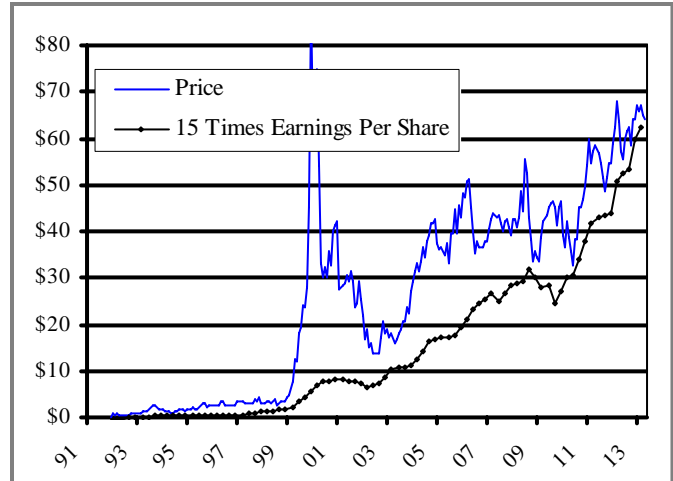


Generally speaking, pioneers are often misunderstood. By nature, introducing new products and services to the public entails overcoming the public's unfamiliarity with things that are new. Qualcomm is a pioneer, and therefore, its revolutionary technologies may be initially difficult to understand. But these technologies are becoming so common in today's world that it is paramount that one becomes familiar with them.

History



Hearing how a fledgling company based in San Diego becomes the world leader in cutting-edge wireless technology is an exciting story and worth exploring in depth. However, for purposes of this report, highlighting a few of the pivotal points that truly shaped the company must suffice.

The first pivotal point occurs at the company's inception and centers on innovative thinking. In 1985, sitting in the San Diego home of Dr. Irwin Jacobs, seven industry veterans started discussing a concept that would change the course of digital wireless communications. The communications industry was intent on establishing a standard for the massive change from analog to digital, a standard that would be sufficient for the next several years. Instead, Qualcomm (QCOM) was set on developing a technology that, when fully utilized, would serve as the blueprint for advanced voice and data transfer for decades to come. Like many innovators who are far ahead of their peers, founder Irwin Jacobs was accused at one point of being a crackpot, and Qualcomm itself was accused by many of selling "vaporware". The accusations would be proven false and the technology proven exceedingly relevant.

The second pivotal point arose from the need for survival. Faced with mounting financial obligations and shrinking revenue, Qualcomm executives were forced to consider how they might monetize their research if they were to survive. So, they pursued licensing arrangements, and, to their surprise, they received a counteroffer in response. Prospective licensees—perhaps driven by their belief in the unlikely success of this technology—requested that all of the patents be issued as a portfolio and any new inventions be added to that portfolio over time. Upon signing these *perpetual* agreements, Qualcomm defined its business model for years to come. Rather than using its inventions to create cellphones, base stations and additional infrastructure, QCOM became the architects of a wireless communications system—a system which, if anyone were ever to use it, would generate enormous royalty income. It just so happens that in the summer of 1993, the U.S. telecommunications industry announced CDMA, a technology developed and owned by Qualcomm, as an official standard for cellular communications.

Today, QCOM has a market cap over \$100B with annual sales of \$19B and earnings of \$6B (and growing). Its business model remains to be a designer of systems rather than a manufacturer. The company controls the most widely used patent portfolio in the industry and continues to develop leading technologies that others actually build or implement.

The Technology

To truly understand Qualcomm, an investor must first understand the technologies being used in wireless telecommunications. Anyone who has purchased a cellphone has heard the terms 2G, 3G, and more recently 4G LTE. These terms are widely used but are often misunderstood. The “G” stands for “generation” and refers to second, third, and fourth generation speed and reliability standards, as set by the International Telecommunication Union. The speed (2G, 3G, 4G) a network is able to provide is solely dependent on the technology being deployed. Listed below is the speed and corresponding technology of the most commonly used wireless networks.

