

# Recasting Corporate Use of Prototypes

**Gary OSTER**

Regent University, Virginia Beach, USA

Phone: 1-757-352-4877

E-mail: garyost@regent.edu

## *Abstract*

*Media depictions of a single, perfect prototype presented with fanfare to clients at the end of the innovation cycle misrepresent the purpose and value of prototypes. Quick, inexpensive, and visual prototypes should instead be routinely used to promote a dynamic, ongoing conversation within and outside of the corporation eliciting emotional responses, discovering and articulating customer needs, and engendering additional valuable ideas. This paper contends that corporate leaders need to expand their vision and use of prototypes to gain insight into needed organizational capabilities, future products, services, and ideas, and areas of expansion that may enhance corporate viability and profitability.*

**Keywords:** *prototypes, innovation, market research, empathic research, compensatory behavior*

**JEL classification:** G34, O16

## **Introduction**

The single most important question regularly faced by a corporation is whether customers will ultimately prefer and purchase their products, services, or ideas (Israel, 1998; Schramm, 2006). Companies that focus on customers and their needs instead of on competitors will engage new opportunities (Taylor, 2000). Innovation is the lifeblood of every modern corporation in the dynamic global marketplace, and innovation is driven by new and fresh ideas (Salk, 1972). Key reasons that global leaders innovate include their goals to harness discontinuities, discover and correct faults with current products or services, understand unarticulated needs, take advantage of latent opportunities that others miss, and extend the utilization of an existing successful product, service, or idea. Fundamental to the achievement of these ends is a form of *experimentation* known as prototyping.

Media depictions of a single, perfect prototype developed at the end of the innovation cycle and presented with great fanfare and showmanship to clients grossly misrepresent the development, use, and power of prototypes. A prototype, regardless of its type, is not meant to represent a *final* idea (Brown, 2008). A multitude of prototypes are instead utilized to promote an ongoing “conversation” between the corporation and clients, and to elicit emotional responses and possible ideas from current and prospective customers, suppliers, and competitors (Schrage, 2000). Promising ideas are quickly rendered into rough prototypes, encouraging new ideas for both company and clients (Kelley, 2001). Prototypes are an integral tool in the design process, not a result of it (Conley, 2007; Brown, 2008; Jones & Samalionis, 2008), and appropriate use of prototypes is critical to mitigation of risk (Utterback, 1994; Davila, 2006).

Experimentation, especially in the use of prototypes, runs contrary to the traditional management development of corporate executives, who more often are trained and rewarded for being astute decision-makers (Boland & Collopy, 2006). Experimentation through prototyping can no longer be only an occasional structured means to an end: it must be recast as a routine method to discover and articulate many plausible opportunities (Jacobs & Heracleous, 2007). Experimentation must become a continuous process through which new and unforeseen ideas bubble to the surface for consideration and are immediately portrayed in two- or three-dimensional form. Translating ideas into visual form is an important first step in turning them into reality (Coughlan & Prokopoff, 2004; Davila, 2006; Junginger, 2007). This paper contends that corporations need to expand their vision and use of prototypes, use quick and inexpensive prototypes to visualize virtually all proposed changes in every type of organization, employ prototypes to strengthen communications with customers, and utilize information gained in the prototyping process to forge an unambiguous link between corporate offerings and customer needs.

### **Deepening Customer Intimacy**

Every successful corporation possesses a visceral knowledge of current and prospective customers and an abiding passion to move quickly and effectively from intimate customer knowledge to successful product and service offerings (Lojacono & Zaccai, 2005; Rodriguez & Jacoby, 2007). Uncovering and meeting both voiced and unarticulated human needs is essential to realize expansive opportunities (Taylor, 2000; Fraser, 2008). Through intensive study of the broader context of customer lives and activities (Fraser, 2006), and looking beyond stale industry orthodoxies and corporate precedent, corporations may imagine new and more cost-effective solutions to meet customer needs (Hamel, 2002). Successful corporations form abiding partnerships with customers, who provide both implicit and explicit knowledge about their perceived needs.

