INTRODUCTION

Serial Innovators and Why They Matter

Carol Bernick is a Serial Innovator.* As a marketing executive at the Alberto Culver Company in the 1980s, she invented first Mrs. Dash® Original Blend salt-free seasoning and then Molly McButter® fat-free butter flavoring. Mrs. Dash is now the most popular salt-free blend in the seasoning category, and the product line has been expanded to include a number of other salt-free seasonings, as well as salt-free marinades. These product lines constitute a significant portion of Alberto Culver's 2008 $84 million nonbeauty revenue stream.

Chuck House also is a Serial Innovator. While at Hewlett-Packard (HP), he invented a number of new products. Most noteworthy among them is the logic analyzer, which records bus communications between two semiconductor chips. Before logic analyzers, engineers used oscilloscopes to help them understand how the circuits they designed were functioning—one signal at a time, a tedious process. Because logic analyzers record many signals simultaneously, these devices drastically improved an engineer's ability to understand circuit operations, speeding the electronic development for myriad new products. In 2002, *Electronic Design Magazine* recognized the logic analyzer as one of the fifty most important

* Throughout this book, "Serial Innovators" is capitalized to emphasize the special role these individuals play in innovation.

electronic innovations ever developed. Since its invention, this product line has earned HP and Agilent hundreds of millions of dollars.

Serial Innovators are individuals who have conceived ideas that solve important problems for people and organizations, have developed those ideas into breakthrough new products and services, inventing new technologies to do so as needed, and then have guided those products and services through the corporation's commercialization process and into the market. Serial Innovators are important to corporations because, like Carol Bernick and Chuck House, they can develop products that generate millions of dollars of revenue. In doing so, Serial Innovators impact millions of lives every day, from the workers employed to make these breakthrough products to the customers who benefit from them. Frequently, Serial Innovators' products change the lives of millions of people for the better.

Serial Innovators in the "creative arts"—of which Paul McCartney is a great example—most frequently innovate independently or with a friend or two, without worrying about whether others in a corporation or firm will allow their ideas to come to fruition. Some Serial Innovators, like Steve Jobs, reside at the top of corporations and can dictate what product ideas the firm will pursue. Other Serial Innovators innovate in the context of entrepreneurial start-ups, like Martin Eberhard, who founded NuvoMedia to develop the Rocket eBook® and Tesla Motors to develop the Tesla Roadster® electric sports car. As founders of start-ups, these Serial Innovators also have significant authority in dictating the innovative path followed.

This book, however, is about Serial Innovators like Carol Bernick and Chuck House,* who reside in the middle levels of large, mature firms, successfully creating breakthrough innovations in spite of organizational systems that seem more likely to stymie breakthrough innovation than support it. These Serial Innovators cannot dictate what products the organization will develop. Instead, they have to use their interpersonal, organizational, and political skills—in addition to their business and technical skills—to bring their innovative visions to commercial fruition.

* Charles H. House has written an interesting book, *Permission Denied: Odyssey of an Intrapreneur from "The Medal of Defiance" to the Corporate Boardroom*, working copy June 2011.

Serial Innovators work differently from the typical development employee. Thus, they need to be managed differently. Although these employees can bring in huge revenue streams, their unconventional innovation processes and the way in which they navigate the politics of project acceptance are so different from the firm's formalized processes, they inherently cause problems for the organization. Consider the following Serial Innovator story.

TOM OSBORN: THE BILLION-DOLLAR PRODUCT THAT NEARLY WASN'T

Tom Osborn is a Serial Innovator at Procter & Gamble (P&G). In the early 1980s, he invented the technology behind the Always® Ultra feminine hygiene pad, one of P&G's billion-dollar (annual revenue) brands. But Tom's innovation nearly got him fired.

After earning a PhD in chemistry, Tom completed a postdoctoral fellowship in which he helped develop technology to measure cosmic ray–induced reactions on the moon—a safety aspect of the Apollo 17 lunar mission. Upon joining P&G, Tom worked in basic research, where he developed radiotracer and nuclear analytical methodologies, most of which also supported safety programs.

