VINNIE MIRCHANDANI

THE
NEW
TECHNOLOGY
ELITE

HOW GREAT COMPANIES
OPTIMIZE BOTH TECHNOLOGY CONSUMPTION
AND PRODUCTION

The New Technology Elite

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To Margaret, Rita, Tommy, and Peanuts—the second opportunity to spend time with you has been so special.

Preface

"This is a song of hope."

That's how the band Led Zeppelin led off many of its live performances of what many consider the best ever rock-and-roll hit, "Stairway to Heaven."

Well, this is a book of hope.

I started my technology career in the 1980s when there was palpable excitement about technology providing strategic advantage. Then technology, IT in most companies, went into the woodshed for the next two decades. It focused on costs, controls, and compliance. It was not focused on competitive advantage. In fact, its costs and overruns made many companies uncompetitive. Over the past 15 years, I have helped countless clients focus on cutting IT costs. That's not much fun.

Starting several years ago, that two-decades-old hope flickered again, and as I wrote my last book, *The New Polymath*, I saw an amazing amount of technology-enabled innovation being planned.

This book builds on that hope. It comes from cataloging elite technology athletes I have included in the book and how they plan to improve how we live, work, and play.

How this book came together deserves an explanation.

If you have ever seen a Gartner (the technology research firm) presentation, you know it is the antithesis of the old-school McKinsey (the strategy consulting firm) presentation, which dictated "no more than six bullets per slide, six words per bullet." Gartner slides have dense graphics, the handouts have speaker notes in a small font, and the voiceover allows the speaker a chance to present additional perspectives beyond the graphs and the notes. You also get to speak uninterrupted at their events for 45 minutes before any questions. My five years there have influenced my presentation style ever since.

So imagine my challenge at the Ignite conference in Toronto, the night of September 2, 2010.[1] The format allowed each speaker just five minutes to present 20 slides. No exceptions. So I had five minutes to summarize my theme—the 400 pages in the book, *The New Polymath*. The setting was even more challenging. It was at the historic Drake Hotel, but in a comedy club format. The audience, many in their twenties, stood in the dark sipping their drinks—the comedy part came from watching the speaker struggle as the projector relentlessly moved slides every 15 seconds.

Through the 20 slides, I tried to convey one basic message to the young crowd. There was something very wrong when the Twitter stream of the GE Global Research Center profiled in the book (and named EdisonsDesk after its famous founder, Thomas Edison) had only 704 followers up to 3,500 as of December 2011 when Britney Spears had almost 6 million. The young are enamored (as I see with my own teenagers) with their iPhones, their Facebook friends, and Twitter streams. They should also be aware that there is plenty of "compound innovation" going on at GE, BASF, BMW, Hospira, and other case studies in the *Polymath* book that are blending a wide range of infotech, biotech, cleantech, healthtech, and nanotech.

On the flight back home on that trip, I found myself thinking about my presentation at Ignite. Interestingly, it was a much younger me standing in the audience asking two questions. Okay, so I would benefit from learning more about GE and BMW and Hospira, but flip it around—what are those big companies doing to learn about and develop products for the younger, tech-savvy consumers like me and others in the audience? And if Twitter allows Britney, Ashton and a bunch of other popular folks to have millions of followers, just how

massive is the Twitter technology infrastructure and that of Facebook and Google?

Those two questions became the seed for this book. They led me to focus on them in the research for my innovation blog[2] and in conversations with a number of my consulting clients and industry colleagues.

At the Consumer Electronics Show in Las Vegas in early 2011, I got a clear answer to the first question. While the big excitement during the show was around the tens of new tablets expected to be rolled out later in the year, I observed companies from just about every industry—from Walgreens, the pharmacy chain, to Nike, the shoe company, to Ford, the auto company—were showing off technology-enabled "smart" products for the new tech-savvy consumer.

It is a really exciting time for many of these companies. For too long IT has been an expensive and low-payback back-office investment. Now technology in the companies' products is allowing them to generate revenue and growth. Technology is fun and profitable again.

