

Steve Jobs – Who Blended Art with Technology

V Rajaraman

Steve Jobs is well known as the creator of the famous Apple brand of computers and consumer products known for their user friendly interface and aesthetic design. In his short life he transformed a range of industries including personal computing, publishing, animated movies, music distribution, mobile phones, and retailing. He was a charismatic inspirational leader of groups of engineers who designed the products he visualized. He was also a skilled negotiator and a genius in marketing. In this article, we present a brief overview of his life.

1. Introduction

Steve Jobs made several significant contributions which revolutionized six industries, namely, personal computing, publishing, animated movies, music distribution, mobile phones, and retailing digital products. In all these cases he was not the primary inventor; rather he was a consummate entrepreneur and manager who understood the potential of a technology, picked a team of talented engineers to create what he visualized, motivated them to perform well beyond what they thought they could do. He was an aesthete who instinctively blended art with technology. He hired the best industrial designers to design products which were not only easy to use but were also stunningly beautiful. He was a marketing genius who created demand for his products by leaking tit bits of information about their ‘revolutionary’ features, thereby building expectancy among prospective customers. The product was then unveiled in a theatrical presentation in a large auditorium by the consummate showman Steve Jobs.

The hype created by the publicity made the company he founded – Apple – a household name. All new products Apple announced during the last fifteen years became bestsellers. Young people queued up outside Apple’s retail stores all over the world, often



V Rajaraman is at the Indian Institute of Science, Bangalore. Several generations of scientists and engineers in India have learnt computer science using his lucidly written textbooks on programming and computer fundamentals. His current research interests are parallel computing and history of computing.

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overnight, to be the first ones to own the most recent Apple product. Apple regularly introduced innovative products starting with Apple II, Mac, iMac, iBook, iPod, iPhone, and lastly the iPad. His life as an entrepreneur is an inspiration to the young, many of whom would like to emulate his success. This article is a short biography tracing his journey through life. His life is an example of how an individual who is passionate about his work, loves what he does, trusts his intuition, believes in simplicity in a complex world, and perseveres in spite of failures can change the world.

I cannot do full justice to Jobs' colourful life in a short article. An authentic account of Jobs' life has been written by Walter Isaacson [1] who was commissioned by Jobs to write his biography when he knew he had cancer. Isaacson spent many days spread over two years, speaking to Jobs, his family, and over a hundred of his colleagues and friends. Based on these interviews he produced a 600-page book which was released soon after Jobs' death. The result is a frank recounting of the complex personality of Steve Jobs, his successes, his failures, the influence of Silicon Valley and the effect of social churning that was taking place in America in the early seventies on his life. Besides Jobs' charismatic leadership, negotiating skills, foresight, belief in intuition, and aesthetic sense, Isaacson also records some unflattering remarks about his complex personality. Jobs was a megalomaniac, often dishonest, manipulative, stingy, ruthless, and boorish in his dealings with his colleagues. He liked to hog the limelight and cried like a child to achieve his ends.

Besides Isaacson's book there are also biographies by Young and Simon [2], Stross [3], and several others. The website: www.allaboutstevejobs.com [4] has a wealth of information on Jobs from where I have drawn a lot.

2. Reed College Days

Steve Jobs was born on 24 February 1955 in San Francisco to Joanne Schieble, an unwed mother, and Abdulfattah Jandali, a Syrian, when they were both students at the University of



Wisconsin. As Joanne's father did not approve her marrying Abdulfattah, their son who was born in San Francisco was put up for adoption. (Joanne and Abdulfattah married later and had a girl). Joanne wanted only college graduates to adopt her son but as it turned out the couple who had promised to adopt the child reneged as they wanted a girl. The child was adopted by Paul and Clara Jobs who had both not attended college. Joanne refused to sign the adoption papers unless she was promised that her son will be sent to college. Jobs couple agreed to do so and adopted the child and named him Steven Paul Jobs (later abbreviated as Steve Jobs).