2G The first—and most predominant—is GSM, which utilizes 2G technology. It remains the most widely used network in the world with approximately five billion connections worldwide (70% of total wireless connections). Increasing demand for more advanced cellphones is causing this technology to become less applicable. Japan and S. Korea have already shut off their GSM networks and AT&T plans to shut off its U.S. 2G networks by January 1, 2017.

3G The leading technology that allows for 3G digital wireless communication is called CDMA. CDMA is a Qualcomm-owned technology that can be found in the vast majority of 3G networks around the world. It also represents the most lucrative portion of QCOM’s patent portfolio.

4G (“Fourth Generation, Long Term Evolution”) is simply the next generation telecommunication standard—the successor to 3G. It promises to increase speed, capacity and capabilities. The leading technology driving this standard incorporates a QCOM patented technology known as OFDMA. 4G LTE is still in its infancy, but it is growing just as fast as infrastructure can be put into place.

Two Key Business Segments

1. Qualcomm Technology Licensing (QTL)

“While death and taxes are notable certainties, there’s another in the wireless world: make a 3G cellphone and you pay patent royalties to Qualcomm.”

—Don Clark, Wall Street Journal

The majority of Qualcomm’s income is generated from its patent portfolio via license agreements with third party manufacturers, with the bulk of these agreements being perpetual. QCOM has developed an extensive patent portfolio, including digital wireless communication technologies, CDMA (3G) and OFMDA (4G LTE). If a chip manufacturer wants to use these technologies, and all of them do, they must have a license agreement with QCOM and pay it a royalty fee—there is no alternative.

Qualcomm has license agreements with every major mobile manufacturer. The list includes Intel, Samsung, MediaTek, Broadcom, HTC, Nokia, LG, Foxconn (Apple's manufacturer) and many more. In total, QCOM has QTL agreements with 195 companies.

QTL Challenges

- Alternative wireless solutions
- Patent policing
- Unfavorable product mix

Alternative wireless solutions

Companies dislike having to rely Qualcomm for CDMA/OFMDA technology. Consequently, it is not uncommon for alternatives to come to market. These alternatives are often short lived and frequently still involve QCOM's proprietary technologies. This can lead to legal complications for firms trying to sidestep Qualcomm. Furthermore, the wireless industry's commitment to infrastructure for 3G technology makes alternatives impractical even if their solution could be shown to be marginally more effective. For example, 4G WiMax came to market in 2006. It was backed heavily by Intel, and its most attractive feature was that it supposedly offered companies an alternative to Qualcomm's royalty fee. This sounds nice in theory, but there are two major problems with 4G WiMax. First, it is not backward compatible with existing 3G infrastructures, and therefore, offers limited commercial scale ability. Second, Qualcomm has claimed that 4G WiMax still infringes on many of its patents covered under CDMA/OFMDA technologies. As a result, early supporters of 4G WiMax are abandoning ship. Sprint, one of the earliest adopters of 4G WiMax technology, has since abandoned future infrastructure developments into this technology.

Patent policing

Qualcomm has been experiencing some difficulties policing its license agreements in China. The problem is limited to local Chinese companies utilizing 3G TD-SCDMA technology, which is roughly one-third of the total Chinese 3G market. The Chinese government funded and developed the TD-SCDMA network in an attempt to avoid paying Qualcomm its royalty. However, QCOM has repeatedly stated that TD-SCDMA infringes on many of its patents. QCOM currently has license agreements with other countries using TD-SCDMA and has collected royalty payments without any problems.

Qualcomm's management believes this is an isolated issue. If these small local Chinese firms want to expand or export TD-SCDMA capable chips outside China, they cannot operate as outlaws. They must follow Qualcomm's license agreement and pay a royalty.