The answers to the second question came in the Apple disclosure that it had sold 25 million iPads in its first year, that Google had signed over 20 million users for its + service in its first month, and that Facebook had crossed the 750-million-user threshold (that is more than the population of most countries in the world). The more I analyzed the operations of Apple, Google, Facebook, Amazon, Twitter, and eBay—their data centers, distribution centers, retail stores, application ecosystems, global supply chains—the more I was impressed with the "industrialization" of their technology. They are considered "consumer" tech, but they have better technology on a greater scale than most enterprises.

Traditional technology users are embedding technology in their "smart" products and services thus learning to become technology vendors. Technology vendors like Apple are, in reverse, running retail operations better than Nordstrom. eBay's PayPal unit is running better operations than many banks. Amazon is running logistics better than many distributors. Google is running data centers far more efficiently than IBM's or EDS's. They are the new best practice leaders.

It hit me that the traditional distinction between technology user and vendor is outdated. The baseball term "switch-hitter" came to mind. Not just in baseball—in soccer, athletes who can fire rockets with either leg are valued. Same with many other sports—ambidexterity is a much

sought-after attribute. Similarly you have to learn to be comfortable on both sides of the plate, to be ambidextrous in the development and consumption of technology.

Beyond ambidexterity, though, truly elite athletes contribute in other ways. Baseball switch-hitters are more valuable if they are also good fielders, base stealers, and have strong, accurate throwing arms. The elite are multi-dimensional—they play good defense and offense.

This book is about elite companies—the technology version of Gold Glove fielders and stolen base leaders. And the great news is the more I researched, the more I found many of them. Across industries. Across countries.

In this book I have tried to bring out that diversity. There are more than 100 examples and interviews from New Zealand to South Korea, from farming to municipal services. The 17 case studies and four guest columns bring the elite attributes out in detail.

Flow of the Book

The book is organized in three parts.

Part I sets the stage for the technology "buyor"—companies that are becoming efficient buyers *and* vendors of technology. It also explores the landscape for such behavior across varied industries and geographies.

Part II explores 12 attributes of becoming what I call the technology elite. It is no longer about being able to talk geeky terms like HTML5 or SQL Injection or cloud architectures. It is about product design elegance, about physical presence in strategic retail locations, about ecosystems of developers and thriving App Stores. It is about being paranoid in the world of groups like LulzSec and Anonymous. It is about being pragmatic in a world where attorneys are even more influential than engineers. It is about being able to fly to Xiamen or Xanadu at a moment's notice.

Part III is focused on how regulators, Wall Street and other market analysts, and society in general are learning to cope with the tsunami of technology innovation that is headed our way. The technology elite we catalog are being sensitive to these external influences—and preparing for the world where these influencers themselves become more tech-savvy.

Let's go through each part and chapter individually.

Part I: The Convergence of Technology Production and Consumption

Chapter 1: The New Monday Morning Quarterback. Traditionally classified as technology "buyers" and "user organizations," many companies are learning to embed technology in their products and themselves become technology "vendors." They are learning to sell to the new tech-savvy consumer who is ready for new form/factors in every product, including shirts, pens, cars, and bulbs. Other companies like 3M and GE would be offended if you mentioned they were "learning" to become technology vendors. They have long viewed themselves as technology vendors even if Silicon Valley may disagree. Then there are companies like UPS, which calls itself "about half a transportation company, half a technology company." The case study on UPS details its technology innovations in DIADs, its franchise stores, its aviation innovations, and much more.

Chapter 2: The "Industrialization" of Technology. Apple, Amazon, Google, eBay, Facebook, Zynga, and Twitter are mostly focused on consumer-facing technology. Under the covers, however, they show the power of "industrialization of technology" as they scale to massive numbers—25 million iPads in Year 1 and 20 million users for Google+ in its first month of introduction. These are technology vendors emulating best practices from varied industries, even competing with them and taking them to new levels. They tend to focus on each other. Amazon, Google, and Apple are all vying for streaming music service. Amazon competes with eBay for online commerce, Google competes with Twitter, Facebook, and Zynga for social impact. Google competes with Apple and PayPal/eBay for mobile dominance. In the process, though, they are raising the bar for established technology vendors like IBM and Microsoft and for corporate IT. The case study in this chapter focuses on HP's complex global supply chain and how it adjusts to countless hiccups caused by the Japanese tsunami, the Iceland volcano, and also to longer-term shifts.