Jobs' family lived in Mountain View, California (in the heart of what is now called the Silicon Valley). He went to elementary school there and was recognized by his teachers as very smart and allowed to skip a class as he was getting bored and playing pranks. The high schools in Mountain View were not good and Steve wanted to go to a good school. He knew he was adopted and this seems to have led to some behavioural problems [1]. His parents moved to another suburb, Cupertino, where there was a good high school. Steve's father was a machinist who tinkered with automobiles in his spare time, renovated used cars, and sold them. Steve also worked with him but his interest was more in tinkering with electronic circuits. In high school he befriended Steve Wozniac (generally known as Woz) who was five years older to him as they had a common interest in tinkering with electronic circuits. In 1973 he finished high school and as promised his parents wanted him to go to a college. Woz had joined the University of California, Berkeley, where the fees was low. Jobs, however, insisted on going to Reed College, a private liberal arts college in Oregon. Even though the fees was high, his parents agreed and he joined Reed College. In the address he delivered to the graduating students at the Stanford University in 2005 [5] he describes his experiences in Reed College as follows:

“I dropped out of Reed College after the first 6 months, but then stayed around as a drop-in for another 18 months or so before I really quit. So why did I drop out?”..... “After six months, I couldn't see the value in it. I had no idea what I wanted to do

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– *Steve Jobs*

with my life and no idea how college was going to help me figure it out. And here I was spending all of the money my parents had saved their entire life. So I decided to drop out and trust that it would all work out OK. It was pretty scary at the time, but looking back it was one of the best decisions I ever made. The minute I dropped out I could stop taking the required classes that didn’t interest me, and begin dropping in on the ones that looked interesting.

It wasn’t all romantic. I didn’t have a dorm room, so I slept on the floor in friends’ rooms. I returned coke bottles for the 5 cents deposits to buy food with, and I would walk the 7 miles across town every Sunday night to get one good meal a week at the Hare Krishna temple. I loved it. And much of what I stumbled into by following my curiosity and intuition turned out to be priceless later on. Let me give you one example:

Reed College at that time offered perhaps the best calligraphy instruction in the country. Throughout the campus every poster, every label on every drawer, was beautifully hand calligraphed. Because I had dropped out and didn’t have to take the normal classes, I decided to take a calligraphy class to learn how to do this. I learned about serif and san serif typefaces, about varying the amount of space between different letter combinations, about what makes great typography great. It was beautiful, historical, artistically subtle in a way that science can’t capture, and I found it fascinating.

“If I had never dropped in on that single course in college, the Mac would have never had multiple typefaces or proportionally spaced fonts.”
– *Steve Jobs*

None of this had even a hope of any practical application in my life. But ten years later, when we were designing the first Macintosh computer, it all came back to me. And we designed it all into the Mac. It was the first computer with beautiful typography. If I had never dropped in on that single course in college, the Mac would have never had multiple typefaces or proportionally spaced fonts. And since Windows just copied the Mac, it’s likely that no personal computer would have them. If I had never dropped out, I would have never dropped in on this calligraphy class, and personal computers might not



have the wonderful typography that they do. Of course it was impossible to connect the dots looking forward when I was in college. But it was very, very clear looking backwards ten years later.”

3. Sojourn in India

While at Reed College, Jobs became a vegetarian, experimented with drugs (LSD), worked in an apple orchard, meditated, and lived in a commune. He was quite restless trying to find meaning in his life.

Jobs left Reed College and came back to Cupertino in 1974. He looked for a job primarily to earn enough to go to India to find enlightenment. At Reed College one of his friends who had gone to India strongly recommended a guru, Neem Karoli Baba, whose ashram was in Rishikesh. He joined Atari, a video gaming company, as an electronics technician. He made contact with Woz who had graduated from Berkeley and was working at Hewlett Packard (HP), an electronics manufacturer. Jobs was put on night shifts as he could not get along with other technicians on day shifts. Woz hung around with him after his day’s work at HP and helped him in some designs.

After a year he asked the owner of Atari to assist him financially to go to India. Atari had sold some machines in Europe which needed repair and Jobs was sent to do it, partially meeting his travel expenses to India. When Jobs arrived in India and looked for Karoli Baba’s ashram he was disappointed as Karoli Baba had died [1]. Jobs roamed around the Himalayas with his friend Kottke from Reed College trying to find another guru but was unsuccessful. However, he got interested in mysticism and Zen Buddhist philosophy which seemed to have calmed his restless spirit. In his words as quoted by Isaacson [1, p.48] he reflected on the lasting influence of his trip to India as follows:

“Coming back to America was for me, much more of a cultural shock than going to India. The people in the Indian countryside don’t use their intellect like we do, they use their intuition instead,

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and their intuition is far more developed than in the rest of the world. Intuition is a very powerful thing, more powerful than intellect, in my opinion. That's had a big impact on my work"..... "Zen has been a deep influence in my life ever since." Jobs later found a teacher of Zen in Silicon Valley and practiced it assiduously. Zen instilled in him faith in simplicity.

