survive", *Bloomberg*, http://www.bloomberg.com/news/2013-10-31/alcatel-lucent-reports-narrower-than-projected-loss-on-cost-cuts.html; Robertson, J. (14 August 2013) "Cisco Cutting Jobs as Revenue Forecast Misses Estimates", *Bloomberg*, http://www.bloomberg.com/news/articles/2013-08-14/cisco-profit-in-line-with-estimates-as-web-traffic-drives-demand (accessed 8 December 2014).
[20] Accenture (2012) "Networking Equipment Providers: Restoring Investor Trust". p.2

technological know-how and engaged mostly in "copycat manufacturing" or original equipment manufacturing for other better-known global brands. In the late 1980s, China went through a period of rapid economic reform with the country opening up for the first time in decades. Global companies rushed to China for its low production costs and cheap labor. Shenzhen, the southern Chinese city where Huawei was registered, was the first to benefit from the Chinese "open-door" policy.

At the time, most Chinese telecom operators were still importing equipment from vendors such as AT&T, Siemens and Alcatel. Ren saw the potential demand for telephone switches and telecommunications equipment in China, and also realized that foreign companies setting up factories in China were not transferring core technologies to their Chinese partners. This left local manufacturers with little competitive advantage as technology advanced.[21] Ren wanted China to have homegrown telecom equipment technology, and started making and developing his own telephone switches, a difficult feat in a state-controlled economy that did not fund private companies.

Ren reinvested most of the profits from his retail business to fund research. His persistence soon paid off, and in 1994, the company launched the first equipment developed in-house, the C&C08, a digital switching system that later became the company's early core product. Ren set up Huawei's first R&D center in Beijing the following year. By 1996, Huawei had established a larger presence in China's telecommunications equipment market, with reported revenue of Rmb 2.6 billion.[22]

To ensure that innovation remained a core initiative, Ren maintained nearly 46% of company staff, and reinvested a minimum 10% of revenue, in R&D each year. This emphasis on research investment enabled the company to churn out a record number of patents each year. Huawei became the world's largest patent applicant in the World Intellectual Property Organization, with 1,737 applications in 2008.[23]

By the late 1990s, Huawei was already one of the big three in the domestic market. But between 1996 and 2002, Chinese telecom operator spending growth lowered drastically from 25% to 2.1% annually,[24] plunging the telecommunications equipment industry into a period of slow growth and dragging vendors into price wars. Huawei's growth strategy was derailed as a result.[25] With narrowing profits and increasing competition, Ren set his sights on the global market. A firm believer in modern management practices, he decided that the only way to prepare Huawei for global expansion was to introduce global best practices. He hired consulting firms IBM, Hay Group and PricewaterhouseCoopers to advise in areas from financial management to human resources strategy, laying a foundation for Huawei to expand its scale and influence as a major global market player.

International Expansion

Huawei's global expansion happened swiftly and on a widespread scale. The company often entered several markets at the same time [see **Exhibit 2**]. In all its overseas markets, Huawei focused on its core carrier business in mobile and fixed broadband networks [see **Exhibit 3**].

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[21] For details, see Huawei's website: http://www.huawei.com/cn/career/social/news/hw-u_274544.htm (accessed Dec 12, 2014)

[22] 第一财经日报（2007年9月30号） "华为之兴" [China Business News (30 September 2007) "The Rise of Huawei" .]

[23] For details, see Huawei's website: huawei.com/en/about-huawei/corporate-info/milestone/index.htm

[24] 经济导刊（2004年9月） "华为出海" http://finance.sina.com.cn/jygl/20040525/1350777334.shtml （于2014年6月23日登陆）。[Economic Herald (September 2004) "Huawei Goes Overseas", http://finance.sina.com.cn/jygl/20040525/1350777334.shtml (accessed 23 June 2014).]

[25] Caijing Magazine (20 September 2004) "Huawei Looks Abroad to Boost Revenues". http://english.caijing.com.cn/2004-09-20/100013874.html (accessed 23 August 2014).

It tested the waters in Hong Kong, an international market near its Shenzhen headquarters, and then moved on to emerging markets in the late 1990s. It entered Russia, India, Africa, and some Southeast Asian countries and secured big contracts including ones with Russia's Megafon and Brazil's Telefonica.[26] During this period Ren also established the company's first global R&D centers in India and Sweden.

One turning point occurred when Huawei's SingleRAN solution technology became widely adopted as the dominant industry design, reducing operator' costs by a claimed 33%.[27] This technology allowed carriers to adopt multiple mobile communications standards on existing platforms, share bandwidth resources, cost-effectively increase bandwidth and upgrade networks without overhauling their original infrastructures.

Following initial success in emerging markets, Huawei forayed into developed European markets beginning in 2001. The European economy was growing more slowly than the emerging markets in Asia and Africa, but demand for network upgrades gave Huawei the opportunity to secure supplier contracts. It first approached smaller European operators by offering below-market prices. Evoxus, a UK-based operator, leveraged Huawei's lower equipment prices to help maintain cost advantage.[28] In France, Huawei offered to test build networks in two cities for NEUF Telecom, thereafter winning its nation-wide transmissions network contract. Huawei finished the project in a shorter than estimated period and saved the company 10% in investment cost.[29] In two years, Huawei doubled its overseas revenue, which at the time contributed 30% of the company total.[30]

In 2004, Huawei secured its first major contract in Europe with Netherland's budget operator Telfort, the smallest Dutch operator and last to upgrade to 3G technology.[31] In the following year, Huawei became an approved global supplier of UK Vodafone and British Telecom. It also landed deals with several German operators including national carrier Deutsche Telekom.[32] Accreditation from these top carriers was a further testament to Huawei's equipment and boosted its reputation in Europe.

In 2005, Huawei's international orders exceeded domestic sales for the first time.[33] Its carrier business also increased to more than 70% of its overall revenue [see **Exhibit 4**]. Its growing visibility and market share solidified the company's position as an all-round equipment and service provider. The company's name recognition jumped 50% between 2003 and 2005, surpassing even some incumbent vendors in perceived market leadership,[34] and was considered to rank with Cisco, Siemens and Alcatel. With Huawei's rapid expansion, its revenue grew a minimum of 40% each year between 2004 and 2008 [see **Exhibit 5**]. It came in fifth globally in the comprehensive equipment retailer market, trailing only such long-standing players as Cisco Systems and Ericsson.

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[26] Huawei (18 October 2002) "Brazil Telefonica Chooses Huawei's Routers", http://pr.huawei.com/en/news/hw-088155-news.htm#.VJEZcMnubEc (accessed 25 July 2014).

[27] Sen, S. (27 October 2013) "Chindian Cheer", *Business Today*, http://businesstoday.intoday.in/story/huawei-bangalore-centre-key-role-focus-functioning/1/199114.html (accessed 12 September 2014).

[28] 吴建国，龚美庆（2006）华为的世界·中信出版社：北京。[Wu, J. and Ji, Y. (2006) Huawei's World, China CITIC Press: Beijing, p 8.]

[29] Ibid., p 9.

[30] 经济导刊（2004年9月） "华为出海" http://finance.sina.com.cn/jygl/20040525/1350777334.shtml （于2014年6月23日登陆）。[Economic Herald (September 2004) "Huawei Goes Overseas", http://finance.sina.com.cn/jygl/20040525/1350777334.shtml (accessed 23 June 2014).]

[31] China Daily (10 December 2004) "Huawei Pushes into Europe with 3G Deal", http://www.chinadaily.com.cn/english/doc/2004-12/10/content_398997.htm (accessed 10 November 2014).

[32] Heavy Reading "Huawei Lands Deutsche Deal" http://www.heavyreading.com/document.asp?doc_id=69983 (accessed 23 July 2014).

[33] For details, see Huawei's website.

[34] Heavy Reading. (2005) Wireline Telecom Equipment Market Perception Study.

Its early start on 4G research allowed Huawei to launch some of the world's first commercial LTE networks in highly developed mobile markets, including Norway, Germany, Austria and Japan. In 2009, along with Ericsson, it delivered the world's first LTE/EPC commercial network for TeliaSonera in Oslo. It also supplied equipment to Japan's SoftBank Mobile, the world's largest LTE-TDD network, whose core networks were supplied by competitors Alcatel-Lucent and Ericsson.[35]

Entry Strategy: "Glocalization"

> *We believe globalization is not just about the globalization of operations and investment. It is more about building a new business mentality; we need to treat the global markets as a single one. We need to build a global value chain just like what we do in an individual market and integrate best resources into the global value chain. This way, value created at any one point along the global value chain can be shared globally.*
>
> - Ken Hu, Deputy Chairman of Huawei Technologies[36]

Huawei's value chain was global. Its "glocalization" strategy was based on the core idea of feeding its value chain with global resources while building on local resources and needs. This was a three-prong strategy that stressed customer-centric innovation, a localized operation and a commitment to long-term local partnerships.

