Something from Nothing: The Paradoxes and Challenges of Communicating Innovation

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ABSTRACT

Using Komisar and Lineback's (2001) description of the two models of innovation—"better, faster, cheaper" and "Brave New World"—this article examines the challenge of describing innovations to potential investors, suppliers, partners, and the public. In particular, this article focuses on the importance of understanding the nature of the innovation prior to attempting to communicate its value and utility to a larger audience. Ultimately, innovators and entrepreneurs must understand the two paradoxes of describing innovation. First, the incremental improvements of the "faster, better, cheaper" model need to leverage claims to be revolutionary. And, second, the truly novel "Brave New World" invention must debut as a modest improvement over the very practices and services it aims to supplant, ensuring rapid uptake by leveraging the public's existing schemas for familiar actions and understandings.

INTRODUCTION

"Built a better mousetrap, and the world will beat a path to your door," Ralph Waldo Emerson declared in what was probably one of the first documented instances of an American thinking about models for innovation. Today, we recognize Emerson's better mousetrap as a version of the "faster, better, cheaper" model of innovation (Komisar and Lineback, 2001). However, the other model of innovation, which Komisar dubs "Brave New World," where entrepreneurs introduce something entirely new into the market, challenges the would-be innovator to describe something completely unfamiliar to potential partners, investors, customers, and the public. The "better, faster, cheaper" models requires entrepreneurs to convince multiple audiences that their products or services improve on something already established, obliging them to overcome would-be customers' biases and loyalty to their already-established competitors. In contrast, the "Brave New World" innovation has to overcome still steeper challenges that somewhat resemble the old tale of the blind men describing an elephant according to the part of the creature they touched. The audience might see your innovation as resembling something completely misleading. Or, worse, they might fail to understand what your innovation actually is. As we'll see, the soundest approach for reaching would-be investors, partners, suppliers, customers, the media, and the public involves an utterly paradoxical strategy: you need to convince these potential, crucial stakeholders that your better-faster-cheaper model is actually a revolutionary innovation, while your Brave-New-World invention is merely a tweak to improve something already out there. But we have other ground to cover, first.

This challenge in getting others to understand innovation is central to the success of every entrepreneur. In fact, communication is the unsung stumbling block of virtually every innovation that has every succeeded—or spectacularly failed. Yet, since we tend to think of communication skills as talents

we acquire at early ages and polish through schooling, the thousands of publications and blogs dedicated to entrepreneurship and innovation barely give the challenges of communicating its value a passing nod. The result? A dearth of knowledge, understanding, or advice to help entrepreneurs conquer the challenges of communication which, in innovation, are legion. Every entrepreneur needs, in fact, to have at least ten conversations with a diverse array of stakeholders, ranging from partners, investors, suppliers, and employees, to competitors, clients, advisors, the media, and the public. But the first and most important conversation is also with him- or herself. Before you communicate your innovation's value proposition to others, the look and feel you're after, you first need to think strategically about your innovation. Your understanding of your innovation, after all, will differ anywhere from minutely to radically from what already exists. And that understanding ultimately determines whether your venture succeeds, fails, or stalls.

THE FIRST CHALLENGE: UNDERSTANDING HOW OTHERS SEE YOUR INNOVATION

Consider the case of the World Wide Web, the innovation that transformed the diverse array of networks we now think of as the Internet into a data-stream that delivers everything from airline tickets to virtual friendships to entertainment. Before Tim Berners-Lee's innovative means of naming links, the various networks—which, in the US, included Darpanet, Bitnet, Edunet, and Internet—were a wild, wild West of uncharted territory, mainly due to hierarchical file structures, an absence of links, and challenging addresses that ran to alphanumeric strings bristling with punctuation. Like most frontiers, the colonizers of the old Internet mainly sought replacements for familiar activities: contacting others via email and instant messaging, using ftp protocols to facilitate collaboration on projects, and posting comments on electronic bulletin boards. You could theoretically do far more online than these fairly utilitarian activities, as the Internet Service Provider (ISP) Prodigy realized early on in offering consumers the means to shop for everything from household goods to a Mercedes (Getts, 1990)—and yet the Internet remained an environment any user needed significant technological savvy to use in even a rudimentary fashion. Enter the World Wide Web, followed by the likes of search engines AltaVista.com, Google, entities like eBay and Amazon, and the social media Holy Trinity of Facebook, YouTube, and Twitter.

