A STRATEGIC ANALYSIS OF SIERRA WIRELESS

By

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ABSTRACT

This paper performs a strategic analysis of Sierra Wireless, a leader in wireless data communications hardware and software. Sierra Wireless operates in the cellular modem industry and develops, manufactures, markets and supports wide-area wireless modems and enterprise software. The company faces challenges to its market leadership across its product lines due to commoditization of the market. It needs to change its differentiation strategy, develop lower-cost products and reduce its operating expenses to remain competitive. This paper argues that the best way to gain cost efficiencies is through restructuring and moving research and development offshore to original design manufacturers and a Sierra Wireless research and development Asian subsidiary.

EXECUTIVE SUMMARY

Sierra Wireless is a leader in wireless data communications hardware and software. It operates in the cellular modem industry and develops, manufactures, markets and supports wide-area wireless modems and enterprise software. The company faces challenges to its market leadership across its product lines due to commoditization of the market.

The cellular modem industry is attractive for existing firms that have achieved economies of scale and cellular data research and development expertise because their scale allows them to meet the increasing volume demands and produce lower-cost products, which can compete effectively in price.

Sierra Wireless has always operated with a differentiation strategy and has done well, capturing a leading market share across its products. However, the differentiation strategy is not sustainable, as the market is becoming commoditized.

A value chain analysis illustrates Sierra Wireless's focus on three components of the value chain: research and development, marketing and customer support.

The key issues facing Sierra Wireless are a differentiation strategy that needs to change, people issues, processes issues and the question of what the future of the industry will bring.

It is recommended that the company develop a new business model around strategic research and development outsourcing in order to be able to remain a worldwide market leader and to develop low-cost products across all technologies every year. The new business model is presented with a strategy.

This project and my MBA are dedicated to

my mother, girlfriend, father and sister (Yovanna, Brooke, Omar and Gioavanna)

for their patience, support and confidence in me for two whole years.

Esta tesis esta dedicada a

mi madre, enamorada, padre y hermana (Yovanna, Brooke, Omar y Giovanna)

por su paciencia, soporte y confianza en mi todo el tiempo de mis estudios.

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1 INTRODUCTION

1.1 The Company

Sierra Wireless develops, manufactures, markets and supports wide-area wireless modems and enterprise software to be used with laptops, Personal Digital Assistants (PDAs) and vehicle-based applications. In addition, the company has introduced a new product line of smartphones.

The company is based in Richmond, B.C. and was founded in 1993 by a group of Vancouver pioneers who worked together to write the industry's first cellular digital packet data (CDPD) network standard to enable the wireless transmission of data that is compatible with the Internet. Today, the company is known to be the leading manufacturer of wide-area wireless modems, supplying products to the major wireless operators in the Americas, Europe and Asia Pacific.

Sierra Wireless employs 305 people, has a research and development (R&D) facility in San Diego and has a sales team spread across North America, Europe and Asia.

1.2 Products and Services

The Sierra Wireless product mix includes five products. The first is PC cards that run in laptops and PDA devices. The PC cards are type II (5 mm thick) devices that are inserted into a PCMCIA PC card slot of a laptop or PDA device. The company currently supports PC cards that operate in the CDMA 1x, EVDO, GPRS, EDGE and UMTS HSDPA cellular networks. The cards are compatible with operating systems such as Windows 98, 2000, Me, XP, CE and Pocket PC. Their functionality includes voice, data and SMS. The design provides excellent coverage and

speed in marginal areas, as well as low power consumption to extend the battery life. The 2G

(Second Generation) GPRS PC card supports download data rates up to 56 kbps. The 2.5G

CDMA 1x and EDGE PC cards support download data rates up to 144 kbps and 216 kbps. The

3G EVDO and UMTS HSPDA PC cards support download data rates up to 2.4 Mbps and 1.8

Mbps. Besides being able to make calls and send SMS messages, a user can access email,

intranets, local area networks, remote software applications and the Internet.

The second product is embedded modules that integrate into OEM's (Original Equipment

Manufacturers') hardware devices. The latest EVDO module has dimensions of 45mm (length)

by 35mm (width) by 5mm (thickness) and weights 12g. The modules can be embedded into

rugged laptops, PCs, handhelds and point of sale devices. With a board-to board-connector, the

modules offer a USB and serial interface to the host device. The company currently supports

modules that operate in the CDMA 1x and EVDO cellular networks. Like the CDMA 1x and

EVDO PC cards, they support voice, data and SMS at speeds up to 144 kbps and 2.4 Mbps.

The third product is modems mounted in vehicles. These modems are rough and designed

to withstand extreme temperatures, humidity and vibration. The company currently supports

rugged modems that operate in the CDMA 1x, GPRS and EDGE cellular networks. Their

functionality and speeds are similar to those of the CDMA 1x, GPRS and EDGE PC cards.

The fourth product is smartphones that provide the functionality of a cellular phone, a

messaging device and a PDA. The smartphone is a Microsoft Windows-based mobile phone with

a foldout keyboard and a joystick for easy navigation, data entry and retrieval. The company

currently supports a smartphone that operates in the GPRS cellular network.

The fifth product is user interface software that functions with every modem product. The

modem software provides the user with a friendly interface for voice, data and SMS operation. In

addition, it displays network status information and signal strength. The software supports

multiple languages and is compatible with operating systems such as Windows 98, 2000, Me, XP, CE and Pocket PC.

1.3 Target Market

The target market consists of businesses that require real time access to data anytime and anywhere. Typical applications for this market include two-way paging, telemetry, banking, text web access, email, vehicle communications, vehicle navigation, field service, public safety, voice, intranet, image web browsing, video conferencing and streaming video.

Two-way paging and telemetry applications require a low bandwidth (data per second) and low interaction (network response). Image web browsing, video conferencing and streaming video require high bandwidth and high interaction. The rest of the applications require a medium bandwidth and a medium to high interaction. For instance, voice requires a medium bandwidth and a high interaction.

The devices that have been developed for these applications include two-way pagers, PC cards, embedded modules, mobile modems, fixed modems and external modems.

With the ongoing deployment of 3G (EVDO and UMTS HSPDA) networks capable of bandwidths up to 2.4 Mbps and 1.8 Mbps, there is a tremendous opportunity to attract more wireless data users who will be able to use image web browsing, video conferencing and streaming video.

The market segments that use wireless data and that Sierra Wireless targets include the mobile office, field service, transportation, public services, healthcare, telemetry, consumer and banking segments.

The mobile office segment consists of white-collar workers who operate in sectors such as field sales and financial services. These people require access to email, corporate intranets and the Internet in order to do their work.

The field service segment consists of field service workers who operate in sectors such as energy, utilities and telecommunications. These people require single-voice dispatch to two-way wireless data solutions.

The transportation segment consists of companies involved in ground-based transportation of people and goods. Examples of applications include tracking and security of goods, tracking of fleets and dispatch services for taxis and buses.

The public service segment consists of public safety organizations such as police, firefighters and ambulance services. An example of an application is a police officer requiring access to an internal database to verify the license plate of a suspect vehicle while on patrol.

The healthcare segment consists of workers requiring wireless data access for healthcare purposes. An example of an application is a doctor requiring access to a patient's file during an off-site visit.

The telemetry segment consists of companies that need to monitor data at fixed and mobile locations. An example of an application is the monitoring of a pipeline flow or an electricity meter's monitoring of power consumption.

The consumer segment consists of people requiring mobile access to wireless data for personal use.

The banking segment consists of ATM machines and remote credit card verification.

According to Gartner, email, personal information management and mobile CRM applications are the key driver applications for wireless data in Western Europe, whereas, according to the Yankee Group, email, custom corporate applications and the Internet are the key drivers for wireless data in North America.

1.4 Customer Evolution

In the 1990s, the market for wireless modems was a niche. Old wireless network technologies could not provide enough capacity at a low price in concentrated areas. The customers were early adopters, had to pay service rates of $200 per month and were satisfied with low speeds of 8 to 14.4 kbps. Two-way paging and telemetry applications were the preferred way to send messages due to its low bandwidth (data per second) and low interaction (network response). The ability to access data anytime and anywhere has become possible due to the convergence of the Internet, portable computers and wireless communications. The increased coverage, increased data speeds, improved devices and software and reduced data rates are causing the adoption of wireless data communications to grow quickly, transforming the market into a commodity market. Products and services are becoming less differentiated.

Computer users now regularly use the Internet to obtain information and email to communicate. In addition, they would like their portable computers to provide the same functionality of Internet and email outside the office as they have when they are inside the office.

Enterprise users continue to adopt more bandwidth-intensive corporate applications such as CRM and ERP that require timely information update and exchange. They continue to improve their productivity and efficiency with email and messaging.

Consumers are seeing email and messaging as an alternative way to communicate. The focus is on new features and functions such as ring tones, cameras, video capability and games.

1.5   Pricing

Sierra Wireless products have always commanded premium prices because they offered differentiated and reliable wireless solutions with world-class support. This pricing model gave the company a high gross margin at 40%. An example of a premium product is the EDGE PC card that is priced between US $240 and $280, whereas the competition's products sell at $200 to $220. Today, as competition increases and differentiation decreases in the cellular modem industry, the company's prices and margins are decreasing. In Q1, 2005 the company's gross margin dropped to 35.3%.

1.6   Revenues and Market Share by Product

In Q1 of 2005, the company had a total revenue of US $20.2 million. The distribution of revenue by product was as follows:

- PC cards accounted for 65% of the revenue.

- Embedded modules accounted for 11% of the revenue.

- Mobile rugged modems accounted for 21% of the revenue.

- Smartphones made no contribution to the revenue.

Sierra Wireless continues to be the global market leader in PC cards for all technologies, embedded modules for CDMA 1x and EVDO and rugged mobiles for all technologies, but its market share is decreasing. Until Q2 of 2004, Sierra Wireless had a 41% market share worldwide of PC cards for all technologies, but in Q1 of 2005 the company's share of the PC card market decreased to 36%. The smartphone is new to the market. The PC card product line is the main revenue generator, but it has a limited horizon. The future trend is that the market for embedded modems will grow large enough until it becomes a standard offering in most laptops, PDAs and smartphones, truncating the growth for PC cards in established markets.

2 ANALYSIS OF THE CELLULAR MODEM INDUSTRY

This section contains an analysis of the worldwide cellular modem industry. The industry is entering a period of significant growth due to the wide deployment of 3G networks, support for broadband-like wireless data speeds and affordable airtime. Enterprises can now choose to go mobile and create a business platform that is accessible from the Internet to increase productivity, lower costs and gain competitive advantages. On the device side, competition is increasing, and differentiation is decreasing, transforming what was a niche market into a commodity market.

2.1 The Cellular Modem Industry

Cellular modems have been available for over a decade, but sales were relatively low, due mainly to their slow speeds. From 1995 to 2000, users had to be satisfied with speeds of 8 to 14.4 kbps from cellular operators using CDPD, GSM and CDMA IS95-b airlink standards. However, in the last five years, cellular data networks using 3G airlink standards such as EVDO and UMTS have begun offering service with speeds higher than 600 kbps.

The deployment of high-speed wireless (3G) networks in Western Europe and the increasing demand for corporate solutions in both North America and Europe are contributing to market growth. In 2004, 2.5 million units were shipped worldwide, compared with 1 million in 2003. By 2009, more than 14 million cellular modems are expected to be shipped worldwide, a growth rate of 2 million per year. PCMCIA modems (removable wireless modems that insert into a notebook's PCMCIA slot) will lead the growth, but by 2009 the embedded modems will likely be sold in equal volumes. (Hyers, 2004)

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The four primary cellular modem manufacturers are Sierra Wireless, Novatel Wireless, Option International and Sony Ericsson, which account for approximately 90% of the units sold worldwide. Among these, Sierra Wireless is the leading manufacturer. It is difficult to predict if the company will maintain its leadership, given its recent decline in market share.

The figure below summarizes the competitive forces within the Cellular Modem Industry.

Figure 2-1 Porter's Five Forces adapted to the Cellular Modem Industry

Threat of Entry

High
(-) High initial investment for small new firms
(+) Growing market
(-) Branding/reputation takes time to achieve for small new firms to achieve
(+) Contract manufacturers integrate forward
(+) Laptop, PDA, smartphone manufacturers integrate backward
(+) Differentiation narrowing
(-) Software know how
(-) Operator relationships

Bargaining Power of Suppliers

High
(+) Airlink chipset vendors concentrated
(-) High-volume Contract Manufacturers not concentrated
(+) Experienced engineers in demand
(-) Lack of concentration in electronic parts

Rivalry Among Existing Competitors

Moderate increasingly High
(+) Perishable products
(+) Differentiation narrowing
(+) Economies of scale
(-) Growing market

Bargaining Power of Customers

High
(-) Lack of buyer concentration
(+) Each buyer has large volume
(+) Homogeneous products
(+) Operators setting standards

Threat of Substitute Products / Services

High
(+) Embedded 802.11 wireless modems
(+) Airport Internet access terminals
(-) Wireline modems
(+) WiMAX wireless modems

Adapted from Bukszar, 2005 and Porter, 1979

2.2 Threat of Entry

There are a few firms that have been in the industry for over a decade and have achieved market share, a reputable brand and some differentiation. However, the market is growing large,

differentiation is narrowing, and new entrants with known brands and economies of scale, such as Sony Ericsson, are coming in.