Chapter 3: Amazon to Zipcar: No Industry Untouched. Either out of paranoia, promise, or "phoenix thinking," industry after industry is thinking

about next-generation, technology-influenced products and services. It is almost impossible to find an industry with what Warren Buffett, the legendary investor, calls "unbreachable moats," where technology's influence is not felt. The case study associated with this chapter is tiny Roosevelt Island in the East River in New York and its amazingly ambitious vision of leveraging technology like smart parking and a next-generation ferry service.

Chapter 4: Australia to Zanzibar: No Country for Old Products. In some ways we live in a flat world where Apple, Google, and Facebook have become our common language. On the other hand, there are so many unique nuances that it would be naïve to assume global branding and universal product versions can be successful for all products. The different rates of technological evolution also offer significant policy opportunities as states, provinces, and nations compete for jobs and investments. The case study for this chapter focuses on the small Baltic country of Estonia and its remarkable digital "Tiger Leap" and rapid evolution away from decades of communist stagnation.

Chapter 5: Convergence, Crossover, and Beyond. Chapter 1 showed traditional technology consumers who are learning to become technology vendors. In Chapter 2, we saw technology vendors who are delivering scale and best practices from a variety of technology buyer industries. Just as in baseball, where only 15 percent of players are switch-hitters, the ambidextrous technologist who is good at both technology production and technology consumption is an elusive species. We need them in the form of "crossover" executives who bring experiences from both technology vendor and user organizations. We present guest column perspectives of two such crossover executives: Tony Scott, CIO at Microsoft who got there after stints at Disney and GM, and Vijay Ravindran, Chief Digital Officer at the Washington Post Co., who was at Amazon in its formative stages.

Part II: Key Attributes for the New Technology Elite: Three Es, Three Ms, Three Ps, and Three Ss

Chapter 6: Elegant: In a World of Flashing 12s. We are seeing a revolution in design in devices, in our software, and in our architecture. If you aspire

to be one of the technology elite, you have to put industrial design high on your agenda. In the case study associated with this chapter, we see how Virgin America, using good design and technology, is redefining the airline industry, an industry that in some studies scores lower in customer satisfaction than the IRS.

Chapter 7: Exponential: Leveraging Ecosystems. A thick application catalog has always been important for a technology platform's success going back to IBM's huge success with the AS/400 in the 1980s. It's become dramatically more important in the past few years. In particular, Apple and Google have shown their App Stores can scale to hundreds of thousands of applications and billions of downloads. In the case study for this chapter, we analyze how RIM (the BlackBerry company) has had to react to this new world.

Chapter 8: Efficient: Amid Massive Technology Waste. There is massive waste in technology: printer ink at $5,000 a gallon, roaming charges of $4 a minute from some countries, calls to application contact centers that amortize to over $10,000 each. The technology elite don't just focus on innovation to improve the top line; they are also intensely focused on efficiencies. In this chapter's case study, we outline the countless efficiencies Facebook has delivered in its Prineville data center which opened in 2011. In a technology world that is traditionally secretive, Facebook surprisingly shared details of much of the data center as part of its Open Compute Initiative.

Chapter 9: Mobile: If It's Tuesday, It Must Be Xiamen. To become a tech elite you have to be a Marco Polo and a Gulliver—bravely exploring a fast-changing world. Suppliers and captive units in exotic locations can provide unique competitive advantage. They can also make much more complicated the supply chain and product development cycles. The case study here shows how Boeing learned from a global supply chain for its new 787. The experience was painful with many delays, but also delivered an amazing number of innovations. The case study further describes how Boeing used HCL Technologies as a glue to bond many of those widespread elements.