After four and a half years in basic research, Tom moved to a research and development (R&D) position in the business side of P&G, in the analytical section of the paper category. Historically, the company looked at paper process improvements in terms of the mechanical structures of papermaking, but Tom was inclined to consider chemical techniques instead. This unique perspective yielded some of his first patents.

Later in his career, when offered a position in P&G's feminine care category, also part of the paper group, Tom made the move. At the time Tom joined feminine care, the group was reorganizing. P&G believed that feminine hygiene offered great opportunities and wanted to enter the market rapidly with a new sanitary pad. The product was in the final stages of development. It featured a new, proprietary technology that had performed very well in its early consumer testing; everyone was excited about the launch.

But an issue with the adhesives that bonded the top sheet to the pad's absorbing core threatened the timeline. Tom quickly defined the problem

and laid out a simple solution; development continued on track. The next step was a limited manufacturing run—just enough product to stage a test market in several cities. Tom was then asked to resolve another typical manufacturing issue. Again, he helped keep the pad moving toward launch.

When he was in basic research, Tom was free to approach problems from a holistic perspective; he was now being asked to work in a more directed way. As part of a business unit working on a new launch initiative, he was expected to solve specific technology issues. But the idea of looking at things from a narrower, technology-specific perspective ran counter to his orientation as a scientist. It was impossible for him to turn his curiosity off. Intuitively, he began to think of feminine pads within the wider context of menstruation—the process itself and the way it impacted women's lives.

He soon realized that the current pad reflected an engineering-based approach to solving women's problems associated with menstruation. The technical group had "made a device to catch fluid" without considering the properties of the fluid or the way the pad interacted with the body. Despite the fact that early consumer testing showed that the proprietary technology worked—the pad offered noticeable dryness as compared to competitive products—it did not perform well in other aspects, including comfort. The more time he spent on the initiative, the more Tom was convinced that "there was no substantial biological and physical science" behind the new pad.

Tom believed that P&G could develop a superior performing pad that was also comfortable, and that such a pad would make a significant difference in consumers' lives. Tom explains: "One of my primary goals in life was to be the most popular guy in the world with women. [*laughs*] But seriously, I really wanted to improve the quality of women's lives."

Tom's supervisor gave him the go-ahead to conduct the basic research needed to create a fundamental understanding of pad performance and to translate that understanding into a prototype product.

Tom's methods were a radical shift from the ways the product development group had approached research in the past. The fluid the team had been using to test prototypes bore little similarity to menstrual blood. Tom changed the testing and testing protocols to a blood-based substance, and

that was just the beginning. He also analyzed wear and flow patterns on thousands of used pads, personally examining hundreds of pads himself. And he realized that, because the FDA classified pads as medical devices, many of the clinical methodologies used in medical device development could be applied to pad research. By building relationships with physicians and staff at a nearby medical school, he was able to investigate the physical and psychological aspects of menstruation, and to develop methodologies to learn how pads interact with and move on a woman's panty as she moves. The more he learned, the more he doubted the veracity of the prevailing model.

Tom knew that most of his product development colleagues came to feminine care from P&G's diaper category. He understood why their mental model of menstruation was, unconsciously, an extrapolation of learning based on diapers. He also understood why they thought of the pad as something that needed to capture and contain a thin, free-flowing stream of fluid. Tom's research showed that menstrual fluid was, in reality, a viscous fluid that was thicker than urine, and that it left the body slowly, through a combination of small drops and intermittent surges. He began to formulate a model built around a series of thicker drops being pulled from the body by gravity, drops that needed to be *pulled into* an interior absorptive pad core.

Through his research Tom became convinced that, in women's minds, product performance was about more than just leakage protection, which could be achieved simply by making the product bigger. Indeed, the approximate menstrual pad size at that time was one-inch thick by two-and-a-half-inches wide by six- to eight-inches long. Tom's extensive direct-user research indicated that women also wanted comfort, and that pads of the day were anything but comfortable. Women often described the experience as "wearing a brick."

Tom's medical school investigations showed that pad comfort included two aspects: thinness and flexibility. Even if P&G had been focused on comfort, it would have been difficult to achieve using the current technology platform, in which comfort improvements came at the expense of protection. The first Always product was now on the market and, although superior to competitive products, was designed strictly for leakage

protection. It was not comfortable. Tom now was certain that the design basis was fundamentally flawed.