2.2.1   (-) High Initial Investment for Small New Firms

Entrance into the wireless WAN PC card market requires a high initial investment. The cost of labour, product, equipment and certification means that the development of a PC card could cost between 4 and 5 million dollars. Labour costs come from a team of between 10 and 15 engineers of different disciplines. These would include mechanical, radio frequency (RF), hardware, software, technical writing, product management, project management, test verification and manufacturing test engineers. A typical project requires building 300 prototypes before moving to the commercial phase. The product costs include direct material and manufacturing costs. Equipment costs include computers, protocol testers, test chambers, radio frequency test stations and bench tools. The certification costs include FCC approval and carrier certification.

2.2.2   (+) Growing Market

The cellular modem market is expected to grow strongly through the next five years. In 2003, the number of units shipped was below 1 million, in 2004 this number more than doubled, and the market is expected to continue growing at a rate of more than 2 million units a year. (Hyers, 2004)

The market is booming because wireless operators are deploying high-speed wireless networks throughout the world, reaching both developed and developing markets. In addition, the high data speeds are enabling more notebook users to be connected at any time from anywhere. New firms will see this as a business opportunity to capitalize on.

2.2.3 (-) Branding/Reputation Takes Time for Small New Firms to Achieve

There are several PC card manufacturers that have recently surfaced in Asia but have been unable to enter the North American and European markets primarily because their brands are unknown, but also because their quality is lower. In North America and Europe, PC card vendors must pass a series of tests with wireless operators before being allowed to sell their products. The tests ensure that devices meet all the standards and operator specifications. In Asia, however, the PC card vendors do not have these same strict requirements. This enables quick entry into the Asian market, at the expense of quality. To tap the North American and European markets, new entrants must have the abilities to develop quality products and to establish relationships with wireless operators.

2.2.4 (+) Contract Manufacturers Integrate Forward

In the past, when the market was small, airlink chipset vendors were flexible in allowing integrators to come up with their own radio implementations for better performance and lower costs. As the market has grown large, it has become difficult and costly for chipset vendors to support numerous implementations. Instead, they force customers to use a standard reference design while continuing to integrate more functionality, leaving less value for modem makers to develop intellectual property. This represents an opportunity for contract manufacturers who already have the know-how to manufacture modems. They can license a reference design from the chipset vendor and develop cellular modems.

2.2.5 (+) Laptop, PDA, Smartphone Manufacturers Integrate Backward

Previously, multiple airlink standards and low data speeds made it difficult for OEM vendors to embed modems. These obstacles are disappearing as new wireless solutions reach broadband-like speeds and networks migrate to only two standards: EVDO and UMTS. The embedded market is set to grow, and cellular modems are going to become a standard in laptops,

PDAs and smartphones. OEMs may decide to develop their own cellular modem solutions. This reduces the need to buy embedded modems from cellular modem makers.

2.2.6 (+) Differentiation Narrowing

Before, Sierra Wireless was able to differentiate its PC cards among its competitors by offering the first Network Interface Card (NIC), better performance, feature-rich user interface modem software and customer support. One of the major advantages of an NIC is that it provides an always-on experience by removing the need for manual set-up.

Presently, airlink chipset vendors are integrating functionality forward, and wireless operators are standardizing the software functionality, thus reducing cellular modem vendor differentiation. From a technical aspect, vendors are differentiating themselves with the antenna style and the extended or unextended form factor. The user interface modem software look and feel is different, but the functionality is the same. More vendors are now supporting a Network Interface Card (NIC). From an end user point of view, choosing a cellular modem is quickly coming down to cosmetics and price. New entrants do not need to develop innovative features to compete, but they have to use their economies of scale to develop low-cost, high-quality products.

2.2.7 (-) Software Know-how

The PC card segment requires knowing how to develop software for modems that work in different operating systems. For instance, a PC card has to support functionality across the supported operating systems such as plug and play, suspend, software installation and outlook SMS plug-in. It is challenging to develop one application that runs on different Microsoft operating systems without open source code. Experience and a good relationship with Microsoft help overcome this obstacle. New firms will have a difficult time developing Windows software for the first time and will require Microsoft's help.

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2.2.8   (-) Operator Relationships

Firms that have established strong relationships with operators will have the chance to pitch new products and leverage their relationship to obtain product approvals for use in the networks. New firms will have a harder time convincing operators to consider their products.

2.3   Rivalry Among Existing Competitors

Rivalry among existing competitors is moderate, but it is increasing for several reasons. First, firms in this industry are targeting the same market segment, the mobile professional. Second, differentiation is narrowing because each vendor is using the same airlink chipsets and offering value-added features with similar functionality. Lastly, firms are concentrated, and, with no firm being dominant in market share, they are unable to set competitive rules. The top two companies are within 10% of each other in market share. The concentration of cellular modem firms in this arena is not sustainable. The market is growing, becoming commoditized and bringing in a lot more competitors.

2.3.1   (+) Perishable Products

Cellular modems have a short life because new technologies keep emerging with faster, smaller and cheaper solutions. Operators are pushing for the latest technological advances. For instance, in the last five years, Sierra Wireless has deployed three PCMCIA cellular modems supporting 2G, 2.5G and 3G North American airlink standards. The speeds have increased from 14.4 kbps in 2G to 10 times faster in 2.5G and 160 times faster in 3G. Today, Sierra Wireless's 2G products are at the end of their lives, and the 2.5G products are fast approaching that point as wireless operators continue to roll out 3G networks.

Another factor making these products perishable is that the product with the latest airlink standard will also support older airlink standards. If a 3G product cannot be used everywhere

because the wireless operator has not deployed 3G networks nationwide, the user will still be able to use the product's fallback 2.5G capabilities.

2.3.2 (-) Differentiation Narrowing

As differentiation decreases, products are becoming commoditized. Operators will carry one or two cellular modem vendors in their product portfolio based on the lowest price and best quality. Firms will fight to get the best prices from parts vendors in order to manufacture lower-cost products and in some cases will decrease their product margins by reducing the selling price to win deals with operators.

2.3.3 (+) Economies of Scale

Firms with economies of scale can be well positioned in this industry for several reasons. First, modem volumes are increasing year after year, and firms have to be able to meet the consumer demand. For instance, if Sierra Wireless maintains a 41% market share, by 2009 it must be able to produce and ship over five million units.

Second, as differentiation is narrowing and price competition is increasing, firms that are able to produce the lowest-cost products will succeed. Firms that buy the highest product part volumes will get better price discounts from part vendors.

Finally, firms that buy the highest product part volumes will have access to the top part vendors and will get better service from them.

2.3.4 (-) Growing Market

As the market grows at a rate of 2 million units per year, rivalry will decrease for several reasons. First, incumbent firms may not have the scale to meet the market demands and will have to leave part of their share to other firms. Second, firms may achieve their revenue goals by

developing products for one wireless technology (North American or European) and selling them only in one geographical area. Finally, if the market continues growing, firms can get a slice of the pie and be prosperous even if the slice is small.

The growth in the market is occurring at the same time as commoditization, and as a result the industry is changing from a low-volume, high-margin industry to a high-volume, low-margin industry.

2.4   Bargaining Power of Suppliers

The bargaining power of suppliers is high. The concentration of airlink chipset vendors is impacting costs and the ability to differentiate. Firms are developing products that offer the same functionality because there are a limited number of chipset vendors.

2.4.1   (+) Airlink Chipset Vendors Concentrated

The airlink baseband and processor chipsets represent only 5% of the product parts, but they provide the core functionality. Qualcomm, ADI and Broadcom are the available airlink technology chipset vendors. In the North American standard, Qualcomm is the only player, while in the European standard all three companies compete. For example, Sierra Wireless's AirCard 550 and Novatel Wireless's Merlin C201 PCMCIA cellular modems use the same Qualcomm "MSM 5105" processor chipset. With this processor, both products can offer download speeds up to 153 kbps. The capabilities of these chipset vendors are invading the modem makers' territory by forcing the use of reference designs. One can no longer deviate from a reference design to come up with a design that will yield cost savings, higher performance and a better fit. Firms have to use reference designs and parts from the same pool of the few chipset vendors to develop their products. It the end, firms offer the same core functionality on their products because they use the same technology vendors. As the market grows, however, new chipset vendors, such as Ericsson, Free-Scale, Motorola and Intel, are likely to enter.

2.4.2 (-) High-Volume Contract Manufacturers Not Concentrated

Contract manufacturers offer a full range of supply-chain solutions to electronic original equipment manufacturers (OEMs). These include integrated design, prototyping and testing, manufacturing, packaging, systems assembly, distribution and post-manufacturing services. There are more contract manufacturers than cellular modem firms in this industry. The top contract manufacturers include Flextronics, Celestica, SCI Systems and Solectron. The main advantage of using a contract manufacturer is to achieve high-volume manufacturing at a low cost.

2.4.3 (+) Experienced Engineers in Demand

Experienced engineers in wireless data communications are in demand. Engineers in this industry require knowledge of wireless technologies such as GSM, CDMA, EDGE, EVDO and UMTS.

2.4.4 (-) Lack of Concentration in Electronic Parts

Ninety-five percent of the product parts can be sourced from many component suppliers. For example, a capacitor can be sourced from Murata, Kemet, ABX, Taiyo Yuden or others.

2.5 Bargaining Power of Customers

The bargaining power of customers is high. Although there are several channels (operators, distributors, OEMs, corporate firms) available around the world to sell the product, operators are by far the most powerful. It is not possible for a device manufacturer to bypass an operator to sell its product. Operators need to approve products for use on their networks, and if a manufacturer desires to sell products to an operator, its products must comply with the operator's feature, functional, specification and price requirements or it will not be able to sell its products. In the past, operators did not have several vendors to choose from, and requirements were negotiated between the two parties. As the market grows and becomes commoditized, a lot of

modem vendors are emerging, and price competition is increasing. This market evolution helps

operators achieve their demands. If a vendor resists the demands, the operator can simply choose

a different vendor.

2.5.1 (-) Lack of Buyer Concentration

Cellular modem firms have plenty of options through which to sell products to their

customers. There are numerous operators, distributors, OEMs and corporate firms in North

America, Europe and Asia Pacific to choose from. Of these, the major operators include Verizon,

Sprint, Cingular and Vodafone.

2.5.2 (+) Each Buyer Has Large Volume

There are many small, medium and large businesses around the world that represent a

great opportunity for a mobile wireless solution. A study done by NOP World suggests that most

US organizations of all sizes are using wireless data solutions or are planning to do so, but large

organizations lead in mobile wireless data access to company databases and applications.

Operators, distributors and OEMs buy large volumes of wireless units to meet the demands of

large (250+ employees) businesses. There are several downsides for modem makers in having

large-volume buyers. First, because buyers have large volumes, they demand low prices and

standard designs. Second, the top five to ten channel partners account for the majority of the

modem vendors' sales. If a major operator, distributor or OEM decides to stop doing business, the

impact on sales is significant.

2.5.3 (+) Homogeneous Products

Corporate users have to follow two steps when selecting a wireless modem solution.

First, they have to determine which wireless operator to get service from. In the United States and

Asia Pacific, they can pick from two types of networks, depending on coverage and speed requirements: CDMA or GSM. In Europe, GSM is the only available network.

Second, once users have found a suitable wireless operator, they can select their wireless modem solution. Users can only choose modems that are available from the operator. Typically, operators buy modems from one or two vendors. Wireless modems could potentially differ in the airlink and user interface software supported, but operators are pushing for standardization, making modems homogenous. In short, operators have power to single out vendors with the cheapest prices and are motivated to get vendors to compete using more standardized designs.

2.5.4   (+) Operators Setting Standards

Operators are dictating the software features and functionality that cellular modem vendors must provide in order to have a chance of winning a contract. This way, operators standardize and reduce the costs of training their work forces to support different software interfaces.

2.6   Threat of Substitute Products/Services

The threat of substitutes should be considered high because there are several products emerging which are offering Internet connectivity anywhere at anytime.

2.6.1   (+) 802.11 Wireless Modems

Newer laptops, PDAs and cell phones are coming with built-in 802.11 or Wi-Fi (wireless network standard) wireless devices, and operators and service providers are offering more and more 802.11 wireless access points worldwide. Wi-Fi offers speeds up to 54 Mbps and coverage of an approximately 90-meter radius. This technology will satisfy the needs of many mobile professionals by allowing them to run bandwidth-intensive applications as fast as if they were at their desktop PC. For instance, rather than using a cellular modem when travelling on business to

stay connected at the airport or at a tradeshow, a user may be able to get Internet connectivity from Wi-Fi access points located at airports and other public places. Security and coverage of Wi-Fi hot spots are obstacles that this technology needs to overcome to attract more mobile professionals. Firms are not likely to develop Wi-Fi PC cards or a combination of Wi-Fi and cellular PC cards because most laptops today ship with a built-in Wi-Fi silicon. Firms may be able to complement this technology by offering a single software interface to manage Wi-Fi and cellular connections. Widespread Wi-Fi hot spots may cannibalize the mobile enterprise market, but not the segments that require wireless data access anytime and anywhere, such as the field services and public safety segments.