Although still marginally in vogue, extensive statistical market research reports, in-depth focus groups, and customer surveys have been found to yield less

and less useful information (Kelley, 2001). Traditional market research methods are inherently incomplete because research subjects are generally imprecise communicators, often using verbal shorthand, metaphors, body language, and facial expressions that can provide ambiguous information (Fournies, 1994). In addition, markets and products that do not yet exist are impossible to analyze (Christenson, 2005). Corporations must look beyond what customers say they want and instead develop what customers show they need. Focused, direct observation of customers in their natural settings, technically referred to as “empathic research,” yields nuances of human behavior in addition to clues to emotion and motivation, context, habits, rituals, priorities, processes, and values of customers (Kelley 2001; Suri, 2005). Empathic research is derived from the word “empathy,” which refers to the ability to recognize and understand a person’s state of mind, metaphorically to “live inside someone else’s skin.” Similar to anthropological studies of people in foreign lands, empathic research is qualitative in nature and based upon focused observation (Suri, 2006). Empathic research is best performed by members of the corporate staff, as “a company should never outsource its eyes” (Kim, 2005). Empathic observational techniques, including those utilizing photos, videos, or the insertion of researchers to view the behavior of consumers in action, provide a completely different window into what people want and need in their lives, what they like or dislike about the way particular products are made, packaged, marketed, sold, and supported, and “work-arounds,” improvised solutions, and observed contradictions between what people do and what they say they do (Lojacono & Zaccai, 2005; Suri, 2006; Brown, 2008). Unlike other admittedly sterile, moderated methods such as surveys, interviews, and focus groups, empathic research captures behaviors, patterns, and lifestyles in context, including implicit and latent user needs (Stevens, 1999; Jones & Samalionis, 2008). Directly witnessing and experiencing aspects of behavior in the real world is a proven way of inspiring and informing ideas, including new corporate opportunities not previously evident (Brown, 2005; Suri, 2005). Empathic research does not need to be limited to customers. The direct observation of vendors, employees, and even competitors can provide crucial information on possible improvements to products, services, and ideas.

The direct observation techniques of empathic research often reveal intentional or unconscious changes customers have made to the form or use of a product, service, or idea, called *compensatory behavior* (Oster, 2008b). The term compensatory behavior was adapted from psychology, where it refers to the behavior that individuals exhibit in their response to anxiety-causing problems in their life. In the business world, compensatory behavior refers to any type of physical modification or use of a product in a manner different from its original intent (Hagel & Brown, 2005). Consumers adapt their behavior to compensate for specific inadequacies. Interestingly, few people realize they are compensating and, therefore, are unable to explain what is wrong with a product or how that product might be improved (South, 2004). Simple examples include double-stacking coffee cups so that one’s hands are not burned by hot coffee, or putting a piece of red tape

on the handle of a black suitcase to help identify it on crowded airport luggage carousels (Suri, 2006; Oster, 2008b). In essence, through compensatory behavior, customers build their own prototypes of future products. Detecting compensatory behavior through empathic research provides valuable information about the unfulfilled and unspoken needs of consumers and help companies enjoy a higher acceptance rate of future product changes as well as substantial competitive advantage (Christenson, 2005; Kelley, 2005). Remarkably, when employees of Rubbermaid Inc. visited the homes of willing customers to observe home storage practices, they returned in less than three days with more than three hundred new product ideas (Stevens, 1999).