He also was convinced that he could invent a pad that would help women get through their monthly periods with increased confidence and ease. Using his new mental model, he began to visualize this pad, not as an absorbent brick, but as a replaceable panty crotch—a smaller, softer, thinner, and more flexible panty "liner." The pad Tom imagined would behave as a garment.

His timing could not have been worse. Although his supervisor had approved Tom's basic research, he hardly expected Tom would challenge the whole basis of the recently launched product and the entire follow-on upgrade program. Given the recently launched pad's competitively superior proprietary technology, everyone was committed to making it a success. Tom's holistic, radically different model also threatened a number of key managers at a deeper level. All had invested significant time and resources—not to mention their reputations—into the old model. Tom's push back was not well received.

Tom's manager ordered him to stop work on his model and to focus on delivering the current initiative. When Tom kept talking about his new comfort-based model and started developing prototypes, his manager began to view him as disruptive to the organization and started the termination process. His manager also eliminated Tom's technical support and other resources, leaving him only an office and a phone.

As long as he was going to be fired, Tom decided to keep working on the product he knew in his heart would transform the quality of life for many women. He found a discarded computer and got to work. Through his network of technical colleagues, Tom knew that the diaper organization was experimenting with superabsorbent materials, which would deliver high absorbency with far less bulk. After locating the new, thinner, absorbent material, he quickly realized that he had to create a laminated product. His pad needed a soft cover to allow the fluid to spread through the tissue layers, a superabsorbent core, and a thin, flexible bottom plastic sheet to prevent fluid from moving out of the pad and onto clothing.

Since the diaper organization could not supply a laminate structure that met his specifications, Tom worked with an external supplier to obtain

a suitable laminate. Then he befriended a contract worker in the development organization who could hand-make pad prototypes. He asked female family and friends to test them. According to Tom, he was able to "bootleg" the prototype development because P&G's accounting systems in the early 1980s were not as "tight" as today. He believes it would be unlikely that anyone could pursue a similar path now. Importantly, Tom did not compromise on safety. He leveraged relationships with old friends in the safety organization to conduct proper evaluations and to provide clearance for testing.

The anecdotal data were encouraging: women loved the pads. But Tom knew he couldn't approach other managers without a statistical panel test. Because a large-scale panel test would require hundreds of pads, Tom and his contractor friend handmade an interim amount (the amount needed for a small-scale panel test) on bootleg.

Around this time, Tom fortuitously found himself under the supervision of a new manager. She was a scientist by training, so Tom hoped she might be open to alternative models. She was, and signed off on a formal test request. The results were stunning. Approximately 80% of the participants preferred Tom's thin, body-conforming pad to the current P&G product. It was a hands-down winner.

Still, the support of Tom's immediate manager was not enough. In the time since Tom had begun work on his alternate model, the feminine care business had realized great success with the initial pad. A second, improved pad—still based on the old model of menstruation, the model Tom believed was flawed—was even more successful. When his small test panel results were announced, some managers did not believe that Tom's prototype could provide sufficient absorption. Still others disregarded the data because they believed Tom's model of menstruation was inaccurate; therefore, his data must be flawed. Managers who were looking at the current business results had no reason or incentive to push for a major change to the current product.

Once again, Tom was forbidden from further work on the project. And again, he was headed for termination. This time, he solicited letters of support from his allies across the technical community. It was a struggle to convince the senior supervisor to read the letters, but he did and the termination process was delayed—"for right now."

Tom used his latest reprieve to continue validating the new model, developing the new product, and searching for potential allies at higher levels. This time, fortune was in his favor. Another new manager rotated into Tom's group. Like Tom, he was a chemist by training. He believed in Tom's model and data. The new manager approved another test for Tom's prototype, a head-to-head, large sample comparison against the organization's competing upgrade product. Again, Tom's pad was the undisputed winner. It was more comfortable and sufficiently absorbent, and estimated production costs for Tom's pad were far less than for the upgrade product. Yet key managers remained unconvinced. The already-commercialized products were huge market successes, having gained significant market share against already-entrenched incumbent products.