2.6.2   (+) Airport Internet Access Terminals

Most busy airports have Internet access terminals. This reduces the necessity for the business traveller to own a PC card cellular modem.

2.6.3   (-) Wireline Modems

In the past, a dial-up connection was the best option for mobile professionals who worked, lived and travelled in rural areas. Users were able to navigate the Internet and do email with small attachments at speeds of 56 thousand bps with a wireline modem. Today, this no longer represents a threat to cellular modems because, at speeds 10 times faster than 56 thousand bps, mobile professionals can use cellular modems to receive email with sizeable file attachments, video conferencing, streaming video, faster Internet browsing and higher-quality graphics.

2.6.4   (+) WiMAX Wireless Modems

WiMAX is an emerging next generation Wi-Fi wireless network standard that offers speeds up 100 Mbps and coverage of approximately an 80-kilometre range. Intel is one of the

main drivers of this technology and expects to support it on its next generation Centrino chipset in 2007. WiMAX PC cards are likely to appear in the market in 2006. This technology represents a big threat to the 3G cellular networks since field professionals who work in areas of a 50-mile radius or less will not require a cellular service. Cellular operators will have to integrate this technology into their offerings to avoid losing customers to WiMAX service providers. Before WiMAX appears as a standard built-in silicon solution in laptops, there is an opportunity for firms to leverage their cellular expertise and develop WiMAX-embedded modules and PC cards. Once the WiMAX silicon is supported in laptops, firms can also develop a software interface to manage Wi-Fi, WiMAX and cellular connections.

Like Wi-Fi, widespread WiMAX use is likely to take away cellular market share, but it will not impact segments that require wireless information while mobile.

2.7 Attractiveness of the Industry

The evolution of cellular data speeds to 3G is appealing to more mobile business professionals who need to access applications such as email, contacts, calendars and the Internet anytime and anywhere with their laptops, PDAs and smartphones. This technology helps mobile professional to get more done, respond faster and make more informed decisions.

This industry, now becoming commoditized, is attractive for existing firms that have achieved economies of scale and cellular data R&D expertise because their scale allows them to meet the increasing volume demands and produce lower-cost products in order to compete effectively in price.

Firms in this industry face many issues. First, chipset vendors are integrating more and more the core functionality, reducing the opportunity to differentiate. Second, operators are selecting solutions that offer the best price and quality. Third, without a strong relationship with

the operator, it is difficult to guarantee making a sale with an enterprise customer. Fourth, firms

may be forced to reduce profit margins to remain price competitive. The industry is quickly

moving from low volumes but high margins, to low margins but high volumes. Furthermore,

cellular PC card-only makers are unlikely to survive in this industry in the short-term as

embedded modem solutions take off. Finally, the emergence of new wireless technologies such as

WiMAX is going to take away market share from cellular modem makers.

2.8   The Future of the Industry and Key Success Factors

The task for the cellular modem industry in the next five years is to embed 3G modems in

laptops, PDAs and smartphones. PC cards will grow rapidly until embedded modems reach the

same volumes in 2009. Then, as original equipment manufacturers (OEM) continue to adopt

built-in 3G solutions until this becomes standard, PC card revenues will decline. Differentiation

in functionality and size in embedded modems is not going to be possible due to the monopoly of

3G chipset vendors; therefore, an increase in price competition will occur.

Until now, operators have had the power to decide which 3G device solutions should be

supported on their networks. As the embedded modem solution skyrockets, laptop, PDA and

smartphone OEM manufacturers that have a recognized brand and are known for their volumes

will be empowered to decide which 3G modem vendors to utilize. Operator power will shift to

the OEMs. In this model, operators do not need to worry about how to re-sell modem maker's

products or to know the identity of the 3G modem vendor whose modem is embedded in a laptop.

They will be making money exclusively from monthly service plans that result from OEMs

selling their products via their own distribution channels.

There are several key success factors in this industry. First, the industry is rapidly

evolving away from a niche market with differentiated products to a high-volume commoditized

market. To compete, firms need to be more cost effective and focus on scale and other cost drivers.

Second, firms must be responsive to operator needs. Fostering good customer relations will facilitate product development. Furthermore, chipset vendor relations will help firms gain price discounts, and infrastructure vendor relations with vendors such as Nortel, Lucent and Nokia will help firms get their products pitched by them when they offer complete solutions to operators.

Finally, the firms that are nimble from design to production and offer superior quality and customer support are likely to succeed in this industry.

3 INTERNAL ANALYSIS

3.1 Strategic Fit

3.1.1 The Current Strategy

To compete in the wireless market, Sierra Wireless uses a differentiation strategy. Its mission statement reflects this: "To be a global leader in providing highly differentiated wireless solutions that enable our customers to improve their productivity and lifestyle." The company offers a high degree of quality in its products by being ISO9000-compliant, and its product costs are fairly reasonable, permitting the company to enjoy high gross margins. This strategy has worked well in the past, but the future is bringing a commoditized market. Products are becoming less differentiated, and price competition is emerging. The early symptoms are already being felt at Sierra Wireless. In Q1 of this year, the company had to reduce its selling prices, and margins went down from 39.6% to 35.3%. The strategic fit chart below summarizes the areas that contribute to Sierra Wireless's differentiation strategy.

Table 3-1 Strategy for Sierra Wireless

Strategic Fit Chart	Cost Based	1	2	3	4	5	6	7	8	9	10	Differentiation
	Low Cost/Adequate Quality											High Quality/Adequate Cost
Product Strategy	Rapid Follower							← X				Innovative
R&D Expenses	Low R&D								← X			High R&D
Structure	Centralized				X →							Decentralized
Decision Making	Less Autonomy				X →							Autonomy
Manufacturing	Economies of Scale						← X					Economies of Scope/Flexible
Labour	Mass Production									X		Highly Skilled/Flexible
Marketing	Comparative/Push							X				High Cost/Pioneering/Pull
Risk Profile	Low Risk						X					High Risk
Capital Structure	Leveraged						X					Conservative

Adapted from Bukszar, 2005

3.1.2 Product Strategy

Sierra Wireless's product strategy has always rested on highly differentiated products, a broad product mix and a first-to-market approach. The company's products have been innovative and boasted distinguished features and superior performance, and with that customers have had access to free technical support. Today, differentiation in the wireless industry is decreasing due to the operators controlling the software functionality and technology chipset vendors controlling the hardware functionality.

The superior performance of Sierra Wireless's products has always lain in high-speed wireless data access, easy installation, seamless access to the Internet and low power consumption.

A critical part of Sierra Wireless's product strategy is offering customers free product training, in-house technical support and a team of field application engineers available to work on site. This is important because it helps customers learn how to use the product. Furthermore, when customers run into problems with their products, they expect a prompt response leading to a resolution.

Sierra Wireless has established a brand leadership in the wireless industry in two ways, by getting to market first and by developing key worldwide carrier relationships. For instance, in 2004, the AirCard line led the PC card market with a 46% share of PC card revenues worldwide. Also, Sierra Wireless's embedded module line had a 75% market share of modules for mobile computing in North America. Today, Sierra Wireless is still a leader but has started to lose its market share to competitors. It is hard to predict if its leadership will be sustainable.

3.1.3 R&D Expenses

Sierra Wireless's high R&D expenses can be explained in several ways. First, it invests heavily in multiple technologies and next generation technologies. For example, developing a next generation product could take 10 to 12 months and cost between US $5M and $6M. In 2004, R&D expenses were 11% of sales, an increase from US $15.9M to US $24.5M. Furthermore, engineers account for approximately 50% of all employees.

Second, Sierra Wireless produces more than one new product per year. In 2004, the company introduced four new products: Voq smartphone, AirCard 580, AirCard 775 and AirCard 555R.

3.1.4 Structure

Sierra Wireless uses a hybrid structure model that is both centralized and decentralized. The structure is centralized during the development phase, as teams must follow the company's Product Life Cycle (PLC) processes. Engineers in one product line must follow the same procedures and policies to meet the company's goals and objectives. For instance, if a product manager comes up with an idea for a new product, a series of documents need to be created before the new project can be approved. These documents include analyses of the concept, business case and marketing requirements. Each document must be reviewed and approved by the executive team.

The structure is decentralized during the execution phase. Each product team has a core team formed by five individuals, each representing a functional area such as engineering, marketing, factory operations, customer support and quality. The core team meets regularly on a weekly basis and is able to quickly react to problems from the field and within the team to offer speedy solutions. For instance, if, at a meeting, the customer support representative informs the rest of the core team that a number of customers are having trouble following the instructions on

the website to install a new software patch, then the team will react immediately to resolve the issue.

When the company grew from a small-sized business to a medium-sized business, it instituted a PLC process, core teams and standard operating procedures across all disciplines. In this work structure, every employee's job is strictly defined, and there is a linear workflow in which one task must be completed before the next one starts. The numerous standard operating procedures and policies position Sierra Wireless as a bureaucratic organization where system maintenance and control are key characteristics. Every phase of the PLC requires the satisfaction of specific exit criteria and the completion of DRA (document review and approval) records with signatures. The downside of this bureaucratic structure is that product development takes longer.

3.1.5 Decision Making

Sierra Wireless uses a hybrid decision-making model that is both dependent and autonomous. Dependent decision making occurs during the development phase and starts with the executive team signing off on a proposal for the development of a new product. This process is slow and costly. For instance, after a new product development proposal is created and presented, including analyses of the concept, business case and marketing requirements, it will take several months for the executives to sign off on it. The delays occur because the executives are busy looking after the day-to-day operations or travelling on business. While the decision-making process is pending, the development normally starts in order to keep the team busy. This has been costly, as many times programs are cancelled three to four months into the development cycle when the executive team finally makes a decision.

Autonomous decision making occurs during the execution phase. Core teams are empowered to come up with options and decide what course of action should be taken to address

a problem without any interference from the executive team. For example, if a new version of software plus documentation for a product is going to be available in three months, the core team must decide if they make this a rolling change (move to the new material when the old material runs out) or an immediate change (scrap the old material as soon as the new material is available). Furthermore, the core team may look to the executive team for input or help in order to expedite the resolution of a problem, but the decision will still be made by the core team.

3.1.6 Manufacturing

Sierra Wireless manufacturing uses an outsource business model. The company has partnered with Flextronics, the largest contract manufacturer in the world with operations in 29 countries. Sierra Wireless focuses on its strengths in engineering, marketing and customer service, and then leverages Flextronics's expertise. The manufacturer focuses on procurement and management of parts, assembly and repair.

The manufacturing strategy is a combination of economies of scope and scale. The supply chain has a two-phase manufacturing structure. A product is first built in Xixiang, China and then packaged in Memphis, USA. This allows Sierra Wireless to make rapid changes and to customize its products. For instance, if a customer cancels an order, Sierra Wireless is able to reconfigure and repackage those units and ship them to another customer.

Sierra Wireless's involvement in the Flextronics manufacturing process includes engineering and development of manufacturing test procedures and fixtures. Sierra Wireless achieves economies of scope by designing standard test procedures and fixtures that run on the manufacturing line to serve different products. This lets the company be efficient when using the same production line for different products. For instance, the CDMA 1x and EVDO PC cards can be made on the same production line.

Economies of scale are present in several ways. First, Flextronics has the personnel and equipment necessary to scale up and manufacture Sierra Wireless's products in high volume. Second, the manufacturer can use its high-volume requirements to procure parts and equipment for different customers at a discounted price, thereby allowing Sierra Wireless to reduce its manufacturing costs per unit.

3.1.7 Labour

The Sierra Wireless team is highly skilled and flexible. The company employs engineers with skills in the areas of hardware, radio frequency, embedded software, Windows software and mechanical design. The company has been creating breakthrough products for wireless data since 1993 and requires people who are innovators looking to challenge themselves. For example, to be hired, a senior embedded software engineer candidate must have many years of experience in design, coding and testing. Knowledge and expertise of the leading wireless communication protocols is an obvious must.

Recent university grads and leaders with more than twenty years of experience are included in the highly skilled and experienced Sierra Wireless engineering team.

A crucial aspect of Sierra Wireless's success is its flexibility to utilize its engineering resources in different projects. First, its two R&D facilities can share their resources in developing products to maximize utilization. Second, as projects conclude, resources can be moved across product lines. Finally, resources can be applied to multiple projects at the same time.

3.1.8 Marketing

Sierra Wireless's marketing strategy focuses on the following marketing mix: a broad product line, premium products, diversified distribution and pull promotion.

Sierra Wireless prices its products higher than its competitors. For instance, the AirCard 550 wireless PC card sells at Sprint for US $299, where the competitor's Merlin C201 sells for US $117. Prices are set higher to give customers a well-differentiated and reliable wireless solution with world-class support. In a commoditized market, this advantage will vanish since end users are no longer able to distinguish Sierra Wireless products from the competition and are likely to buy the cheapest.

The distribution strategy consists of direct sales and sales through diversified channel partners such as wireless operators, resellers and OEMs. Direct sales are used for major accounts and existing customers requiring additional products or accessories. Operators purchase products from the company for resale to customers and can also co-sell products with the Sierra Wireless sales team. Resellers purchase products from Sierra Wireless, bundle them with other value-added elements such as computer hardware and software and resell complete solutions to customers. OEMs integrate Sierra Wireless products into their own products and sell them to customers through their distribution channels. Examples of these channels include Verizon Wireless, Insight and Toshiba.