### **Choosing Prototyping Targets**

Although most often people think of *product* prototypes, it is equally important to prototype service offerings, process technologies, and enabling technologies (Davila, 2006). For example, firms may inexpensively prototype new usages of existing financial, human, and real assets to determine more efficient and profitable utilization scenarios (Pfeffer & Sutton, 2000). Proposed changes in facilities, policies and procedures, advertising, product line extensions, reporting relationships, operating instructions, product pricing, distribution channels, etc., all lend themselves to prototyping. Prototyping should be considered in ten specific corporate areas, including the business model, networking, enabling process, core process, product performance, product system, service, channel, brand, and customer experience (Tekes, 2007). Although virtually nothing creates customer value like regular prototyping and subsequent innovation (May, 2007), it is important to note that all innovations do not have identical value. In a landmark study of innovation, the Doblin Group reviewed more than 100,000 innovation projects conducted by corporations over the ten year period 1995-2005. Their findings were surprising and perhaps counterintuitive. Although corporations put the vast majority of their innovation budgets into product performance and systems (the basic features, performance, and functionality of a product and the extended systems that are ancillary to a product offering), the return per dollar spent was far less than money spent on the business model (how the company makes money), networking (the structure and value-chain), or customer experience (how you develop an overall experience for customers) (Tekes, 2007). In brief, *everything* is and should be considered for prototyping by individuals and corporations (Kelley, 2001; Hamel, 2002). The Doblin study may help corporate leaders decide where to allocate prototype funding so that it has maximum effect.

### **Partners in Prototyping**

Every employee of every type of organization should be routinely prototyping. To be consistently successful at innovation, corporations must redefine their relationships with current and aspirational customers. Customers should not merely be the final recipients of elegant finished prototypes and completed corporate innovation: they must be co-creators and constant critics of a

steady stream of inexpensive, rough, and rapidly constructed prototypes willingly shared by corporations (Hagel & Brown, 2005). Successful innovators view customers as eager collaborators in the design process, willing participants in the formulation of specifications and review of many “sloppy” prototypes, and champions of finished products, service, or ideas to other prospective customers (Kelley, 2001; Davila, 2006). Successful innovators have special antennae for frustration, friction, anomalies, faulty assumptions, and pieces of information that just don’t seem to complete *any* puzzle. Successful innovators build huge, informal ideabanks that may complete a myriad of riddles not yet spoken, and when organizations formalize that process, it is called “institutional learning.” Every innovative idea starts and ends with a current or prospective customer in mind. Prototyping is an essential core competency of the radical innovation team, the *lingua franca* of the innovation process (Schrage, 2000; Brown, 2008). In addition to current and prospective customers, prototypes may be effectively shared with those termed “saviors on the edge,” those outside of the industry or field (Burkan, 1996). The nature of “saviors in the edge” is that they are related, not by industry or profession, but by similarity of problems, and may have unique and valuable perspectives on the prototype.

### **Benefits of Prototypes**

The development of corporate strategy has traditionally been shaped by macrodata, including industry trend analysis, competitive analysis, technology assessments, and demographics, all competed in descriptive text and numbers (Lojacono & Zaccai, 2005). Conversely, the regular use of prototypes helps participants intentionally engage imprecise abstract concepts and visual language to more effectively imagine, explore, and ultimately decide on new ways to meet customer needs (Conley, 2007; Fraser, 2008; Owen, 2008). Regardless of the type, speed of construction or roughness of presentation, prototypes move abstract concepts understood by few to tangible models available to many in an effort to stimulate “thinking out loud” (Schrage, 2000; Boland & Collopy, 2006; Brown, 2008). The fundamental goal of prototyping is to generate as many alternatives as possible. Prototypes are not built to answer questions; instead, they generate “useful surprise” (Schrage, 2000) and engender the necessary conversation to encourage the right type of questions (Peters, 1995; Schrage, 2000). As a rule, successful innovators do not look for complete answers (Davila, 2006). Conceptual fragments generated during early prototyping may be recombined and extended into new prototypes to ever more closely match customer requirements (Hamel, 2002).

The lack of customer needs-articulation is an important issue to most corporations. In many instances, customers may not be aware of their own their higher-order needs and aspirations, cannot reliably express them, or may deem them irrelevant, insignificant or embarrassing (Lojacono & Zaccai, 2005). Through deepened intimacy with customers, employees may continually share prototypes with consumers to gauge their response and seed new product ideas. Just as a chef

gives away samples of a new and unusual dessert in a restaurant to learn whether customers like it, corporations must provide a steady stream of “improved” prototypes to customers, ask what they would change if they could, and then ultimately hope for a “hot yes” from prospective customers (Lynn, 2002). The fundamental goal for sharing prototypes is to elicit emotional responses, new questions, possible future directions for the research, and to test new ways the meet consumer’s desires (Lojacono & Zaccai, 2005).