Unfavorable product mix

Qualcomm receives approximately 3% to 5% on every 3G/4G LTE handset sold anywhere in the world. These royalties are paid based on the wholesale handset price of the unit—not the retail price. As the ASP (average sales price) for handsets decreases, revenues QCOM generates from

licensees decreases. Emerging markets are playing a huge role in the evolution of handset prices. Manufacturers such as Apple and Samsung want to get their smartphones into the hands of people living in these regions, and they need to keep the price as low as possible. In China, six times as many smartphones costing under RMS 1000 (160 U.S. dollars) were launched in 2012 as in 2011.

Both high-end and low-end smartphones use Qualcomm technology. However, the royalties on higher-end handsets are much more attractive. The recent explosion of lower-end smartphones in emerging markets may hurt future ASP, but this is not yet the case. Since 2010, handset ASP has actually increased from \$186 to \$220 (wholesale figures). However, if the trend were to reverse and ASP started to steadily decline, the royalties would suffer on a per-unit basis but should be more than offset by higher volumes. Meanwhile, QCOM is expected to get a boost from larger emerging markets like China and Brazil, which are planning major transitions to 4G LTE standards. Handsets that support these capabilities command a higher ASP and, therefore, higher royalty payments.

QTL Advantages

- Low capital requirements, high operating margin and ample free cashflow
- Mass migration from 2G to 3G
- Emerging markets

Low capital requirements, high operating margin and ample free cash flow

“When it’s raining gold you don’t grab a thimble—you grab a bucket.”

—Charlie Munger, Berkshire Hathaway

As of September 2012, Qualcomm had only \$63M invested in the QTL business segment. Amazingly, from this small capital base, QCOM generated \$6.3B of revenue and \$5.6B of earnings before taxes.

QTL	2012	2011	2010
Revenues	6.3B	5.4B	3.7B
Income before taxes	5.6B	4.8B	3.0B
Operating margins	88%	88%	83%
Total assets	\$63M	\$36M	\$28M

Clearly, the license/royalty business model is extremely attractive. This business requires little capital and the

operating margin (see table above) is extremely high. Consequently, QTL generates only 35% of revenue yet 71% of income. The operation has grown substantially in recent years, stoked by the global explosion of smartphones using 3G technologies.

QTL creates a virtual cash pipeline, and Qualcomm does not need to invest that cash back into the business to grow revenue and earnings. For example, a tractor dealership must reinvest its earnings in the business if it wants to grow. It makes more money by selling more tractors, so money is constantly invested into inventory. Conversely, Qualcomm has already made major investments in research and development as well as its patent portfolio. Now it can simply collect cash.

Mass migration from 2G to 3G

Wireless subscribers are switching from 2G to 3G standards in record numbers. Several factors are leading the revolution, mainly, the maturation of 3G networks. Infrastructure is in place that allows for strong network connections. In some rural areas, it is not uncommon for “mobile” to be the sole platform for computer/Internet access. The reason: *cost*. It is more cost-effective to plant a single 3G-capable tower that can serve several dozen miles than to dig up miles of farmland. As a result, there are now more than *three times as many* 3G connections than fixed Internet connections in less developed countries, like China.

In addition, handset capabilities have grown rapidly over the past several years and prices have come down. This means access to 3G networks via better phones at cheaper prices with more capabilities.

There are currently two billion 3G connections around the world and roughly five billion 2G connections. As users continue the migration to higher-tech handsets, the number of Qualcomm chips and license royalties should grow in lockstep. According to *Wireless Intelligence*, 3G/4G connections will top four billion (50% of all connections) by 2017. The beauty of Qualcomm is that whether or not those four billion subscribers are using an Apple or Samsung handset, they *will* be using 3G/4G technology, thus paying a royalty to Qualcomm. As the saying goes,

“If you’re an arms dealer, you don’t care who wins the war.”