With its Asia-based factories and research development centers in technology hubs around the world, Huawei produced upmarket equipment at a lower cost than competitors from developed markets. Its China-based research costs were also significantly lower than its European counterparts': a Chinese R&D employee who worked on average 2,750 hours a year costs US$25,000 while a European R&D employee who worked half those hours costs US$120,000.[37] Huawei ran 16 R&D centers, 28 joint innovation centers and 45 training centers worldwide [see **Exhibit 6**]. The company adopted a "distributed innovation strategy" where each global R&D facility was assigned an innovation focus. Its Stockholm facility, one of its first global R&D centers, was built to design 3G systems. Its Indian facility launched many cutting-edge technologies, including SingleRAN.[38] These centers were located close to customers, and in "locations that offered an existing ecosystem, a collection of skilled talent and existing linkages with universities and research institutes and infrastructure."[39]

Customer-centric innovation, in Huawei's case, was often born out of the cost pressures faced in emerging markets. For some products, this required stripping off seemingly standard features, and sometimes presented opportunities for reverse innovation, with products later adopted in more advanced markets. For example, a site-sharing solution that tackled low utilization of wireless base stations in India was later deployed by European telecom operators.[40]

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[35] Bloomberg (30 September 2011) "Softbank's 4G Network Draws from Huawei, ZTE, Alcatel, Ericsson" http://www.bloomberg.com/news/2011-09-30/softbank-s-4g-network-draws-from-huawei-zte-alcatel-ericsson.html (23 September 2014).

[36] Huawei (16 May 2014) "Huawei Builds a Global Value Chain by Integrating Globalization and Localization" http://pr.huawei.com/en/news/hw-336749-globalizationlocalization.htm#.VKTvBtKUdmo (accessed 12 July 2014).

[37] 吴建国，龚勇庆（2006）华为的世界，中信出版社：北京。[Wu, J. and Ji, Y. (2006) Huawei's World, China CITIC Press: Beijing, p237.]

[38] Sen, S. (27 October 2013) "Chindian Cheer", *Business Today*, http://businesstoday.intoday.in/story/huawei-bangalore-centre-key-role-focus-functioning/1/199114.html (accessed 11 November 2014).

[39] Huawei (11 September 2013) "Huawei Reaffirms Commitment to Europe and European R&D Investment", http://www.huawei.eu/press-release/huawei-reaffirms-commitment-europe-and-european-rd-investment (accessed Dec 12, 2014).

[40] Huawei (25 October 2011) "Huawei's Strategy for Emerging Markets", http://pr.huawei.com/en/news/hw-103993-nikkeiglobalmanagementforum-kenhu-emergingmarket-i.htm (accessed 9 August 2014).

Huawei's hiring policies were also part of its immersive process of becoming part of local telecommunications industries. About 70% of its overseas employees were local hires.[41] Building local partnerships was a major part of its "glocalization" incentive and Huawei believed that sharing resources with local partners would bring about business sustainability by showing new markets that it was an innovation-driven company. This resulted in its 28 joint-innovation centers with 14 global telecom operators, each with a research focus in fixed or mobile technologies.

Huawei's Suppliers

Suppliers acquired raw materials, design prototypes and produce specific parts for equipment makers. Some components were harder to source than others and left vendors with few or even only one supplier to choose from. Finding an alternative supplier to redesign certain components also took time and money. Other components were more standardized and easier to obtain. Huawei also produced some of its semiconductor components in-house via its Chinese subsidiary HiSilicon.

Being a dominant player in China, Huawei was nicknamed the "black widow spider" because it abandoned or acquired domestic suppliers a few years into the relationship. Many of its Chinese suppliers were smaller companies that depended heavily on Huawei as a major revenue source. Tat Fook Technology was one such domestic supplier that generated more than half of its revenues from Huawei.[42] Many of Huawei's suppliers suffered from narrowing profit margins due to fierce competition brought about by procurement procedures that it and ZTE Corporation enforced. Once a year, Huawei invited suppliers to submit tenders in an open bidding process; the process encouraged suppliers to outbid each other by pushing prices down.

Globally, Huawei sourced from both big manufacturers and smaller specialist equipment suppliers. Huawei's supply chain included more than 700 suppliers, the majority of which were European and Asian [see **Exhibit 7**]. By volume, about 70% of Huawei's components came from outside China. US suppliers contributed 32%, and European and Taiwanese suppliers accounted for another 32%.[43] In 2012, it entered into US$6 billion worth of contracts with three US suppliers: Qualcomm Inc., Broadcom Corp and Avago Technologies.[44]

In recent years, the Chinese government had grown wary of foreign technology being adopted in local Chinese infrastructure. In an attempt to protect China's technology sector and safeguard national security interests, it was reported to be replacing foreign with local technology in banks, state-owned companies and key government agencies.[45]

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[41] Huawei."Letter from the Chairwoman", http://www.huawei.com/cn/about-huawei/corporate-info/annual-report/2013/letter-from-chairwoman/ (accessed 13 Dec, 2014).

[42]田运昌（2013 年 7 月 26 号）"华为与供应商业绩迥异 大富科技新海宜净利滑坡"，证券日报，http://www.cestock.cn/finance/qiyexinxi/2013-07-26/A1271152.html（于 2014 年 7 月 23 日登陆）。[Tian, Y.C. (26 July 2013) *Securities Daily* http://www.cestock.cn/finance/qiyexinxi/2013-07-26/A1271152.html (accessed 23 July 2014).]

[43] Procurement Leaders (1 August 2013) "Huawei Investing in Australian Supplier Network", http://www.procurementleaders.com/news-archive/news-archive/huawei-investing-in-australian-supplier-network (accessed 23 July 2014).

[44] Reuters (17 February 2012) "Huawei to Buy $6 Bln from Qualcomm, Broadcom, Avago", http://www.reuters.com/article/2012/02/17/huawei-qualcomm-broadcom-avago-idUSL2E8DHBBM20120217 (accessed 23 July 2014).

[45] Bloomberg (18 December 2014) "China is Planning to Purge Foreign Technology and Replace with Homegrown Suppliers", http://www.bloomberg.com/news/2014-12-17/china-said-to-plan-sweeping-shift-from-foreign-technology-to-own.html (accessed 3 January 2015).

Huawei in the United States

Huawei entered the US and European markets at around the same period in the late 1990s. Unlike the warm welcome received in Europe, Huawei's entry into the US market was not smooth sailing. Since establishing its subsidiary Futurewei in Texas in 2002, it sank into a prolonged period of low sales and slow growth. Four years later, in 2006, US revenues totaled only US$51 million[46], contributing less than 1% of its global revenue.

Huawei entered the US market with a low-cost approach. It sold routers and switches in trade shows 30% cheaper than those of largest vendor Cisco Systems, its biggest competitor.[47] One Huawei advertisement's tagline was "The only difference between us and them is price," behind which was San Francisco's Golden Gate Bridge, referring to Cisco Systems' famous logo.[48] Huawei's hostile pricing strategy soon attracted Cisco's attention and laid the foundation for future legal disputes with the US giant.

In January 2003, Cisco filed a lawsuit against Huawei on 21 counts of copyright and other violations with respect to routers and switching products, including operating source code.[49] Though Cisco dropped the suit nine months later, the incident gave Huawei enough bad press to dampen sales. More copyright-related lawsuits followed, including a patent lawsuit filed by handset maker Motorola Inc.

Huawei had already established a solid standing as one of the top 10 players in Europe. Yet in North America, less than 10% of US players were using its products.[50] To open up avenues for US growth, Huawei established a joint venture with 3Com. It also teamed up with small start-up Amerilink Telecom to distribute its equipment and act as its consultant. Having a local partner meant that Huawei could sell its products to clients unfamiliar with its name through 3Com channels. It also continued to make deals with smaller firms, such as a 3G deployment for Cricket Communications in Chicago.

In 2010, Huawei had more than 1,200 employees in the US with seven research and development centers, including a flagship facility in Santa Clara, California, that employed 700 engineers and researchers. It opened another research facility in Bridgewater, New Jersey, a year later to serve as its North American wireless-technology hub.[51] But Huawei continued to face challenges. Its Chinese background raised a red flag among American consumers, especially after the media widely reported that Ren was a former engineer in the People's Liberation Army.

Political Links Impacting Commercial Performance

The US government and American companies became increasingly wary of Huawei's presence in the country, concerned that it might be undertaking espionage activities for the Chinese government. In 2008, the US government blocked Huawei's attempt to purchase

[46] For details, see Huawei's website: http://usahuawei.com/

[47] 吴建国，窦勇庆（2006）华为的世界，中信出版社：北京。[Wu, J. and Ji, Y. (2006) Huawei's World, China CITIC Press: Beijing, p176.]

[48] Multinational Business Review, p. 146

[49] Thurm, Scott. (24 January 2013) "Cisco Sues Huawei of China, Alleging it Violated Patents", *The Wall Street Journal*, http://online.wsj.com/news/articles/SB10433370537326888864 (accessed 27 June 2014).

