



Andrew Baker

Trend spotting: Qualcomm executives consider the next wave of growth in semiconductors

Steven Mollenkopf and Murthy Renduchintala offer their take on the technology, talent, and business strategies required to keep pace in an industry that continues to evolve.

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Mobile technologies have been at the core of semiconductor growth over the past few years, but as growth rates overall have begun to taper off, the industry is asking itself, “What’s next? Which technologies and strategic approaches will drive *new* growth?” In this interview, Steven M. Mollenkopf, CEO of Qualcomm, and Murthy Renduchintala, executive vice president of Qualcomm Technologies and copresident of Qualcomm CDMA Technologies, share their perspectives on what’s ahead for the semiconductor industry and how Qualcomm and other technology companies can adapt to ever-evolving commercial and technological trends.

McKinsey on Semiconductors: *Growth in semiconductor revenues and profits has slowed*

as the industry has matured. Is there a growth challenge confronting the industry?

Steven Mollenkopf: I don’t see a fundamental growth challenge. The overall semiconductor industry may be roughly flat, but certain segments are thriving—the mobile industry, for instance. Although annual growth in mobile computing is declining from more than 30 percent to a somewhat lesser number, the mobile industry as a whole is still active and relevant and will remain so. Mobile phones are “talking” to other devices. They are aggregating data and enabling other ecosystems, such as automotive and home, to develop. Almost every piece of electronic equipment can use some technology inherited from the smartphone. Innovation in the area of

smartphone technology is not declining; if anything, we expect the production cadence to multiply, which will create growth.

Murthy Renduchintala: To a large degree, growth now is about achieving technological breadth. Qualcomm, for instance, started off as a modem player, but now we also focus on radio-frequency devices, application processors, power-management offerings, power amplifiers, and connectivity products. We cannot capitalize on new opportunities by looking inward, over-emphasizing profit-and-loss numbers, and being afraid to take on risk. So we approach new ventures with a long-term focus. Failure on the first, second, or even third generation of a product doesn't deter us; we have the scale to conduct new product research and design. Our goal is to lead in the areas of technology that will be sources of growth and new opportunities.

McKinsey on Semiconductors: *A number of semiconductor players have been engaged recently in high-profile mergers and acquisitions. What do you think is prompting this activity?*

Steven Mollenkopf: It's clear that a number of companies are looking at M&A as a means to grow quickly. The Avago Technologies–LSI deal seems to have opened up new possibilities in the industry; that deal is unusual in how the companies have built scale across different product segments. We pursue mergers and acquisitions only when it makes strategic sense for us to do so. In early 2011, for instance, we bought Atheros not just with short-term connectivity growth in mind but also to gain access to a different set of channels for introducing our smartphone technology in new ecosystems. We were able to realize this long-term strategic goal with the deal.

Murthy Renduchintala: I think there are some companies, such as Facebook, Google, and Twitter, from whom large acquisitions are expected. Investors expect these companies to have bold visions, and acquisitions often lend credence to those bold visions. At Qualcomm, however, we are not there yet. We need to be more discriminating in our approach. We have more than 50 R&D organizations across the world, and we are very thoughtful about how and where to acquire more. We cannot radically change our culture—it is the key to our success.

McKinsey on Semiconductors: *One of the important factors in Qualcomm's growth has been the fabless-foundry manufacturing model. What changes can we expect to see in this model going ahead?*

Steven Mollenkopf: One of the most interesting shifts over the past few years has been the importance of increased demand for mobile products, which has been a critical driver of the fabless-foundry model. There are few product categories in which companies can sell more than a billion units a year, and that will not change soon. Technology scale will have a big influence on industry dynamics, and we will see clear consolidation based on who can continue to invest in next-generation technologies. Some of this consolidation is already visible, and it will continue to accelerate.

Murthy Renduchintala: I think we will see greater fidelity between economic cost and benefit. We are already beginning to see “elongation” of industry demand over multiple nodes and technologies. For example, the scope of the mobile-technology portfolio also comprises power amplifiers and radio-frequency devices rather than just bulk CMOS.¹ Interesting collaborations such as the one between GLOBALFOUNDRIES and Samsung across leading-edge technology nodes

suggest an attempt to match supply diversity with demand. There are a number of unknowns, too—for instance, how soon will SMIC be able to reach scale here? What does the future hold for UMC?² The strategic landscape could take many different directions, all of which will have an impact on the industry.