Chapter 10: Maverick: No Rules. Just Right. In technology, more than any sector, being a maverick is tolerated, even encouraged. Disruption is not a dirty word in technology. Tech elites understand, though, being a maverick does not mean no rules. It means defining your own rules and discipline to support your position. The case study here is Apple, which has shown time and time again how it breaks others' rules, while defining new ones for itself and its competitors. We look at 10 gutsy moves Apple has made over the last decade and how it plays Maverick—the character Tom Cruise played in the movie *Top Gun*.

Chapter 11: Malleable: Business Model Innovations. Technology-elite companies like Apple and Amazon have shown that creativity in pricing and efficiency in costing are as important as good product design and logistics. And not just pricing around their own products but around music, books, and telephone service. Technology is allowing every industry to experiment with new business models like "as a service," and "from the bottom of the pyramid." In the case study, we see how a young company, Valence Health, using sophisticated analytical technology and a new business model aimed at providers versus payers of healthcare, is building a viable venture.

Chapter 12: Physical: Why Test Driving Is Still Important Even in a Digital World. We would not buy a car without a test drive and somehow we seem to have forgotten that physical, tactile experience continues to be important with technology products. The technology elite know better and also know you need knowledgeable, friendly customer service to go with it. The case study for this chapter is Taubman Shopping Centers, which has thrived in the last decade with Apple, Bose, and other technology stores and its own digital infrastructure, when brick and mortar was supposed to be dying.

Chapter 13: Paranoid: But Not Paralyzed. Teardowns, jailbreaks, and rootings are almost a badge of honor in technology world. They are tame, however, compared to the malicious hacking and espionage technology companies are increasingly subjected to. In such a climate, it helps to be paranoid. The case study here profiles the Wireless Aerial Surveillance Platform, a drone that can hack into networks and eavesdrop on mobile

conversations and shows other reasons to be vigilant. Of course, being paranoid does not mean being paralyzed. The technology elite just look at it as a cost of doing business. Life has to go on.

Chapter 14: Pragmatic: When Attorneys Influence Technology Even More than Engineers. If the hacking and the espionage described in the previous chapter do not paralyze companies looking to build smart products, the spreading lawsuits surely can. In many ways, the technology elite know that good lawyers are just as important as engineers in technology. They can help enterprises to be pragmatic, even when surrounded by "rattlesnakes." Benjamin Kern, an attorney with the firm of McGuire-Woods, also has an interesting personal background as a technology entrepreneur. He provides, in a guest column, some of that pragmatic advice on the tricky world of fuzzy patents and uneven intellectual property (IP) protection with global supply chains.

Chapter 15: Speedy: In a New Era of Perishability. A key trait of the new technology elite is their speed—in product innovation, in anticipating changes in competitive landscapes, in managing volatility in demand forecasting and supply chains, and even in their back office. In the case study we look at the Corning Gorilla Glass product, which defines the new clockspeed. It has been adopted in over 400 electronic products in less than three years.

Chapter 16: Social: Amid Chatty Humans and Things. The technology elite know how we live in a world of chatter, human and nonhuman. Learning to interpret that chatter and to magnify it via social savvy is no longer a "nice to have." Not just your employees, your products also need to be "social." In the case study we look at a socially savvy product—the Lexmark Genesis—and the social media launch it enjoyed.

Chapter 17: Sustainable: Mining the Green Gold. To be considered a technology elite, it is increasingly expected that you put sustainability high on your self-evaluation scorecard. The definition of sustainability, however, gets more ambitious by the day as we grapple with "conflict minerals" and the ethics of becoming dependent on nonrenewable rare earths in

so many of our technology products. The case study looks at Google's breathtaking array of green initiatives.

Part III: Outside Influences on the Technology Elite

Chapter 18: Regulators and Technology. Many of the earlier chapters show savvy government and municipal technology groups. In general, however, regulation of technology lags the fast-changing markets it is supposed to watch over. Regulators are themselves being challenged to become technologically elite. The case study focuses on how 3M uses its "Periodic Table" to summarize its 46 technology platforms (that get manifested in over 55,000 of its products) to communicate with market watchers. It manifests what regulators will increasingly have to become savvy about.