Corporations have traditionally commenced internal strategic conversations with constraints: the constraints of budgets, of ease of implementation, of the quarterly earnings focus that Wall Street dictates. Most often, the myopic focus upon constraints leads to incremental changes in existing products, services, or ideas. Using rigorous inductive and deductive logic, employees are required to prove the likely success of a new product, service, or idea before it is introduced (Martin, 2005). Successful innovators employ an additional form of logic: *abductive* reasoning, or the logic of what *might be* (Liedtka, 2004; Martin, 2005). The goal of abductive reasoning is to intentionally build up a mountain of possible solutions. Although constraints can never be completely ignored (May, 2007), successful prototypes encourage new insights through the temporary suspension of judgment, assumptions, and reality so that one might ask, “What if *anything* were possible?” (Liedtka, 2006; Jones & Samalionis, 2008; Oster, 2008a).

Prototypes make it easier to utilize the power of metaphor and analogy for the transmission of knowledge (Nonaka, 1991). A metaphor is a figurative language and a distinctive method of perception that allows individuals to understand something intuitively through the use of imagination and symbols without the need for analysis or generalization (Nonaka, 1991). Through the use of metaphors, people put together what they know in new ways and begin to express what they know but cannot yet perfectly articulate (Nonaka, 1991). Thomas Edison was exemplary of innovators who consistently used a principle, property, or device, developed in one context to solve a problem in an entirely different one (McAuliffe, 1995; Israel, 1998). The rapid recasting of ideas through the continual use of analogy and metaphor through prototyping exponentially expanded and sustained innovation at Edison’s Menlo Park laboratory (Pretzer, 1989).

It is neither prudent nor possible to remove all elements of risk from corporate innovation programs (Schramm, 2006; Lafley & Charan, 2008). Fear of risk related to innovation often causes corporations to over-invest in the past (Skarzynski & Gibson, 2008). Risk may be substantially mitigated, however, through the intentional use of low-cost experimentation via prototypes (Hamel, 2002; Oster, 2008d). An all-consuming aversion to risk causes companies to tilt innovation toward incremental changes in existing products rather than radical new products, services, or ideas (Davila et. al., 2006). Successful corporations have learned that, as risky as innovation is, not innovating through the use of prototyping is far riskier (Foster, 1988).

## Characteristics of Successful Prototypes

Innovation of products, services, processes, or ideas cannot occur unless new combinations of ideas are communicated from one person to another, and prototypes are a tangible method of doing so (Coughlan & Prokopoff, 2004; Brown, 2005; Davila et. al., 2006). Innovators *never* attend a meeting without a prototype in hand. Successful prototypes possess six key characteristics: they are visual (two- or three-dimensional), they are inexpensive and developed very rapidly, they are intentionally rough (do not purport to resemble a final product, service or idea), they are openly shared with others, and they are rapidly revised. Prototypes may be constructed using a wide variety of media, including sketches on paper, newsprint, cardboard, foamcore, videos, digital pictures, storyboards, bubble-charts, mindmaps, “exploded” diagrams, computer renderings, clay carving, spreadsheets, process maps, simulations, Powerpoint presentations, virtually *any* simple visual representation that helps people to understand better where lack of clarity yet exists (Peters, 1995; Hagel & Brown, 2005; May, 2007). Rough “approximate” prototypes encourage people to revise their thinking about a particular subject and to “try on” a multitude of possibilities (Kawasaki, 1999; Schrage, 2000; Brown, 2005). Information visually depicted by one or a group of prototypes may quickly elicit the desired emotional connections between people, products and services, and can help a company to appropriately triangulate these findings with requisite technologies and economic objectives (Kelley, 2001; Lojacono & Zaccai, 2005; Fraser, 2006). An accurate measurement of progress in innovation in modern organizations is the speed and extent with which non-textual visual representations of concepts and ideas are developed and shared between employees and customers. The future success of global businesses will pivot on their ability to capture and portray new ideas, and the capabilities and rabid tenacity necessary to turn them into reality.