Emerging markets

Demand for 3G is quickly expanding in developing nations. These markets represent the greatest growth potential for the entire “wireless ecosystem”, accounting for roughly 85% of the world’s population. Moreover, the majority of these markets have “bottom heavy” demographic profiles, meaning a large portion of the population is 25-to-59 years old. In some cases, 50% of the population is under age 25. This demographic strongly demands applications that include audio and video streaming and social networking. The growing need for 3G-capable handsets and infrastructure to support these applications has created an enormous opportunity for the wireless industry.

The largest of the emerging markets are China, Brazil and India. Each country is currently in a different stage of its 3G evolution.

India

- Population: 1.27 billion
- 33 million 3G subscribers (4% penetration rate, among the lowest in the emerging regions)
- In 2010, major mobile operators acquired 3G licenses; the Indian government received \$15 billion (U.S. dollars) from the auction of 3G spectrum
- Demand for applications that require 3G capabilities relatively weak—90% of telecom revenue from voice and under 5% from Internet

- Major mobile carriers have reduced the price of 3G data tariffs to stimulate 3G markets; Airtel (market-leader) lowered prices by 70% and other operators promptly followed

Brazil

- Population: 196.7 million
- 68 million 3G subscribers (28.8% penetration rate)
- 3G users expected to increase to 115 million by 2015 (40% penetration rate)
- New government program gives massive tax breaks to companies making capital investments into Brazilian 3G/4G infrastructure in preparation for 2014 soccer World Cup and 2016 Olympic Summer Games
- \$8-\$9B (U.S. dollars) in 3G investments by end of 2016, meaning potential tax savings of \$1.6-\$3B

China

- Population: 1.35 billion
- 325 million 3G subscribers (30% penetration rate)
- Invested over \$70B in 3G infrastructure and spending additional \$4B in 2013
- Ministry of Industry and Information Technology (MIIT) created task force to increase 3G subscribers; 3G now accounts for 80% of all new connections.
- Goal: add 100 million users by end of 2013

While 3G markets mature, the transition to 4G LTE has already begun. China Mobile (the world's largest mobile-telecommunications firm) is investing \$6.7B in LTE infrastructure this year. That includes 200,000 LTE trial base stations in nine cities. China Mobile has asked the MIIT to issue licenses enabling LTE networks to be launched by year-end. Once such licenses are issued, converting 3G base stations to 4G is a relatively simple, cost-effective process. A typical base station runs about \$30K, but costs only \$10K to make the conversion upgrades.

2. Qualcomm CDMA Technologies (QCT)

In addition to its licensing business, Qualcomm designs first-class integrated-circuits-and-system chips for mobile manufacturers through its QCT segment (or "the chip business"). QCOM's chips are found in more handsets worldwide than those of any other company. They design integrated circuit products used in a wide variety of wireless devices, including mobile phones, tablets, laptops, handheld wireless computers, gaming devices and infrastructure equipment. QCOM controls 52% of the baseband chip market; its closest competitor, Intel, has only a 12% marketshare.

QCT Challenges

- Increased competition
- Decreasing margins
- Tablet market

Increased competition

Current Chairman and CEO, Dr. Paul Jacobs, when recently asked about Qualcomm's increasing competition, responded:

"It depends on what segment. There isn't anybody really that competes well across [the spectrum]. In the chip business, you've got guys at the low end, the MediaTek of the world. You've obviously got Intel, who's not really a competitor yet, but they're trying to come in on the high end. Then you've got...the guys [like] Nvidia, Broadcom, STE and [other] companies that are trying to compete in the middle. It depends where you look. There are always competitors out there, one way or another."

The competition has noted Qualcomm's high-end superiority, and they have shifted focus to the middle and lower-end markets. Companies like Nvidia, MediaTek and Broadcom are trying to gain marketshare in emerging markets where customer concerns do not center on performance. Many low-end handset customers simply want a cheap cellphone with basic 3G capabilities.