Chapter 19: Society's Changing View of Technology. While we can build technologically elite enterprises, we cannot mandate a technologically elite society. The reality is it is "unelite" and uneven. So we need a new set of professionals to prepare society for the avalanche of coming technologies. In a guest column, Prof. Mary Cronin of Boston College focuses on another challenge we will face in the next few years. She writes about the continuous, automatic, and invisible tracking of individuals by multiple smart devices and the related explosion of personal data and the new privacy challenges society will have to address.

Chapter 20: Market Watchers Morphing. As the technology elite like Amazon, 3M, HP, and UPS pioneer new ways of communicating to financial and other market analysts, they raise the bar for those analysts. They also create new expectations for every other company they are benchmarked against. We present the text of a groundbreaking letter Jeff Bezos, CEO of Amazon, sent to his shareholders, which is full of technology jargon. It does come with this reassurance: "Now, if the eyes of some shareowners dutifully reading this letter are by this point glazing over, I will awaken you by pointing out that, in my opinion, these techniques are not idly pursued—they lead directly to free cash flow."

And finally, we end with a summary chapter that brings together many of the trends we have discussed in the first 20.

Endgame: "Welcome to the NFL." This chapter summarizes the 12 elite attributes we discussed in Part II. It also profiles the impact of more demanding regulators and market watchers and changing societal expectations we discussed in Part III.

What Got Left Out?

I could have profiled twice as many guest columns and detailed case studies. I could have written about all kinds of advances in biotech and nanotech since my last book. What about peers and competitors of companies profiled in this book—are they sitting still or innovating on their own?

It's like making a Hollywood movie. Plenty gets left behind in the "director's cut." In my case, some of those "30 minutes" edited out can be found on my two blogs. Those are living, breathing documents compared to a printed book that can be only a snapshot.

Of course, I would welcome reader comments and conversations. I expect a few will disagree with me, for including the HP supply chain example when it announced, then reversed course within a matter of weeks, that it was de-emphasizing its PC business. In my opinion it is a good example of the acrobatics needed in the dynamic technology marketplace. Others might disagree with my profiling RIM with its work-in-progress ecosystem as it tries to catch up to Apple's and Google's. Or the much-delayed Boeing 787. In my opinion, the 787 supply chain and the passenger comfort innovations it incorporates deserve the ink. So, I look forward to the feedback and the discussions.

In the meantime, as "Stairway" advises, there's time to change the road you are on. It's a good time to emulate the technology elite. Yes, this is a book of that hope.

Acknowledgments

As I reviewed a late edit of this book, I felt like I was watching ESPN's X Games, which focuses on extreme sports. The pages that follow are filled with many technology athletes and their acrobatics. So, let me start by thanking the "athletes" themselves. The many interviewees and guest columnists in the book spent hours talking to me, wrote about unique nuances in their businesses and provided their innovative perspectives on technology.

The comparison to the Games also reminded me that hundreds of coordinators have a hand, behind the scenes, in organizing such an event.

There were many like Barry Dayton at 3M, Bryan Majewski at Baker Tilly, Sarah Pakyala at Corning, Alan Alper at Cognizant, Alison Bolen at SAS, Tiffany Anderson at Tibco, Ramana Rao at The Washington Post Company, and Lacey Higgins at Workday, who coordinated many of the interviews in the book. Jim Spath at Stanley Black & Decker helped with a critical review of the materials. They may not show up in the book, but these and many others played a significant role. To them, also my heartfelt thanks.

It's the same with my publisher, John Wiley & Sons. John DeRemigis, and his entire editing and marketing team, worked marvels

through several versions of the manuscript. A book on technology, business, society, and public policy stretches the dictionary in many directions.

The biggest thanks go to my wife, Margaret. She encouraged me to write the book. I would have waited a few more years after *The New Polymath*. She calmly helped me navigate the ups and downs common in such an undertaking.

She is the unheralded Chief Organizer of the event. Or her behalf, and all the "athletes," I invite you to enjoy the "Games"!