Book Reviews

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Books reviewed in this issue:

- *Code Name Ginger: The Story behind Segway and Dean Kamen's Quest to Invent a New World*
- *Open Innovation: The New Imperative for Creating and Profiting from Technology*

Editor's note: The former section, "Books received for possible review in a future issue," has been replaced by a more dynamic list available to reviewers. If you are interested in reviewing books for *JPIM*, please contact Preston Smith at preston@NewProductDynamics.com.

Code Name Ginger: The Story behind Segway and Dean Kamen's Quest to Invent a New World, by Steve Kemper. Boston, MA: Harvard Business School Press, 2003. 319 + x pages. $27.95.

Code Name Ginger provides an in-depth examination of the new product development process for Segway, the "personal transportation system" formerly known as "Ginger" and "IT." Kemper was granted unprecedented inside access to Kamen and the Segway product development team for nearly three years, starting with concept development all the way through detailed design. Unfortunately, Kamen kicked Kemper out just as the technical design was nearing completion and as the challenges of manufacturing were heating up. Still, *Code Name Ginger* presents a true-to-life portrayal of product development and sheds light on the impact that poor management and idiosyncratic behavior can have on a product development team as they skip stages and blow through gates. However, *Code Name Ginger* is not a reference book; it is a nonfiction business novel alike that product development and Segway enthusiasts will find enjoyable and educational.

Merle Crawford (Crawford and Di Benedetto, 2003) has taught us that there are three reasons products fail: (1) lack of customer need, (2) failure to meet customer needs if they exist, and (3) poor marketing of the product. The story of Segway is the tale of a product development that excelled at meeting perceived customer's needs. Kamen's engineers designed and redesigned elements of Segway, right down to the helical gearbox with gear ratios selected for performance and for the pleasant audible tones they generate. The marketing of Segway was extraordinary, creating unprecedented market awareness with virtually no advertising budget. Dean Kamen and Segway appeared on virtually every morning program and on 20/20, and took every photo opportunity with the president of the United States. Segway had a cameo appearance on "Ed" (NBC primetime), and an assault team in one of Tom Clancy's *Netforce* novels used a herd of Segways decked out in stealth shielding. However, although Segway is an elegant solution and is marketed well, it most likely will fail because it was designed for a nonexistent market need, failing to meet the first criterion for success.

So, do not read *Code Name Ginger* for another lesson on the value of voice-of-the-customer research; there was no customer research at all. Do not read *Code Name Ginger* for a lesson on viral marketing; for Segway the viral infection started with Kamen's celebrity and was super heated by his paranoia, a combination difficult to duplicate. Read *Code Name Ginger* for the lessons that it teaches about the dynamics of a team engaged in the development of a product that they love—a team that succeeded in spite of and, paradoxically because of, their technically genius charismatic leader, Dean Kamen.

Kamen is a self-made multimillionaire whose company, DEKA, invented the first portable insulin pump, Baxter's HomeChoice dialysis machine, and the iBot,

a wheelchair capable of climbing and descending stairs. One day a DEKA employee surfed past Kamen on an iBot proof-of-concept test apparatus consisting of a platform balancing on a single axle, driven by two servomotors and using a joystick for steering. In a flash of inspiration, Kamen saw a new-to-the-world product that he felt could change the world. He fell in love with that concept, which became Segway.

From the beginning, it is clear that Kamen and the Segway team failed to analyze how the product would meet any market need. If DEKA had a robust phase-gate design process, the Segway project would not have passed into design until the opportunity was analyzed and when a product concept was developed. However, as long as Kamen was in charge, nothing would stop Segway from being developed. Since Kemper lived in Kamen's house for many months and often talked with Kamen late in the evening, he was able to examine Kamen's role in the process and illustrate in detail how his presence affected the project. In particular, three facets of Kamen's personality stand out: (1) He was paranoid that other manufacturers would discover and steal the project; (2) he always had final authority over the direction of the product and refused to relinquish control; and (3) he was the ultimate cheerleader and salesperson.

Before Segway, DEKA was principally a design house. From the beginning, however, Kamen wanted not only to design Segway but also to manufacture it as well—an aspect with which he was unfamiliar since DEKA only designed products. Wisely, Kamen hired an experienced chief executive officer (CEO), Tim Adams, to manage the company and assigned a highly respected project manager to oversee the design process. Kamen insisted that he would focus his efforts on pleasing his investors; however, he was unable to separate himself from the design process. Kamen's continued involvement in the design process promoted "feature creep" (p. 75), which frustrated and undermined his managers. For example, when a manager vetoed a new idea in order to keep the project on schedule, Kamen often would issue a counter-veto (p. 36). When professional marketers were hired, they became frustrated because Kamen's extreme paranoia prevented any market testing. Ultimately, the marketing manager was fired because he continued to cling to his belief that he needed to talk to customers before he could finalize a marketing plan or even could select a name for the product.