Once again, Tom leveraged his networking and relationship-building skills to gain internal product acceptance. Fortunately, P&G culture doesn't discourage lower-level employees from building relationships with managers. Tom had recently met the new director of the entire paper organization socially, and he reached out to him. The director said, "Make an appointment and tell me about it." Tom invited his direct managers to the meeting, but they declined. The new director, who was not invested in the old model or technology, found the data compelling. But given the success of the current products, he did not push Tom's model or product idea.

Shortly thereafter, Tom ran into a former colleague, now heading paper R&D at one of P&G's international R&D locations. He was interested in the new product, based on a belief that comfort was very important in his market, and ran new tests on Tom's prototypes in his geographic region. The results were stellar. Soon after, a feminine hygiene pad of Tom's design was launched abroad.

Despite the successful launch of feminine pads based on the old model, momentum had finally shifted to the thin-and-comfortable concept. With two important senior management Champions, the rest of the organization now rallied to the new model and product. The Always Ultra concept was fully supported, staffed, and globally launched. Women around the world experienced a radical and positive change in the way they dealt with their monthly periods. Now in its third decade, successive generations of

Always Ultra continue to deliver protection *and* comfort for women, as well as huge profits for P&G.

In 1998, Tom was inducted into the Victor Mills Society, the company's highest level of recognition for R&D leadership and creativity. Reflecting on the Always Ultra experience nearly a quarter of a century later, Tom notes that P&G—including managers who once opposed him—values diverse perspectives and different ways of framing problems. In fact, P&G now puts ongoing effort toward developing new approaches to innovation and nurturing many kinds of Innovators. He also believes that his Always Ultra experience helped him develop relationship and communication skills that have proven invaluable in all aspects of his career and life.

THE PROBLEMS WITH SERIAL INNOVATORS

The Always Ultra story is likely far more information about feminine hygiene issues and products than the readers of this book (whether male or female) ever wanted to know (and certainly more than coauthors Ray and Bruce ever wanted to know). But Tom's story exemplifies how a profitable product almost did not get developed because Serial Innovators work differently from other development people, reconceptualizing product categories and businesses and frequently breaking organizational rules and norms, all of which can lead to difficulty managing them successfully. Their innovation process is very different from the formal new product development (NPD) processes found in firms. It frequently starts with developing an understanding of the basic science behind a particular phenomena or problem and spending significant time personally understanding customer needs. Serial Innovators tend to take personal responsibility for gaining and maintaining the political acceptance for a project. Thus, "talent management" of these individuals must help them manage their innovation, development, and political navigation processes.

Tom's plight is not a singular one. In 1982, HP created and bestowed upon Chuck House the "Medal of Defiance" for successfully continuing development of one of his major innovations after being specifically told to cease and desist. Chuck also was demoted back to lower levels of the HP organization twice during his career. Ironically, he was relieved to be

demoted; within the strictures of the organization, he was better able to innovate as a lower-level employee.

On the one hand, then, Serial Innovators are valuable members of an organization—perhaps the most valuable individuals in the firm, as they are capable of creating breakthrough innovations that capture large new revenue streams. On the other hand, they can be difficult to manage successfully in the context of the typical organizational innovation and NPD processes.

The purpose of this book is thus to help you understand

- how Serial Innovators differ from others involved in the development and innovation processes in the organization and the general model depicting how they understand problems and create solutions (Chapter 1);
- how Serial Innovators operate in the context of the organization, both in terms of their innovation "process" (Chapters 2 and 3) and in managing the politics of innovation (Chapter 4);
- what characteristics differentiate Serial Innovators from others in the organization in terms of personality, perspective, motivation, and preparation (Chapter 5);
- how the organization can identify and develop Serial Innovators (Chapter 6);
- how Serial Innovators are managed most effectively (Chapter 7); and
- our recommendations and challenges for those who are or who hope to become Serial Innovators, or those who would like to manage or work productively with them (Chapter 8).