The promotion is a pull strategy. The company spends a significant amount of money to attract customers. In 2004, the sales and marketing expense was 9.5% of sales or US $20 million. The company communicates its product messages to channels and customers by using publications, industry associations, analysts, conferences and trade shows. It uses industry and customer testimonials. An example of this is found in *Laptop* magazine: "The fast service and affordable unlimited data transfer plan make the Verizon Wireless Network and the Sierra

Wireless AirCard 555 the best in this roundup." An example of a customer testimonial is the following from Brenda Raney at Verizon Wireless: "I won't leave home without it. That is one gadget you'd have to cut off my hands to get back. The card allows me to be more productive when I need to be, and I don't waste time." In addition, Sierra Wireless works with channel partners to find ways of increasing end user adoption of wireless solutions. In 1998, Sierra Wireless founded the WirelessReady Alliance program to accelerate the rate of mobile computing adoption through the delivery of complete wireless data solutions.

3.1.9   Risk Profile

The risk profile for Sierra Wireless is high. The company approaches investment decisions with caution and prudence. Projects to develop new products typically cost $5 to $7 million. The market life for wireless modems is between three and four years and is dictated by the appearance of new technologies and the deployment of wireless networks. Projects are evaluated with a business case and financial analysis calculating the return on investment and net present value.

There are several factors that may increase the risk of the business. First, in the past, wireless operators would order thousands of wireless units from Sierra Wireless, taking the risk of not selling them. Today, operators do not commit to buying a high volume of units, and vendors must manage the risk of carrying inventory.

Second, downturns in the economy that affects enterprise spending, as well as delays in network deployments, impact directly on business revenues.

Third, product market launch delays and increased competition result in loss of market share, and this hinders the ability of the company to invest in new developments.

Finally, developing products focusing only on enterprise end user requirements and without considering the operator requirements could result in operators not being interested in reselling the products.

3.1.10 Capital Structure

Sierra Wireless's capital structure is conservative. The company has been financing operations from equity placements, government research and development grants, investments, cash flow from operations, accounts receivables and an operating line of credit.

In November of 2003, the company issued a public offering of 4.6 million shares generating US $67.4 million. In 2004, the BC government funded US $2.6 million for research and development. The investments that Sierra Wireless uses include government treasury bills, bankers' acceptances, commercial paper and government bonds. As of March 31, 2005 the company's net cash amounted to $94 million, short-term investments to $26 million and accounts receivable to $15.6 million.

In addition, the company has an unsecured credit line of $10 million with a Canadian bank. Even though the company used $7.6 million of its own cash flow for the first quarter, it has sufficient cash to carry its operations for the rest of the year without borrowing money from the credit line.

3.1.11 Overall Assessment of Strategic Fit

Sierra Wireless has always used a differentiation strategy to move into wireless data market segments with innovative products. The company has done well, capturing a leading market share across its PC cards, embedded modules and rugged mobile products. However, the future of the industry is moving toward commoditization, and if the company ignores this market evolution, hoping that it will go away, it will not survive.

The differentiation strategy in its present form is not sustainable as the market is becoming commoditized. Furthermore, as the company increases its number of products across different technologies, the focus is becoming more on standardization than differentiation. In addition, hardware differentiation is decreasing since airlink technology vendors are integrating backwards and pushing their reference designs. R&D costs are significant, and, as more product lines are added, it becomes difficult to fund new developments and sustain leadership across all technologies. The company needs to use the revenue margins generated from existing products to develop new ones.

Sierra Wireless's structure and decision making are also problematic. The company is becoming bureaucratic and centralized as it grows. Engineers follow too many procedures and policies throughout the product development cycle in order to meet the company's goals and objectives. This results in the company taking longer to launch new products.

3.2 Firm-level Value Chain

The following figure summarizes Sierra Wireless's value chain by showing both the support and primary activities. Support activities include firm infrastructure, human resource management, technology development and procurement. Primary activities include sales and marketing, inbound logistics, operations, outbound logistics and service.

Figure 3-1 Sierra Wireless Value Chain, adapted from Porter

Firm Infrastructure	• Finance and Accounting • Quality Management • Legal Services		• IT Services • Management			
Human Resources Management	• Recruiting • Payroll • Education and Training		• Benefit Administration • Compensation			
Technology Development	• IPR Management • Product Lifecycle Process • Project Teams • Testing with Partners		• Infrastructure Lab Access • On Line Change Orders • Production/Process Management • Equipment/Knowledge Sharing	• Market Research		
Procurement	• Lab and Office Equipment • Prototype Parts • Production Parts		• Forecasting of Parts • Cost Reduction of Parts			
Primary Activities	• Product Management • Pre-sales • Market Development	• Prototype Supply Chain Management • Production Supply Chain Management	• Project Management • Product Design, Testing, Verification • Manufacturing Testing • Printing • Configuration and Packaging • Localization • Operations Management	• Customer Order Management • Product Shipping • Warehousing	• Product Management • Marketing Communications • Marketing Programs	• Customer Support
	Pre-Marketing and Sales	Inbound Logistics	Operations	Outbound Logistics	Marketing and Sales	Service

Legend: Core Competencies Outsourced
Adapted from Bukszar, 2005 and Porter, 1985

3.3 Firm Infrastructure

The firm infrastructure activities include finance and accounting, legal services, quality management, management and IT services.

3.3.1 Finance and Accounting

The finance and accounting department has experience in financial accounting, public company disclosure and reporting processes, and mergers and acquisitions. This team is responsible for maintaining detailed operating records and preparing notes and financial statements such as Income Statements, Balance Sheets and Cash Flow Statements. Given that Sierra Wireless is publicly traded on the Nasdaq and TSE stock exchanges, its accounting reports

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are audited by KPMG and conform to US/Canadian generally accepted accounting principles (GAAP). Other activities include a stock option program, financial modelling, credit extension and collections from customers, and investor relations. Financial modelling entails income statement and balance sheet forecasting. Investor relations involve responding to calls from investors, preparing investor materials and going to visit various analysts.

The company contracts out the following activities tax returns and tax planning, valuations, filing of regulatory documents on SEDAR and EDGAR, printing of financial documents and managing of cash (investment management). For example, Sierra Wireless uses CIBC World Markets to perform company valuations in preparation for acquisitions.

3.3.2 Legal Services

The legal department is responsible for drafting, reviewing and interpreting sales and licensing agreements such as non-disclosure agreements (NDA), contracts, software license agreements and end user license agreements. Other legal activities, related to securities and intellectual property patents, are contracted out.

3.3.3 Quality

The quality department is responsible for ensuring that the company develops products, which conform to, and anticipate, future customer needs. For example, it monitors the quality of software, firmware, hardware, mechanical devices, manufacturing testing and beta trial verification testing. In addition, the quality team performs functional, cosmetic and performance audits throughout the manufacturing cycle. For example, every month the quality team gathers five units randomly from a product line and carries out an audit.

Outsourced activities include: protocol lab testing, temperature cycling testing and carrier field trials. OEMs embedding Sierra Wireless's modules will work with operators to certify their products and therefore Sierra Wireless's modules on an operator's network.

3.3.4   IT Services

The IT services department takes care of network administration and security management. For example, a new initiative is underway to implement secure ID key chains with unique pass codes that grant access to laptops and PCs.

The company has invested in a JDE ERP system that provides the following functionality: financial management, manufacturing and supply chain management, human resources management and internal supply management. Another initiative is underway to implement a Pivotal CRM system for the sales team.

Web development is done by CMI, and spam filtering by FrontBridge.

3.3.5   Management

An executive team and a board of directors form the management team. There are 12 people on the executive team—the CEO, the COO, the CFO, the CTO and ten vice-presidents representing the areas of marketing, engineering, finance, operations, sales, customer support and IT. The board of directors is made up of six independent directors and the CEO. The major role of the board is to approve and contribute to the development of the company's strategic plan.

At the strategic level, the executive team develops the strategy, and the board of directors reviews and approves it. The strategy covers the business and industry outlook, a SWOT analysis and a product roadmap among other things. The main purpose of the strategy is to develop the annual business plan and financial budget. A strategy meeting kicks off the process in the fall, and a subsequent meeting takes place in the spring to evaluate the status of the plan.

At the product level, members of the executive team review and approve new product concepts and business cases. Product concepts require approval signatures from the VP of Operations, VP of Engineering, VP of Marketing and one of the CEO, COO and CTO. Business cases require approval signatures from the CEO or COO, VP of Marketing, VP of Sales, VP of Operations and VP of Engineering. The product approval process is slow due to the number of members involved and in the past has led to the cancellation of many new developments because of decision-making delays.

3.4 Human Resource Management

The human resource department is responsible for recruiting, training, compensation, payroll and benefits administration. The recruiting is done in house and also outside with assistance from Westcoast HR services and executive search firms. Training is funded by the company and involves sending employees to conferences and outside educational programs such as the MICA leadership training or the Stanford Executive program. Employees may request assistance with other training, such as undertaking an MBA program. The compensation is done internally and consists of cash and a stock option plan that is derived from annual performance reviews. The benefit administration consists of enrolling employees in the Maritime Life plan and working with a broker who oversees renewals and the addition of new benefits. The payroll is outsourced to a provider, ADP, which takes care of payroll processing, deductions, pay slips and T4s. In the past, the company offered stock options to its employees as an incentive to retain them, but today it has replaced this with a 3% RRSP and a stock options matching program. A significant issue that high-technology companies face is that when the market picks up, there is a surplus of jobs and people start leaving their current jobs. In 2004 Sierra Wireless's turnover started at 3% in Q1 and was trending downward to 1.6% in Q3. From Q4 of 2004 until Q1 of 2005, the turnover increased to 3%. Employees are leaving to find opportunities at other companies.

3.5 Technology Development

Sierra Wireless's technology development consists of ten activities that improve the product and the process.

First, intellectual property rights (IPR) management focuses on preparing applications for patents on concepts that are used in products, preparing applications for trademarks such as the AirCard™ PC card product name, obtaining copyrights on artistic representations, protecting trade secrets and monitoring infringements. Sierra Wireless currently holds 68 patents and uses a bonus incentive to encourage employees to develop intellectual property. Patents can originate from any product and may protect innovative mechanical and software component concepts and designs. In addition, the IPR team ensures that Sierra Wireless complies with patents and trademarks from other companies when entering into licensing agreements. For example, the PC card bottom label requires displaying Qualcomm patents. A law firm in San Jose does the actual filing and registration activities. The company uses non-disclosure and confidentiality agreements with its employees and partners before allowing access to its proprietary information.

Second, as a founder and member of the WirelessReady™ Alliance, Sierra Wireless is able to borrow and test member laptops and PDAs to ensure interoperability with its modem products. This helps deliver better mobile solutions to end users without a large financial investment.

Third, the product life cycle (PLC) methodology is a sequence of practices followed by Sierra Wireless for designing, developing, producing and delivering a product from initial concept through production and release. A core team approach is used to manage the product's PLC through a defined set of project phases: concept, planning, design and development, qualification testing, introduction, general availability and end of life. For example, the planning

phase requires the development of the business case, marketing requirements, engineering functional specifications and product development plan. A core team is a "whole product" team with each member being responsible for the various functions required on a project, such as engineering, marketing, support, operations and quality. In addition, the leaders of the engineering team define development standards to be used on all development projects for PC cards, rugged modems and embedded modems. An example of a standard is defining the smallest common hardware and radio module that supports the interfaces (serial, USB, PCMCIA) of all the product lines. If a team is developing a new PC card following the common module methodology, after completing the testing, it can re-use the technology to develop an embedded module or a rugged modem. This way, the company can reduce the development cycle time and the time to market. Similarly, the software team develops standard components that can be re-used across products. An example of this is re-using the graphical user interface modem software from an older product generation on a new development.

Fourth, project teams are employed to develop new products. Twenty to twenty-five people from different engineering disciplines such as mechanical, hardware, embedded software, Windows software and radio frequency engineering form a typical project team. Other team members bring expertise in project management, product management, quality, documentation and technical support. In a project, each engineering discipline has a team leader and two to three engineers, depending on the complexity of the program. Engineers make up the majority of the team. Sierra Wireless has R&D capabilities located in Richmond, BC and Carlsbad, CA, with approximately 148 engineers.

The US facility resulted from the acquisition of a company called AirPrime. The complete integration of AirPrime and Sierra Wireless took four months and, ending in December of 2003. In 2004, the two companies started running as a combined entity. Although the people aspect integrated well, there is still work to be done in the process and technology areas.

In Carlsbad, Sierra Wireless develops CDMA products, and in Richmond GSM products. Functional managers control the allocation of resources for projects. The project manager has to work with different functional managers to staff a project team. In Carlsbad, resources are shared for a portion of the time across multiple projects, whereas in Richmond resources are assigned to a project for the duration. Sometimes it is difficult to embark on new GSM programs when resources are occupied in current projects, but the company is leveraging its US R&D capabilities to assist in the development of new GSM products. For instance, if hardware resources required for a new GSM development are tied up with projects in Richmond and Carlsbad has not used up all of its hardware resources time, a multi-sited project may be undertaken. Richmond may develop the software and Carlsbad the hardware. This way, resource utilization is maximized. The downside lies in having two teams separated by a considerable distance, making it difficult to communicate. This requires extensive communications and site visits to ensure the teams are aligned to the same goals and objectives. The decision to set up a multi-site team project is discussed by the CTO and his two reporting VPs of Engineering (USA and Canada).