[50] Light Reading (23 February 2005) "Huawei Gains Ground in HR Survey" http://www.lightreading.com (accessed 13 July 2014).

[51] The Messenger Gazette (29 July 2011) "Huawei Technologies Opens Bridgewater Facility", http://www.nj.com/messenger-gazette/index.ssf/2011/07/huawei_technologies_opens_bridgewater_facility.html (accessed 22 June 2014).

3Com, citing alleged ties to the Chinese military.[52] In 2010 Huawei failed to win contracts from Sprint Nextel in a joint bid with Amerilink, after which cooperation dwindled.

Market opportunities further narrowed when the National Security Agency warned AT&T, a major US carrier, to suspend purchasing equipment from Huawei, given national security concerns. Huawei hired lobbyists and cooperated with local partner firms, but the US government continued to prevent Huawei from gaining a larger share in the US telecommunications market.[53] The company booked only US$1.3 billion in US revenues from in 2011, a minuscule amount compared to its global revenues of US$32.4 billion.[54] That year, Huawei withdrew its acquisition of 3Leaf Systems, following US government advice.[55]

Shortly afterward, Ken Hu, deputy chairman of Huawei's US operations, wrote a lengthy open letter to rebut media accusations.

> *In recent years, misperceptions and rumors have been the shadow of Huawei, affecting Huawei's reputation and, we believe, the United States government's judgment of Huawei.*
>
> - Ken Hu, Deputy Chairman of Huawei Technologies[56]

Soon after this, Huawei changed course in the US to focus on selling less sensitive products such as handsets,[57] and the company was able to gain customers from the low-income sector. Huawei also continued its R&D investment and research partnerships with universities, including Stanford and Princeton. But after more than 10 years of struggle, Huawei stepped back from one of the most lucrative telecommunications equipment markets. Eric Xu, Huawei's executive vice president, said the company was "not interested in the US market anymore."[58]

Entering Canada

In the spring of 2008, when Huawei was still struggling with its US operations, it opened its first Canadian office in Markham, Ontario. The city was located just north of Toronto and home to many technology companies, including Microsoft and IBM. Huawei's vision was to become integrated into Canada's telecommunications ecosystem – to become a Canadian household name, to hire locally and to invest in local infrastructure.

> *We have learned that to be successful we need to have a strong local presence.*
>
> - Sean Yang, President, Huawei Canada[59]

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[52] Weisman, S. (21 February 2008) "Sale of 3Com to Huawei is Derailed by US Security Concerns", *New York Times*, http://www.nytimes.com/2008/02/21/business/worldbusiness/21iht-3com.1.10258216.html?pagewanted=all&_r=0a (accessed 22 June 2014).

[53] Pomfret, J. (8 October 2010) "History of Telecom Company Illustrates Lack of Strategic Trust Between US, China" The *Washington Post*, http://www.washingtonpost.com/wp-dyn/content/article/2010/10/07/AR2010100702210.html (accessed 21 June 2014).

[54] For details, see Huawei's website: http://usahuawei.com/

[55] Reuters (19 February 2011) "Huawei Backs Away from 3Leaf Acquisition", http://www.reuters.com/article/2011/02/19/us-huawei-3leaf-idUSTRE71J38920110219 (accessed 21 June 2014).

[56] For details, see company's website: http://www.huawei.com/ilink/en/about-huawei/newsroom/press-release/HW_092875

[57] Fierce Wireless (9 January 2012) "Huawei Plans CDMA/LTE Phones for US Market in 2012" http://www.fiercewireless.com/ecslive/story/huawei-plans-cdmalte-phones-us-market-2012/2012-01-09 (accessed 19 June 2014).

[58] Hille, K. (24 April 2013) "Huawei 'Not Interested in US Any More' After Repeated Denials for Market Access", *CNN*, http://edition.cnn.com/2013/04/24/business/huawei-not-interested-us/ (accessed 19 June 2014).

[59] 2013 Ontario Economic Summit: The Global Competitive Landscape with Sean Yang. https://www.youtube.com/watch?v=wP9D5_kDj5w

Canada's Telecommunications Industry

Canada's telecommunications service industry market was worth C$44.8 billion as of 2013, but the majority of its revenues were generated by retail service providers, with equipment vendors only contributing 8% [see **Exhibit 8**].[60] Canada's retail sector was small, contributing only 3% to the global, and 10% to the North American markets [see **Exhibit 9**].[61] The country's fixed broadband penetration, an indicator of market saturation, was comparable to other advanced markets but mobile broadband subscription was lower than its counterparts' [see **Exhibit 10**]. Despite the increasing uptake of smartphones, no more than 39% of mobile revenues in 2011 were generated from voice-only subscriptions.[62]

In line with most advanced markets, the country's overall industry had been marked by declining sales in the fixed-line sector and higher growth in the wireless sector, and industry growth was largely dictated by periods of network upgrade [see **Exhibit 11 and 12**]. The government was also trying to increase competition by introducing a fourth national carrier, in the hope of lowering user costs and increasing mobile penetration.[63] Canada's sound economic condition [see **Exhibit 13**] during this period ensured a moderate level of industry growth. But its small population of 34 million, spread over a vast land area, made coverage less available in remote regions such as the Yukon, Manitoba and the Northwest Territories.[64]

Canada's Telecom Service Operators

Canada had three national carriers and nine smaller regional providers. Rogers, the largest carrier, held about one-third of the market with more than 9.5 million subscribers. Telus and Bell, both with subscribers nearing 8 million, vied for the second and third spots [see **Exhibit 14**].[65] The top five service providers accounted for 85% of the market.[66] Given Canada's vast area, market share also differed across the country's 10 provinces and three territories.

Canadian operators began upgrading to interim-4G technology in 2009, and to 4G LTE in 2011. Rogers launched the country's first 3G and 4G networks, generally a few months ahead of Telus and Bell. Rogers's deal with Apple Inc. for exclusive iPhone release until 2009 also helped drive subscriber growth. To reduce infrastructure spending and expedite the launch of next-generation networks, Telus and Bell agreed to co-build and share both an interim 4G (HSPA) and final 4G LTE networks. The two split the C$1 billion construction cost and used Huawei and Nokia Siemens Networks as their main suppliers.[67] It was common for carriers to work with several suppliers for different types of equipment [see **Exhibit 15**]. Since partnering, Bell and Telus had been gaining market share from Rogers. Telus had also been growing its subscribers much faster than the other two based on its services' merits.

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[60] Canada Radio-Television and Telecommunications Commission. Communications Monitoring report 2014

[61] Canada Radio-Television and Telecommunications Commission. Communications Monitoring report 2012 http://www.crtc.gc.ca/eng/publications/reports/PolicyMonitoring/2012/cmr6.htm#n1 (accessed 20 December 2014).

[62] Ibid.

[63] Dobby, C. (15 May 2014) "A Fourth National Wireless Carrier Could Give the Canadian Economy $1Bln Boost Annually, Watchdog Says", *Financial Post*, http://business.financialpost.com/2014/05/15/big-telcos-grip-on-wholesale-wireless-roaming-rates-should-be-loosened-competition-watchdog-says/?__lsa=94c9-536a (accessed 9 August 2014).

[64] For details, see Huawei's website: http://www.huawei.com/en/about-huawei/publications/communicate/hw-082751.htm (accessed 9 August 2014).

[65] CBC News (14 February 2014) "Telus Overtakes Bell as 2nd-Largest Wireless Provider" http://www.cbc.ca/news/business/telus-overtakes-bell-as-2nd-largest-wireless-provider-1.2537335 (accessed 11 August 2014).

[66] Canada Radio-Television and Telecommunications Commission. Communications Monitoring report 2014 http://www.crtc.gc.ca/eng/publications/reports/PolicyMonitoring/2014/cmr5.htm#s5 (accessed 10 January 2015).

[67] Avery, S. (5 October 2009) "Bell, Telus Confirm iPhone Launches" http://www.theglobeandmail.com/technology/bell-telus-confirm-iphone-launches/article4295007/ (accessed 5 January 2015).