Nonetheless, Qualcomm is as able to serve the low end as well as the high end. QCOM is the market leader in baseband chips and controls an even greater share of the 4G LTE chip market. Last year, 47 million 4G-capable chips were manufactured, with Qualcomm chips representing 86% of total sales. In terms of silicon-based chip solutions for cheaper handsets, QCOM is well positioned to grow marketshare. The firm recently developed two low-end Snapdragon processors (200 and 400), giving fabricators an effective way to lower handset prices without excessive cuts in processing power. Apple is rumored to be developing a cheaper version of its iPhone for emerging markets and may be talking with Qualcomm about using its processing chips. A company like Apple or Samsung is concerned with maintaining gross margins while at the same time not sacrificing product performance. Qualcomm's Snapdragon 200 and 400 processors are a great solution to the problem and OEM's all around the world are beginning to take notice.

Decreasing Margins

The past several years have seen a decrease in QCT operating margins. From 2008 to 2012, margins fell from 27% to 19%. In Q2 2013, the trend has continued with operating margins dropping to 17%. The recent decrease is due to higher legal expenses related to the patent portfolio and higher variable employee costs. Accelerated spending on patent filings, reflecting the patent filing change from "first-to-invent" to "first-to-file", also affected recent results. Though, management still anticipates a year-end operating margin in the 18.5% to 20.5% range.

QCT	2012	2011	2010	2009	2008
Operating margins	19%	23%	25%	23%	27%

Qualcomm sells both high-end (Snapdragon 800 and 600) and low-end processors (Snapdragon 400 and 200). Naturally, the margins are more attractive on high-end chips. In a perfect world, QCOM would only sell high-end chips and reap the benefits of increased margins. However,

this is not the case. An increase in emerging market handsets—utilizing low-end chips—has increased sales, but those sales have come at the expense of decreased margins.

In addition to selling processing chips, which has increased at a good clip in recent years, QCOM sells mobile station modems and a variety of other chips. Bottom line, gross margins fluctuate depending on any given quarter’s product mix. For instance, a quarter subject to an iconic device launch, like the Galaxy S4, will materially boost margins and as a result add to quarter over quarter fluctuations.

Tablet Market

Qualcomm’s presence in the tablet market, to date, has been underwhelming. Management focused on a tablet operating system that has yet to really develop. Steven Mollenkopf (COO) discussed the issue in Qualcomm’s latest conference call,

“[Tablets are a] market in which we really have not participated [significantly], primarily because the operating system on which we put our biggest bet has yet to develop, but we think it will.”

Although QCOM has not been a major player in the tablet market, it is beginning to gain momentum. It was recently announced that the next generation Google/Nexus 7 will use QCOM’s Snapdragon processor. Furthermore, QCOM beat out Nvidia, whose chip, the Tegra 3, was in the previous Nexus model. The next generation Google/Nexus 7 will be released in July, and Google expects to sell around 12 million units—double last year’s shipments.

QCT Advantages

- High returns on capital
- Superior chips

High returns on capital

QCT accounts for 65% of total revenue and 29% of income. At year-end, Qualcomm had \$2.3B worth of assets committed to the chip business, which generated earnings before taxes of \$2.3B, which represents a 100% return on invested capital—very impressive by any standard.

QCT	2012	2011	2010	2009	2008
Revenues	\$12.1B	\$8.9B	\$6.7B	\$6.1B	\$6.7B
Earnings before taxes	\$2.3B	\$2.1B	\$1.7B	\$1.4B	\$1.8B
Total assets	\$2.3B	\$1.6B	\$1.1B	\$0.9B	\$1.6B

Qualcomm is able to achieve such high returns on capital because it uses a fabless production business model. This means that QCOM designs its chips and then outsources to foundries for manufacturing. This is extremely cost-effective. A new state-of-the-art fabrication facility can cost billions of dollars to build and maintain, but QCOM avoids these major capital expenditures by working with third-party suppliers to perform the manufacturing and assembly of its chips.