Actually, the real story doesn't quite unfold this way. Like the fax, incandescent lighting, the phonograph, and tape recorders, all technologies with significant gaps between their patenting and widespread use, the moment the World Wide Web was unveiled was greeted, not with enthusiasm and investors reaching for their checkbooks, but, instead, with incomprehension. I remarked on this particular bit of the World Wide Web's history in 2001 when I became one of the co-chairs of the International Hypertext Conference. I mentioned to one of the conference organizers that I wanted to alter the public image of this highly selective conference.

"After all," I remember saying, "this conference is mostly famous as being the venue that rejected Tim Berners-Lee's paper proposing the World Wide Web and giving him a lousy poster session."

"Damned right!" the other organizer barked, without hesitation. "We were right! His idea wouldn't scale!" (Douglas, 2001).

But, by 2001, we knew damned well the web would scale. In fact, some of us knew the web would rapidly straddle the world. As the World Wide Web he envisioned celebrated its quarter-century, critics remarked on the irony of Tim Berners-Lee's innovative idea gaining a crappy poster session at a conference full of early adopters who knew innovations when they saw them—including a panel of

reviewers who were themselves innovators. Moreover, Berners-Lee's proposal in 1991 was not freshly created for that conference. Instead, the researcher at CERN, the European Center for Nuclear Research, had first laid out his central premise in an earlier, 1989 paper (Berners-Lee, 1989). Nevertheless, papers accepted to the International Hypertext Conference sessions included papers on software for creating hypertexts and for navigating hyperspace, including the very "lost in hyperspace" phenomenon Berners-Lee's proposal explicitly addressed, an issue that had also cropped up at the first-ever Hypertext Conference in 1989 (Hardman & Edwards, 1989; Bernstein, Bolter, Joyce & Mylonas, 1991; Joyce, 1991; Gloor, 1991). In contrast, the first-ever demonstration of the World Wide Web was relegated to an exhibition space in the hotel hosting the conference, where attendees wandered among research displayed on posters or, in Berners-Lee's case, on a NeXt computer, mostly after having helped themselves to the tequila fountain set up in the courtyard outside (Mach, 2014). Moreover, Berners-Lee's own supervisor at CERN had merely noted "vague but exciting," on the March 1989 iteration of the proposal, reacting nearly identically to the reviewers who relegated his proposal to a poster session, as well as the attendees who mostly seem to have ignored his demonstration—not one of whom ever mentioned it, when they recounted the conference afterward (Douglas, 1991a; Douglas, 1991b). But the scenario isn't as ironic as most people like to imagine. In reality, the scenario is typical of the reception of most innovations: blank incomprehension.

SCHEMAS: CREATING SOMETHING FROM NOTHING

Scottish inventor Alexander Bain received a patent for the first facsimile machine in 1843 and used his expertise in building clocks to create a machine that used two synchronized pendulums to scan images and metal pins on a cylinder for transmission. To receive the image, his device relied on electrochemically sensitive paper saturated with a chemical solution. The patent office recognized his invention readily enough, granting Bain ownership of "improvements in producing and regulating electric currents and improvements in timepieces, and in electric printing, and signal telegraphs," that could produce "a copy of any other surface composed of conducting and non-conducting materials can be taken by these means" (Polhemus, 1878). Bain subsequently patented a chemical telegraph that improved the signaling speed of Samuel Morse's telegraph. His invention, moreover, was copied by inventor Frederick Bakewell, who patented what he dubbed "the copying telegraph" in 1848, after Bain provided Bakewell with access to his workshops with an eye toward hiring Bakewell to fully describe his innovations. Yet the facsimile machine—now known as the fax—failed to gain widespread use until the late 1970s (McFarlane, 1980).

In the same way, other inventions stuttered on their introduction, including Thomas Edison's phonograph (Conot, 1979), languishing mostly unused for decades prior to the widespread adoption that ultimately attested to their usefulness to millions of users. These innovations, like the ill-fated Apple Newton, the hand-held computer with nearly the same functionality as the now-ubiquitous Apple iPhone and its imitators, all relied on lengthy directions for how users might adopt them. And they all faced the same challenge as Bain's facsimile and Berners-Lee's CERN proposal. How do you describe something that is unlike anything that had come before it and enables its users to perform actions they can't envision?

To somewhat paraphrase art historian E.H. Gombrich, there's no such thing as an immaculate perception (Gombrich, 1960). Gombrich meant that we perceive objects only because we learn how to perceive them, subtly and mostly unconsciously, via schemas. Put simply, schemas are the building blocks of comprehension, enabling us to comprehend everything from the difference between a dog and a

cat to understanding that shadow can make objects appear to recede and that distant objects appears smaller than closer objects (Schank & Abelson, 1977; Runelhart, 1986). Gombrich invoked schemas like the ones I've just described to explain not only how art evolved but also how our perceptions evolved with it. Ancient Egyptians, for example, had a limited schema for representing distance or even proportions in their art, preferring to represent important figures in images as larger than the workers clustered around them (Gombrich, 1960). But even today, we rely on learned schemas to understand that the straight stick, thrust into water, only appears to bend but remains unchanged by the water, just as those railroad tracks, receding into the distance, remain parallel and do not converge, despite what our eyes tell us.