Competition in Canada

Huawei's Canadian strategy was in line with its global one: it emphasized its network equipment and service businesses, with a growing focus on service solutions targeting enterprises, as well as its retail business in low- to medium-end mobile phones and tablets. Its two biggest competitors, Ericsson and Nokia Siemens Networks, had a similar profile of being heavily involved with carriers [see **Exhibits 16 and 17**], except that they both had divested their enterprise solutions and handset businesses to focus on the carrier segment. Ericsson was the largest player in the fourth-generation network (LTE) market, with a 35% market share in mobile network equipment.[68] Second-place Nokia Siemens Network, based in Finland, held about 20% of the LTE global market share.[69]

Ericsson had a long-time presence in the region with more than 3,400 employees in Canada. It deployed 4G networks for five of the seven top operators in North America: Verizon, AT&T, Sprint and T-Mobile in the US; and Rogers in Canada.[70] Globally, Ericsson's 10 largest customers accounted for 46% of its net sales. Like Huawei, it also had a research focus on next-generation and cloud-based technology. But the company continued to face greater pressure to cut costs and improve efficiency, as its profits were being dragged down by an unprofitable chip-making subsidiary and sluggish sales growth due to tighter competition.[71] It also planned to increase the revenue contribution from managed services, as that segment was proving more profitable than network rollouts and hardware equipment sales. In fact, its operating margins from network rollouts had been negative in 2011 and 2012 due to high supplier costs.[72]

Nokia Siemens Networks had narrowed its business even further than Huawei and Ericsson to focus solely on mobile broadband. Unlike Huawei and Ericsson, a higher percentage of its revenue was generated from services than equipment sales. Its clients included eight of North America's biggest operators and it also had greater exposure in advanced high-margin markets such as Japan and South Korea, as well as the US. It had strong high-margin software sales and avoided lower-margin services such as field maintenance.[73] Nokia Siemens had 4,000 suppliers globally.

Huawei came in second in the global wireless network equipment market with a 22% share, slightly more than Nokia Siemens Networks' 18%.[74] In 2013, Huawei continued its strong performance and won 40% of all contracts awarded globally, surpassing Ericsson's 34%.[75] By the end of 2013, it had deployed more than 500 wireless networks globally, serving 45 of the world's 50 largest operators. In recognition of its rising industry standing, Huawei was also elected into international industry bodies, including the 3rd Generation Partnership Program, the principal association for the advancement of next-generation mobile technology, and the European Telecommunications Standards Institute.

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[68] Ericsson (2012) "Annual Report".

[69] Nokia Siemens Networks (2012) "Annual Report".

[70] Soper, M. and Antlitz, Chris. (22 March 2013) "Ericsson Leads the LTE Marke by a Wide Margin", *Fierce Wireless*, http://www.fiercewireless.com/press-releases/ericsson-leads-lte-market-wide-margin-rivals-huawei-zte-and-samsung-will-ga (accessed 16 December 2014).

[71] Ericsson (2012) "Annual Report"; Ewing, A. (24 October 2013) "Ericsson Profit Margin Falls Short as Rivals Weigh on Sales", *Bloomberg*, http://www.bloomberg.com/news/2013-10-24/ericsson-profit-misses-estimates-as-competition-weighs-on-sales.html (accessed 27 December 2014).

[72] Ericsson (2012) "Annual Report", p.37.

[73] Nokia Siemens Networks (2012) "Annual Report".

[74] Carew, S. (10 September 2012) "Nokia Siemens Eyes Huawei's No.2 Market Position for 2013", *Reuters*, http://www.reuters.com/article/2012/09/10/us-nokia-siemens-executive-idUSBRE88917S20120910 (accessed 28 December 2014).

[75] Informa (14 August 2013). "Huawei and Ericsson Dominate LTE Contracts as Deployments Accelerate". http://www.informa.com/Media-centre/Press-releases--news/Latest-News/Informa-Telecoms-and-Media-Huawei-and-Ericsson-dominate-LTE-contracts-as-deployments-accelerate/ (accessed 24 December 2014).

Huawei's' Business in Canada

Huawei's prime focus in Canada was the carrier segment. Aside from equipment sales, it tailored carrier infrastructure to meet specific business needs. Its line of carrier service solutions was designed around four objectives: to achieve higher average per-customer revenue, to broaden bandwidth, to lower costs and to enhance operational efficiency.

Huawei leveraged its global leadership position and low-cost proposition to secure major contracts with some of the biggest industry players [see **Exhibit 18**]. It provided equipment to Telus's LTE network and launched wireless networks for regional carriers such as Saskatchewan Telecommunications. Geographically, it started in the west Canada region and later spread to the central and eastern provinces. It also reached beyond urban communities to build rural networks for smaller carriers like Ice Wireless and Iristel in remote Northwest Canadian communities.[76] Huawei also sold handsets via local distributors, including Wind Mobile, Bell Mobility and Virgin Mobile. It tapped into the enterprise solutions business with domestic distributor Capella Telecommunications, which sold videoconferencing equipment for the company.

In April 2010, Huawei launched an Ottawa research and development facility, making a five-year commitment to invest C$67 million in research. This facility was expected to spearhead Huawei's global research into 5G, the next-generation mobile technology that will replace 4G in 2020.[77] That same year, Huawei opened a new head office in Markham, Ontario, with 250 employees in a 46,000 square foot facility. Huawei then teamed up with Carleton University and carrier Telus in a C$1.4 million-investment in cloud computing technology. It also launched joint innovation centers with Telus and Bell to develop broadband wireless solutions and core network products. This continued investment reflected Huawei's belief in the core strength of Canada as an innovative technology hub.

The Ottawa city government welcomed Huawei's expansion. The city was already home to technology companies, start-ups, venture capital firms and research institutions, and had been competing for the title of "Silicon Valley North" with other Canadian cities. Following Huawei's research commitment in the city, the city government tendered it a C$6.5 million grant from its Strategic Jobs Investment Fund. The government continued its show of support for Huawei, including a visit from Mayor Larry O'Brien to Huawei's headquarters in Shenzhen, and Prime Minister Stephen Harper's attendance at an LTE signing ceremony with Telus and Bell Mobility.[78]

> *Huawei is a remarkable telecommunications success story that will be able to leverage Ottawa's R&D talent globally. Huawei is a welcomed new member of Ottawa's knowledge-based economy.*
>
> - Larry O'Brian, Ottawa Mayor[79]

Huawei hired large numbers of skilled immigrants with past experience of working with Huawei technologies in other countries. In its Markham facility alone, 60% of its employees

[76] For details, see Huawei's website.

[77] The Globe and Mail (13 November 2013) "Huawei to Boost Canadian Investment as New Wireless Technology Looms", http://www.theglobeandmail.com/report-on-business/huawei-to-boost-canadian-investment-as-new-wireless- (accessed 26 July 2014).

[78] Light Reading (9 February 2012) "Huawei Wins LTE Deals at Bell & Telus" http://www.lightreading.com/ethernet-ip/huawei-wins-lte-deals-at-bell-and-telus/d/d-id/693436

[79] Huawei (20 April 2010) "Huawei Deepens Commitment in North America", http://www.huawei.com/ilink/en/about-huawei/newsroom/press-release/HW_071871?KeyTemps=Canada%20R&D%20Centre%20opening (accessed 22 July 2014).

were immigrants from more than 35 countries.[80] Many of them brought hands-on experience with Huawei's products in other Huawei facilities. New immigrants also had the added advantage of a lower turnover rate, which Huawei was able to maintain at 3% in its Canadian operations.

Cyber-security Concerns

> *We've worked hard to build a Canadian organization ... We look forward to continuing to grow Huawei Canada as an integral partner in Canada's ICT ecosystem.*
>
> - Sean Yang, President, Huawei Canada[81]

On October 8, 2012, part of Huawei's vision was dashed when the House Committee on Intelligence of the US Congress released a report concluding that Huawei posed a national security threat to the US, due to its ability to spy on and participate in espionage activities through telecommunications equipment provided to US companies or governments. The Committee advised the US government and private companies to exclude Huawei's equipment from its systems and infrastructure, and blocked the company from acquiring local telecom companies.[82] The release of this report not only presented a blow to Huawei's US business, but alerted other governments to be wary of procuring telecommunications from Huawei. The Australian government later banned Huawei from bidding on its national broadband network, and the Indian and UK governments both said they would review Huawei for potential cyber-spying threats.[83] India had previously barred domestic carriers from buying telecom equipment made by Chinese companies for security reasons.

Yang found those accusations unfair, and even called them a "perception of the Cold War" at one point. He denied the accusations and said the company had no reason to jeopardize its business by engaging in spying activities.[84] He stressed that Huawei was incorporated in Canada and would therefore follow local laws and regulations.

Reaction from the Canadian government was not as strong as in the US. The Harper government nonetheless invoked a national security exception in the construction of a government communications network, allowing it to discriminate against companies deemed risky to Canada's security system.[85] Prime Minister Harper did not openly point to Huawei as a risk but mentioned that there was a national security dimension to its relationship with China.[86] Despite not causing immediate business losses in Canada, the report resulted in some negative press for Huawei in the country and could have marred Huawei's potential to make future deals.

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[80] Toronto Region Immigrant Employment Council, "Huawei Canada – 2011 RBC Immigrant Advantage Award" http://triec.ca/how-we-make-change/is-awards/winners/huawei-canada-%E2%80%93-2011-rbc-immigrant-advantage-award/

[81] Huawei (27 November 2012) "Huawei Canada Wins Gold at the Business Excellence Awards", http://www.huawei.com/ca-en/about-huawei/newsroom/press-release/hw-197864-canada.htm (accessed 19 June 2014).

[82] US House of Representatives. Permanent Select Committee on Intelligence. "Investigative Report on the US National Security Issues Posed by Chinese Telecommunications Companies Huawei and ZTE", https://intelligence.house.gov/ (accessed 22 June 2014).