Some of the chapters in the book, such as Chapters 1 (the general framework for understanding Serial Innovators in the context of NPD), 2 (their innovation process), 4 (how they manage the politics of the organization), and 5 (Serial Innovator characteristics), are purely descriptive and recount what we saw in our research. Their purpose is to help readers identify Serial Innovators and understand who they are and how they do what they do.

Other chapters move beyond the direct observations of our research, prescribing how to better manage Serial Innovators to maximize their probable success. Chapter 3, for example, describes a number of techniques

Serial Innovators use to uncover customer problems in detail. It also provides suggestions that will help managers support these workers in this very important task. Chapter 6 describes how to identify Serial Innovators and then suggests how to cultivate nascent Serial Innovators to realize their full potential. Finally, Chapter 7 is fully prescriptive. It contains all of our advice for successfully managing Serial Innovators. The book closes with Chapter 8, which directs "love letters" with advice individualized to each of the different constituencies targeted in the preface.

ABOUT THIS RESEARCH

This research has taken place across a number of phases over nearly a decade. Even though we all worked at the same university, this project began with two disjointed investigations. Unbeknownst to each other, Abbie had started investigating people she termed "Product Visionaries" about the same time Ray and Bruce started a project about people they termed "Technical Visionaries." Amazingly, the two groups were brought together by the director of an NSF branch whom we separately had approached to explore funding opportunities. We are eternally grateful that they put us in contact with each other.

The early research used the terms *Product* and *Technical Visionaries*. However, we found the word "Visionary" problematic. We were looking for people who were more than just visionary—we were trying to understand people who actually had developed multiple products and moved them through to market. Ultimately, we settled on "Serial Innovators" as the term that best described their entire range of finding and understanding problems, inventing, and bringing new solutions to the marketplace.

In the first research in this stream (Vojak et al. 2006), ten technology managers in high-tech industries were interviewed to define which characteristics most frequently appear in industrial Technical Visionaries. Industrial Technical Visionaries were defined as "technical individuals who effectively synthesize multiple technologies and business strategy to identify new and innovative breakthrough products and processes." Then, 418 American and British industrial physicists were surveyed to determine their perceptions of how important each of the characteristics was to the success of Technical Visionaries.

The next project investigated how Technical Visionaries are motivated and demotivated (Hebda et al. 2007; Hebda 2012), through structured in-depth interviews with twenty-four Technical Visionaries, their twenty-two technical managers, and their eighteen human resource managers. These individuals came from seventeen companies in the following industries: aerospace and defense; automotive and transport; chemicals; computer hardware; computer services; consumer products manufacturers; electronics; industrial manufacturing; medical equipment; and telecommunications equipment. Material from this research helped shape Chapters 6 and 7.

In 2002, *Electronic Design* celebrated its fiftieth year of publication. To mark this anniversary, they officially established an Engineering Hall of Fame, inducting fifty-eight individuals representing fifty landmark lifetime achievements. More than twenty-five thousand *Electronic Design* readers determined the honorees through online voting. We developed the general model describing Serial Innovators (described in Chapter 1 and Figure 1.6 in this book) from an in-depth investigation of how eleven of the thirty-three still-living inductees created their breakthrough innovations (Griffin et al. 2009).

Another project investigated three Serial Innovators, two Inventors, two Champions, and two Implementers in one large firm (Griffin et al. 2007). We conducted in-depth interviews with each of them, and with seventeen of their coworkers and managers, to understand what persons in each role do in organizations, and how they differ from each other in their methods, personalities, and attitudes. Chapter 1 is drawn in part from this project.

At that point, we finally embarked on "the big project," by interviewing additional Serial Innovators from a diverse set of industries that included: agribusiness, consumer packaged goods, electronics, engineering services, heavy manufacturing, medical devices, and paper products (Price et al. 2009). Some of these individuals were found through self-nomination or nomination by another in their firm after they listened to one of us present some of our findings at conferences. Others we found through our industry contacts. When someone was nominated, we first conducted a preinterview to determine whether they met our requirements of having driven at least two successful breakthrough products to market. In this

process, we eliminated nearly half of those initially nominated. In addition to interviewing over thirty of their coworkers and managers, we interviewed most of these Serial Innovators multiple times, producing a very rich set of data.

In writing this book, we worked from the data generated across all our projects.