However, schemas involve far more than visual perception, as Tim Berners-Lee and every innovator before him discovered. At the same conference where he unveiled the first demonstration of the World Wide Web, Jay Bolter and Michael Joyce were veterans of the same dilemma that had relegated Berners-Lee's innovation to an audience of margarita-slugging conference-goers, who circulated amid the "poster" offerings fresh from the courtyard's margarita fountain. Bolter and Joyce (1987) developed one of the first and most innovative software applications that enabled writers to create interactive, hypermedia documents. Their application, StorySpace, first appeared in beta form a year prior to Apple's debut of its own hypermedia system HyperCard (Akscyn, Halasz, Oren, Riley, & Welch, 1987; Bernstein, 1987; Douglas, 1988; Joyce, 1991). Using StorySpace, writers could rapidly create idea maps of documents, link a network of nodes together with simple mouse-clicks, and create complex conditions for readers navigating documents using Boolean strings. The entire interface was a genuine graphic user interface (GUI), enabling writers to manipulate complex networks of ideas visually, and for their readers to see intricate, detailed cognitive maps of the links between ideas, best demonstrated in Jay Bolter's re-creation of *The Iliad* as a hypertext with dozens of links between each segment of the narrative (Douglas, 1988). For ease of use and the sophistication of the works the software could produce, StorySpace surpassed any application available even decades later. Using it, writers could, with mouse-clicks to create nodes and pathways, create conditions for readers' navigation that rivals the structural sophistication of most websites and even video games available nearly twenty years later. However, whenever I or other colleagues demoed the early, 1.0 beta versions of the software, virtually no one understood what he was seeing. The best approximation one viewer managed was that the software was "just a big database" (Douglas, 1987).

However, by 1991, users had already begun creating works using StorySpace, including two of the academics who made the conference program, Michael Joyce and Stuart Moulthrop, and others had begun publishing scholarly articles on the application three years earlier. But Berners-Lee was in the same fix as Bolter, Edison, and Bain had been. He had created a mechanism for addressing a need that no one else realized existed. In fact, what Berners-Lee's proposal described was a virtual means of replicating the interactions that occurred at CERN, from serendipitous meetings in a corridor to initiations into working with a new teams and circulated newsletters. The CERN workplace environment, he noted, was extraordinarily rich (Berners-Lee, 1989, 1990). The problem, however, lay in its necessarily high turnover, since researchers seldom stayed longer than two years. As researchers departed, they took their knowledge, practices, and discoveries with them—particularly the understandings and methods that never saw publication. Moreover, when new researchers arrived, their productivity remained limited until they had gained an understanding of how previous projects had worked or which potential collaborations might be most fruitful. Even when researchers had recorded details of prior projects, subsequent researchers found the data difficult or impossible to retrieve. So Berners-Lee began by trying to solve

CERN's primary inefficiencies, rapidly realizing that CERN was merely a microcosm of organizations world-wide and, ultimately, of the world itself (Berners-Lee & Cailliau, 1990). The problem lay in how to describe something that didn't yet exist. Moreover, Berners-Lee's proposal failed to resemble anything currently in use as it worked to overcome limitations the average user knew intimately by relying on an entirely novel way of handling, linking, and making accessible documents.

EVEN BRAVE NEW WORLDS AREN'T ENTIRELY NEW

In retrospect, journalists see that first demonstration at the International Hypertext Conference as the birth of the World Wide Web, our era's equivalent of the Big Bang, nothing less than "a concept and a structure that would soon spark a worldwide information revolution" (Mack, 2014). But to read Tim Berners-Lee's terribly modest proposal is to begin to sympathize both with the organizers who rejected his proposal for the main conference sessions and the attendees who preferred to stay outdoors, within convenient refilling distance of the free margarita fountain. Because what Berners-Lee was suggesting was not a revolutionary Big Bang, utterly discontinuous with everything that had preceded it, the masterstroke that transformed the Internet into something one could use to sell cars, employ a developer 8,000 miles away, hold meetings in real time on three continents, and offer an entire graduate degree curriculum online. Instead, he suggested innovations that built on existing models for hypermedia, relying on terms like "link" and "node" to describe an online environment that could contain graphics, text, or any sort of content stored in an environment that placed no constraints on the data itself (Berners-Lee, 1989, 1990). However, Berners-Lee described a means of replicating CERN's environment in a virtual web of documents, reducing the center's turnover of researchers and subsequent loss of knowledge gleaned from work.