4. Apple Computers

Jobs returned to Cupertino and went back to work at Atari. Jobs renewed his contact with Woz who was still working for HP. During his spare time Jobs designed electronic circuits and joined a computer hobbyists association called the Homebrew Computer Club. The idea of personal computer was just emerging in 1974. Intel had introduced a microprocessor chip 8008 in 1972 and a number of small companies and hobbyists in California were building computer boards using it. A small company called Altair announced a system which had a circuit board with an Intel processor, a keyboard, and a display consisting of Neon tubes. This created a stir among the hobbyists of Homebrew Computer Club.

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In mid-1975, Woz felt he could build a much better computer board which could use a TV screen to display characters and numbers. He went back to his laboratory in HP after working hours and built a single board computer and the necessary software in two months. He connected the board to a keyboard and a TV monitor and in his words [1], "I typed a few keys on the keyboard and I was shocked! The letters were displayed on the screen." He showed it to Jobs who was impressed and immediately told Woz that they should make more boards and sell them. Woz was diffident but Jobs convinced him that the boards could be sold. Woz and Jobs put in their savings of \$1300 and started building the boards in Jobs' garage. Jobs also convinced Woz that they should start a company and after discussions they decided to call it Apple Computers. (Jobs loved apples from his days in Oregon where he worked in an apple orchard.) Jobs and Woz made a great pair complementing each other's talents. Jobs was



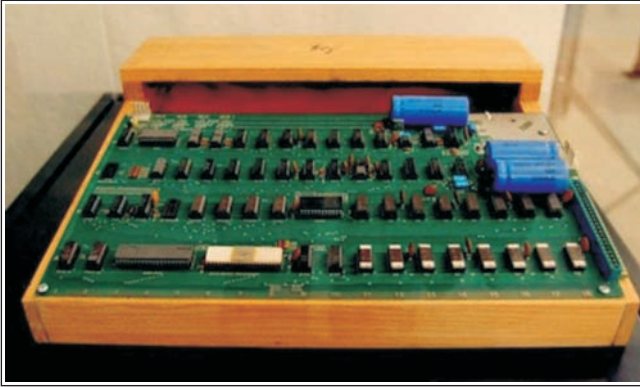


Figure 1. Apple I board.
(Courtesy:
www.allaboutstevejobs.com)

outgoing, a born salesman, and driven by an ambition to succeed. Woz, on the other hand, was shy, socially withdrawn, and was not financially savvy. He was, however, a wizard in building computers and writing software. Jobs got an order for fifty single board computers called Apple I (*Figure 1*), from a local electronics store and raised the capital to buy components. They sold over 1000 boards and made enough profit. Woz immediately started building the next model Apple II.

Jobs soon understood that a computer board had a limited market. To have a bigger market a fully integrated system was required consisting of a good power supply, processor board with memory, a keyboard and a display. He did not want any fans in the system to cool it as fans were noisy and failure prone. He hired a good power supply designer who designed what is known as a switched mode power supply which did not dissipate heat thereby eliminating a fan. He also got a good designer to package Apple II in a beige coloured plastic case (*Figure 2*). Once the integrated system was ready he had to raise capital to manufacture the machine. He convinced Mike Markkula, who had been a marketing manager at Intel, to become a partner. Markkula invested \$ 250,000 for 26% share of Apple computers. Jobs and Woz each had 26% and the rest was reserved for future investors. Markkula made three important points for Apple II to succeed. They were:

Figure 2. Apple II computer.



Apple II was the computer which launched the personal computer industry. Woz's wizardry in circuit and software design combined with Jobs' insight in system integration and sleek packaging led to the success of Apple II.

foreseeing what the users need better than competitors; focussing on major features of a product and not being distracted by extraneous factors, and the need to present a product with good appearance which convinces customers that the product is professionally designed. He remarked that very often people judge a book by the design of its cover. This was an important lesson to Jobs.

