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Design Thinking and Innovation at Apple

Think different.

— Apple Advertising Slogan, 1997–2002

On March 15, 2012, the day before its new iPad became available, Apple's share price reached US\$600 for the first time in its history—signaling solid financial strength and future growth prospects as world economies, and businesses, continued to recover from the worst recession since the Great Depression. With a market capitalization of about US\$ 550 billion and annual sales exceeding \$100 billion, Apple was worth nearly three times the industrial giant General Electric, exceeded the value of Sony Corporation by a factor of 25, and became the most valuable publicly traded company in the world. All the more amazingly, a scant 12 years earlier, when Steve Jobs returned to Apple, the company's share price had hovered around \$5 and the future was uncertain at best. Jobs, after all, had already been fired from the firm he co-founded almost a decade earlier, and he was coming back when the company was nearly written off. Even so, through that difficult period, the core commitment to product design and development had stayed alive.

Since being founded in 1976, Apple has been considered a leading designer and integrator of computer hardware and software. By 2012, it had fundamentally changed the computer, music, mobile telephone, and retail industries through its sleek products, innovative stores, and new business models. Moreover, the iPad tablet computer accelerated the transformation of the publishing business. Apple stores had some of the highest revenues per square foot in the retail sector. Its applications (App) store had achieved one billion downloads only nine months after launch (in 2007) and reached 25 billion by March 2012. Surprisingly, Apple's radical innovations also came with consistency. Anyone who used the Apple II in 1978 and then picked up an iPhone three decades later would find a familiar object. Somehow the new device was the same as the old one: different, but the same.

Apple's success was not just the result of clever strategic moves or an innate sense of market timing. It came from a deep commitment to understanding how people used computing devices and a desire to develop "insanely great products." The iPod famously arose from the all-pervasive love of music within the firm. At the same time, this enthusiasm remarkably matched the needs, abilities, and dreams of millions of customers. And, for all these new markets that were conquered, Apple kept its eyes on the core computer business.

Professor Stefan Thomke and independent researcher Barbara Feinberg prepared this case. This case was developed from published sources. HBS cases are developed solely as the basis for class discussion. Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective management.

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As Apple ventured into new businesses and faced an ever-increasing number of fierce competitors, the roots of its success puzzled many industry experts and technology pundits. The company often defied conventional business logic and was not afraid to experiment outside its core markets. It built retail stores when competitors were moving to *direct* sales and distribution models, and its products were rarely first to market. There was, however, a surprising consistency in the way the company worked. Simply put, the “Apple Way” was a set of principles with a deep commitment to great products and services at its core: design thinking, clear development strategy and execution, its CEO as chief innovator, and the rational courage to conduct bold business experiments.

Design Thinking

Those of us on the [original] Macintosh team were really excited about what we were doing. The result was that people saw a Mac and fell in love with it. . . . There was an emotional connection . . . that I think came from the heart and soul of the design team.

— Bill Atkinson,¹ Member of Apple Macintosh Development Team

It was not evident that falling in love with computers was something that made sense at the time when these were machines for data processing and automation. Moreover, in the mid-1970s, when Apple entered the scene, computer equipment was typically housed in discrete locations within company headquarters and government facilities, guarded and used only by specialists. The notion of personal computers as a tool for *individual* work was unimaginable. Corporations and governmental agencies controlled how work functioned and, by extension, influenced the creation of tools that were to be deployed to control it. The business processes and systems that evolved were eventually captured in enterprise software, with its emphasis on automating tasks.

To Steve Jobs and the original cadre of Apple developers, however, the goal *was* to design a computer that both supported and fostered individual work. Moreover, they reasoned, potential customers would *have* to fall in love with computers if they were to master the machine’s apparent complexity and spend a lot of money to do so. People would have to *see* how this tool would benefit them and want that benefit for themselves. Apple’s products would target people with this appeal. From the beginning, Apple addressed individual users (“the rest of us”), believing that products that were *intended* to be useful to people would in fact so be. For that to happen, the level of complexity needed to be reduced dramatically.