Nothing about Berners-Lee's proposal, even at the time when his demonstration was consigned to the area adjacent to the courtyard, was particularly innovative, especially since the terms "link" and "node" had been used to describe a collaborative environment like NoteCards (Trigg, Suchman and Halasz, 1986), Guide (Brown, 1987), and Storyspace (Bernstein, 1987; Bernstein, Bolter, Joyce & Mylonas, 1991; Joyce, 1991; Moulthrop, 1991). In fact, by 1989, when Berners-Lee first sketched out his proposal, the terms "link" and "node" had already been dubbed the "lingua franca" of hypertext by Apple's Tim Oren and Xerox PARC's Frank Halasz at the first-ever conference dedicated solely to hypertext, held two years earlier (Akscyn, Robert, Halasz, Frank, Oren, Tim, Riley, Victor, & Welch, Lawrence, 1987). Moreover, more than forty years earlier, Vannevar Bush has envisioned the Memex, a strictly theoretical means of making a "mountain of research" more readily available to scientists—most notably and not coincidentally, physicists. As Director of the Office of Scientific Research and Development, Bush's portfolio of responsibilities included coordinating the activities of over 6,000 American scientists to the application of warfare, including the Manhattan Project that developed the atomic bomb (Bush, 1945). Berners-Lee's proposal similarly attempted to make the research findings of physicists more accessible to other researchers. If Berners-Lee had relied on his audience's pre-existing schemas for understanding hypermedia, his proposal and the debut of the World Wide Web would have fared differently. In 1991, both Bush's Memex and Ted Nelson's subsequent Xanadu (Nelson, 1987) represented highly accessible as references, known to both the Hypertext Conference attendees and the organizers who denied his proposal a slot in the conference's accepted papers.

Instead, Berners-Lee ignored the true novelty of his own innovation in its earliest working description, a model that existed in both Bush's and Nelson's theoretical models for making data

available to researchers. Unlike the systems of Guide, NoteCards, HyperCard, and StorySpace, all familiar to the San Antonio conference attendees, Berners-Lee's innovation aimed to create an online system of nodes and links unconstrained by software working within a single application. Even at the 1991 conference, the well-known hypertext applications that featured heavily in the conference proceedings had generated only a handful of the texts (Douglas, 1989; Moulthrop, 1991). Moreover, even had hundreds of hypertexts existed, a hypermedia web created in HyperCard remained unreadable in StorySpace and vice versa. Furthermore, within a few years' time, most of the hypertexts created by the primary hypermedia applications of the day would be unreadable as the software developers failed to support changes to PC operating systems (Harpold, 2009).

Had Berners-Lee couched his proposal as an online realization of Memex or Xanadu, his offering might have made the conference mainstream sessions. Ironically, his proposal does mention a common problem of the early hypermedia era, the "lost in hyperspace" phenomenon common to anyone who spent time browsing through hypermedia texts, where backing up might bring readers not to the node they last visited but, instead, to a node linked to the one they had just visited (Douglas, 1989). Moreover, existing online resources tended to use file structures that were hierarchical and required users to know at least the location of the uppermost item in the tree, making the "lost in hyperspace" dilemma Berners-Lee attempted to solve in his proposal already a familiar phenomenon even at the initial 1987 conference (Conklin, 1987; Hardman and Edwards, 1989).

Instead, Berners-Lee's innovation that created the World Wide Web as we know it involved three distinct acts of creation, one present but not show-cased in his proposal rejected for the main 1991 conference, the second two, entirely absent from the proposal but visible in his NeXT demo that conference-goers mostly ignored. First, Berners-Lee used a non-hierarchical link structure to impose order on the near-unnavigable Internet of the era. At the time, even geeks needed to know at least a general location for a resource and, in most scenarios, the location of the head of the hierarchical tree housing the resource. Today, users can still stumble across its like when they reach no-longer maintained websites, where marooned nodes exist without a landing page to orient users and link them to the sought-after nodes. Had Berners-Lee highlighted that aspect of his proposal, the conference committee would likely have seen in his proposal a means of hacking tidy plots and street signs—the equivalent of a platted housing development—from what had formerly been a dense jungle of resources that obscured users' line of sight and mostly derailed their searches sooner rather than later. Second, Berners-Lee's innovation that made the web accessible was up and running on world's first-ever website and web server, a NeXT computer at CERN in August, months prior to the conference. The world's first website was using an address that looked like a human language and, despite CERN's location, in English: http://info.cern.ch/hypertext/WWW/TheProject.html (Cern, 1991). This innovation was subtle, yet perhaps as significant as the online network of resources. The first-ever website relied on a universal resource locator or URL that used real language, rather than the abstruse symbols users previously needed to navigate, including the befuddling Unix addresses that bristled with exclamation points and alphanumeric strings. Third, Berners-Lee and his collaborators at CERN had created HTML or HyperText Markup Language, creating uniformity in the way that all servers represented menus, links, text, and online help. In addition, that first website both gave the World Wide Web its name (rendered as "WorldWideWeb") but also the familiar http that precedes all World Wide Web addresses, which stood for HyperText Transfer Protocol (Berners-Lee, Cailliau, Groff, and Pollermann, 1992).