[83] Gairola, M (28 March 2012) "After Going Down Under, Huawei Under Lens in India", *Hindustan Times*, http://www.hindustantimes.com/business-news/sectorsinfotech/after-going-down-under-huawei-under-lens-in-india/article1-832254.aspx (accessed 14 July 2014).

[84] Marlow, I. (4 January 2013) "Huawei Canada's Sean Yang: Dismissing Suspicion over Dim Sum", *The Globe and Mail*, http://www.theglobeandmail.com/report-on-business/careers/careers-leadership/huawei-canadas-sean-yang-dismissing-suspicion-over-dim-sum/article6957873/?page=all (3 August 2014).

[85] Reuters (9 October 2012) "Huawei Faces Exclusion from Planned Canada Government Network", http://uk.reuters.com/article/2012/10/09/usa-china-huawei-canada-idUKL1E8L9J6020121009 (accessed 11 August 2014).

[86] Murphy, J. (12 October 2012) "Huawei Concerns Being Monitored: PM", *Toronto Sun*, http://www.torontosun.com/2012/10/12/huawei-concerns-being-monitored-pm (accessed 11 August 2014).

> *It's been a tough month for us here in Canada. ... The report from the U.S. Congress has not been helpful, and for many Canadians who've never heard of our company before, we've got significant work to do to build trust. We understand this. Building this trust is not going to happen overnight.*
>
> - Sean Yang, President, Huawei Canada[87]

The following year, the company ramped up investments in 5G research in its Ottawa facility and opened an office in Regina, Saskatchewan, in central Canada. In November 2014, Huawei announced a plan to invest CS500 million in the Ottawa region and create 325 new jobs in the next five years. This included C$210 million worth of investments in new research initiatives focusing on 5G, cloud technology and enterprise mobility as well as a doubling of its Ontario R&D staff to 500 employees.[88] In January 2015, Huawei began hiring a research director for mobile security in Kitchener, Ontario, a city west of Toronto that, together with nearby cities Waterloo and Cambridge, forms "Canada's Technology Triangle." Many companies drew on resources from the University of Waterloo's research and technology park located there. Canadian cell-phone maker BlackBerry was also headquartered in the area.

Amidst increasing government scrutiny and negative press, Yang had to decide how Huawei could continue to build trust and retain its investment, revenue growth and market position in Canada. He pondered what Huawei could do to reaffirm its commitment. To what extent was the external perception of Huawei as a Chinese company affecting Huawei and how could Huawei fix that? As Huawei plans to stay in Canada for the long term, rapid resolution of these issues was pressing, and formulating strategic moves for sustainability was critical.

[87] Trichur, R. (30 October 2012) "Huawei Aims to 'Build Trust' in Canada", *The Globe and Mail*, http://www.theglobeandmail.com/report-on-business/huawei-aims-to-build-trust-in-canada/article4762723/ (accessed 9 August 2014).

[88] PR Newswire (1 November 2014) "Huawei to Invest $500 Million into Ontario over Next 5 Years" http://www.prnewswire.com/news-releases/huawei-to-invest-500-million-into-ontario-over-next-5-years-281153232.html

EXHIBIT 1: TOP TELECOM EQUIPMENT PROVIDERS IN 2012

Company	Country of Origin	Revenue (2012) USD in Mln	Business Focus
Ericsson	Sweden	34,964	Carrier
Huawei Technologies	China	35,353	Carrier
Alcatel-Lucent	France	19,095	Carrier
Cisco Systems	United States	46,061	Enterprise
ZTE	China	13,522	Carrier
Nokia Siemens Networks	Finland	17,675	Carrier
Ciena	United States	1,834	Enterprise
Avaya	United States	5,171	Enterprise
Brocade	United States	2,237	Enterprise
Juniper Networks	United States	4,365	Enterprise

Sources: Ericsson (2012) "Annual Report"; Huawei Technolgoies (2012) "Annual Report"; Alcatel Lucent (2012) "Annual Report"; Cisco Systems (2012) "Annual Report"; ZTE (2012) "Annual Report"; Nokia Siemens Networks (2012) "Annual Report"; Ciena (2012) "Annual Report"; Avaya (2012) "Annual Report"; Brocade (2012) "Annual Report"; HP (2012) "Annual Report"; Juniper Networks (2012) "Annual Report"; 1US$ = SEK 6.51 on 28 December 2012; 1US$ = € 0.76 on 28 December 2012; 1US$ = Rmb 6.23 on 31 December 2012.

EXHIBIT 2: HUAWEI'S CORPORATE HISTORY

1987 Founded in Shenzhen, China, as a retail agent for a Hong Kong-based manufacturer selling Private Branch Exchange (PBX) telephone switches.

1990 Developed PBX technologies for small enterprises and hotels.

1992 Developed digital switching solutions for rural communities.

1995 Revenue reached Rmb 1.5 billion, mostly generated from rural communities.

1997 Launched GSM wireless solutions.

1998 Expanded into metropolitan areas within China.

1999 Establish R&D center in Bangalore, India

2000 Establish R&D center in Stockholm, Sweden.

Overseas revenue reached US$100 million.

2001 Divested non-core subsidiary Avansys to Emerson for US$750 million.

Established four research centers in the US.

Joined the International Telecommunication Union.

2003 Established joint venture, H3C, with 3Com focusing on enterprise network solutions.

2004 Established joint venture with Siemens to develop TD-SCDMA solutions.

Won a US$25 million contract from Dutch operator Telfort, its first major contract in Europe.

2005 Overseas revenue exceeded domestic revenue.

Selected as a preferred telecoms equipment supplier and signed Global Framework Agreement with UK operator Vodafone.

Selected as a preferred supplier by British Telecom to provide multi-service network access components and optical transmission equipment for its £10 billion network upgrade program.

2006 Sold 49% of shares in joint venture with 3Com for US$880 million.

Established joint research center with Motorola to develop UMTS technologies.

2007 Established joint venture with Symantec to develop storage and security appliances.

Established joint venture with Global Marine to provide end-to-end submarine and network solutions

Became a partner to all the top operators in Europe.

2008 Ranked third in worldwide market share in mobile network equipment.

First large-scale deployment of UMTS/HSPA in North America for Telus and Bell Canada.

Largest applicant for patents under the World Intellectual Property Organization. Accounted for 10% LTE patents worldwide.

2009 Ranked second in global market share of radio access equipment.

Delivered the world's first LTE/EPC commercial network for Telia Sonera in Oslo, Norway.

Launched the world's first end-to-end 100G solution from routers to transmission system.

2010 More than 80 SingleRAN networks deployed, of which 28 were LTE/EPC networks.

Established Cyber Security Evaluation Center in the UK.

2011 Shipped approximately 20 million smartphones globally.

Launched GigaSite solution and U2Net, both service solutions to help operators improve network capacity.

2012 Unveiled the industry's first 400G DWDM optical transport system.

Established a R&D center in Finland.