Apple II was launched in April 1977. It was a good-looking machine, easy to use, had reasonably good software and was a hit. Soon VisiCalc (the first spread sheet program) was ported on Apple II and it enhanced its appeal. Apple II went through several models and sold around 6 million units in 16 years. Apple II was the computer which launched the personal computer industry. Woz's wizardry in circuit and software design combined with Jobs' insight in system integration and sleek packaging led to the success of Apple II.

4. Apple Macintosh

Apple II was known as Woz's computer and Jobs wanted a better computer which would be identified as his. Jobs heard that a research laboratory, Xerox PARC in Palo Alto was designing state-of-the art computers. He visited Xerox PARC and saw a new Cathode Ray Tube display in which each picture element (pixel) could be addressed. This was a novel idea and was called a 'bitmapped display'. They also showed him a device which could point to any pixel. Jobs immediately perceived the potential of these technologies to revolutionize personal computers. He requested that a team from Apple be given a detailed demonstration and more information on these innovations. Xerox agreed after negotiating payment terms. Jobs wanted to use the bit mapped graphics display of Xerox which would provide an easy to use interface for an average user to work with the computer. As a result Apple started designing a new computer to be called Lisa, the name of Job's illegitimate daughter, with Jobs as its leader. Jobs behavior with the engineers working on the project was rude. They rebelled and wanted another manager and Jobs left the Lisa project and was scouting around to start for another project.



In 1979, Jeff Raskin – an able engineer at Apple – started a project to build a low cost machine with good graphics. He called it McIntosh, his favourite type of apple. The name was changed to Macintosh due to commercial reasons and it was envisaged as a low-end Lisa. He assembled a talented group of engineers and started the design. Soon word spread about how well the computer was being designed. In 1981, when Jobs was looking for something to do after his ejection from the Lisa project he heard about Jeff Raskin’s project and hijacked it from him. He changed the design and drove the engineers hard to produce a machine with a good graphical user interface and an industrial designer to design a case to enclose the electronic circuits. A mouse was used as a pointing device and a floppy disk was the main secondary memory. The result was an attractive, easy to use machine. Jobs was a control freak. He did not want customers to open the case. A special tool was required to open it and a customer had to take the computer to an Apple service centre for any repair or adding memory. The computer had no expansion slots and thus no peripherals could be attached to it. (This obsession of Jobs continued, and even today Apple products have to be taken to their store to change a battery!) The machine was launched one year after Lisa, in 1984, with great fanfare. A special advertisement movie called 1984, a takeoff on George Orwell’s novel 1984, was used to publicize the launch. (It costed the company \$1.5 million [1].) The marketing blitz and Jobs’ charisma during the launch resulted in a good initial sale, even though the price was high (\$2495). Soon the users realized that the processor Motorola 68000 used by Macintosh (which was abbreviated as Mac) was too slow and the 128 KB memory was too small to use the graphics interface effectively. The availability of only a floppy disk as secondary store and its high price led to poor sales. Apple II was the machine which kept the company afloat.

One of the features of Mac was the numerous excellent fonts available for printing which could be displayed on its bitmapped display. As Jobs had attended calligraphy classes at Reed College he had a passion for providing good fonts in Mac. A model of

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Mac was released with a laser printer (specially designed for Apple by Xerox) along with special software called Page Maker designed by Aldus for Mac. Page Maker had a feature which allowed users to print exactly what they see on the screen (called WYSIWYG – What You See Is What You Get). The large variety of fonts, WYSIWYG, and the ease of use made Mac popular with publishers and launched what was later called the desktop publishing industry. This market was, however, small.