Simplicity in Design and Use

Helping people “love” their equipment and the experience of using it animated—and continues to motivate—how Apple products were and are designed today. Cordell Ratzlaff, a major architect of the Mac OS X operating system (circa 1990), noted:

We did the design first. We focused on what we thought people would need and want, and how they would interact with their computer. We made sure we got that right, and then we went and figured out how to achieve it technically. In a lot of cases when we came up with a design that we knew really worked for people, we didn’t know how we were going to build it. We had a design target, and we worked with engineering to reach it. We ended up doing a lot of things that we initially thought were impossible, or would take a long time to do. It was great because we were applying a lot of creativity and ingenuity on the design side and then pushing the engineers to use the same kind of creativity and innovation to make that happen.²

From the beginning, Apple products were conceived of as being highly interactive. To that end, said Jonathan Ive, Apple's senior vice president of industrial design, who spearheaded the iPod's development (late 1990s), "So *much* of what we do is worry about the smallest of details . . . [while] I don't think all the people using the product notice or care in a conscious way about every little detail, I do think in the aggregate it's really important, and it contributes to why people like the product."³

Worrying about the smallest detail, which includes even the packaging of Apple products, has helped realize co-founder Steve Jobs' design sensibility: that simplicity is the ultimate sophistication. Distinct from organizations whose notion of "detail" is often conflated with "features," Apple products are often noteworthy for what they *do not* contain. Years ago, the slot for inserting diskettes was eliminated from Mac computers (you would have to add an external device); reviewers criticized Apple for its arrogance and omission of must-have features. Other companies soon followed Apple's lead, however, and external devices were quickly developed to plug into ports that Apple products contained. In other words, when the smallest detail is scrutinized, it's possible to discover what can be lived without—and what can be developed elsewhere. Here's how Paul Mercer, whose Pixo company implemented iPod's user interface software, characterized the phenomenon:

[T]he iPod is very simple-minded . . . it really doesn't do much other than let you navigate your music. That tells you two things . . . [first] that the simplification that went into the design was very well thought through, and, second, that the capability to build it is not commoditized. The fact that nobody has been able to duplicate the capabilities . . . means that the building blocks may be difficult to come by, and that the design sense, to create a simple and easy-to-adopt solution, does not exist in most product development organizations worldwide.⁴

This "design sense" was evident in the iPod Mini, which actually *reduced* the amount of music that could be played but took advantage of new hard drive technology. "The mini was designed with exactly the same philosophy [as the original iPod]," explained Ive:

We were trying to take advantage of and exploit the fact that it was a smaller drive and really understand the difference. We made one model taking an approach [similar to the original], using that design vocabulary and form factor, and it was just completely wrong. Then we started to explore very different materials and approaches. We realized we could make this in aluminum. Unlike with stainless steel, you could blast it and then anodize it—which is a form of dyeing—and then you could do color in an unusual way.⁵

Thus the Mini, with a quarter *fewer* songs that could be played yet with a mere \$50 price "reduction" from the original iPod—but it came in colors!—became, against near universal wisdom, a wildly popular product that was both an extension of the original and a unique item purchased for its own sake. Apple's ability to draw upon exactly the same philosophy but adapt it to new technologies and different materials was equally evident in the Nano and Shuffle, which even further reduced the amount of music that could be played, as well as the size of the product. These, too, took off. The idea was that people would want a "portfolio" of iPods—and so they did. Moreover, an entire industry sprang up to surround the iPod, with accessories, "stations," and links to other devices.

Beyond Fashion

Given the sleek appearance of iPods, iPhones, the iPad and Mac computers, and all these products' prominence in media depictions, it's tempting to attribute their popularity to Apple's ability to tap into a *zeitgeist*—a sense of what is popular, fashionable, trendy at the moment. But there

is more to coolness than fashion. In fact, Apple goes beyond superficial trends and gets to the essence of customer experience such that its “design” seems to happen from the inside out, while the outside continues to be deeply appealing and, ineffably, “cool.” According to Steve Levy, who’s written extensively about Apple, the iPod managed the amazing feat of being deemed individually cool while also being deemed cool for millions upon millions of users.

The appearance of Apple products is thus “the result of painstaking attention to detail,” according to Ive. “The thing that all of our competitors are missing is that they think it’s about fashion, they think it’s about surface appearance. . . . And they couldn’t be further from the truth.” Ive was talking about the vivid iMacs that debuted in mid-1998 and signaled Jobs’ return to the company:

The iMac [wasn’t] about candy-colored computers. The iMac [was] about making a computer that is really quiet, that doesn’t need a fan, that wakes up in fifteen seconds, that has the best sound system in a consumer computer, a superfine display. It’s about a complete computer that expresses it on the outside as well.⁶

In fact, Ive could have been citing almost any product the company released in the past decades, including the ones that did not succeed in the marketplace—for example the G4 Cube. Apple CEO Steve Jobs described that product as: “. . . the coolest computer ever made . . . it’s our vision of what technology should be and how it should work and what it can do for you. We make progress by eliminating things. It’s a much more courageous approach, much harder than living with all this [cheaper] stuff.”⁷ The outside of the (expensive and ultimately unsuccessful) elegant cube exhibited, Jobs believed, the integrity of the entire product’s design, from its “intention” through its concept development, through the process of making it and, ultimately, to the user’s experience of working with it—such that the simplicity that resulted becomes the ultimate sophistication.