Everything that represented the World Wide Web as we know it was already present in that first-ever demo in San Antonio in 1991. In addition, Berners-Lee had all schemas he required to introduce his

innovation to a rarified audience. That audience would have understood the concepts of orientation in hyperspace, non-linear and non-hierarchical links, a unified language for making content display uniformly across sites, the concept of a web, and addresses that did away with the generally incomprehensible and decidedly impossible to remember addresses formerly used for displaying content on what was coming to be known uniformly as the Internet—even if its constituents also consisted of what was originally Darpanet, Bitnet, and Edunet. Instead, by ignoring already-established schemas in his proposal, Berners-Lee condemned his proposal to oblivion and his demo to a scrap of history, leaving pundits to marvel at the obtuse or drunken conference attendees who saw his NeXT demo and failed to report the Next Big Thing to the world (Mack, 2014; Whitney, 2014). In retrospect, the moment of innovation is stark and users instantly grasp novelty. In actuality, users shun novelty for excellent reasons, as we'll see below.

No worries: Berners-Lee hardly suffered for that initial stutter. Within scarcely more than a decade, he would become Sir Tim Berners-Lee, knighted for "for services to the global development of the Internet" (BBC News, 2003), the first of a veritable avalanche of honors bestowed on him, in addition to his mantle as creator of the World Wide Web. However, he could have enjoyed his honors more immediately and powered his vision of a World Wide Web to more rapid acceptance had he adhered to the paradoxical formulas entrepreneurs should rely on for introducing "faster, better, cheaper" and "Brave New World" innovations to a broad audience.

INTRODUCE INCREMENTAL TWEAKS AS REVOLUTIONARY

As someone who spent a quarter-century in advertising, I would have clouted the first person who proposed advertising a not-terribly-innovative product as "evolutionary," rather than "revolutionary." In the perverse logic of advertising, the less revolutionary an item is—the faster-better-cheaper model—entrepreneurs need to focus on positioning the service, technology, or device as something that revolutionizes the way your target market uses products or services created by existing competitors. While these incremental nudges might seem less-than-revolutionary, to your target audience, your minimal tweaks can tip the way they use something into a novel approach. Or, even better, your nudges can push consumers to adopt something they hadn't seen as entirely necessary before your tweaks.

Consider, for example, the iPhone, which was certainly not the first smartphone to enter the marketplace—nor even Apple's first attempt at a computer shrunk to fit in your pocket. Instead, that honor goes to the Apple Newton, ironically one of the company's most conspicuous failures (Grudin, 2013). Apple's Newton was truly revolutionary—and needed the introduction-by-stealth strategy we'll shortly explore. In contrast, the iPhone followed a long line of first personal digital assistants (PDAs), a term ironically coined by Apple's then-CEO John Sculley when he introduced the Apple Newton during a 1992 trade show (McCracken, 2012). In producing the earliest PDAs, Apple and Nokia witnessed the crash-and-burn introductions of the Apple Newton (Carlton, 1997) and Nokia 9000 Communicator ("Nokia Unveils World's First All-In-One Communicator," 1996; King, 2006)—both devices that could send and receive faxes, email and short messages, as well as serve as Internet browsers, calculators, calendars, address books, notepads and calculators. As we'll see when we turn to how to introduce truly novel innovations, both companies made the error of thrusting at the public something for which they lacked schemas.