To Kamen's credit, he recognized that he could not rely on customers to provide specific design direction for Segway. "He liked to say that if you asked people where they would put a third eye, most would say the back of their head. But if you gave them the option of putting it on the end of a finger—he would wave his in illustration—the advantages were instantly clear. Dean had learned long ago that customers didn't always know best. They hadn't thought about the problem deeply enough to envision innovative solutions" (p. 195). This passage reveals perhaps the greatest lessons in the book and explains why Kamen was unconcerned with the lack of market research. Market research that attempts to ask respondents for solutions always will fail to generate innovative solutions, and evidently, this was the only kind of market research Kamen had witnessed. However, customers are the best and only reliable source for identifying market needs, something Kamen failed to realize.

One of the greatest business myths is that customers did not ask for Post-It™ notes. However, those on the product development team were able to determine that prospective users saw real value in the product, even if they could not articulate that value. Customers usually cannot identify solutions to their problems, nor should they be asked to. But they can and do identify their problems or needs (Havener and Thorpe, 1994). When the first quasi-market research was conducted at DEKA, it revealed customer need issues: "Some riders had also said that their commutes to work were too long for Ginger, or that they preferred to walk for short errands" (p. 227). Rather than taking this research as a warning and investigating further, they continued to move forward. Kemper suggests that Kamen suffered from blind faith in the product and "bends reality to fit his vision" (p. 296). To be sure, it was this blind faith and Kamen's persistence that propelled this project through development.

Were the details of what happened in the company subsequent to the author's dismissal available, the reader would learn how the product became known as Segway rather than as Ginger or Flywheel. The reader likely also would learn about detailed production and marketing plans and what other politics played into the final production of Segway. Approximately 6,000 Segways had been sold in the first 18 months after launch (information from a product recall), although a plant was built that could produce 40,000 units per year. Undoubtedly, the product has not revolutionized the world, as Kamen suggested it would, nor has it met his expectations. Nevertheless, the insights revealed in this book are valuable not only to managers, marketers, and engineers but also are

entertaining for anyone interested in Segway. *Code Name Ginger* also offers valuable insights from the prospective of various product development disciplines.

References

Crawford, C.M. and Di Benedetto, C.A. *New Products Management*, 7th ed. Boston, MA: McGraw-Hill Irwin (2003).

Havener, C. and Thorpe, M. Customers Can Tell You What They Want. *Management Review* 83(12):42–45 (1994).

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Open Innovation: The New Imperative for Creating and Profiting from Technology, by Henry Chesbrough. Boston, MA: Harvard Business School Press, 2003. 227 + xxxi pages. US$35.00.

A decade or two ago, companies generally developed all portions of their product internally, but the trend more recently has been toward many variations of codevelopment. For example, a supplier might develop a complete subsystem (especially in the automotive industry), or a product development firm develops all or most of the product. In electronics, it is becoming popular for a supplier both to develop and to manufacture the product.

Henry Chesbrough tackles a small but important portion of this external development: obtaining or providing—from the outside—the ideas or technology incorporated in the product or its manufacturing process. This is much narrower than *innovation*, which normally refers to the complete process of bringing an idea or technology to market. Thus, this book more accurately might be titled *Open Technology*.

Open Innovation will be enlightening for anyone interested in managing the technologies used in products or their manufacturing processes, especially in technology-intensive businesses. Although its focus is on technology, it also provides valuable insights that can be generalized sharing other parts of innovation across organizational boundaries, so this book—with appropriate reinterpretation—becomes a good reference for codevelopment in general. Chesbrough writes from the perspective of the large company, but his material applies to any size firm, especially very small or startup firms that must look outside for technology by necessity.

This book contrasts an older model of closed "innovation," exemplified by strongly vertically integrated companies such as General Motors, IBM, and Xerox, in which technology is developed internally and is prohibited from going outside to a newer model of open innovation that encourages the flow of technology both into and out of the firm.

In contrast with many other books by business school professors, this one is not based on a broad survey and statistical analysis. Instead, Chesbrough provides several detailed case studies and weaves them together with his commentary on the principles involved. He presents many interesting examples, including Lucent, Procter & Gamble, Millennium Pharmaceuticals, Adobe, and 3Com.

Open Innovation opens with a chapter on Xerox's Palo Alto Research Center (PARC), which has been cited often as a poor example of technology management. But Chesbrough looks deeper and divides PARC's technology into two types. Technologies applying to Xerox's core business of copiers and printers, indeed, have been managed effectively. However, Xerox established PARC to move into the computer business, and most of PARC's technology therefore was focused on computers. The computer technologies have been problematic, not because of the technologies themselves but because Xerox could not provide effective business models for them.