This notion of design-as-product-integrity seems clearly driven by Jobs himself, powerfully suggested by the product his “next” venture created after he was ousted from Apple (in 1985): the NeXT computer workstation, which Jobs targeted to the education market. (Apple bought the company, NeXT Software, in 1996, triggering Jobs’ subsequent return.) Although the product was not a commercial success, the NeXTStep architecture became the basis of Apple’s subsequent OS X computer operating system and the machine ended up being the development platform Sir Timothy Berners-Lee used to create the client for the World Wide Web (in late 1990).

Wrote Berners-Lee: “The NeXT interface was beautiful, smooth, and consistent. It had great flexibility, and other features that would not be seen on PCs till later, such as voice e-mail, and a built-in synthesizer. It also had software to create a hypertext program.”⁸ At a point when he faced an early decision of reprogramming the World Wide Web on another system, given the fact that NeXT machines were hardly prolific, Berners-Lee noted, “Trading in the NeXT for some ordinary computer would have been like trading in a favorite sports car for some truck. . . . I decided to stick with the NeXT.”⁹

Significantly, the beautiful, smooth, and consistent interface didn’t sacrifice features, some of which would not be seen on other PCs until years later. Apple’s vision of simplicity, one that arises from a thorough understanding of elegance and the integration of sophisticated features and functionality, did not imply an inherent tradeoff *between* these elements. There was no compromise between simplicity of use (beautiful, smooth, and consistent) and functionality, which included “prescient” features (like hypertext), compared to products that, in the guise of simplicity, in fact did only one thing (the “one-button” approach tried for cameras and phones, for example). Rather, the simplicity-sophistication outcome captured in NeXT and Apple products generally stemmed from a critical point: the design team kept on going until they found the key underlying principle of a

problem—which, in turn, could then be built upon. At Apple, problems were moving targets, not something that was to be solved once and for all.

Innovation, Product Development Strategy, and Execution

You can see a lot by just observing.

— Yogi Berra, Major League Baseball Player and Manager

At Apple, innovation, product development, and execution have been deeply intertwined with the firm's history and co-founder Steve Jobs' pivotal influence on it. For instance, the Mac was never intended to be only a computing device; it instead exemplified a way of how people could (and should) work with a computing device. So powerful was this vision that Apple's computers managed to retain a considerable amount of their design integrity, and fanatical "fan" base, during the tumultuous period between 1985, when Jobs left the firm, and 1997, when he returned to eventually become its chief once again. Nevertheless, Apple floundered during that period.

Jobs and Steve Wozniak founded the company in 1976, and were soon joined by Mike Markkula, Jr., who helped in accessing venture capital. Its first personal computer, the radical Apple II, premiered in 1978, and the firm had a successful IPO two years later. IBM shortly thereafter entered the market and though its machines had none of the combined simplicity and pizzazz of Apple's, they could be cloned. In contrast, Apple's were essentially developed from scratch and featured a proprietary operating system as well as unique hardware. In 1984, Apple brought out the Macintosh, famously in conjunction with a Super Bowl advertisement (inspired by George Orwell's 1984) that even now remains a stunning feat of promotion and fundamental statement of the company's commitment. But the cloning continued, and Apple's market share (and eventually profits) began a long decline that did not fundamentally reverse until a year after the advent of the iPod.

In April 1985, the Board axed Jobs' operational role at Apple, and he left shortly afterwards, to found NeXT and then to co-found the animation production company Pixar Studios. From 1985 to 1993, Apple would be run by John Sculley, PepsiCo's former CEO and a marketing expert. Jobs had lured him to Apple in 1983, reportedly with the challenge: "Do you want to sell sugared water all your life?" Under Sculley's tenure, Apple, facing massive competition from IBM-clones, as well as rapid changes in technology and an explosion in venture capital-driven investment that fueled new competitors, grappled with which markets to target—and hence, what products the firm should develop. When those decisions were not successfully resolved, Michael Spindler (an engineer and Apple's president under Sculley) took over, from 1993-1996. He was replaced by Gilbert Amelio, a PhD physicist and former CEO of National Semiconductor, who reigned from 1996 to 1997. Shifts in strategy accompanied each new regime.