2013 LTE solutions deployed in more than 100 capital cities and nine financial centers.

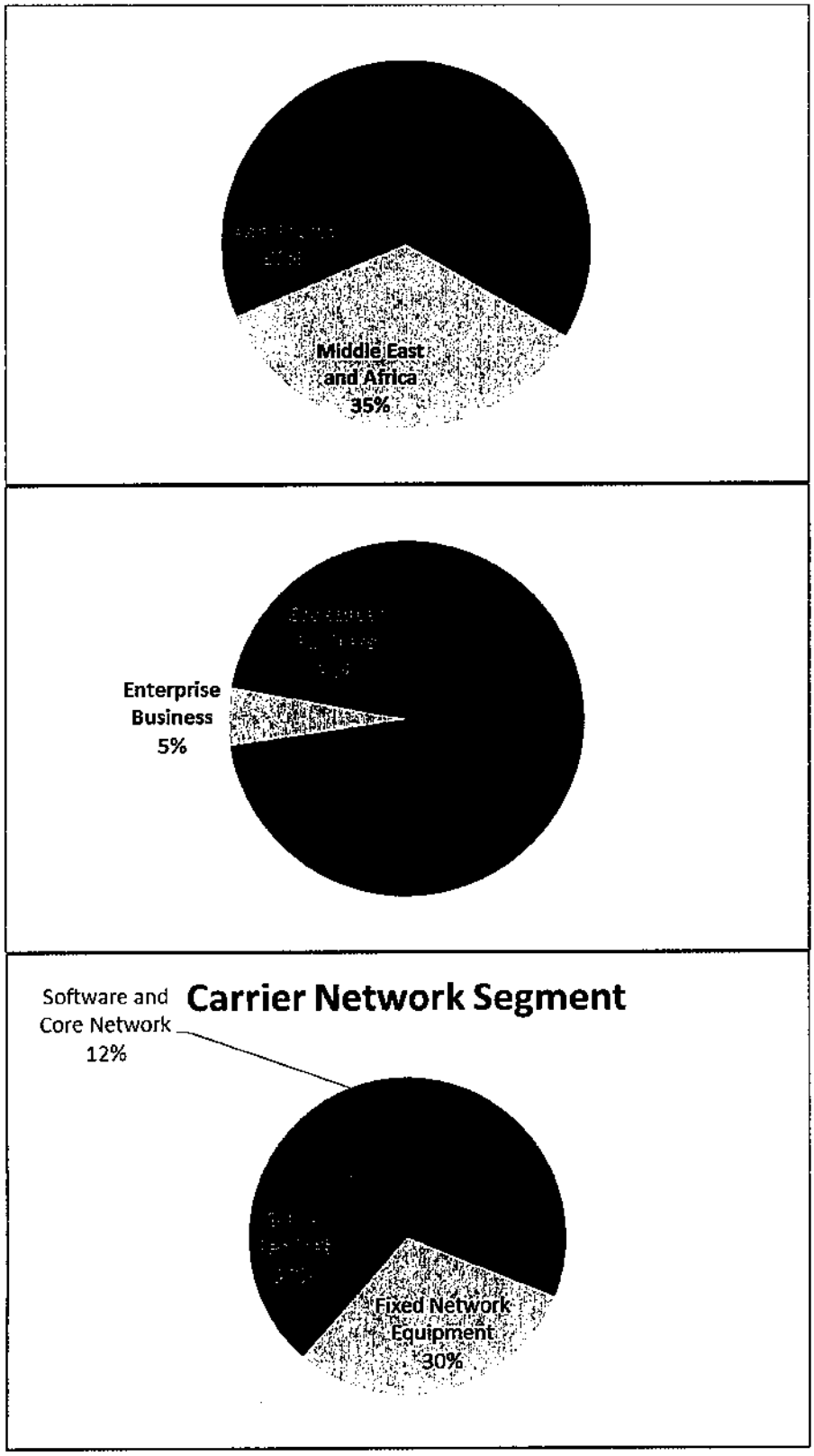
Source: For details, see Huawei's website: http://huawei.com/en/about-huawei/corporate-info/milestone/index.htm.

EXHIBIT 3: HUAWEI'S PRODUCT AND SERVICE OFFERINGS

For Telecom Operators		For Enterprises	
Solutions	**Products**	**Solutions**	**Products**
ARPU Up	Radio Access	Networking & Security	Networking
Broader +Smarter	Fixed Access	Cloud Computing & Data Centers	UC&C
Costs Down	Network Energy	UC&C	Cloud Computing & Data Centers
Go Greener	Transport Network	eLTE Broadband	Management & Tools
	Data Communication	Trunking	Wireless
	Application and Software	BYOD Solutions	
	Server		
	Storage		
	OSS		

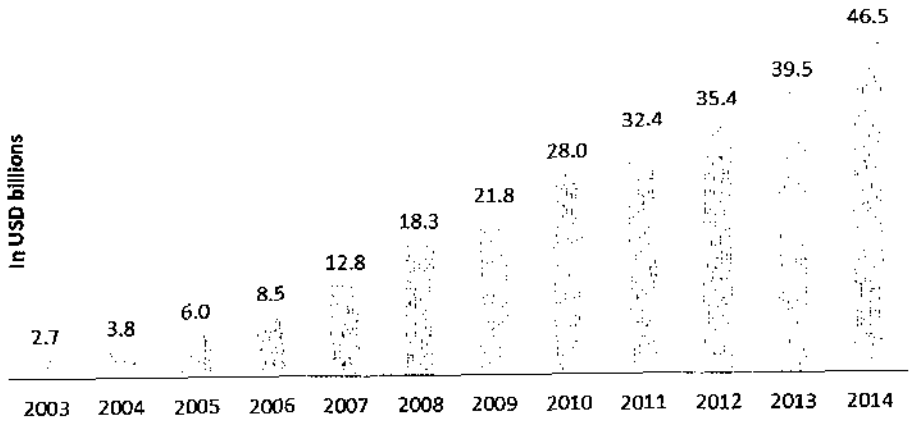
Source: For details, see Huawei's website.

EXHIBIT 4: 2012 HUAWEI'S 2012 REVENUE BREAKDOWN BY SEGMENT AND REGION



Source: Huawei (2012) "Annual Report".

EXHIBIT 5: HUAWEI'S REVENUE (2003-2014)



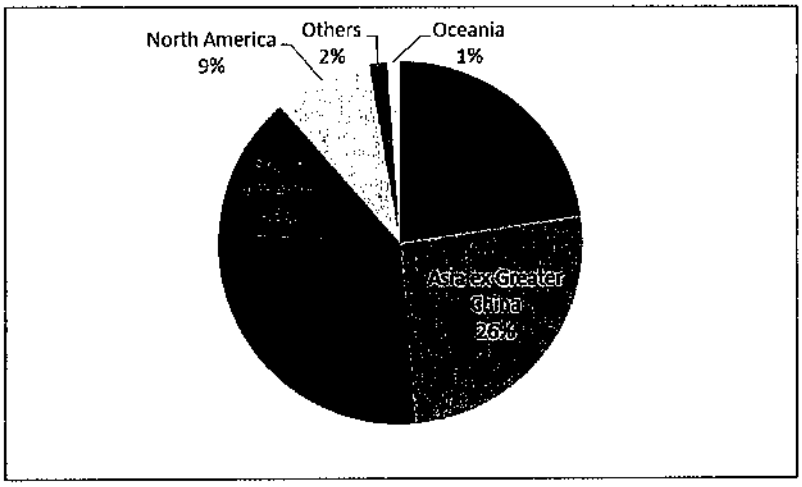
Sources: Huawei. (2007 to 2014) "Annual Report."

EXHIBIT 6: HUAWEI GLOBAL RESEARCH CENTERS

Country	Technology Focus
Sweden	Microwave technology, base station, mobile system design, algorithm/IRF design, chipset design, terminal chipset design
United Kingdom	Optoelectronics, chip technology
Ireland	OSS
Germany	Renewable energy, mobile broadband solution, antenna, software platform, optical, future network research
Belgium	Carrier software, application software architecture
France	Standards, media chip design
Finland	Mobile devices, terminal operating system
Italy	Microwave technology, optoelectronics
Canada	Next-generation mobile, cloud technology
United States	Next-generation communications solutions
China	R&D headquarters
India	Next generation networks, intelligent networks, data communication

Source: For details, see Huawei's website: Huawei.com.

EXHIBIT 7: HUAWEI'S GLOBAL SUPPLIER DISTRIBUTION



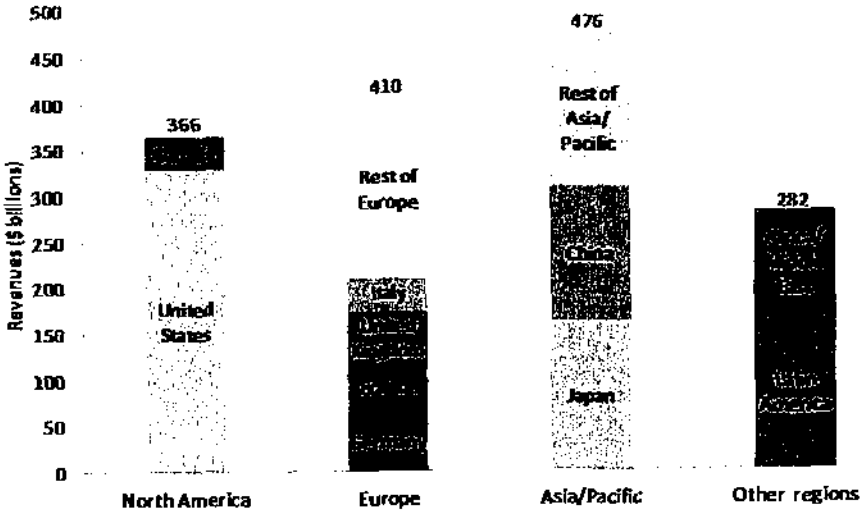
Source: Huawei (2012) "Annual Report".