Every day, we use schemas—frameworks for understanding the world around us—to organize what our senses convey to us into something meaningful. Schemas cue reactions and behaviors, and we rely on

them unconsciously in everything from understanding the function of a zipper and the direction in which it moves to close a jacket (up) to the way we should behave while attending a symphony (listen in silence to the end of the piece, applaud, then sit still for the rest of the program). In addition, researchers who study consumer behavior have long known that we adapt quickly to schemas and tend to gravitate to things that are slightly discontinuous with our existing schemas. In other words, objects that offer a sliver of novelty without requiring us to learn new behaviors (Mandler, 1982; Myers-Levy, 1989). In fact, consumers will seek out moderate amounts of novelty, preferring this slight tang of novelty to familiar or extremely novel items (Venkatesan, 1973). So entrepreneurs bringing something faster, better, or cheaper to the market tend to face a far easier challenge in their first conversation about an innovation than the entrepreneurs truly inventing a Brave New World. Apple, not coincidentally, crashed and burned with its Apple Newton, as did Nokia with its 9000 Communicator, as few users of the time could identify a schema for browsing the Internet while, say, waiting for their order at McDonald's. Users stayed away from the stark discontinuity with existing schemas for phones to the point where Personal Digital Assistant might as well have stood for "Please Don't Adopt," as consumers didn't—in droves. But in these instances, both Apple and Nokia simply faced a version of the Berners-Lee problem. Both companies proposed a consumer fix for an increasingly connected world, in which the Internet was already beginning to play a substantial role as a means of making information available. However, instead of reaching backward to invoke schemas already familiar to users, Apple and Nokia presented their proto-smartphones as novelties.

By the time Apple made a second attempt to address the market for a pocket computer with its iPhone, Apple was aiming directly for the faster-better-cheaper model of innovation and a market already familiar with the highly successful Blackberry. Consumers had already adapted to thumb-typing on a minute keyboard and with the notion of sending texts, answering voice calls, and surfing the World Wide Web Berners-Lee had envisioned ("A Short History of the Blackberry," 2009). From there, Apple needed to only introduce the "better" part of the innovation equation. In June 2007, the iPhone debuted simultaneously with updates to the Apple iTunes application that enabled peripheral devices to synch efficiently with purchases from the iTunes store (Cohen, 2007). Moreover, Apple earlier announced at its Worldwide Developers' Conference that is new iPhone would support third-party applications, accessible initially via the Safari browser on the iPhone (Dowling, 2007). By the time the iPhone debuted, users could do more than web-surf, talk, and text on their smartphone—they could also run over 500 third-party applications, a quarter of which were free (Kim, 2007; Ricker, 2008). During the iTune's store's first weekend in operation, users made over 10 million downloads (Pocock & Pope, 2008). Although the iPhone only worked for consumers subscribing to AT&T's wireless service (Lewis, 2007), 9 million consumers purchased an iPhone during its first weekend alone (Gruber, 2013). In its stretching for "better" and the mild schema incongruity users prefer, Apple did away with the physical keyboard, replacing it with a virtual keyboard that popped up onscreen on demand. Instead of a cluttered palm-sized phone, Apple's iPhone boasted the same simplicity of design as its wildly popular iPod, another product that had debuted into a market crowded with mp3 players, yet proved so successful it first marginalized, then eliminated, its competition.

The Apple iPhone only looked revolutionary as a smartphone, a slender monolith with only an on/off switch, a central button for waking the phone and quitting apps, and minute buttons for volume and muting its ring. In fact, Apple merely merged the simplicity of design of its iPod, along with its connectivity to its iTunes store, with the functionality already offered by Blackberry. However, exactly as a good marketer would, the company trumpeted the revolutionary nature of the iPhone—precisely as

Apple had presented its Macintosh as ground-breaking in its earliest ad campaigns and memorable Superbowl commercial invoking George Orwell's *1984* ("Evolution of Apple Ads," 2009). The lesson here? Introduce your faster-better-cheaper product as revolutionary, even as you develop your pitch to would-be investors and potential partners, positioning the service or product in ways that invite them to picture consumers using your innovation in entirely familiar ways, to support already-existing tasks and needs.

Paradoxically, you must adopt precisely the opposite approach to introduce a product or service that truly is revolutionary in the Brave-New-World-ish way Komisar (2001) envisions. In your earliest conceptualizing phase, in your initial conversations with yourself as you prepare to pitch to venture capitalists or on Kickstarter, you need to focus on how you're merely improving something that already exists out there. Otherwise, you encounter the Berners-Lee dilemma—or, worse, the Alexander Bain problem of the fax that languished purely as an idea for over a hundred years.