Chesbrough's main thesis is that a technology's commercial value depends mainly on its associated business model, and without an effective business model, the technology has no commercial value. In Xerox's case, it has a deeply established corporate business model, starting with its pioneer Model 914 copier. Some characteristics of this business model are that the product is leased (not sold) and is serviced only by Xerox personnel, and its technologies are developed entirely internally and are protected from external use. Because this business model was entrenched so strongly, Xerox was incapable of formulating the alternative business models that would make PARC's computer technologies successful. These technologies had to leave PARC, often with PARC's more entrepreneurial employees and Xerox's blessing, in order to find a business model that fit them. Two such PARC technologies are Ethernet, which spawned 3Com, and PostScript, which became the foundation of Adobe.

This book is organized nicely. Chapter 1 sets the stage by using PARC to illustrate key points. Chapter 2 shows how closed innovation started in the early twentieth century with the powerful corporate research laboratories of GE, GM, IBM, AT&T, and RCA and it shows how this era eroded in the late twentieth century, due mainly to employees becoming

more mobile and the rise of venture capital, which together provided external options for ideas laying on the shelves of the corporate research labs.

To provide contrast and continue the story, chapter 3 describes open innovation in terms of a new logic: "Instead of making money by hoarding technology for your own use, you make money by leveraging multiple paths to market for your technology. Instead of restricting the research function exclusively to inventing new knowledge, good research practice also includes accessing and integrating external knowledge" (p. 52).

Chapter 4 is the core of the book, as it covers business models. A business model has six objectives:

- Articulate the value proposition, which is the means by which the product will create customer value.
- Specify the target market segment.
- Define the value chain for distributing and servicing the product.
- Using the market segment and value chain information, formulate the cost structure and target margins desired.
- Describe how the product fits with suppliers, customers, partners, and others in its value chain.
- Determine a competitive strategy by which the product will build an advantage over others.

Chesbrough believes so strongly in the importance of business models that he claims an inferior technology with a better business model often can beat a better technology with an inferior business model, and he offers a comparison between the Xerox Star computer and the IBM PC as an illustration of this. Whereas large corporations usually value sticking to their business models and improving them, venture capital firms succeed by consciously trying out different business models until they find one that works.

Chapters 5 through 7 each provide a case study illustrating a facet of open innovation. Chapter 5 shows how IBM moved from the closed innovation paradigm to the open innovation one, going through a "near-death" experience in the transition. In disc drives, for example, IBM abandoned a highly proprietary position in which they only would supply drives as a part of their computers and instead started selling drives to direct competitors of their notebook computers. Chapter 6 covers Intel's sophisticated open innovation approaches that have been refined from the company's founding principles. One such approach is Intel Capital, in which the company invests in startup companies developing technologies

in which they might have an interest, both as an investment and to learn firsthand about the technologies. Chapter 7 describes a new ventures group at Lucent which was highly successful by most measures in selling technologies for which Lucent had not established an application. Unfortunately, this group eventually succumbed to the corporate immune system.

Chapter 8 addresses patents, licensing, and royalties connected with technology that moves between firms. The philosophy for managing such intellectual property differs greatly between open innovation and closed innovation. Chesbrough advises that an organization's intellectual property strategy should reinforce its business models. A fascinating case study here shows how Millennium Pharmaceuticals licenses only the portion of a given technology for which the customer has a commercially effective use, retaining other rights to that technology so that they can sell them to another firm having a business model that fits those rights better. In reference to the six bullets above, Millennium distinguished based on market segment. Typically, each drug company has specific diseases that it pursues, so, for example, a given drug company might have a high interest in a gene or protein to fight obesity but be far less interested in the same gene or protein for applications against cardiovascular disease.

Chapter 9, "Making the Transition," is the most directly useful one, especially for the book's target audience of managers wishing to move from closed to open innovation. Here Chesbrough offers a rich selection of advice, one item of which is to define and to communicate your organization's business model, much as managers often are advised to do with their mission statements. He also cautions that, even with open innovation, a company still needs a strong internal research and development (R&D) capability to understand the technologies arising externally and to be able to integrate them, even if they do no internal technology development. Although external ideas and technologies are valuable for creating value for your company, do not rely on them to claim value for your organization.

Although this is a book concentrating on technology as it is related to business and not about innovation as a process (customer research, design, testing, etc.), the thoughtful innovation manager can learn much from it about managing many nontechnology portions of innovation in this era of expanding codevelopment.

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