The fabless business model also allows for flexibility. QCOM can select suppliers that offer the most efficient process at the most competitive prices.

Superior chips

Qualcomm’s Snapdragon processors are second to none. In terms of processing power, battery life, and connection speeds, few chips compare. What is more, QCOM has created a processor to serve high and low-end mobile devices.

The Snapdragon 600 was recently selected as the processing chip for the Galaxy S4—Samsung’s new flagship handset. Samsung expects to sell roughly 10 million units this quarter with 70% using QCOM’s chip and the remainder using Samsung’s own processing chip (Exynos 5 Octa). More mature 3G/4G LTE markets, like the U.S. and Europe, will receive the Galaxy S4 with QCOM’s chip. The reason is simple. Samsung’s chip does not have 4G LTE capabilities, and therefore, it is being sent to countries lacking the infrastructure for these standards. Record breaking sales indicate that the Galaxy S4 is a huge success, and it is now Samsung’s fastest selling smartphone in history.

Capital Allocation/ Stewardship

Management

As mentioned previously, QCOM is currently led by Chairman and CEO, Dr. Paul E. Jacobs—son of founder Irwin Jacobs. He has been CEO since 2005 and chairman since 2009. Jacobs’ results, thus far, are shown at right.

	2005	2012	*CAGR
Revenue	\$5.7B	\$19.1B	18.90%
Net Income	\$2.1B	\$6.5B	17.50%
EPS	\$1.26	\$3.71	16.70%
ROE	19%	19%	

*Compound annual growth rate

Paul Jacobs received a PhD in electrical engineering and computer science from UC Berkley, with an emphasis on robotics. His father literally wrote the book on digital communication theory, and thankfully for shareholders the apple didn’t fall far from the tree. Jacobs has seen what is happening to companies like Intel, and he knows the pitfalls of being too successful in your own industry. He constantly reminds QCOM employees,

“Don’t get complacent; don’t believe you win just because you show up. We have to work every single day, and people are coming after us from every different direction.”

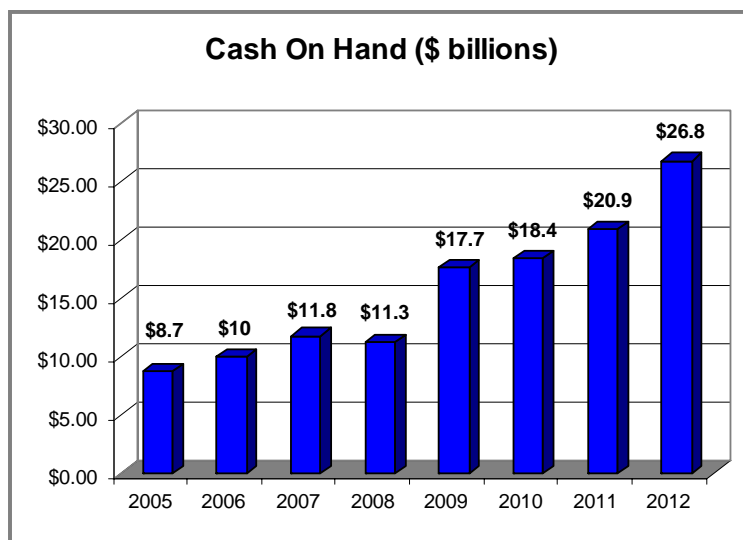
In addition to an impressive track record and strong leadership ability, Jacobs has a significant personal investment in QCOM. He currently owns 4,661,965 Qualcomm shares worth \$300M. Needless to say, he has a strong incentive to see the stock do well over time.