Fifth, equipment and knowledge sharing is practiced across the company. Different projects sometimes require the same equipment, but only one set is available due to the high cost. Project managers encourage team members to share equipment. For instance, the company has only one acoustic testing system, in San Diego. If a Vancouver project requires acoustic testing during the development phase, the project manager will arrange to send units to San Diego for the testing. Knowledge sharing is done in several ways. First, at design reviews, team leaders from other projects are invited to provide feedback on the designs, based on their own experience. Second, documentation is available on the network to all employees, and status reports are distributed by email to all team members and the executive team weekly. Third, monthly project reviews take place with all project leaders across the company and the executive team. Finally, lunch and learn sessions from different functions take place monthly to educate other functional

areas in a project. For example, the software team could show the product's software architecture diagram in an attempt to educate and include hardware and radio frequency engineers.

Sixth, infrastructure provider relationships are leveraged to get lab access for testing. For example, during the development of the 3G CDMA wireless modem for North America, instead of buying an expensive airlink protocol tester, the company relied on its partner, Lucent Technologies, and sent engineers to Lucent's lab facilities every month to test the new modem with the real infrastructure.

Seventh, production capacity management and process improvement activities carried out by Sierra Wireless's contract manufacturer, Flextronics, permit the company to meet customer demands at a lower cost. For example, if a customer requests an order of 10,000 units, the factory has the ability to quickly scale up production and build 5,000 units per week, completing the order in two weeks. In addition, if the factory encounters significant falloff in the number of units it is supposed to produce during the build and test process, it immediately stops the line and employs resources to resolve the issues before continuing to build more units. This way, build and test times are controlled.

Finally, market research involves three activities: market analysis, research projects and competitive analysis. Product management across all product lines uses this market research information to explore business opportunities and develop business cases. Also, this helps the marketing team to develop product branding and messages that create awareness.

The market analysis uses market data and research reports from Gartner, Ovum and iGillott to study the wireless modem market, market developments, the competitive landscape and technology evolution. News stories and customer and channel feedback form part of this analysis.

Research projects, such as focus groups, are used to gather feedback on products directly from the end users. The incentives used to attract a focus group include: the chance to try a new technology, free service for two months, free product, and a $50 gift for attending. The data is collected weekly via web surveys.

The competitive analysis involves tracking the competition by reviewing their websites, press releases, presentations and financial reports and by receiving feedback from customers and channel partners. Further, competitive testing is done to analyse competitive differences, customers and product features offered by the competition.

3.6 Procurement

The purchasing activities at Sierra Wireless include the buying of lab and office equipment and of prototype parts. The lab equipment sourcing and maintenance is taken care of by the lab manager, and the IT department sources the office computer equipment, printers and copy machines. Typically, one brand is selected for the whole company to get volume discounts. Administrative assistants procure office supplies such as pens and log books. The development buying team procures parts for the prototypes in volumes of 1,000 to 2,000 units during the development phase. The development phase requires many prototype builds of 50-100 units at the early stages, followed by a 1,000 run at the last stage. This team is also responsible for negotiating good prices and cost reductions since the members of this team are the first company employees involved with electronic part vendors.

At the product production stage, the sales-operations team orders the final product from Flextronics, which takes care of the procurement of all parts for the product. This team must also provide regular forecasts of the number of units to build. The development buying team monitors the pricing from the vendors that sell the most expensive components to see if it can be improved.

3.7 Primary Activities

Sierra Wireless adds value through five primary activities: pre-marketing and sales, inbound logistics, operations, marketing and sales, outbound logistics, and service.

3.7.1 Pre-Marketing and Sales

Pre-marketing and sales responsibilities include product management, market development and pre-sales. These activities occur before the product is designed and built. There are approximately 28 people in marketing and 23 people in sales.

Product management responsibilities include overseeing product development, following the product life cycle (PLC) and leading core teams. The product management team is in charge of understanding user needs and creating and delivering a business case and marketing requirements to the engineering team. In the marketing requirements documents, there is a section to specify the Stock Keeping Unit (SKU) requirements. Typically, the options for PC cards and rugged modems include: voice and data, data only, North America (frequency support), Europe (frequency support), Sierra Wireless branded, co-branded, and network operator branded. The embedded modems' SKUs are similar to the others with the exception of branding; for these, the OEM integrator does the branding. In addition, the product management team develops a product launch and beta testing plans and is responsible for product documentation and promotional material. The product launch plan must have key dates when the product is to be completed and approved for use with defined operators. The beta testing plan involves selecting key customers, shipping the product with the software and defining a method of supporting the product and collecting feedback.

The market development responsibility consists of working with lead customers, channel partners and industry specialists to validate concepts and prototypes. This helps the company increase interest, solutions and demand for its products.

The pre-sales activities are comprised of winning supply agreements with operators or OEMs before the product is built. In this case, the operator and OEMs drive the product requirements. Sierra Wireless' sales force meets regularly with OEMs and operators to pitch new product ideas.

3.7.2 Inbound Logistics

Inbound logistics occurs in two phases. First, Sierra Wireless's internal development buying team gets involved at the prototype development stage to procure, receive, store, inspect, handle and control the inventory of parts. The development team has to prepare a "build of materials" (list of product parts for each prototype (three to four builds of 50 units), which the buying team uses to procure all parts in volumes lower than 1000 pieces. Parts are received and stored at Sierra Wireless for a short period of time until all parts have been received. An inspection then takes place to ensure that the quantities and part numbers are correct and that there was no damage to the parts. In addition, parts are checked and recorded against the build of materials. Once all the parts have been received and checked against the build of materials, Sierra Wireless ships the kit of parts to Flextronics's prototype build facility in the US. Some parts come with a minimum order quantity of 1,000-2,000 pieces, so the buying team has to control the inventory to ensure leftover parts can be used in subsequent builds or sold to the factory when the development stage is complete. It is expected that the list of parts will change after the test completion of prototype build.

Second, when the product is ready for mass production, Flextronics's build facility in China gets involved. Once the Sierra Wireless engineering team has completed the prototype build phases and the product meets the airlink specifications, regulatory requirements and customer requirements, a final list of parts is produced. This list is handed over to Flextronics-China to procure, receive, store, inspect, handle and control the inventory of parts.

3.7.3 Operations

The operations activities are associated with transforming inputs into finished products. After the business case and marketing requirements for a product are finalized, the project manager works with the functional team leads to create a functional specification (what engineering commits to design), product specification (what is promised to be delivered to the customer) and the whole product development plan. The development plan includes a development strategy, risks and assumptions, resource requirements (manpower and equipment), development costs and a detailed schedule. The project manager is critical to ensure the team is committed and completes the product development on time. One hundred forty-eight people are involved in engineering development, and 21 in manufacturing activities.

Using the functional specification and the development plan, the engineering team carries out the software design, then develops and tests the hardware, radio frequency (RF), mechanical, Windows software, embedded software (firmware) and manufacturing test software components.

The design and development stage of the hardware, radio and mechanical components require high-level and detailed documentation (schematics, PCB layout, CAD models, build of materials, drawings, test plans, etc.). After a review of these, prototypes are built. The verification for the hardware, RF and mechanical components is done on each prototype build, manually in the lab to ensure that the prototypes work. Typically a project requires three engineering 50-unit prototype builds and a small 200-unit pilot run (SPR) build. After each build, defects are found and resolved before subsequent builds. The defect rate should be minimal at the SPR build.

The design and development phase of the Windows software (graphical user interface), embedded software (modem software) and manufacturing test software also requires high-level and detailed documentation (requirement specifications, design documents, test plans, etc.). After a review of these, the code is written, tested and debugged. Those working in this area are

responsible to ensure that the software/firmware works at each prototype stage. Software and firmware releases are made available. Typically a project will include three major releases of software: alpha, beta and final. Defects encountered at each release are resolved on subsequent releases. The defect rate should be minimal at the final release. All software and hardware defects are stored in a web tracker and reviewed periodically.

The manufacturing test software development is divided into four major sections: smoke test (all inputs and outputs are working), functional test, performance test and configuration of user/operator settings. The test sections use computers, fixtures and test equipment. The separation of the test sections allows flexibility to better utilize the test time. For instance, while a unit is busy in the performance test station, another unit can start the smoke test in parallel. This test software is developed throughout the program and is expected to be fully functional at the SPR build. For builds of 50 units, engineers test the hardware manually.

The product verification team starts an integrated verification when the hardware and software is stable and ready for user testing. This takes place when SPR prototypes are ready, running beta software, and the documentation is complete. Furthermore, a two-week beta trial takes place with selected customers. The support team manages this program and gathers customer feedback.

The approvals team is responsible to perform interoperability testing with infrastructure vendors and wireless operators. This team's mandate is to obtain the operator's product approval for use in its network.

The technical writers create the customer documentation such as the pocket quick start guide, user guide and data sheets.

The printing of the customer documentation, CDs, labels and packaging boxes is contracted out.

Maintenance of line activities involves developing new features, localizing the product and fixing bugs, utilizing embedded software and windows software resources. Localizing the product, including translating the software and documentation into different languages, is outsourced to a company called Welocalize. This company does the translations and qualification testing. At the completion of the localization, Sierra Wireless uses internal native language speakers to audit the deliveries.

Engineering activities, including R&D design and development, are done extremely well. The company has learned to develop high-performance, reliable products.

Sierra Wireless's manufacturing uses an outsource business model. The company has partnered with Flextronics, the largest contract manufacturer in the world, with operations in 29 countries. The supply chain has a one-phase manufacturing structure at the development stage and a two-phase manufacturing structure at the mass production phase.

At the development stage, prototypes are built in San Jose, CA. There is no testing done at the factory in the first three prototype builds, but Sierra Wireless engineers will be on site during the build for support. After the build is complete, the testing is done at Sierra Wireless. At the SPR build, Sierra Wireless test engineers do trials and training of the complete manufacturing test line. Once the test line is proven to work, the product is moved to the production facility in China.

At the mass production stage, the product is first built in Xixiang, China and then configured and packaged in Memphis, USA.

Operations management involves coordinating build schedules, producing factory work instructions and documentation, and providing feedback to engineering on factory issues reported at all locations to ensure the product is designed for manufacturability. The manufacturing test team is available to support the factory when issues occur.

Decisions need to be sped up. Delays in approving projects and cancellations are restraining the speed of development.

3.7.4 Outbound Logistics

Customers (operators, resellers, OEMs) can order the product via a purchase order through the company's sales force or its e-commerce web store. When an order is placed, the sales-operations team passes the order to the operations team, which in turn passes the order to the Memphis location. The order must identify a product's SKU. For example, SKU #1100091 is the AirCard 750 GPRS (European standard) wireless PC card. For each product line, there are many SKUs that contain customizations for specific customers (big operators) such as labels, packaging and languages. The Flextronics fulfilment (configuration and packaging) location (in Memphis, USA) receives the order with the SKU and shipping address. It configures and packages the units according to the SKU's specifications and ships them directly to the customer. The sales-operations team manages the order transaction cycle until it ships and then notifies the customer.

Sierra Wireless has a contract warehouse facility in Vancouver, which carries accessories. For instance, PC card accessories include a headset, a leather carrying case and antenna adapters. Orders for these items are also placed with the sales team or through the e-commerce store, and the accessories are shipped directly from Sierra Wireless's small shipping facility.

3.7.5   Marketing and Sales

Marketing activities also include product management, marketing communications, marketing programs and sales. These activities occur after the product is designed and built.

The role of product management in this cycle of the PLC is to execute the product market launch. Marketing communication centres on communicating the product position to channels and customers. This is done in several ways by using media such as business and trade publications, industry associations, contacts with opinion leaders and industry analysts, conferences and trade shows.

Marketing programs such as the WirelessReady Alliance are developed with channel partners to provide complete business solutions and to increase end user adoption. In addition, Sierra Wireless offers promotional material (brochures, gifts, presentations, product literature) and training for OEMs, operators and resellers. To ensure Sierra Wireless's business partners are successful in sales and support, the marketing team provides free on-site and web-hosted training.

The Sierra Wireless sales team is spread across Europe, North America and Asia Pacific to sell products to operators, resellers, OEMs and enterprise customers in 36 countries and 63 networks. The majority of enterprise customers buy Sierra Wireless's products through resellers. The sales team is also responsible to provide sales forecasts every month. Moreover, a secure and user-friendly e-commerce web store is used for selling products and accessories. The sales force gets a percentage of the product's gross margin. For instance, a regional sales manager could make 0.53% of the product gross margin in commission.

3.7.6   Service

The service department provides technical and product support to customers and channels through telephone, email, the company's website and field technicians.

The team has approximately 12 members who have technical expertise in operating systems and are fluent in different languages. A customer can call Sierra Wireless's toll-free number from any part of the world and request technical support for free.