Jobs tried to improve Mac with a faster processor but it did not improve sales. He was also becoming boorish in his treatment of engineers. Several engineers from the original Mac design team left. Those who remained complained to Sculley (who had been induced earlier by Steve Jobs to join Apple as its CEO) about Jobs' rude behaviour. Sculley sided with the Mac team and asked Jobs to leave the Mac division and start a R&D division. Jobs did not agree and tried to get rid of Sculley by influencing the board of directors of Apple. The board, however, sided with Sculley and asked Jobs to be the Chairman of Apple with no executive powers. After a few months Jobs quit as he was sidelined. In his address to Stanford students [5], he expressed his feelings as follows:

“I didn't see it then, but it turned out that getting fired from Apple was the best thing that could have ever happened to me. The heaviness of being successful was replaced by the lightness of being a beginner again, less sure about everything.”
– Steve Jobs

“So at 30 I was out. And very publicly out. What was the focus of my entire adult life was gone and it was devastating. I really didn't know what to do for a few months. I felt that I had let the previous generation of entrepreneurs down – that I had dropped the baton as it was being passed to me. I met with David Packard and Bob Noyce and tried to apologize for screwing up so badly. I was a very public failure, and I even thought about running away from the valley. But something slowly began to dawn on me – I still loved what I did. The turn of events at Apple had not changed that one bit. I had been rejected, but I was still in love. And so I decided to start over.

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ness of being a beginner again, less sure about everything. It freed me to enter one of the most creative periods of my life.”

Box 1. Steve Jobs – Time Line – First Innings – Founding Apple Computers

1955	24 February 1955, Steve Jobs born in San Francisco. Put up for adoption by unmarried mother.
1969	Meets Steve Wozniac at school. Wozniac is 5-years older and a wizard in electronics circuit design. Jobs’ shares passion in electronics with Wozniac
1973	Jobs joins Reed College in Oregon, an expensive private liberal arts college. Drops out after one semester but stays on to attend courses which interested him including one on calligraphy. Becomes a hippie, experiments with drugs (LSD), starts meditation, and becomes a vegetarian.
1974	Joins Atari – a video game maker as an electronics technician. Saves enough to travel to India to “seek enlightenment”. Returns a Zen Buddhist with a firm belief that intuition is as important as logic.
1976	Wozniac designs Apple I single board computer in Job’s garage. Jobs immediately realizes the business opportunity in selling the boards. Starts Apple Computers with Wozniac as partner with a capital of \$1300.
1977	Capital infusion by Mike Markkula who hires Mike Scott as CEO. Wozniac joins Apple full time. Apple II designed professionally by Wozniac’s team
1978	Apple II succeeds heralding PC revolution. Steve Jobs visits Xerox PARC research facility. Sees bitmapped display, mouse, and Ethernet. Immediately realizes the importance of these technologies in future computer design.
1980	Apple goes public. Jobs’ net worth jumps to \$ 200 million.
1982	Steve Jobs featured on the cover of the <i>Time Magazine</i> .
1983	Apple’s Lisa computer released. First computer with graphical user interface. Not a commercial success.
1984	Apple’s Macintosh computer which was designed under the leadership of Steve Jobs released. First machine with icons and use of mouse to point and click. Too expensive and flops in the market. Later succeeds as a desktop publishing machine due to the availability of several fonts, ease of use, and a laser printer.



UNIX was a superior OS and this was immediately perceived by Jobs even though he was not a programmer.

5. Life After Apple

A few months after he left Apple, Jobs decided to start his own computer company. He called it NeXT. He heard about a student from Carnegie Mellon University, Avie Tevanian, who had designed a kernel called Mach for the UNIX operating system and he employed him. UNIX was a superior OS and this was immediately perceived by Jobs even though he was not a programmer. He asked his engineers to design NeXT computer as a perfect cube. It was however difficult to build. The hardware was a failure but the Operating System of NeXT was one of the best in the market and kept the company afloat.

In the meanwhile he heard from his friend Alan Kay of Xerox PARC that an excellent graphics terminal which could be used for animation was being built by a group in a company called Industrial Light and Magic (ILM) owned by George Lucas. The group had some excellent researchers, Ed Catmull, Alvy Smith, Ralph Guggenheim and a brilliant animator from Walt Disney Studios, John Lasseter. They all believed in computer animated movies and were developing a powerful computer to process graphics data and a programming language to process it. Lucas was not interested in computer graphics and wanted to sell ILM. Jobs visited ILM laboratories and he was as impressed as he was when he saw the work at Xerox PARC. Lucas was asking \$30 million for ILM and Jobs felt it was too high and decided to wait till the price was reasonable. Lucas was in financial trouble and in desperation he reduced the price to \$10 million. Jobs bought ILM in January 1986 and named it Pixar Inc.