The debates within Apple during this period revolved around not only whether to license the Mac operating system and begin to compete in the "cloning space," but also about the importance of the business market, which had almost zero penetration by Apple. (By contrast Apple had nearly 50% of the "education" market and dominated "artistic" enterprises, e.g., in graphics, advertising, movies, animation, and music.) The business market was almost entirely a combination of the Windows operating system and Intel processors (then known as Wintel). Products and projects at Apple proliferated in consequence of these various strategies—and failings. Some, like the PowerBook (1990) laptop computer, were big successes, but many others, like an attempt to create set-top boxes for TVs, were flops—as was the Newton, Apple's personal digital assistant (PDA) entry that became

the butt of endless jokes for its hand-writing analysis errors. Apple eventually did embark on a licensing program, which by 1997 represented 20% of Mac unit sales.

The creative core of technology development had managed to exist during this period of Apple upheaval, but the process became more “traditional” and resembled approaches found at other companies. Don Norman, a well-known expert on design who worked as vice president of advanced technology at the company from 1993 to 1998, described it this way:

There were three evaluations required at the inception of a product idea: a marketing requirement document, an engineering requirement document, and a user-experience document. . . . These [three documents] would be reviewed by a committee of executives, and if approved, the design group would get a budget, and a team leader. . . . [T]he team would work on expanding the documents, inserting plans on how they hoped to meet the marketing engineering, and user-experience needs—figures for the release date, ad cycle, pricing details, and the like. It was a consultative process, [but it led] to a lack of cohesion in the product.¹⁰

There were, Norman noted, more than 70 Macintosh Performa (computer) models between 1992 and 1997. Critics noted that the rapid proliferation of models confused customers and increased complexity at Apple.

Excellence in Execution

*The system is that there is no system. That doesn't mean we don't have process. Apple is a very disciplined company, and we have great processes. But that's not what it's about. Process makes you more efficient. But innovation comes from people meeting up in the hallways or calling each other at 10:30 at night with a new idea, or because they realized something that shoots holes in how we've been thinking about a problem. It's ad hoc meetings of six people called by someone who thinks he has figured out the coolest new thing ever and who wants to know what other people think of his idea. And it comes from saying no to 1,000 things to make sure we don't get on the wrong track or try to do too much. We're always thinking about new markets we could enter, but it's only by saying no that you can concentrate on the things that are really important.*¹¹

— Steve Jobs

Jobs took immediate action upon his return to the company in August 1997: stopping the licensing program, closing two divisions, eliminating 70% of new projects, shutting facilities (and moving manufacturing abroad), changing the distribution system, and launching a website for direct sales. Product lines were drastically reduced (from 15 to 3) and the sophisticated marketing, characteristic of Jobs' tenure before, resumed. On the design, development, and execution levels, many things were likewise revived: the quest for “insanely great products” was picked up anew, as Jobs put himself back into the innovation process. The iMac debuted in August 1998.

Working alongside Jobs was Tim Cook, Apple's chief operating officer. Cook joined the company in 1998, having previously worked at IBM and Compaq, with the assignment to “clean up the atrocious state of Apple's manufacturing, distribution, and supply apparatus,” an effort that enabled inventory to drop from literally months to a few days. According to *Fortune Magazine*,

Apple routinely pulls off the miraculous: unveiling revolutionary products that have been kept completely secret until they magically appear in stores all over the world. The iPhone, the iPod, any number of iMacs and MacBook — the consistently seamless orchestration of Apple's product introductions and delivery is nothing short of remarkable. . . . In 2006 Apple

transitioned its entire computer line to running on processors made by Intel. . . . Cook's team . . . made sure there was nary a blip in sales.¹²

When Steve Jobs took a leave of absence in 2009 to receive a liver transplant, Cook ran the company. The products rolled on, the stock went up, Jobs came back, and the iPad debuted. Significantly, at the same time that "atrocious" operations were being cleaned up in the late 1990s, the core approach to development remained consistent: working intimately with manufacturers and being completely attuned to customers. "Apple [still] takes an amazing interest in material selection and how things are manufactured," according to Mark Rolston, senior vice president at FrogDesign, which worked closely with Apple in the 1980s. "They continuously [today] ask what a manufacturer can do for them . . . [they] will change a whole factory's process."¹³

Platform Strategy

Apple has been notoriously tight-lipped about both its strategy and operations—an approach that has turned into marketing magic and high expectations among its followers. But the company's approach to innovation has been more complex than just designing exciting products: its streamlined product portfolio and extensive reuse within product families suggests that Apple has a clear platform strategy. The OSX operating system, for example, is used in all of Apple's computers as well as in the iPhone. And the iPhone and iPod Touch clearly come from the same platform, as does most of the iPod family, and now comes the iPad.

Broadly, firms that follow platform strategies envision a family (or generation) of products at the earliest stages of product concept and planning. At this point they think ahead to not only what would be needed for the initial product's release, but also what would be required subsequently—and when that should happen. With all this in mind to one degree of specificity or another, companies then design the initial product *as a platform*, with an architecture that will accommodate the development and production of the (derivative) products envisioned.