## Preparing the Organization for Successful Prototyping

Few individuals and corporations naturally accept and accommodate new and innovative ideas (Von Krogh, Ichijo, & Nonaka, 2000). Although the knowledge and skills needed to design and develop new products, services, and ideas have become much more demanding and require the ability to make non-obvious connections between radically diverse knowledge bases (Nambisan, 2008), tradition, orthodoxy, arrogance, and insecurity still routinely engender intellectual balkanization (Grudin, 1990; Charan, 2007). Active corporate prototyping and subsequent innovation require courageous leadership to inspire, manage, and support discovery, learning, and change (Manu, 2007). Appropriate information must be recognized, evaluated, shared, and utilized continuously throughout the organization (Nonaka, 1991) and regular, systematic institutional learning requires appropriate and visible channels for sharing information, wide knowledge of the questions guiding the scan, and policies, procedures, and incentives for actually

sharing useful information (Day & Schoemaker, 2006). Openness and the routine sharing of information gained from prototyping is the *sine qua non* of innovative corporations (Bennis & Biederman, 1997; Von Grogh, Ichijo, & Nonaka, 2000), and requires a culture of trust, respect, and curiosity (Day & Schoemaker, 2006).

The generation of new, fresh ideas is based largely upon the diversity of motivations, experience, and thought among corporate employees (Sutton, 2002). Broad skill sets and personal idiosyncrasies are important positive factors in the development of innovative ideas in organizations (Bennis & Biederman, 1997; Andrew & Sirkin, 2006; Skarzynski & Gibson, 2008) and must be intentionally considered in all hiring decisions. Individuals within corporations must intentionally escape the shackles of convention, tradition, and orthodoxy of thought to imagine possible new innovative concepts (Kawasaki, 1999; Dyson, 2003).

Directed training is necessary for employees expected to design, implement, and maintain institutional learning systems utilizing prototypes (Nonaka, 1991). Once training is completed, employees are better able to sort through conflicting signals and detect patterns and insights that others often miss (Schwartz, 2004; Charan, 2007; Manu, 2007). "Creative friction" that naturally occurs because of polarized viewpoints and the passion of individual employees must be encouraged and managed (Hirschberg, 1998; Horibe, 2001), allowing team members to listen to each other, be willing to understand and appreciate conflicting viewpoints, and positively question each other's assumptions (Gryskiewicz, 1999). An essential role of corporate leadership is to thwart innovation antibodies, the naysayers and Devil's Advocates who seek to derail corporate innovation efforts (Kelley, 2001, 2005; Cagan & Vogel, 2002; Oster, 2008c). Organizations need to recast the meaning of failure and create an environment where taking risks on breakthrough innovations is recognized as being valuable to the company (Grudin, 1990; Schwartz, 2004; Davila, 2006). Most importantly, employees must learn to use their peripheral vision to intentionally "tune in" to seemingly random bits of environmental information, those far-off, fuzzy, intermittent signals, capturing new information and ideas and using them to find creative solutions for customers (Gryskiewicz, 1999; Schwartz, 2004; Day & Schoemaker, 2006). Consistently doing so ahead of the competition is a matter of corporate survival.

### **Concluding Thoughts**

The only long-term source of profit and logical reason to invest in a company is confidence in their ability to consistently innovate (Schwartz, 2004). Superior, protracted innovation guided by prototyping provides opportunities for companies to grow faster and better than their competitors, and to successfully influence the direction of their industry (Gryskiewicz, 1999). Constant prototyping that ignores industry orthodoxies encourages insight into needed organizational capabilities (Jones & Smalionis, 2008), plausible future products and services (Kelley, 2000), and even entirely new areas of expansion for the corporation (Lafley, 2008). This paper has shown practical steps leaders should take to enhance



corporate use of prototypes. To positively change customer expectations, up-end industry convention and basis for competitive advantage, and reap the welcomed financial harvest from increased innovation (Hamel, 2002), corporations must routinely and consistently employ prototypes to visualize and communicate alternate futures.

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