The website has product documentation, technical specifications, software downloads, a question and answer section, troubleshooting wizards and notes, and a frequently asked questions area. In addition, the team does web surveys to get feedback on the quality of its technical support. Over 96% of surveyed customers rated Sierra Wireless's technical support higher than other companies' technical support. Customer satisfaction scores 4.5 out of 5. The goal of the website is to provide customers with tools and knowledge to help them resolve issues by themselves. The company is very effective in delivering on-line self-support. In August of 2004, the team received 800 calls but resolved 8,000 issues electronically.

Field support consists of a team of approximately ten field application engineers, who are available to work on site if a customer runs into problems that cannot be resolved over the phone. This team works with resellers and customers to eliminate any technical obstacles in any sales opportunity.

Furthermore, products have a standard one-year free warranty. The service department will replace any unit that is returned and deemed defective by a customer within one year of purchase.

Customer service activities are done extremely well at Sierra Wireless. Surveyed customers rate Sierra Wireless's technical support higher than that of other companies.

3.8 Culture of the Firm

The culture at Sierra Wireless is based on its corporate story, teamwork, communications, social activities, community work and career development.

The corporate story is the history of the company. In the past, the founders have presented the story in town hall meetings. Today, the presentation is available to all employees. The story begins by describing the mission of the company, the idea behind the company, the securing of funding and the beginning of the company's operations, in a warehouse. It describes the evolution of the company's products, including ups and downs, revenues and shipments from 1994 until 2001. Furthermore, it touches on the IPO and the foundation of the WirelessReady Alliance, and ends with several key statements that constitute the Sierra Wireless way. First, people make the difference, and employees have to think strategically and act aggressively. Second, complacency kills, and only the paranoid survive. Finally, employees must run a marathon and not a sprint.

Teamwork is strong at Sierra Wireless and is present throughout the product life cycle. Traditionally, project managers were empowered to make all decisions throughout the entire development cycle, but this method had a few shortcomings in product quality, customer satisfaction and product marketing. First, units were shipped with incomplete packaging such as missing user guides or CDs. Second, customers calling for support discovered that the support staff knew nothing about the product. Last, products were developed without a business case. The Sierra Wireless core team approach is based on a multi-disciplinary team that is responsible to own the product from beginning to end and has the goal to have all parts of the product ready at the same time. Five leads representing marketing, engineering, support, operations and quality form a core team. The engineering representative is the project manager, and the marketing representative is the product manager.

Another aspect of the company's excellent teamwork occurs in the way engineers tackle problems. Team leads and project managers encourage team members to talk about their problems with colleagues in meetings. This has helped resolve problems quicker and has developed teams that are open, share their knowledge and avoid competition.

Communication also plays a key role in the Sierra Wireless culture. There are several ways the company communicates and shares information. First, the CEO chairs quarterly meetings with all employees to discuss financial results and provide an update of the business.

Second, project meetings consist of status meetings, program review meetings, ad hoc meetings and lunch and learn meetings. Status meetings take place every week at different levels of the organization such as meetings of the core team, the engineering project team and the project function team. These meetings provide a weekly update on progress and issues. The COO, the VP of Marketing and the VP of Engineering host program reviews. The purpose of these monthly meetings is for the core teams to present the status of their projects. This is a half-day event, and every project participates. Ad hoc meetings take place when email communications that include many people create a trail that becomes difficult to follow. Ad hoc meetings are also used to resolve problems. Lunch and learn meetings occur once per month, they take place at lunchtime, and the audience is a project team. Participants bring their lunches to the meetings and have the opportunity to learn about key topics from other disciplines. For instance, the hardware team could make a presentation about the hardware design of the product to the rest of the project team.

Third, the intranet contains information from all departments and has the purpose of educating people from one department on what is going on in other departments. For example, the marketing department shares its market research information for all products with the other departments. Furthermore, this site has information about company events, employee photos, a product search engine, a product photo gallery, etc.

Lastly, there is corporate newsletter that is published every quarter. This newsletter includes interviews with employees, corporate updates and information on social events.

Social activities at Sierra Wireless are managed by a committee. This committee is made up of employee volunteers and organizes company and community events. Company events include the anniversary party, the Christmas party and a golf tournament. Community events include the United Way campaign and sponsorships for Science World, the junior Whistler cup and others.

3.9 Financial Analysis

3.9.1 Discussion of Income Statement

Figure 3-2 below shows the income statement from 2000 to 2005. Revenues show an aggressive positive trend to 2004, when the company's revenue reached $211 million. Expenses for sales and marketing and for research and development continue to increase over time as the company adds new products to its portfolio. The company was profitable in 2003 and 2004. In 2004, the company achieved record earnings of $25 million. Even though Sierra Wireless has used a differentiation strategy to become a market leader, it has been operating in a tough market in which to make money. The company has been in an accumulated deficit position for the past five years. The income tax expense fluctuates, showing that the company is using its capital losses from previous periods wisely. Revenues and profits have been trending upward, but in Q1 of 2005 the company's revenues dropped by $21 million compared with Q1 of 2004. This significant decline can be explained several ways. First, the wireless data market is becoming commoditized, competition is increasing, and the company is not able to sustain premium prices. Customers are opting for lower-cost products. Second, the company lost a key contract with palmOne to supply embedded modems for the Treo600. Third, the company is lowering selling prices and margins to remain competitive.

Revenues are likely to remain flat or to continue decreasing until Sierra Wireless introduces its new next generation products, which are going to be available later this year and at the beginning of next year. New products will offer first mover advantages and will help the numbers

in the short run, but in the long run the company needs to adapt its strategy to a wireless data commodity market.

3.9.2 Discussion of Balance Sheet

Figure 3-3 below shows the company's balance sheet from 2000 to 2005. Cash holdings are showing a positive trend, reaching $131 million in 2004. Accounts receivable continue to increase as revenue increases. However, inventories have increased dramatically in Q1 of 2005, indicating that the company is having trouble selling its products due to the increasing competition.

Long-term liabilities have decreased since 2003.

Share capital is increasing slowly and in Q1 of 2005 reached $218 million.

Figure 3-2 Income Statement

($US 000,s)	2000	2001	2002	2003	2004	2004**	2005**
Revenue	53,476	62,348	77,130	101,709	211,205	41,641	20,180
Cost of goods sold	29,067	47,035	69,132	60,551	127,600	24,839	13,055
Gross margin	24,409	15,313	7,998	41,158	83,605	16,802	7,125
Expenses:							
Sales and Marketing	9,907	12,726	11,564	11,585	20,029	4,173	4,289
Research and development	11,662	16,902	14,896	15,994	24,527	4,739	7,261
Administration	5,915	10,460	4,708	6,597	8,993	2,064	2,935
Restructuring and other charges			12,869	1,220	289		
Integration costs				1,947			
Amortization	2,654	2,084	2,331	2,327	2,438	636	691
	30,138	42,172	46,368	39,670	56,276	11,612	15,176
Earnings (loss) from operations	(5,729)	(26,859)	(38,370)	1,488	27,329	5,190	(8,051)
Other income	3,974	2,317	170	965	1,989	84	535
Earnings (loss) before income taxes	(1,755)	(24,542)	(38,200)	2,453	29,318	5,274	(7,516)
Income tax expense	1,363	(273)	3,463	198	4,398	704	78
Net earnings (loss)	(3,118)	(24,269)	(41,663)	2,255	24,920	4,570	(7,594)
Deficit, beginning of period	(4,514)	(7,632)	(31,901)	(73,564)	(71,309)	(71,309)	(46,389)
Deficit, end of period	(7,632)	(31,901)	(73,564)	(71,309)	(46,389)	(66,739)	(53,983)

** Three months ended March 31

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Figure 3-3 Balance Sheet

($US 000's)	2000	2001	2002	2003	2004	2004**	2005**
Assets							
Current assets:							
Cash and cash equivalents	6,891	12,085	34,841	70,358	131,846	62,601	94,898
Short-term investments	72,144	31,879		14,760		20,369	25,838
Accounts receivable	22,588	10,504	13,865	21,566	22,506	22,652	15,583
Inventories	12,560	25,591	6,673	1,511	11,090	2,096	18,691
Deferred income taxes	506	224					
Prepaid expenses	1,239	1,180	864	2,223	5,021	1,956	4,622
	115,928	81,463	56,243	110,418	170,463	109,674	159,632
Long-term investments							
Fixed assets	7,500	14,694	7,198	24,639	10,044	32,331	11,176
Intangible assets	8,904	10,054	6,907	5,985	14,208	6,551	13,920
Goodwill				14,620	19,227	15,354	19,227
Deferred income taxes	3,733	4,030	500	19,706	500	20,022	500
Other		483	241	500	1,152	500	1,039
	136,065	110,724	71,089	175,868	215,594	184,432	205,494
Liabilities and Shareholder's Equity							
Current Liabilities							
Accounts Payable	20,683	4,356	3,017	5,966	4,122	2,634	4,307
Accrued liabilities		12,555	12,431	22,221	33,890	26,558	31,414
Deferred revenue and credits	750	1,050	297	399	461	250	664
Current portion of long-term liabilities	736	341	2,803	1,328	758	1,328	559
Current portion of obligations under capital lease		947	831	141	664	87	619
	22,169	19,249	19,379	30,055	39,895	30,857	37,563
Long-term liabilities	83	671	2,896	2,266	1,747	1,935	1,680
Obligations under capital lease		761	60		287		182
Shareholders' equity							
Share capital	122,174	122,673	123,047	214,047	218,805	217,241	218,827
Additional paid-in capital					440		440
Warrants				1,538	1,538	1,538	1,538
Deficit	(7,632)	(31,901)	(73,564)	(71,309)	(46,389)	(66,739)	(53,983)
Accumulated other comprehensive income	(729)	(729)	(729)	(729)	(729)	(400)	(753)
	113,813	90,043	48,754	143,547	173,665	151,640	166,069
	136,065	110,724	71,089	175,868	215,594	184,432	205,494

** Three months ended March 31

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3.9.3 Discussion of Financial Ratios

The figure below shows the key financial ratios for the years from 2000 to 2005. Sales growth had been increasing steadily until 2005, when the revenues dropped substantially. The gross margin, net operating margin and EBITDA margin were steadily decreasing to 2002 and then started increasing to 2004. In 2005 these ratios started decreasing again. The most recent gross margin number is still comfortably above the industry average. The EBITDA margin, on the other hand, is well below the average of negative 0.10%.

There have been four major events that have negatively affected the company's financial position. In 2001, Metricom, the sole operator of Ricochet wireless technology, committed to a 12-month supply agreement to purchase $33 million in Sierra Wireless PC cards, but Metricom filed for bankruptcy and only bought $4.5million. As a result, Sierra Wireless had to write down the remaining inventory and reduce its staff from 290 to 260 people. In addition, the economic slowdown forced Sierra Wireless's customers, operators, resellers and OEMs to reduce their inventories before buying new products. Gross, EBITDA and net margins were affected by the excess inventory, doubtful account charges and the economic slowdown. Excluding the inventory charges, gross margins reached 39.6%.

In 2002, the economic downturn continued, and enterprise spending decreased, resulting in a decline in sales of Sierra Wireless's 2G products. A supply agreement with AT&T Wireless for a large volume of Sierra Wireless GSM PC cards was not met due to delays of the operator's final approval. Contractual discussions between the two companies led to Sierra Wireless suspending the sales order for the entire volume commitment. To reduce operating expenses, another workforce reduction from 275 to 180 people was made. The restructuring costs included severance packages, inventory charges against CDPD and 2G CDMA products, fixed and

intangible asset charges and facilities charges. These factors affected the gross, EBITDA and net margins. Excluding restructuring and other charges, gross margins were 34%.

In 2003, the company had restructuring and integration costs resulting from the acquisition of AirPrime. Sierra Wireless wrote down R&D equipment, licenses and test equipment. Furthermore, it reduced its workforce by 19 employees and recorded facilities restructuring and integration charges. In spite of these charges, this year was a good one for Sierra Wireless, as sales increased due to the introduction of new 2.5G products and products previously sold by AirPrime.

In 2005, the company's revenues in the first quarter decreased by 51.5% compared to the same quarter in 2004. Revenues decreased for several reasons. First, increasing competition n the 3G EVDO market segment resulted in losing sales to Verizon Wireless. In addition, channels decreased their demand for PC cards in order to reduce their inventory levels. Second, the company lost a key customer (palmOne), resulting in a significant decline of embedded module sales from 43% in Q1 of 2004 to 11% in Q1 of 2005. Finally, there were no sales generated by the smartphone product line. There is speculation that palmOne may have decided to stop doing business with Sierra Wireless because the Sierra Wireless's smartphone product line competed directly with palmOne's Treo product line. These factors had a significant impact on Sierra Wireless's gross, EBITDA and net margins. Increasing competition from lower-priced products is forcing Sierra Wireless to decrease its prices, hitting directly on its margins.

The return on equity and return on invested capital trended downward to 2002 and then upward to 2004. In 2005 these ratios started decreasing again, showing that the fundamental earning power of Sierra Wireless's assets is declining.

Sierra Wireless's liquidity ratios, current ratio and quick ratio were decreasing in 2000, increasing in 2002 and decreasing again in 2005. The declining liquidity, accompanied by a sales decline, indicates that the company is having financial difficulties.