A platform strategy offers big advantages and benefits to a company, its suppliers, and its customers. For companies, like Apple, who put a premium on design, resources and time invested into the initial product is leveraged across derivative products; these can be developed and ramped up more quickly because they build on and make use of existing design elements in the platform. This is efficient, as well. With high levels of sharing and reuse of assemblies, sub-assemblies, and parts, the result is greater reliability and lower costs, benefiting company and suppliers alike. Company employees benefit too, through the knowledge they gain in designing, producing, and supporting the platform (i.e., initial) product. That in turn can be efficiently transferred to derivatives.

And finally, customers benefit from a company's effective use of a platform strategy. More stable and reliable designs mean products that require less repair, maintenance, and service, in general and particularly for first-time users. Commonality of user interfaces and design elements means that repeat customers face less of a training hurdle; they are applying their knowledge of how the product family "works."

Iterative Customer Involvement

From the outset, Apple insisted on integrating customer's experience into its design and development processes. This is how Larry Tessler, who in 1980 migrated to Apple and invented the

cut-and-paste and editable dialog box, designed the Smalltalk browser [and] simplified the use of the mouse, described his efforts back then:

What I realized [is] the best way to design software [at Apple] is with the customer, which is now called participatory design. With [art students] . . . I watched how they used it and saw when they got confused. . . . That was my first experience with what we call usability tests today, people can see what the problem was and how to fix it, and I realized that I could make something simpler.¹⁴

Tessler elaborated:

In the user interface design, it was a lot of trial and error. We tried different things and found out what did and didn't work. A lot of it was empirically driven. I kept bringing new stuff in and saying, "What about this?" and [we would] set up tests so that different people could try it. For example, if you have a scroll bar . . . which way should [the arrows] be? When you scroll toward the bottom of a document, the document moves up, so there's some reason to think of a down arrow, and some reason to think of an up arrow. A really good question is, "What do people expect? When people see an arrow, which way do they think it will move?" What I found mattered much more than whether the arrow went down or up was where the arrow was: if the arrow was at the top, they expected to see more of what was above, whereas if it was at the bottom, they expected to see more of what was below.¹⁵

Another example, from Bill Atkinson recalling his work on an early Apple graphics application (mid-1980s), MacPaint:

I think that the more user testing a piece of software has, the smoother it can become. The process of software design really is one where you start with a vague notion of what you're trying to make, and that . . . slowly . . . gets better defined. As you work with it more, it gets to the point where it is something, but as you try it you realize, "You know, I've kind of missed the mark here." For example, first you pit and pat it . . . then you throw away all of the code and build . . . from scratch and you've got a clear, clean model. Then you start pitting it and patting it, and adding things that people want, and it gets a little lopsided and difficult, and you realize after a while, "You know, what I'm really building here is more like a cobbler's bench." That's when you have to put it aside and build a cobbler's bench deliberately, and craft it to be right for a cobbler's bench. You iterate like that, testing, and then being willing to set aside and build from scratch again.¹⁶

The idea that design should be driven first by user needs and desires is reinforced by Cordell Ratzlaff, referring to the development of Apple's operating system OS X (circa 2000):

There is nothing that I would not consider changing; I think an interface really has to be appropriate for the people who are using it. People don't use a computer to enjoy the operating system. . . . They use a computer because they want to create something. . . . The computer is just a tool . . . it's about what people want to do . . . you have to know who those people are and what they are really trying to accomplish.¹⁷

Beautiful Products

The "beautiful object" is never far from mind, but it, too, can be changed. Consider that the original iPod's design was so powerfully connected to its pristine color (white), relating it to the

polymer finish that accomplished the look. Having determined that “intense” white was the object’s color, researcher and author Steve Levy describes how Ive describes the translation process:

Ive [sketches] how they laid the polycarbon plastic in the rear steel cladding to get “quite a strong, almost sort of halo around the product. . . . The surface itself is a ‘double-shot polycarbonate,’ a two-layered concoction wherein an injection molding procedure binds a transparent plastic coating over a layer of solid white.”¹⁸

As Levy recounts, Ive waxed rhapsodic (“pouring his heart out”) over the importance and beauty of this pristine “snow-colored skin.” Yet just a few years later, polycarbon plastic and “snow” were superseded by a new material (aluminum) and the advent of colors as the Mini was triumphantly introduced. The original iPod was not discontinued but sold alongside the new one and continued to flourish. “I remember doing over the model with Jon,” said Jobs. “We were giddy. People had told us it was impossible when we showed them the layouts. This was not easy, but we pulled it off.”¹⁹