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Pixar Inc made a graphics workstation called Pixar Image Computer (PIC). Its price was too high even for the professional market and sales were disappointing. In 1988, Pixar released two cheaper graphics workstations. These machines had a computer language called RenderMan to render 3D graphics. Jobs wanted to sell the company as it was bleeding money with no sales. In 1990 John Lasseter got an idea to make animated TV commercials to survive and keep the talented team together. In 1990,



Pixar was losing money at a fast rate (a loss of \$ 8 million) and Jobs was continuing to finance it. In 1991, Jobs shut down the hardware part of Pixar, keeping only Lasseter's animation department. Even though Pixar was losing money it was regularly getting prizes. Its animated short movie *Tin Toy* bagged the Motion Picture Academy Award. This attracted Walt Disney productions to sign a contract with Pixar to make a full length feature film entirely using Pixar's computer animation. In 1991, a contract was signed to make an animated movie named *Toy Story* which was released in 1995 and was an instant hit (Figure 3). It grossed \$160 million and the production cost was only \$27 million. Jobs immediately realized the potential of animated movies and took full control of Pixar. Pixar went on to make some more memorable computer animated movies, the most notable one being *Finding Nemo*. The main contribution to Pixar by Jobs was understanding the potential of good graphics workstations, the future role of computer animation, and persevering with Pixar while it was unprofitable. Later Jobs commented, "I am convinced that about half of what separates the successful entrepreneur from the non successful ones is pure perseverance". When Pixar went public Jobs became a billionaire as he owned 80% of Pixar.

6. Return to Apple

While Jobs was struggling with the NeXT computer, Apple was rapidly losing its market share in personal computers. Even though it continued with the Mac line of computers, the emergence of Windows OS for PCs by Microsoft that also had good graphical interface was a big blow to Mac sales. Apple went up to the Supreme Court of USA to prevent Microsoft from releasing Windows OS. It lost the case as the judges opined that the original inventor of graphical user interface was Xerox and not Apple. Soon it looked as though Apple had to be closed. In 1996, the new management of Apple felt that Jobs vision and drive will put Apple back on track and requested him to return to lead Apple. Apple also bought NeXT STEP, the state-of-the-art Operating System, from Jobs for \$ 400 million. NeXT was closed



Figure 3. *Toy Story* computer animated movie.

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– Steve Jobs



Figure 4. iMac G3 with keyboard and mouse.

down. Jobs joined first as an adviser and in 1999 became Apple's CEO.

Jobs forte was identifying talented engineers – what he called the 'A' team. He brought with him the best software designers led by Avie Tevanian from NeXT and recruited hardware engineers. From mid-1997, Jobs worked feverishly. His first strategic decision was to restrict Apple to four product lines: iMac, Power Mac, iBook, and Power Book.

The genesis of iMac was a project in progress at Apple designing a Network Computer which was a stripped down, computer that could be connected to the Internet and use the servers on the Internet. Jobs modified it to be a stand-alone desktop. He called it iMac. (The prefix i is conjectured as internet enabled. Apple never officially confirmed this). Apple had hired John Ive, a genius industrial designer, before Jobs had returned to Apple. Ive designed the case of iMac as a translucent, blue/green machine with a rounded back and it was a beauty (*Figure 4*). iMac had no floppy, only a CDROM drive and built-in hard disk. It was the first desktop machine to have USB ports for adding more I/O units. Jobs presented it with his usual flare for showmanship in an auditorium in Cupertino on May 6, 1998. The machine was received with great enthusiasm by Apple customers and put Apple back on the map in the PC industry. This was followed in January 1999 by a professional version of iMac – Power Mac, and in July 1999 by iBook – a laptop version of iMac and a few months later by Power Book a laptop for professionals. Apple was turned around and made profitable in two years by Jobs. By 1999, Apple's products were admired by customers. Commenting on the turnaround of Apple Jobs said "Deciding what not to do is as important as deciding what to do."

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7. Digital Hub Strategy – Apple's Entry as a Retailer

By late 1999, a number of consumer products such as digital cameras, music players, and camcorders were becoming popular.