The debt to equity and asset to equity ratios fluctuated in 2002 and then stabilized starting in 2003. The low numbers indicate that the company does not use debt financing.

Figure 3-4 Financial Ratios

	2000	2001	2002	2003	2004	2004**	2005**	Industry Average *
Revenue growth		16.6%	23.7%	31.9%	107.7%		-51.5%	
Gross margin	45.6%	24.6%	10.4%	40.5%	39.6%	40.3%	35.3%	23.9%
EBITDA margin	1.7%	-36.0%	-46.5%	4.7%	15.0%	14.2%	-33.8%	-0.10%
Net Income/sales	-5.8%	-38.9%	-54.0%	2.2%	11.8%	11.0%	-37.6%	
Return on invested capital (ROIC)		-22.2%	-46.6%	10.8%	29.9%		-6.5%	
Return on equity (ROE)		-21.1%	-46.3%	4.6%	17.4%		-5.0%	
Current ratio	5.23	4.23	2.90	3.67	4.27	3.55	4.25	
Quick ratio	4.66	2.90	2.56	3.62	3.99	3.49	3.75	
Debt/equity	0.20	0.22	0.46	0.23	0.24	0.22	0.24	
Assets/equity	1.20	1.23	1.46	1.23	1.24	1.22	1.24	

** Three months ended March 31

*• Computer communications equipment average of 46 firms

Industry Average after Blazenko, 2004

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4 ISSUES

4.1 Wireless Operators Have Too Much Power

Wireless operators have a significant influence in the wireless data industry, and developing relationships with them is key to survival in the industry. First, the wireless operator has to approve the product for use in its network. The approval process takes several months, and without it no sales are possible even if there is a potential enterprise customer interested in the product.

Second, operators are enforcing common software features and functionality to reduce their costs. This reduces differentiation, reduces innovation and dilutes branding among wireless maker products.

Third, wireless operators are moving inventory risk to vendors. They do not commit to large volumes and focus on short-term product demand, making it difficult for Sierra Wireless to know how many units to build and keep in inventory.

Fourth, wireless operators are selecting lowest-cost products rather than the ones that provide the best solution for the end user. An operator that has to select one or two wireless modems among devices that lack significant differentiation will pick the cheapest one. A cheaper wireless modem will reduce the amount of money that the operator has to invest to sell the product.

Finally, when modem makers develop products focusing only on enterprise end user requirements and exclude operator requirements, they run the risk of having operators not being interested in reselling their products. An example of this is the Sierra Wireless smartphone. The

product had a rich feature set for the mobile user, but only one operator bought the product.

4.2 Embedded Market Growing Fast

By 2009, more than 14 million embedded modems are expected to be shipped worldwide. As this market grows rapidly and embedded cellular modems become standard in laptops, PDAs and smartphones, the embedded market will cannibalize the PC card market. In Q1 of 2005, PC card sales accounted for 65% of Sierra Wireless's total revenue. PC cards are the main generators of revenue for Sierra Wireless. If the company does not get some early design wins in the embedded market, it risks losing significant market share. Price competition in this arena will be even higher, given the lack of differentiation in functionality and size due to the monopoly of 3G chipset vendors. If this embedded market becomes extremely attractive and standard, laptop, PDA and smartphone vendors may decide to develop their own cellular modem solutions. This will reduce the need to buy embedded modems from cellular modem makers.

4.3 New Wireless Technologies

The increasing deployment of Wi-Fi technology and the appearance of WiMAX wireless technology may cannibalize the roaming enterprise market. The market segment of customers who are satisfied with wireless data access limited to Wi-Fi and WiMAX coverage is not going to require a cellular solution. If cellular operators do not integrate this technology into their offerings, they will lose customers to WiMAX service providers. If cellular operators integrate the technology and offer it as a complement, then customers will have the option to get both cellular and WiMAX services from the same operator, allowing them to use cellular coverage when WiMAX is not available and save some dollars.

4.4 Strategic Fit Not Aligned with the Changing Environment

Sierra Wireless has done well with a differentiation strategy designing innovative and premium products. However, this strategy is no longer sustainable in its present form given the key environmental changes.

Wireless data is becoming a standard, devices and software are becoming undifferentiated products, and price competition is increasing. Sierra Wireless needs to adapt its current strategy to the wireless data commodity market; otherwise, its revenue stream is going to disappear. Differentiation across Sierra Wireless products is decreasing due to several factors. The company has to focus on re-use of designs and standardization to develop new products faster and maintain the same look and feel across all products. On the hardware side, there is no more room for differentiation due to technology vendors integrating functionality backwards. Furthermore, since the technology vendors are concentrated, all wireless players must use the same reference designs. On the software side, wireless operators are enforcing common software features and functionality to ease their support costs. To counteract the differentiation obstacles, Sierra Wireless is investing in future technologies to be first to market. The drawback is that this provides a short-term advantage that disappears when the competition surfaces, and the firm is too slow in making decisions. To make this a true advantage, the firm must speed its decision making and transform the fleeting short-term advantages into a long-term advantage through continuous product leadership.

4.5 Slow Decision Making

Sierra Wireless's slow decision making has several drawbacks. New developments can get stuck in the planning phase for months. Numerous development plans, marketing requirements and business cases for new products are produced in order to facilitate decision making, but instead of aiding the decision-making process, this slows it down. Receiving a

unanimous consent from the CEO or COO, VP of Marketing, VP of Sales, VP of Operations and VP of Engineering on new product business cases sometimes takes too long. Decisions to cancel programs occur frequently, sometimes when programs are already in the execution phase. Last year, a PC card program and a smartphone program were cancelled.

The slow decision making affects the business negatively in adding unnecessary costs, reducing team morale and losing first mover opportunities. The cost to cancel new programs is significant. Teams need to be assembled, and the ramp-up takes time. Sometimes engineering parts, development equipment and licenses are procured and first and even second engineering (ENG) prototypes are built before a program is cancelled. Returning parts and equipment to suppliers harms the relationship going forward, and writing off inventory affects the company's financials. Team morale decreases when cancellations occur, reducing employees' faith in the company's new products. First mover opportunities vanish when the company takes too long to decide. When this occurs, there is no point in developing a new product when similar products from competitors are available. The company then has to wait for the next wireless technological breakthrough in order to have another chance to be first or is forced to source a solution from a competitor.

4.6 High Employee Turnover

Sierra Wireless has been experiencing a 3% employee turnover in the last few months. This can have a significant impact on productivity and development schedules. For example, the smartphone software team has been trying to find software candidates for weeks to replace the ones who left. It took four to five weeks to find a single candidate suitable for a position. Once a candidate is hired, it takes another three to four weeks for the person to ramp up and be productive when given a task. Jobs at Sierra Wireless have a significant learning curve, and there is a considerable time gap between the hire date and the date when the employee reaches a

minimum level of productivity. Development schedules have very tight deadlines, and development teams cannot afford to wait up to two months for an individual to be hired and get up to speed.

There are several reasons why employees are leaving the company. Some employees are finding better paying jobs. Sierra Wireless used to offer stock options with a four-year vesting period, and this was a great incentive for employees to stay with the company. In 2004, the company stopped its stock option plan and replaced it with a 3% RRSP and a stock options matching program. The stock option plan was great during the dotcom era, when the stock was rapidly appreciating, but not so great more recently, when the stock has not been appreciating.

Employees are able to move up the corporate ladder in other companies. The VP of Marketing left to run a start up as a CEO. A software director left to become a VP of Engineering. A software developer left to become a software team lead.

When employees experience program cancellations, they worry about the future of their jobs, and some leave to find job security at other companies.

5 RECOMMENDATIONS

5.1 Wireless Operators Have Too Much Power

Wireless operators have a significant influence in the wireless data industry, and developing relationships with them is key to succeeding in selling products. From the beginning, Sierra Wireless has fostered strong relationships with important wireless operators such as Verizon, Sprint, Cingular and Vodafone. Sierra Wireless is the operators' first choice when they need new wireless products. Unfortunately, the relationship advantage decreases when competitors surface and offer the same value at a lower price. There are several actions that Sierra Wireless could take to balance the power of operators. First, establishing relationships with infrastructure vendors such as Nortel, Lucent and Nokia would help Sierra Wireless get its products pitched by these vendors when they offer complete solutions to operators. Second, establishing relationships with big enterprise accounts such as Microsoft and Allstate Insurance would influence operators to accept Sierra Wireless's products and features. Finally, as the market for embedded modems grows, it is crucial that Sierra Wireless establish relationships with laptop, PDA and smartphone OEMs that have a recognized brand and are known for their volumes. They are likely to have power in deciding whether they want Sierra Wireless products to be part of their wireless business solutions.

5.2 Embedded Market Growing Fast

In five years, the market for embedded modems will grow large, and then it will become a standard offering in most laptops, PDAs and smartphones. Sierra Wireless has to start working on deals to embed its 3G products in the products of these device manufacturers as the future brings a possible decline of PC cards, which are Sierra Wireless's main generator of revenues.

The upside is that the company has already started investing in the future. In Q1 of 2005, it received two design wins to integrate its new embedded modules into the laptops of two large manufacturers. The downside is that before the company receives volume commercial orders, the development, integration and certification phases have to take place. Sierra Wireless has made a step in the right direction by starting to partner with laptop manufacturers. It should continue seeking deals with more laptop manufactures and also start looking at ways to procure PDA and smartphone deals. The company can use the reputation and experience of its early wins to generate more wins. It should not only concentrate on big players but also small ones. This will help close as many doors as possible to the competition.

5.3 New Wireless Technologies

The increasing deployment of Wi-Fi technology and the appearance of WiMAX wireless technology may cannibalize the roaming enterprise market unless wireless operators integrate the technology and offer it as a complement. Since Intel is already working towards supporting the wireless standard WiMAX at the CPU level, it probably does not make sense for Sierra Wireless to make an effort to develop WiMAX-capable PC cards or embedded modules. The window of opportunity is decreasing as Intel completes this offering. There are two things that Sierra Wireless could do to be better prepared when WiMAX becomes available. First, the company could develop and licence a software interface to manage Wi-Fi, WiMAX and 3G cellular connections. Second, Sierra Wireless could develop partnerships with WiMAX service providers and work with them to see if the company could develop new products for this market. Third, the company could develop intellectual property around a seamless hand-off between Wi-Fi, WiMAX and 3G networks once these technologies appear embedded in laptops. The company should do the same with PDA and handset manufacturers.

5.4 New Business Model

The company must develop a new business model around strategic R&D outsourcing and R&D offshoring to be cost effective. It should decrease its R&D expenses and manufacturing costs by using ODMs (Original Design Manufacturers) located in India or Asia and moving its R&D product development to Asia while keeping a leaner R&D team in Richmond and Carlsbad. India and Asia continue to have an abundance of graduating engineers available to work for low wages.

ODMs located in Asia and India lack a recognizable brand but provide large-scale manufacturing services and product design and development services. The main benefit of using ODMs is lower engineering labour, component sourcing and conversion costs. Asian ODMs should be used for developing product modifications to existing products where no new IP is created because the necessary IP is already in place. The effort required to ensure that the ODMs do not infringe on Sierra Wireless's IP and become competitors is lower since these products are already mature and have a market.

An offshore R&D centre (or centres) could be established by acquiring a PC card vendor's engineering team or a cellular data engineering service house located in Asia. Besides cheaper engineering labour and cellular data R&D expertise leverage, the main advantage would be in the creation and protection of Sierra Wireless's IP. An Asian R&D centre should be used for developing new and leading edge products where any new IP that is created would belong to Sierra Wireless. If an ODM were to develop the latest and greatest Sierra Wireless products, Sierra Wireless would run the risk that any new IP created would belong to both Sierra Wireless and the ODM. This means that the ODM could easily use the IP to become a competitor.

Even though Sierra Wireless's Asian R&D centre would be distant and culturally different, the company has the ability to manage it well for several reasons. First, Sierra Wireless

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is already a very multicultural organization, and it has many employees of Asian background who are bilingual. Second, the company already has experience working well with distant partners such as Flextronics and customers located around the world. Finally, the company could relocate a small number of people to ensure that the Asian subsidiary works well with the North American locations.

Transferring manufacturing to a low-cost country could save 15% to 20%, but moving it along with the R&D development could save more than 50% of the total development cost. It would be even more economical if the company found one Asian or Indian ODM and acquired one Asian R&D centre capable of developing products for both CDMA and GSM airlink technologies.

For this new business model to be successful, Sierra Wireless would need to modify its current strategy. The company is in a favourable position and could make good use of its cash (as of Q1 2005, $94 million) to make a strategic acquisition and cover the costs of adopting the new business model.

Moving the company from a solid differentiation strategy to a new business model around strategic R&D outsourcing will be difficult and requires a risk assessment. There is a risk that Sierra Wireless will not be able to effectively manage the new organization due to pre-established preferences and practices that are hard to let go of.