Apple’s ability to change from the passionate advocate of pristine white to the driving force behind colors and new materials suggests the importance of design as a *motivation* to continued innovation, rather than as a static approach that assumes a single conclusion. It also suggests a passion for and close attention to new materials and manufacturing processes, which can offer new opportunities for product innovation. This passion enables a paradox. As Jobs noted, Apple’s explosive growth is not an excuse to “play it safe. *That’s the most dangerous thing we can do. We have to get bolder. . . .*”²⁰

The CEO as Chief Innovator

*When [Steve] Jobs was still in his twenties, he once explained his vision of design to me, using as a symbol the object whose name he appropriated to name his computer company. “Fruit—an apple,” he said. “That simplicity is the ultimate sophistication . . . when you start looking at a problem and it seems really simple with all these simple solutions, you don’t really understand the complexity of the problem. And your solutions are way too oversimplified. Then you get into the problem, and you see it’s really complicated. And you come up with all these convoluted solutions . . . that’s where most people stop, and the solutions tend to work for a while. But the really great person will keep on going and find . . . the key, underlying principle of the problem. And come up with a beautiful elegant solution that works.”*²¹

— Steve Levy, Author, *The Perfect Thing*

Steve Jobs and Apple seem like interchangeable terms: a discussion of the company in any forum immediately segues into the man and his influence. Convincing research reveals that company founders essentially imprint their organizations with their own personality characteristics, and Apple-Jobs is no exception. Given the unusual situation of Jobs’ being the chief of the company twice, it’s possible to see his influence evolve over the 12-year gap between his two periods of hands-on influence. The company evolved even without his actual presence.

From his earliest days at Apple, Jobs’ “design sense” was confident and refined; his sensibility predominated at the company, reinforced as like-minded people were hired and as design work there evolved. Jobs had no formal design training, just as he had no engineering (or business) education. Yet those, who have had both the formal training and extensive experience in these fields, are impressed by both his talent and his ability to inspire others. His well-known temperament, often characterized as dictatorial, may in fact reflect demands that arise from a distinct vision of the *meaning* of the company, its products and how that can be achieved. This vision has been a demand

to across-the-board excellence; in aesthetics, it is Jobs' own ideas of what constitutes design perfection, but in other areas, superior operations are the result. Products are launched on time and with high quality. Product concepts and early prototypes are never shown in public. Apple's promise is an integral part of its relationship with customers: once the company introduces a product in public, it would become commercially available through its retail and on-line stores. This excellence and commitment is demanding—"the really great person" who digs into a problem and finds the "beautiful elegant solution that works" works very hard indeed.

More broadly and without the connotation of beautiful, *elegant* solutions are the result. Problem-solving work began to characterize a growing proportion of economic activity in the U.S. by the late 1970s and early 1980s. Such "knowledge work" distinguished these activities from those of "manual work," i.e., tasks routinely performed, with the dominating image being an assembly line. Jobs' vision held that Apple products were to be personal tools that enabled and enhanced *individual* efforts for such problem solving. It seems that he has continued to see consistency between the problem-solving efforts within Apple product development and the work that customers would themselves be undertaking. The appeal has not been to select organizations or businesses as customers; it has been one that puts individuals (and their problem-solving efforts) first. This is becoming a familiar notion today; it is hard to overstate how radical it was in the early 1980s, when companies were overwhelmingly preoccupied with creating "enterprise solutions."

Beyond the vision, the drive, the total hands-on involvement in decision-making, from strategy to product and service design to packaging, Jobs has been the face of the company. Products are not rolled out; they are presented to the public by Apple's management team in periodic extravaganzas that are shrouded in elaborate (and much-ridiculed) secrecy beforehand. To penetrate it, even web cams have been deployed dockside to scrutinize shipments coming in from factories in Asia in an attempt to determine what will be unveiled. This cat-and-mouse game, going on for more than a decade, has propelled Jobs into what one analyst called the Princess Diana of business leaders. Unlike other popular "front men," however, Jobs has used his prominence to effectively, dramatically, and boldly move his company into new spaces, all of which, when looked at in retrospect, seem like totally evident changes. When the iPhone debuted, Apple Computer was renamed Apple, perhaps signaling "[T]hat simplicity is the ultimate sophistication." In November 2009, *Fortune Magazine* named Jobs CEO of the decade.