The majority of Qualcomm’s balance sheet consists of cash and bonds. Investors would expect this situation to bring down return on equity—cash is yielding nothing and interest on bonds is historically low. Even so, management has consistently achieved high returns on shareholders

capital. Last year, they earned a 19% return on equity. What is more impressive is that Qualcomm is earning well over 100% on capital invested in business operations—an extraordinary result. Moreover, they generate these high returns employing no debt.

Capital allocation

Paul Jacobs has been in charge of deploying QCOM’s capital for the past eight years. Because QCOM has prospered, cash that is readily available to be deployed has grown substantially. In 2005, cash and equivalents totaled \$8.7B. Today, Qualcomm has over \$30B in its coffers.

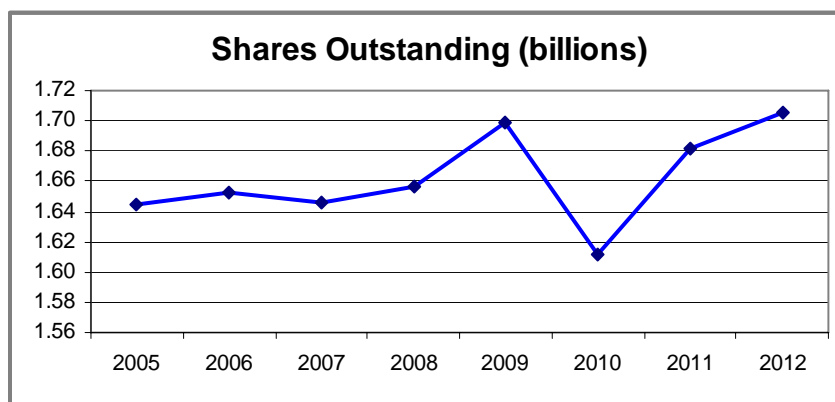


Dividends

Qualcomm began paying a dividend in 2003, and this policy has continued to grow. Under Jacobs’ stewardship, QCOM has paid out a total of \$8.3B in dividends. Without fail, dividends have increased ever year since—growing 185% in the past eight years. Typically, QCOM pays out 25% to 30% of earnings.

Share repurchases

Qualcomm repurchases stock, but this does not represent a return of capital to shareholders, as it only repurchases shares in an equal amount issued to employees. As part of its compensation package, QCOM issues a significant amount of stock to employees.



In the past eight years, QCOM has bought back \$10.4B worth of stock. Over this same period it has issued stock-options totaling \$8.5B and restricted shares worth \$3.1B, totaling \$11.6B in total performance-based compensation.

Qualcomm issues stock options and restricted shares in an attempt to retain talented employees and executives, and also to align management’s interest with shareholder’s. QCOM executive officers and directors own a combined total of 9,868,572 shares, worth approximately \$640 million. Consequently, management is very focused on increasing shareholder value. However, buybacks in excess of share issuances would certainly be welcomed.

Acquisitions

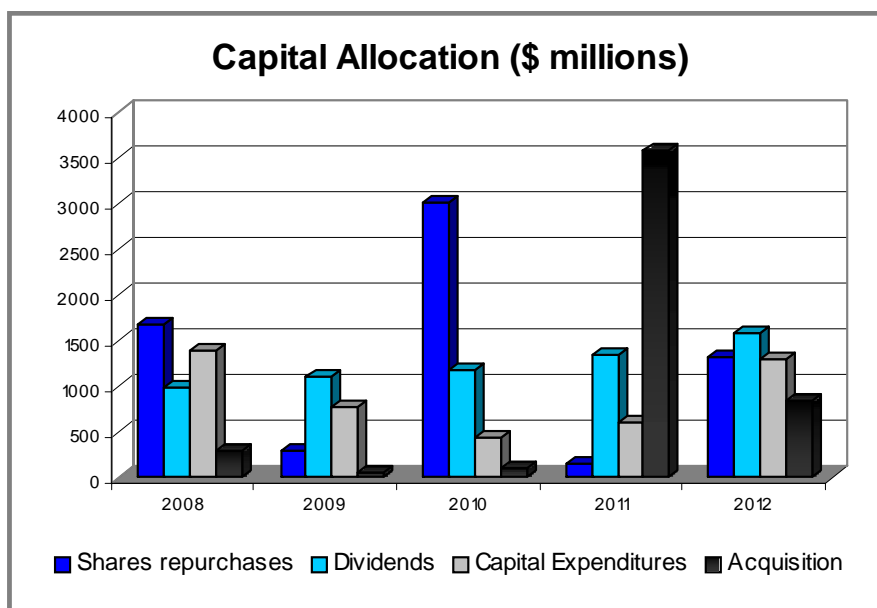
Part of Qualcomm's growth initiative is to make strategic investments and acquisitions. The goal is to open new opportunities for technologies, obtain development resources, grow the patent portfolio and pursue new business. In a given year, QCOM will typically purchase a handful of smaller companies. The focus of these acquisitions is often on obtaining or expanding QCOM's technologies and patent portfolio.