EXHIBIT 8: CANADA'S TELECOMMUNICATIONS INDUSTRY

In C$ billion	2009	2010	2011	2012	2013	CAGR 2009-2013
Retail total	37.3	38.1	39	40.2	41.1	
Annual growth	*2.2%*	*2.1%*	*2.5%*	*3.0%*	*2.3%*	2.5%
Wholesale total	3.6	3.5	3.7	3.7	3.7	
Annual growth	*1.3%*	*-2.2%*	*5.5%*	*0.5%*	*-1.0%*	0.7%
Industry Total	40.9	41.6	42.8	43.9	44.8	2.3%

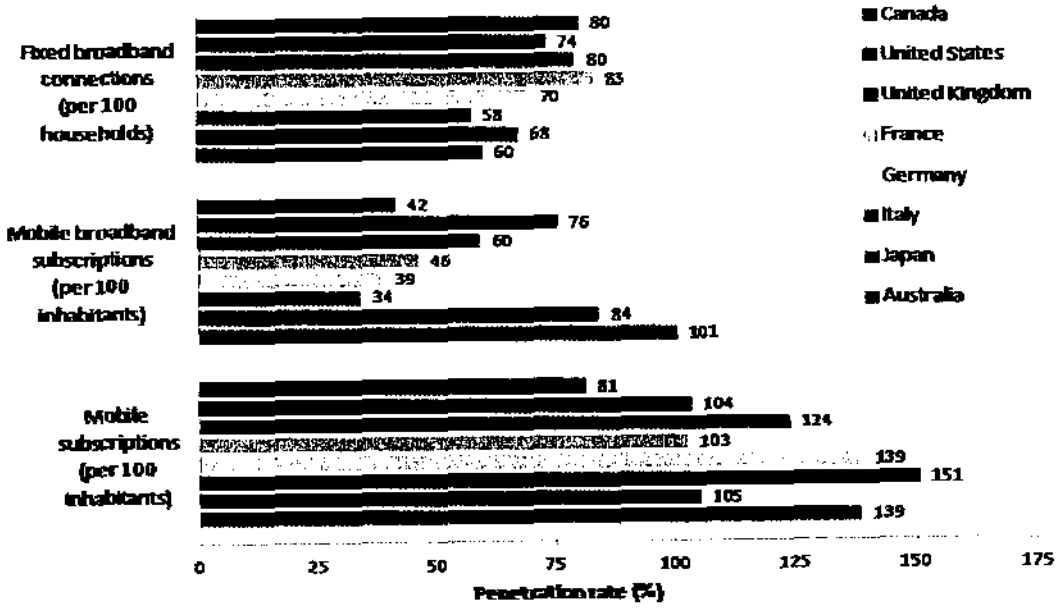
Source: Canada Radio-television and Telecommunications Division. "Communications Monitoring Report 2014: Telecommunications Sector", http://www.crtc.gc.ca/eng/publications/reports/PolicyMonitoring/2014/cmr5.htm#s5.

EXHIBIT 9: GLOBAL TELECOMMUNICATIONS RETAIL REVENUES 2012 BY REGION



Source: Canada Radio-Television and Telecommunications Commission. "Communications Monitoring report 2013: International Perspective", http://www.crtc.gc.ca/eng/publications/reports/policymonitoring/2013/cmr7.htm#n1.

EXHIBIT 10: GLOBAL BROADBAND MOBILE SERVICE PENETRATION 2012



Source: Canada Radio-Television and Telecommunications Commission. "Communications Monitoring report 2013: International Perspective", http://www.crtc.gc.ca/eng/publications/reports/policymonitoring/2013/cmr7.htm#n1.

EXHIBIT 11: CANADA'S TELECOMMUNICATIONS WHOLESALE MARKET BY SEGMENT

		2013 (C$ mln)	CAGR (2009-2013)
Wireline	Voice	1,137	-8.2
	Data/Internet	1,615	2.5
Wireless Mobile		953	15
Total		3,706	0.7

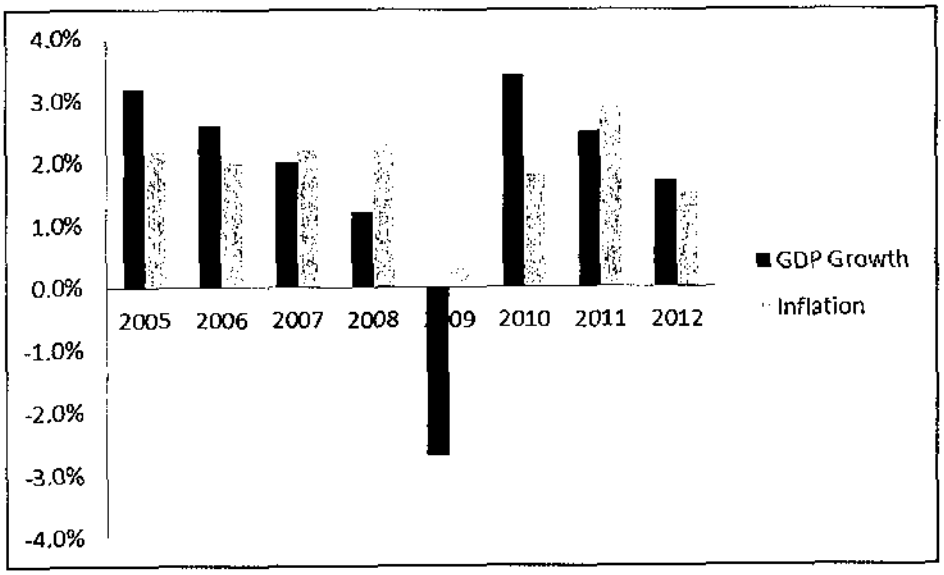
Source: Canada Radio-television and Telecommunications Division. "Communications Monitoring Report 2014: Telecommunications Sector", http://www.crtc.gc.ca/eng/publications/reports/PolicyMonitoring/2014/cmr5.htm#s5.

EXHIBIT 12: CAPITAL EXPENDITURE BY TELECOM SERVICE PROVIDERS

	2009	2010	2011	2012	2013	CAGR 2009-2013
Wireline Total(C$ bln)	4.2	4.4	4.6	4.7	4.9	
Annual Growth	-1.4%	5.1%	5.4%	2.0%	4.2%	4.2%
Wireless Total(C$ bln)	2.2	1.8	2.5	2.6	2.3	
Annual Growth	-63.0%	-18.9%	35.2%	4.9%	-11.4%	0.5%

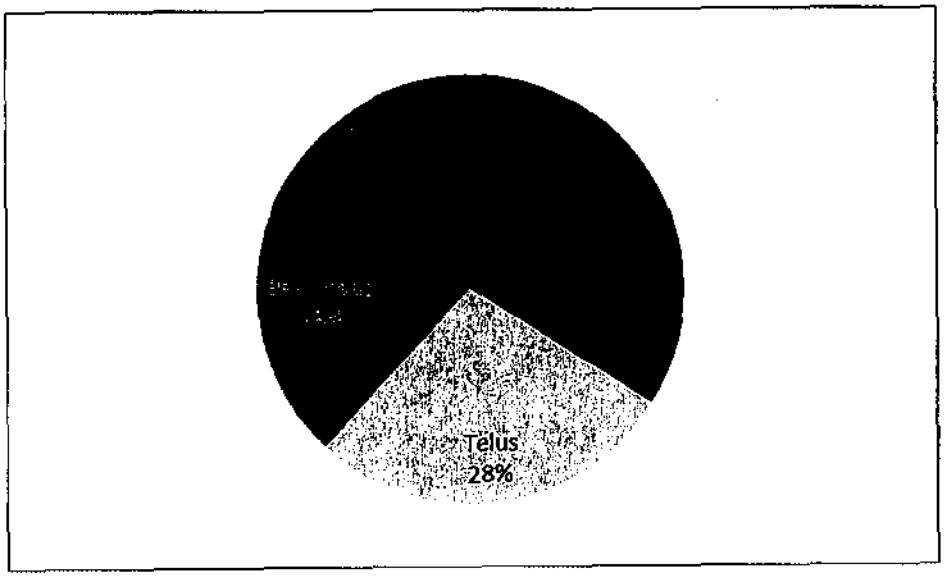
Source: Canada Radio-television and Telecommunications Division. "Communications Monitoring Report 2014: Telecommunications Sector", http://www.crtc.gc.ca/eng/publications/reports/PolicyMonitoring/2014/cmr5.htm#s5.

EXHIBIT 13: CANADA'S GDP GROWTH AND INFLATION



Sources: Government of Canada. Statistics Canada. "Consumer Price Index: historical summary (1994 to 2013)", http://www.statcan.gc.ca/; The World Bank. Open Data. "GDP Growth (Annual)", http://data.worldbank.org/.