Bold Business Experimentation

A towering example of boldness was the decision to move into retail. Now that there are hundreds of Apple Stores worldwide, it's hard to recall how controversial the entire idea was at the time. Not only was the company's first store opened in May 2001, just as the "technology bubble" was bursting, but it followed on the heels of similar attempts, most notably the computer company Gateway, that had spectacularly failed. Apple Stores of course were to be created with the same painstaking focus on detail that characterizes all the company's products (and hence were expensive ventures): as indeed they *are* Apple products, not simply outlets for purchasing them. Thus, they occupy prime real estate in upscale malls and/or freestanding locations and are considered "architectural statements."

Yet at the time this move was being finalized, stores, any stores, derided as physical "bricks," were, experts assured us, to succumb to Internet "clicks," and Dell's endlessly praised Web-based purchasing approach was considered best-practice. That Internet-based model allowed customers to create their own products by providing various combinations that could be swiftly built and shipped

through the firm's super-efficient manufacturing and delivery processes. Along with analysts and business pundits, the magazine *BusinessWeek* was a strong advocate for Dell's model:

By 2002, Dell offered a full line of desktops, notebooks, workstations, and servers, in addition to software, service, and support. The company had \$31.9 billion in sales, approximately half of which was generated by its Web site. Dell executives attributed their success to the company's distinctive business model, which centered on direct sales and built-to-order manufacturing. Dell needed only 36 hours after taking an order to ship a computer out the door ... Customers could use Dell's Web site to design the exact configuration of hardware and software that they required and find out immediately how much it would cost.²²

By contrast, customers visiting an Apple Store found products already configured at prices distinctly higher than those at Dell's website (and elsewhere); there were no workstations and servers, and limited software for sale. There were, in fact, not that many products at all. Tech repair and support were provided by "geniuses" at a "bar" within the store, an approach that eventually proved its worth but definitely was considered quirky at the time. Also at the outset of this adventure in retail, there was no iPod mania to attach to—the iPod debuted five months after the first store, in McLean, Virginia, opened. Macintosh computers, while having a fanatical fan base, still represented a minuscule percentage of the market (around 3%). Who would be coming to an Apple Store? For what reason?

The bet was on "foot traffic," deemed ridiculous by analysts at the time. Yet foot traffic is exactly what the stores generated, as curious non-Apple customers, along with Apple fans, were drawn into elegant surroundings that hosted beautiful objects whose utility could be immediately accessed. Seven years later Apple Stores had become "destinations," the retailing Holy Grail, as Apple products, so well showcased, grew in both numbers and popularity. In turn, these destination shoppers attracted more foot traffic, and a virtual circle was established. The prominent inclusion of the "genius bar," wherein repair work was publicly undertaken, helped seal the company as being beyond cool. The results spoke for themselves: Apple stores eventually generated the highest revenue per square foot in the entire retail sector.

The move into retail operations was, of course, not the first "store" Apple created; the iPod transitioned from being an iTunes-based device to one that accessed a repository of music in an iTunes Music Store. The company then launched the Apps Store, followed by a bookstore after the iPad launch in 2010. The entire music industry was forced to accommodate Jobs' vision of easily accessible and inexpensive music that could be "shuffled" any way the user wanted. The movie industry, likewise, is slowly being brought into the fold. Thus, not only Apple, but also entire industries have been evolving their business models based on Jobs' *simplicity equals sophistication* notion.

Against Conventional Wisdom

The exhaustive press on all things "Apple" and "Jobs" (representing more than 1.2 billion Google references) contains considerable, often vociferous, comments on the company's "failure" to respond to what is going on in the world. The open source movement (catalyzed in Linux) has been mostly ignored by Apple. The company insists on developing, and integrating, its own hardware and software. It designs its own chips for iPods, iPhones and iPads, a backward migration that appears very much out of step with how the computer industry has been evolving. The original "locked" iPhone generated miles of furious writing. The company attacks Web sites that dare to speculate on what the company is planning, in some cases even suing the authors. At the same time, Apple has "opened" up to outside developer communities, in its own way, and has invented the "App Store,"

along with the other “stores” it set up. In fact, very few apps have been developed by Apple employees.

Apple suppliers keep their mouths closed about what they’re doing, having learned that a slip of the tongue can forfeit business. The web cams focusing on landing docks to discern the products that come in from manufacturers elsewhere are there because the company provides no clues to what is happening. In a world that currently celebrates open platforms, collaboration, third-party developers, “community” design, and transparency, Apple seems clearly an outlier. Somehow, of course, the company manages to create products that people want—that win design awards and garner worldwide kudos for the company and its leader.

This apparent—and clearly successful—flouting of trends, having gone on for so long and in so many arenas, should raise questions about whether assumptions of what is open and closed, what transparency means, what customer-first/development-first imply, etc., are sufficiently comprehensive. Perhaps there are other ways of considering how “insanely great” products can arise.