	2012	2011	2010	2009	2008
Acquisitions	\$833M	\$3,600M	\$94M	\$54M	\$298M
No. of companies acquired	8	1	6	1	5

In May 2011, Qualcomm acquired Atheros Communications, Inc. for \$3.1B. The acquisition is expected to accelerate the expansion of the company's platforms and bolster new business beyond handsets, into home and other items that can utilize Wi-Fi communications. This purchase was fairly large—much larger than Qualcomm's typical acquisition—which might only cost a couple million dollars. As the figures above show, Paul Jacobs has no problem being patient or making smaller strategic acquisitions. Most importantly, it seems that he only pulls the trigger when he believes that an acquisition is adding to shareholder value. It is not about creating a larger company; it is about creating a more valuable company.

Valuation

At \$62 per share, Qualcomm appears quite attractive. The stock is currently trading at 15 times earnings, and backing out its large net cash position, it's trading at just 11 times earnings. Over the past five years, QCOM has sold at an average PE ratio of 20. A decreasing multiple indicates that the market is not excited about Qualcomm's growth prospects. For all the reasons discussed above, QCOM's future seems brighter today than at any other point in time. In 2013, revenue is expected to grow by 32% to \$25B and earnings-per-share is projected to grow approximately 21% to \$4.50/share. Plus, customer migration from 2G to 3G should continue to stoke growth for years to come—and that's not factoring in future 4G LTE growth. There are currently 98 million 4G LTE subscribers around the world, and that is projected to double by the end of the year to 198 million. By 2016, 4G LTE is expected to reach one billion users representing a compounded growth rate of 139%. With Qualcomm's 86%



market share in 4G LTE chips and exclusive 4G LTE license fees, the future appears bright for this corporation.

Relative to its peer group, Qualcomm is selling at a discount. They are the industry leader, by a wide margin, in mobile integrated circuits and systems. Nonetheless, Qualcomm is selling at a PE ratio below many of its competitors. For instance, Broadcom is selling at 25 times earnings, Texas Instruments at 23 times earnings, and Nvidia at 15 times earnings. Moreover, Qualcomm offers a healthy dividend—currently yielding 2.1%. Intermediate-term corporate bonds and U.S. Treasuries are yielding roughly 3% and 2%, respectively. Therefore, QCOM offers a competitive dividend yield, while at the same time offering considerable upside for capital appreciation.

Executive Summary: QCOM	
POSITIVES	NEGATIVES
<ul style="list-style-type: none">• Industry-leading patent portfolio• 3% to 5% royalty on all 3G handsets• Mass migration from 2G to 3G• Snapdragon processors are being adopted into more flagship handsets (e.g., Galaxy S4)• Already signed next-generation 4G LTE agreements with Samsung, Nokia and LG	<ul style="list-style-type: none">• Increased chipset competition could drive down margins further• Problems with collecting 3G TD-SCDMA royalties in China

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