EXHIBIT 14: CANADA'S MOBILE MARKET SHARE BASED ON SUBSCRIBER NUMBERS



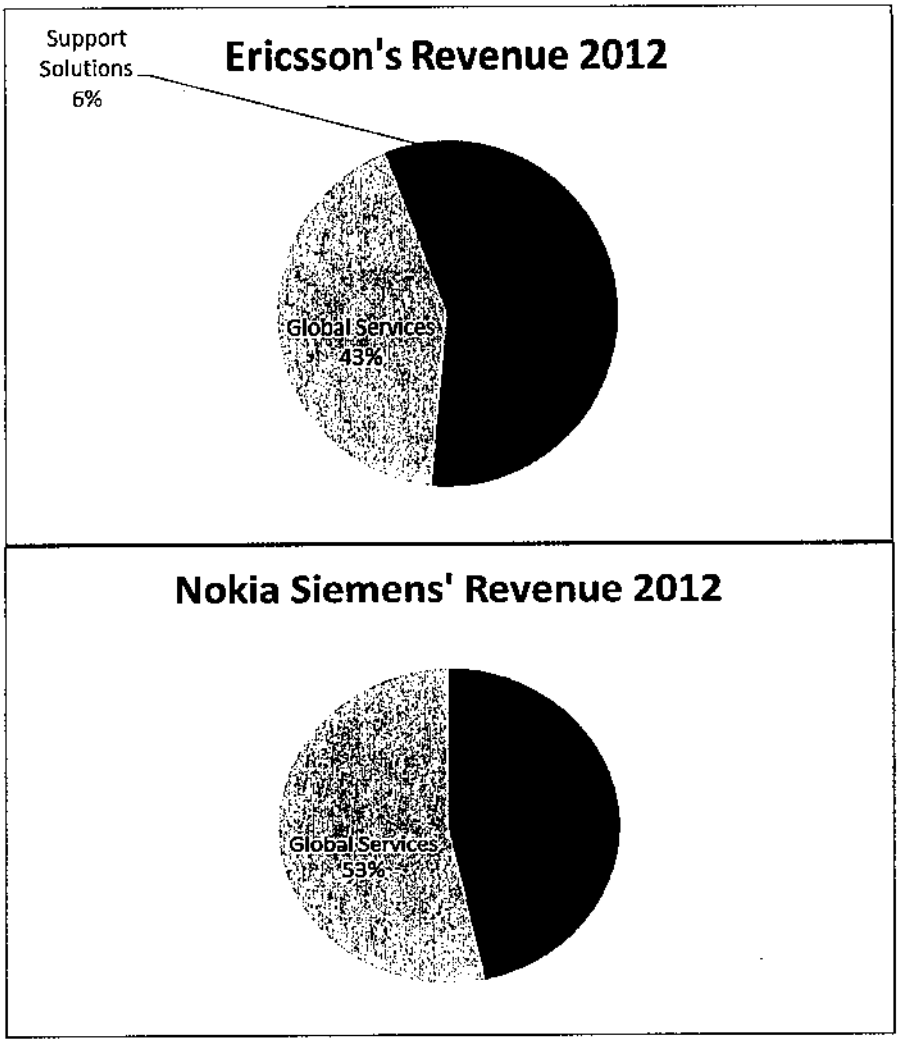
Source: Canada Radio-television and Telecommunications Division. "Communications Monitoring Report 2014: Telecommunications Sector", http://www.crtc.gc.ca/eng/publications/reports/PolicyMonitoring/2014/cmr5.htm#s5.

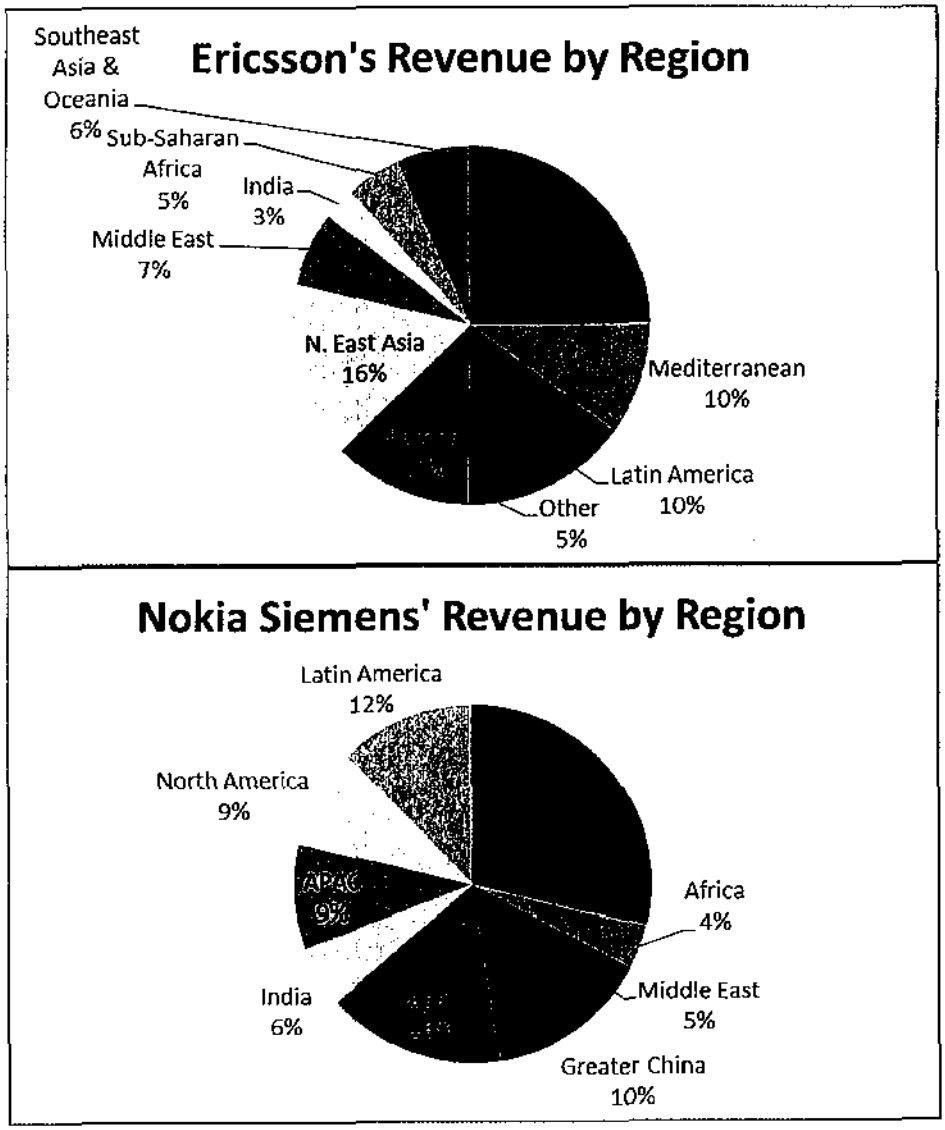
EXHIBIT 15: EQUIPMENT AND SERVICE PROVISION TO TOP TELECOM OPEATORS IN CANADA

	Huawei	Ericsson	Nokia Siemens Networks
Rogers	No	Yes (LTE deployment)	No
Telus	Yes	Yes (IP system)	Yes (Radio access network, core network technology)
Bell	Yes	Yes (MTM)	Yes (HSPA network)
SaskTel	Yes	No	Yes (Core network technology)
Wind Mobile	Yes	Yes	No
Tbaytel	No	Yes	No
MTS	No	Yes	No

Sources: For details, see companies' websites: Huawei.com; Ericsson.com; Networks.nokia.com/.

EXHIBIT 16: TOP TWO COMPETITORS' 2012 REVENUE BY SEGMENTS AND REGION





Sources: Ericsson (2012) "Annual Report"; Nokia Siemens (2012) "Annual Report".

EXHIBIT 17: 2012 FINANCIALS OF TOP 3 CANADA EQUIPMENT VENDORS

In US$ Mln	Ericsson	Nokia Siemens	Huawei
Revenue	34,964	17,675	35,353
Operating Income	2,215	1,087	3,204
Operating Margin	6.30%	6.15%	9.10%
R&D as a percentage of revenue	14.40%	14.30%	13.70%

Sources: Ericsson (2012) "Annual Report"; 1US$ = SEK 6.51 on 28 December 2012; Nokia Siemens (2012) "Annual Report"; 1US$ = €0.76 on 28 December 2012; Huawei (2012) "Annual Report"; 1US$ = Rmb 6.23 on 31 December 2012.

EXHIBIT 18: HUAWEI'S TIMELINE IN CANADA

2008- Opens first office in Canada.
Selected by Bell Mobility and TELUS of Canada to deploy North America's first LTE-oriented HSPA network.
Elected to 3GSM(Mobile World Congress) Board of Directors.

2009- Deployed HSPA network across Canada for Bell utilizing Huawei's leading SingleRAN solution and base stations.

April 2010- Opens first R&D facility in Ottawa, Ontario. Made five-year commitment of C$80mln.
Receives a Strategic Jobs Investment Fund grant of C$6.5mln from the local government.

January 2011- Opens Markham headquarters: 46,000 square foot facility with 250 employees.
Signs agreement with Telus and Bell to create Joint Innovation Center.

June 2011- Huawei, TELUS and Carleton University signed a C$1.4 million deal to establish a research laboratory dedicated to enterprise cloud services.
Launched Canada's first wide band AMR service for Wind Mobile using Huawei Core Network.

October 2011- Ontario premier visits Huawei's Markham facility.

February 2012- Signs agreement with Telus and Bell mobility to provide 4G LTE wireless networks across Canada, ceremony attended by Stephen Harper

July 2012- Surpassed Ericsson as world's largest telecom equipment vendor by sales.

September 2012- Signs agreement with SaskTel to launch TDD-LTE.

September 2013- Opens office in Regina, Saskatchewan.

April 2014- Partners with ABC Communications to deploy TD-LTE fixed wireless service.
First provider to deploy innovative TD-LTE technology in British Columbia.

Source: For further details, see Huawei's website www.huawei.com.