5.4.1   Product Strategy

The product strategy should rest on developing low-cost products fast while maintaining quality and performance. The development of new products should be in three categories: line extensions, me too products and product modifications. (Lukas, Hult, Frolick, 1996) Line extensions are new products that increase Sierra Wireless's established product line and are new

to the market. These products would be developed in house and in collaboration with Sierra Wireless's Asian R&D centre. Examples of these products include PC cards and embedded modules running the world's first airlink technologies. Concentrating the company's R&D resources in developing leading edge products would give Sierra Wireless the ability to be first to market.

Me too products are products that are not new to the market but are new to Sierra Wireless. These products would be developed by ODMs. An example is a PC card or embedded module that operates at a frequency band suitable for Eastern European countries or Japan but is not supported currently by Sierra Wireless products.

Product modifications are products that result from modifications to existing products. These products would also be developed by ODMs. An example is modifying a PC card to develop an embedded module form factor or vice versa.

Handing off the development of me too products and product modifications to ODMs would give Sierra Wireless the R&D scale to develop many products per year.

The company should continue offering technical and product support to customers. However, it should focus on reducing costs by developing tools for customers to resolve problems on their own.

5.4.2 Marketing

Several factors have to be considered in the marketing area for the new business model to be effective. First, the company has to use an aggressive pricing scheme across its products. The low price of line extension products could be used to penetrate the market quickly, generate volume sales and create a barrier of entry to competitors. The low price of product modifications and me too products will allow the company to sustain its market share, generate volume sales

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and beat the competition. The keys to developing an aggressive product price are being able to leverage the ODMs or contract manufacturers into supplying low-cost component sourcing and conversions, finding ways to lower the cost of engineering development, and accepting a lower margin.

Second, managing relationships with ODMs is going to be critical for success. This will require managers with strong communication, negotiation and business skills, as opposed to merely technical and operational skills. Managers will become the communication bridge between Sierra Wireless's needs and the services provided by the ODMs. Negotiations will be required daily to align the services with the requirements. Business skills are the key to understanding the organization's business needs and aligning them with the ODMs' services. In addition, top management must get involved in constantly reviewing the relationships and giving them proper direction. With good ODM partnerships, Sierra Wireless will have the economies of scale and part sourcing power to negotiate better airlink chipset pricing and win wireless operator product bids. These relationships will require constant attention since a separation from an ODM partner will impose severe switching costs and potential IP infringements on Sierra Wireless. To be prepared for an extreme situation like this, Sierra Wireless should also have a second source ODM.

5.4.3   R&D Expenses

In the new business model, when developing line extension products, the Carlsbad and Richmond R&D facilities would be responsible for the project management and design of the products, including hardware, radio, mechanical, embedded software, Windows software and manufacturing test software components. High-level and detailed documentation should be completed and reviewed before it is handed over to the Sierra Wireless Asian R&D subsidiary. An example of the documentation required is that the documentation for the Windows software

should include requirements specifications, design documents and test plans. Sierra Wireless's Asian R&D facility would build, verify the prototypes and, write, test and debug the software code. Richmond and Carlsbad would review the changes made in the Asian R&D centre to the initial hardware and software designs. Furthermore, Richmond and Carlsbad would perform the product certification testing required for European and North American wireless operators.

When developing me too products and product modifications, the project management would be done in Carlsbad or Richmond, depending on the product's airlink technology. The assumption here is that design documents for the hardware, radio, mechanical, embedded software, Windows software and manufacturing test software components are available already from existing products. These would be handed over to the ODMs, which would do the prototype development and verification and the software implementation, testing and debugging. Sierra Wireless would have to request reviews at different points of the project and receive prototype samples for testing. Testing would be required again to ensure the final product meets the specifications.

Even though both an ODM and a Sierra Wireless Asian R&D subsidiary offer a cheaper engineering labour rate, the ODM method could incur significant costs that should be considered. Testing of prototype samples would need to be conducted at both the ODM and Sierra Wireless locations. Project management would be required at the ODM's site to coordinate the activities of product development, but project management would also be required at Sierra Wireless to guarantee a product that meets the requirements. Another cost would be monitoring ODM partners to guarantee that there is no infringement of Sierra Wireless's intellectual property. The company needs to enforce policies to safeguard its IP.

5.4.4 Structure

The Sierra Wireless internal PLC processes are no longer practical to develop products using different R&D locations (Carlsbad, Richmond, Asia) and ODMs. There has to be a simplification of processes, paperwork and sign-off gates to allow Sierra Wireless's Asian R&D facility and ODMs to develop products using their own engineering policies and procedures. This will allow the company to work efficiently across all facilities, deal with cross-cultural differences and achieve the speed required to develop products.

New processes are required to continuously monitor costs of activities, set clear targets and requirements that everyone can understand, and define communication guidelines.

5.4.5 Decision Making

Fast and informed decisions on what products to develop are going to become critical for success and survival in a commodity market. Sierra Wireless has to make smart choices faster than its competitors in order to sustain a competitive advantage.

Decisions to approve the development of products should not require the signatures of five executives and a hierarchy of three layers of decision makers. Reducing the number of decision makers and layers would give the company speed and minimal delays.

The company should avoid using the traditional and formal upward executive review of big product decisions. Instead, it should move these decisions down the management layers. This would prevent executives from putting off decisions.

Informed decisions require a constant watch over real time information. The company should institute a regular industry analysis review and an analysis of leads by channel and market segment, in addition to completing a product business case. This would help reduce the cancellation of projects underway and save big dollars.

Sierra Wireless must define a process to assess the success of decisions to approve the development of new products. If decisions are not successful, it is important that Sierra Wireless understand the reasons. This would help Sierra Wireless avoid running into the current trap of delaying decisions and cancelling projects.

5.4.6 Manufacturing

Even though Sierra Wireless has been able to reduce its product costs by using Flextronics, lower cost competitor products are still beating Sierra Wireless. For instance, the competitor Novatel Wireless uses a Korean LG subsidiary contract manufacturer and is able to develop even lower cost products. Sierra Wireless needs to immediately find another contract manufacturer that offers lower component sourcing and conversion costs than Flextronics. The new contract manufacturer could be part of the ODM or a standalone manufacturing house. ODMs that possess state of the art manufacturing facilities should preferably carry out both the development and manufacturing activities of products in one location. This way, costs would be lower, it would be easier to communicate and resolve issues, and the company could just pay once for a designed and manufactured product. Since the company develops products for two technologies, it would also be cost-effective to have one ODM centre that could do both CDMA and GSM development and manufacturing. Sierra Wireless should continue using Flextronics until another ODM or another contract manufacturer could prove its manufacturing capabilities. Flextronics should be used as a benchmark. Once an ODM or another contract manufacturer has proven that it is capable of manufacturing Sierra Wireless products that are as good as or better than those produced by Flextronics, the company should negotiate better pricing with Flextronics prior to moving the manufacturing of in-house products to another place.

5.4.7 Labour

The ODMs and Sierra Wireless's Carlsbad, Richmond and Asian R&D centres would require familiarity with 3G airlink technologies and have engineering skills in hardware, radio frequency, mechanical, embedded software, Windows software, and manufacturing test software components, but at different levels of expertise. Carlsbad and Richmond would need senior and expert engineers with over ten years of related experience to concentrate on the high-level design of products. The ODM and Sierra Wireless's Asian R&D centres would take the designs developed at Carlsbad and Richmond and focus on the implementation. Intermediate, junior and senior engineers with up to five years of experience would be suitable for these activities. The development of line extension products would require a project manager with a minimum of six people in Carlsbad (CDMA) or Richmond (GSM) to carry out the design of the hardware, radio, mechanical and software components. In addition, two people in Carlsbad or Richmond would be needed to carry out the wireless operator and infrastructure certification testing. Sierra Wireless's Asian R&D facility would require around 15 to 20 people to develop and test a new product.

The development of me too products and product modifications would demand a project manager and a test team of three people in Carlsbad or Richmond. The test team would verify the performance of the hardware and software at different stages of product development. ODMs would also require a project manager and a development team of at least 25 people to develop the products.

5.5 The Reshaping of Sierra Wireless

The new business model calls for re-engineering Sierra Wireless to establish design houses in Carlsbad and Richmond and move R&D project development to Sierra Wireless's Asian subsidiary and ODMs. A team of approximately ten to fifteen engineers to perform the design and test of ODM products would be required at each of the Richmond and Carlsbad

locations. Assuming Sierra Wireless acquires an Asian R&D house that can do both GSM and CDMA, around 50 engineers would be adequate there to develop new products. This means that the company would have to downsize its current engineering headcount by about 50 people. Any engineer who does not have ten years of experience in the field and more importantly has no design experience in functional areas such as hardware, radio frequency, mechanical, embedded software, Windows software and manufacturing test software is a likely candidate to be laid off. Furthermore, the company must adjust its R&D management layers to reduce overhead. If the company is going to keep project teams in its Asian R&D centre, then it does not make sense to have directors of product development, functional managers and VPs of engineering at both the Carlsbad and Richmond facilities. A Director and a VP of Engineering should be able to handle the three R&D locations. As the company grows and expands its product portfolio by adding new product lines, more project managers and engineers with the necessary skill sets would be required at each location.

As soon as the acquisition of the Asian R&D house takes place, the employees who do not have the required skill to work in the redesigned Richmond and Carlsbad locations should be laid off. This should be done immediately to avoid losing key individuals due to uncertainty. The company should provide severance packages and do its best to help the former employees find new jobs. As was the case with the Sierra Wireless/AirPrime integration, the Asian R&D house integration should not take longer than three months. The company should assemble two integration teams: a steering committee and a working group. Executives in the steering committee would provide direction and decision making. Functional engineering representatives and a project manager in the working group would work on defining integration milestones. The functional engineering representatives should have adequate expertise to transfer knowledge to the Asian R&D centre. Lessons from the previous acquisition should be used, and the company should also use gap and cost-benefit analysis to resolve issues during and after the integration.

These would be useful, for instance, to determine whether the acquired company should preserve its own processes and systems or adapt to Sierra Wireless's processes and systems. The gap analysis would evaluate the existing processes, systems and goals at the two companies and the distance between them. The end result should be recommendations for system and process improvements. The cost-benefit analysis would take the recommendations and evaluate the cost of a proposed implementation compared with its perceived benefit. (Jossey-Bass, 1999)

Similar to the integration teams, the company should put together two ODM teams: a steering committee and a working group. Executives in the steering committee would provide direction and decision making. Project managers, product managers and other representatives with outsourcing experience would constitute the working group and work on defining the changes required for Sierra Wireless to work well with ODMs.

Another aspect that requires special attention is public relations around the new business model to avoid negative publicity that could alienate Sierra Wireless's customers and harm its reputation. The company should be proactive and consider several things. First, Sierra Wireless should present information demonstrating that Sierra Wireless needs to reduce its operating costs to survive in a cellular market that is becoming commoditized. Second, the company should explain that the short-term pain of reducing its workforce would result in long-term gains such as revenue growth and the creation of new jobs across all its locations. Third, Sierra Wireless should present stories of other companies that are already using similar strategies. For instance, Intel is developing its next-generation mobile processor in Israel, and Nortel Networks is developing its wireless Internet infrastructure in India.

The success of this new business model would also depend on people. Given a different stock market environment today, the company needs to reinstate and re-craft its employee stock option plan to offer the same incentives given before when the stock was appreciating. This will

help attract and retain the best people in all locations. In addition, the company would have to educate its employees about the new business model. Employees might find yet another reason to leave, thinking that their jobs were going to be outsourced. HR should work with the executive team to hold companywide meetings to announce the plans, reasons and business value for developing new products through ODMs and Sierra Wireless's Asian R&D subsidiary. Management must explain clearly and openly how the new initiative would promote growth, improve job security and improve the competitive position of the firm. (Keil, 2004)

To address the ongoing problem of employees leaving voluntarily, Sierra Wireless could take several actions. The company should conduct exit interviews to learn why employees are leaving. Since it is unlikely that employees will share openly with their managers the true reasons for leaving, an outside consulting firm should be used to get better results.

Sierra Wireless should not wait until the last minute to react when employees are ready to leave. Instead, it should proactively target key individuals who provide value to the company, are difficult to replace and are key to customers and projects. The company should ask them questions such as: Why do you stay? What will keep you here? Are you using your talents? What may take you away from this company?

Once it is understood why people leave and why they stay, what they value and look for in the future, the company should invest in creating opportunities for them to use their talents; in effect, the company should develop a plan to keep these valuable employees, with specific promises and deadlines. If necessary, the company should get outside help from a consulting firm or look at the successful strategies of other companies such as the 100 best companies to work for. (Brown, 2004)

REFERENCE LIST

Blazenko, George (2004). SFU EMBA 606 Course Notes (Industry Ratios).

Brown, Colin (2004). Talent Retention Solutions.

Bukszar, Ed (2005). SFU EMBA 607 Course Notes.

Hyers, Ken (2004), Cellular Modem Worldwide Shipment Forecast and Market Overview.

Jossey-Bass (1999). The Complete Guide to Mergers and Acquisitions.

Keil, Steve (2004). How Strategic Outsourcing Creates Growth.

Lukas, Hult, Frolick (1996). Reducing Cycle Time in the New Development Process: A Best Practices Investigation.

Porter, Michael (1979). How Competitive Forces Shape Strategy.

Porter, Michael (1985). Competitive Advantage: Creating and Sustaining Superior Performance.