Constant Learning and Adaptation

“We make progress by eliminating things,” Jobs has emphasized, and the simplicity of Apple products has been heralded from the company’s origin. It was the commercial rationale for making products that the “rest of us could use,” as Apple ads famously stated early on. But eliminating things and “simplicity” are not identical as either motive or objective. It is naive to assume that deciding “what to take out” automatically creates the appealing and useable products that Apple and Jobs strive for and so often create. Making something “simple” to use does not imply eliminating functionality; making something elegant does not suggest that “features” are absent.

Moreover, these products evolve and go on to include things that were previously eliminated. The iPod, as we’ve seen, was resolutely in one material and color in its beginning, and then, as a product, “became” another version in another material and an array of colors. The iMac, starting in 1998 in an array of colors and in one determined shape, “became” in ensuing years a machine in white only, now is offered in vastly different configurations—and who knows what will happen next year? The iPhone, never to be opened, now has a developer platform and countless dedicated applications; the digital rights agreement that animated the entire iTunes Store logic has been discontinued. New possibilities seem always available and incorporated, over time. Yet there is one approach that seems to hold steady—in the look of the products and in their use.

Perhaps the most dramatic example is how the virulent “anti-business” company, vividly on display in its 1984 Super Bowl ad for Macintosh, eventually embraced the very platform of the enemy. During Jobs’ absence, the intervening CEOs all debated various strategies for so-called PC and Windows-compatibility, in the pursuit of the business market. While Jobs nixed the licensing arrangement upon his return, he also accelerated the development of OS X, based on the NeXT architecture he spearheaded after his ousting from Apple and which ultimately was able to accommodate Windows. Apple had enabled Windows users to (seamlessly) access the iPod as part of that thrust. And even before that, in his first MacWorld on his return to the company, Jobs announced a \$150 million “investment” from Microsoft. The zealots hissed but Wall Street cheered. As noted, such moves seem utterly obvious in retrospect. Of course a device as popular as an iPod would have to ensure that “everyone” had access to it. Of course, if you want your computers to be for everyone, you have to ensure that they accommodate everyone.

Apple's Future

Steve Jobs remained on medical leave for most of 2011. In August, he resigned as CEO and was elected Chairman of the Board. He died of respiratory arrest related to his cancer on October 5, 2011. His successor, Tim Cook, who had been running Apple's day-to-day operations during 2011, was made CEO on August 24, 2011.

In 2011, Apple sold 172 million post-PC devices (iPods, iPhones, and iPads) and these devices accounted for 76% of the company's fourth quarter revenue. By March 2012, it had 362 retail stores that were visited by more than one million people every day.

Apple's share price had increased by about 60% since Cook became CEO.

Endnotes

- ¹ Bill Moggridge, *Designing Interactions* (Cambridge MA: MIT Press, 2007) p. 101.
- ² Moggridge, *Designing Interactions*, p. 144.
- ³ Steve Levy, *The Perfect Thing: How the iPod Shuffles Commerce, Culture and Coolness* (New York: Simon & Shuster Paperbacks, 2007), p. 100.
- ⁴ Moggridge, *Designing Interactions*, p. 315.
- ⁵ Levy, *The Perfect Thing*, p. 102.
- ⁶ Levy, *The Perfect Thing*, pp. 95–6.
- ⁷ Levy, *The Perfect Thing*, pp. 95–6.
- ⁸ Tim Berners-Lee, *Weaving the Web: The Original Design and Ultimate Destiny of the World Wide Web by Its Inventor* (New York: HarperCollins, 1999) p. 28.
- ⁹ Berners-Lee, *Weaving the Web*, p. 31.
- ¹⁰ Daniel Turner, "The Secret of Apple Design," *Technology Review*, May 2007.
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- ¹² Adam Lashinsky, "The Genius Behind Steve Jobs," *Fortune Magazine*, November 10, 2008.
- ¹³ Turner, "Secret of Apple Design."
- ¹⁴ Moggridge, *Designing Interactions*, p. 60.
- ¹⁵ Moggridge, *Designing Interactions*, p. 89.
- ¹⁶ Moggridge, *Designing Interactions*, p. 102.
- ¹⁷ Moggridge, *Designing Interactions*, p. 146.
- ¹⁸ Levy, *The Perfect Thing*, pp. 99–100.
- ¹⁹ Levy, *The Perfect Thing*, p. 222.
- ²⁰ Levy, *The Perfect Thing*, p. 222.
- ²¹ Levy, *The Perfect Thing*, pp. 93–94.
- ²² Gary McWilliams, "Whirlwind on the Web," *BusinessWeek*, April 7, 1997.