INTRODUCE TRULY NOVEL INNOVATIONS AS EVOLUTIONARY, NOT REVOLUTIONARY

In retrospect, we realize that Berners-Lee should have invoked his notion of a World Wide Web as, say, an online version of HyperCard that enabled users to access data the way Vannevar Bush and Ted Nelson had envisioned with their Memex and Xanadu theoretical projects. That master of invention, Thomas Edison, himself realized this notion of innovation-by-stealth perfectly in a conversation with himself, captured in the notebooks in which he jotted his ideas. "Object, Edison to effect exact imitation of all done by gas so as to replace lighting by gas with lighting by electricity," (Basalla, 1988).

Remarkably, Edison aimed to ape a system providing a yellowish, flickering light insufficiently bright for close work that included sewing or reading, in addition to a system that smudged walls with smoke from its naked flame and proved a significant fire hazard (Silverberg, 1967). At the same time, his notebooks record Edison envisioning a world powered by electricity that switched on electric cigar lighters and sewing machines, even as leading American scientists publicly aired their collective belief that a system of safe, electric lighting was "manifestly absurd" (Conot, 1979). When Edison gave electric lighting its highly public debut in lighting the offices of Drexel, Morgan & Company, his new lighting system relied on all the trappings familiar to long-time users of gas lighting, from its continuous circuit and 13-watt candlepower bulb right down to the shades that formerly protected gas flames from guttering in drafts. The imitation of gas lighting was so convincing that, the New York Times reported, scarcely anyone would realize the rooms were lit by electricity (Silverberg, 1967). Strikingly, Edison's early prototypes of the incandescent bulb provided a light equal to "two or three gas jets," the sort of incremental one would assume consumers would immediately embrace as a welcome change from gas lighting (Israel, 1998). In addition, Edison formed the Edison Illuminating Company, incorporated as a gas company, enabling Edison to lay the wiring for his DC power beneath New York City streets, rather than adding them to the forest of wires overhead, as only utility companies were permitted to dig up city streets (Silverberg, 1967). Inconveniently for Edison Illuminating, the copper wires leaked electricity, blew circuits, and occasionally delivered shocks to unfortunate horses and pedestrians traversing the streets above. Edison would have to invent a means of insulating wires, in addition to the meter he relied on to exactly replicate the metering used by existing gas companies (Israel, Nier & Carlat, 1998). However, Edison's early meters relied on zinc sulfate to determine how much electricity customers used, a contraption that froze whenever temperatures dipped below 40 degrees (Silverberg, 1967). Furthermore,

for the first six months of its operation, until Elihu Thompson invented even this rudimentary means of measuring usage, Edison Illuminating Company's earliest clients enjoyed their electric lighting free of charge (Conot, 1979).

Perhaps most remarkably, Edison's incandescent lighting system succeeded in spite of its inventor having miscalculated the immensity of the task of replacing a well-established gas system with an entirely different means of generating light. Ultimately, Edison underestimated the costs of wiring (Hughes, 1983), the efficiency of the Direct Current (DC) system on which his system relied (McNichol, 2006), an accurate means of metering gas (Conot, 1979), and the entrenched interests of gas companies in one of the most corrupt political regimes in US history—New York's Tammany Hall (Granick, 1975). Nevertheless, after its launch in 1872, Edison's electric light relegated gas to a source for only cooking and heating by the turn of the century, in spite of battles with improvements to the quality of gas lighting (Ives, Kingsbury & Karrer, 1918) and Tesla's more efficient Alternating Current (AC) winning over Edison's DC (McNichol, 2006). Edison's success owes much to his introducing his truly revolutionary device as merely evolutionary (Hargadon & Douglas, 2001)—and of sticking to Emerson's edict about building a better mousetrap, not inventing an entirely new means of killing rodents.

The lessons here are particularly vital for that all-important first conversation about your Brave-New-World innovation, the one you hold with yourself. Edison's first sketches of an electrified world, led by the Trojan horse of incandescent lighting, were explicit about just how closely his new system needed to hew to the trappings of the one he was replacing with an entirely new and different system, powered by electricity. In addition to his notebook exhortation to replicate the light shed by gas, he also envisioned a system that would "utilize the gas burners and chandeliers now in use. In each house I can place a light meter, whence these wires will pass through [existing gas pipes in] the house, tapping small metal contrivances that may be placed over each burner" (Israel, Nier& Carlat, 1998). To use this new, potentially terrifying electric lighting, even the earliest adopters simply relied on decades-old behavior and habits. The key to Edison's success was a velvet revolution, one that incrementally nudged its adopters from long-familiar behaviors into a brave new world where electricity powered the phonograph, microphone, and other Edison inventions, even as it would eventually revolutionize the way consumers cooked and preserved food, entertained themselves, extended their working days, and ultimately organized even their cities.