McKinsey on Semiconductors: *Another critical factor in Qualcomm's growth has been its management of intellectual property. The broader high-tech industry also seems to be increasingly concerned about how to create and defend its intellectual property. What effect will this focus have on growth and productivity?*

Steven Mollenkopf: The turbulence that you see in intellectual property today comes from the collision of two different types of industries and models. On one hand, you have the cellular industry with its well-understood royalty structure. Standards bodies have been established that make it easier for industry players to collaborate and monetize their intellectual property. The rules have been set. On the other hand, you have companies from outside the industry trying to deliver mobile-computing and wireless products and realizing they also need intellectual property to do that. Eventually, I think players inside and outside the cellular industry will get access to the intellectual property they need, and that model will proliferate.

At Qualcomm, we have invested billions from our revenue base to fuel our research in wireless technologies. These investments have helped the broader industry grow, as well—the industry players using our technology can use our R&D investments, and they would not have been able to do this if we had been unable to monetize our intellectual-property portfolio. Certainly, some players are still using intellectual property as an

offensive or defensive weapon, but I think we will eventually evolve to a more stable situation that encourages rather than hinders growth, productivity, and innovation.

McKinsey on Semiconductors: *The major buyers of information technologies used to be the so-called G7 industries—banking and securities, government, insurance, manufacturing, media and communications, retail, and utilities. Now the major technology buyers are consumer-facing Internet companies such as Alibaba, Amazon, Baidu, Facebook, Google, and Tencent, which are developing their own proprietary cloud servers and platforms, often bypassing original-equipment manufacturers. How could this shift affect semiconductor companies such as Qualcomm?*

Steven Mollenkopf: Our business has always been about enabling the success of our ultimate customers. So, for instance, we have spent a great deal of time understanding our telecommunications customers and creating products and services to suit their needs. We have extended that approach to critical cloud players as well.

Murthy Renduchintala: We must be careful not to overstate the effects of such a shift on original-equipment manufacturers. There is a lot of complex hardware and software integrated in a smartphone. It is true that the silicon and firmware must be aligned with the operating system, but a great deal of the fidelity of the smartphone is a function of the hardware and how it is integrated within the device. One of the virtuous benefits of scale is that imperfections in products inevitably get sorted out over multiple generations; over time, these improvements result in more differentiated and innovative products. Original-equipment manufacturers contribute more to this outcome than they usually get credit for.

McKinsey on Semiconductors: *How important is it for Qualcomm to develop a brand?*

Steven Mollenkopf: Marketing and branding certainly matter to us but not in the shape of a sundry flyer or something along the lines of the “Intel Inside” campaign. Our objectives are strengthening our channels and ensuring that our customers understand our business model. I see the need to be targeted and precise in our marketing efforts, but I do not foresee us spending as much on branding as we do on, say, product research.

Murthy Renduchintala: Our branding efforts have always been about maintaining our reputation and technical credibility. Operators check the quality of their networks based on how well a Qualcomm radio works on it. With our technological expertise across a number of cellular-

transmission standards, including CDMA and LTE, we are, and should be, perceived as the technology bellwether.

McKinsey on Semiconductors:

Semiconductor start-ups have long been a source of innovation. But recently, there have been fewer new entrants and a decline in venture funding. How does Qualcomm manage its innovation pipeline?

Steven Mollenkopf: A shrinking innovation pipeline is never good for the semiconductor industry. The hardware platform could benefit from the kind of open-source revolution that enabled the whole “three guys in a garage” era of software innovation. That said, we are interested in people using semiconductors and mobile technology in innovative ways, and the mobile sector is not as significantly starved of venture funding.

Steven M. Mollenkopf



Education

Holds a BS in electrical engineering from Virginia Tech and an MS in electrical engineering from the University of Michigan

Career highlights Qualcomm (1994–present)

CEO
(March 2014–present)

President and chief operating officer
(2011–14)

Executive vice president, Qualcomm CDMA Technologies (2008–11)

Fast facts

Is a published IEEE author

Holds patents in areas such as power estimation and measurement, multistandard transmitters, and wireless-communication transceiver technology

Serves as chairman of the Global Semiconductor Alliance and as a member of the board of directors for the Semiconductor Industry Association

Murthy Renduchintala



Education

Holds a BE in electrical engineering and an MBA and PhD in digital communications from the University of Bradford

Career highlights Qualcomm (2004–present)

Executive vice president, Qualcomm Technologies, and copresident, Qualcomm CDMA Technologies (QCT) (2012–present)

Senior vice president, QCT Engineering (2007–12)

Vice president, QCT Engineering (2004–07)

Skyworks Solutions/ Conexant Systems (2000–04)

Vice president and general manager of Cellular Systems Division

Fast facts

Member of Qualcomm's executive committee

Member of IEEE in both the United States and United Kingdom

McKinsey on Semiconductors: *Government is becoming an active player in a number of industries—finance, healthcare, natural resources. Why not in semiconductors?*

Steven Mollenkopf: I think the semiconductor industry is structurally different from the ones you mention. We do not affect citizens' daily lives as directly as the finance, healthcare, or natural-resources sectors do. Our products could be seen by some as expensive, but they are not prohibitively so. Most important, we are truly a global supply chain, and that makes it incredibly tough for any single government to regulate.

McKinsey on Semiconductors: *Many big companies become victims of their own success and tend to miss the "next big wave." How do you intend to keep challenging yourselves at Qualcomm?*

Steven Mollenkopf: We feel as though we are constantly reinventing ourselves, or at least every

five years or so. In the 1990s, we were in the hardware and infrastructure business because that was the way to increase demand for our technology. Then we started making and supplying chips, and that business grew. Then WCDMA came along, and critics predicted that would be the end for us; eventually we took a leadership position in developing products that complied with that wireless standard. When smartphones appeared, critics said, "This is about computing, and Qualcomm knows nothing about it." We performed very well in that domain and exceeded expectations yet again when the LTE standard for wireless access emerged. Essentially, we are *always* challenging ourselves.

McKinsey on Semiconductors: *How has Qualcomm kept its culture intact despite rapid growth?*

Steven Mollenkopf: Culture is a part of every discussion at the company. We have developed a

strong engineering and innovation culture that we have sustained through different products and technologies. We are committed to a culture of continuous innovation and risk taking, and we treat our people exceptionally well—they are our most important assets, after all. There are two things that really motivate our engineers. The first is working on a product they can take pride in; they can point it out to a spouse or a family member and say, “I worked on XYZ, and it is a really cool product.” The second is working on a project that is very interesting from a technological perspective. Lucky for us, these two factors are closely linked. As long as we continue to create innovative products and innovative technologies, we will remain in a virtuous cycle that will feed on itself.

Murthy Renduchintala: Our senior-management team really believes that “in your success may lie the seeds of your destruction” if you fail to pay attention to what’s going on around you. We never want to get complacent. At the top levels of the company, we spend a lot of time questioning what we’re doing, making sure we aren’t getting lazy, and always remembering how we got to this point. Just a few bad quarters can be the difference between success and failure, and there are a lot of lessons for us to draw from. That’s one of the reasons we invest so much in R&D and believe that you have to think about the business five years out. Also, we demand that our different product and technology groups become stand-alone centers of excellence.

McKinsey on Semiconductors: *Steve, you assumed the CEO role only recently; how has the journey been so far, and what is your vision for Qualcomm?*

Steven Mollenkopf: I have had a great time. I like technology, and I like the team we have. For me personally, it’s very rewarding to know that almost everybody has the opportunity to use the tools and technologies we work on. Many technical discussions in the industry today are about topics such as cell phones and high-level operating-system software. In many cases, when I read about new technologies in the newspaper or on blogs, I am personally familiar with the products being discussed and the people who are playing an important role in their creation. I’m at the center of something very exciting, and I’m glad to be a part of it.

Looking five years down the road, I would like us to be the number-one mobile-computing company. To do that, we need strong collaborations. We have always been a relationship-oriented organization, and we have had strong, successful interactions with standards bodies and wireless carriers. We’ll continue to do that, focusing on strengthening our ties with operating-system manufacturers, fabs, and other semiconductor players. Delivering a great product today is a much bigger undertaking than it used to be—more than any one company can completely manage on its own. Collaborative activities will be central to our next wave of growth. ○

¹ Complementary metal-oxide semiconductors.

² United Microelectronics Corporation.