IGNORE THESE PARADOXES AT YOUR PERIL: OBJECT LESSONS IN FAILURE

Contrast Edison's success with two further object lessons, both of which barreled head-long into Brave-New-World territory and bludgeoned would-be adopters with novelty and a revolution of the French *La Grande Peur* stripe: Edison's own phonograph and Apple's Newton. Unlike Edison's careful aping of gas lighting, his newfangled phonograph came with a lengthy list of suggested uses dreamed up by Edison himself. The ten uses, presented in order of descending importance, began with Edison's own favorite, taking dictation without using a stenographer, and ran through talking books for the blind, teaching public speaking, reproducing music, and recording telephone calls (Basalla, 1988). Despite Edison being at the height of his fame as an inventing genius, the phonograph languished all but unused for nearly twenty years. Only after the lucrative recording industry sprouted in the 1890s, with other inventors introducing versions of the phonograph that played music, did Edison finally recognize his fourth suggested use of the phonograph as potentially lucrative. Prior to that point, its inventor—who once admitted to an assistant his belief that the phonograph lacked any "commercial value"—had insisted

that the phonograph's primary purpose lay in taking dictation (Conot, 1979). Doubtless, this particular purpose was useful for a man who seemed to seldom sleep and insisted that genius was 1% inspiration and 99% perspiration. And, ultimately, Edison's vision of talking books for the blind and answering phone calls would be realized by devices invented by others that nevertheless satisfied the same schematic understanding invoked by Edison's now-familiar phonograph. In the same way, Apple introduced its Newton to the public with a double-page spread, topped with an Edison-phonograph-worthy question, "What is Newton?" followed by a list of the Newton's primary uses and their benefits (Marcus, 1994). If your introduction of an innovation begins with a rhetorical question that borders on the existential, you're probably already well en route to Brave-New-World incomprehension. Moreover, this list contrasted starkly with the ads introducing the 1984 Apple Macintosh. In one, a hand reached into a shopping bag and pulled the Macintosh out by a handle familiar to consumers from portable televisions, above the tagline: "Of the 235 million people in America, only a fraction can use a computer." Apple's more famous ad simply featured an image of the Macintosh with "hello" written in cursive on a blank page, a dramatic departure from the green lines of startup code that greeted users booting up any PC ("Evolution of Apple Ads," 2009). The cursive suggested human handwriting, while the design of the Macintosh itself, a box with a small, grey, square screen reminiscent of early televisions, insinuated the first truly personal computer within consumers' framework of devices used for entertainment. The best Brave-New-World inventions come equipped, not with a list suggesting the ways in which they might transform your world but, instead, with design and utility that situate them readily and comfortably within your target market's existing understandings.

If you think Edison's incandescent light, the Apple Macintosh and iPhone are isolated exemplars, consider the lengthy list of successful technologies that employed precisely the sort of rear-view mirror thinking Marshal McLuhan deplored (McLuhan, 1964), including the earliest automobiles, dubbed "horseless carriages," that employed the trunks, running boards once handy for accommodating coachmen running alongside horses, and what Basalla (1988) dubbed "skeuomorphs" to designate an aspect of an object's design that existed purely to invoke earlier devices, without serving any visible, tangible purpose (Knappett, 2002). Even the early names, "horseless carriage" for automobiles and "ice box" for refrigerators invoked the limited technologies the new devices replaced. If Emerson were around to have witnessed the debut of the Apple Newton—and were much of a wit—he might have quipped, "Invent a revolutionary way to kill mice, and the world will beat a hasty retreat *from* your door."

COMMUNICATING INNOVATION: FIVE RULES TO REMEMBER

The lessons for this first conversation with yourself on your innovation are simple:

1. Whenever possible, invoke existing schemas—understandings and behaviors your stakeholders and target audience will find familiar.
2. Position your faster-better-cheaper innovation as revolutionizing something already well-established.
3. Introduce your truly revolutionary product or service by stealth, using a Trojan horse approach to encourage its adoption by supporting existing behaviors and invoking familiar objects and understandings.
4. If you can use a schema to pitch your innovation, you're likelier to succeed with both faster-better-cheaper and Brave-New-World models alike (Heath & Heath, 2007). For example, invoke schemas in even a short-hand pitch. The iPod lets you stash a stereo and your entire CD collection, in addition to your favorite songs, in a pocket. The iPhone is the offspring of your phone and computer.

5. If you need a list to describe all the terrific uses to which your invention might be put, brace yourself for your prized innovation languishing in oblivion for, at best, a few years (as with Berners-Lee's vision of a World Wide Web), for decades (Edison's phonograph, the idea behind the Apple Newton) or for a century or longer (Bain's fax) (Hargadon & Douglas, 2001).

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