Jobs perceived the need for good software on iMac to store and process these. iMac already had good software for processing pictures. He saw the need to have software to process music and movies also on iMac. This would make Apple computers a hub of the new ‘digital lifestyle’. Apple first developed a digital movie editing application for movies stored in DVDs of iMac. This was not very popular. However, an application to select music tracks from CDs, mix them, and burn them on CDs became popular (it was marketed as rip, mix and burn). Jobs’ vision was to make Apple multimedia software easy to use and enable users to do creative work. Apple’s share of the personal computer market was only about 5%. Jobs felt that unless users actually see and experience Apple’s superior user interface it will remain a niche product. He thus embarked on a strategy of opening Apple retail stores where consumers can ‘test drive’ Apple products. He hired some of the best employees of other major retail stores to implement his vision. His vision proved correct. Soon, Apple products began to be appreciated by customers and sales skyrocketed.

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8. Apple’s Entry into Consumer Electronics – iPod

In the meanwhile, Jobs realized that there was no popular consumer product for music similar to digital cameras and camcorders. He decided to enter this field which led to the design of iPod – a pocket size music player which looked attractive, had an excellent user interface, and a 5GB disk storage which could store 1000 hours of music in compressed MP3 format. It could be connected to iMac by a fast interface and music from iMac could be downloaded on iPod effortlessly. iPod was introduced in October 2001 just before the Christmas holiday season, and was an instant hit (*Figure 5*). It heralded the entry of Apple into the consumer electronics industry.

A problem still remained; that of obtaining music legally from music producers which could be played on iPod. Jobs used his negotiating skills with several music producers to get their concurrence for downloading single music tracks from music albums for 99 cents and entire albums for \$9.99. In 2003, Apple estab-

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Figure 5. Jobs showing an iPod.



Figure 6. Jobs showing an iPad.

lished iTunes retail music stores to market music. Most of the sale proceeds from iTunes stores went to the music producers. Apple's main interest was to sell more iPods. Every few months iPod was improved. Later iPod versions could be used as a personal digital assistant and had many applications besides playing music. By 2004, iPod became Apple's bestseller.

9. iPhone and iPad

The iPhone project began in 2003. It was to be a product which fulfilled Jobs' vision of 'digital convergence'. Phones depended on communication companies. Before the serious development of iPhone, Jobs told the major mobile telephone companies in USA that Apple's iPhone will have features that will be 'light years' ahead of others in the market and that the cellphone companies will make money by selling data services available on iPhone.

Again he used his considerable negotiation skills to get AT&T, the major mobile telephone company in USA, to agree to pay royalty to Apple every month for each iPhone bundled with AT&T as the carrier. iPhone seamlessly married hardware and software. It used iMac's Operating System allowing it to be as powerful as a computer. The revolutionary feature of iPhone hardware was a touch screen display with several icons to invoke applications and a virtual keyboard. iPhone was pocket sized and allowed its users to make phone calls, take photos, email, use it as a personal digital assistant, browse the web, download music, and watch movies. The user interface was fantastic and the phone was attractive. In spite of its high cost, consumers queued up in front of Apple stores the night before its release in 2007 to become proud owners of this new marvel of technology. The first version of iPhone sold 6 million units.

While the iPhone project was a year old, Jobs was diagnosed with cancer of the pancreas and was devastated. He was advised surgery but postponed it, trying various diets, meditation etc., hoping cancer would go away. Ultimately Jobs was operated after



Box 2. Steve Jobs – Time Line – Second Innings at Apple Computers

- 1985 Jobs ousted from Apple. Starts NeXT computers. Jobs realizes that Operating System based on UNIX is the future and gets one designed for NeXT.
- 1986 Jobs buys graphics computer company ILM, from Lucas. Realizes potential to make computer animated movies using graphics processors and bitmapped display. Recruits talented engineers and animators. Names company Pixar.
- 1988 NeXT designed as a perfect cube. Marketed to universities and industries as a powerful workstation. Fails in the market. UNIX-based OS salvaged and marketed as NeXT STEP.
- 1991 Pixar signs deal with Disney Studios to make computer animated feature films. It takes Pixar five years to reach this state of maturity.
- 1995 Jobs become CEO of Pixar Animation Studios. *Toy Story*, the first full length computer animated movie, released. Becomes box office hit. Pixar goes public. Jobs net worth becomes \$1.5 billion.
- 1996 Apple which had floundered buys NeXT for \$ 400 million and invites Jobs' back as adviser.
- 1998 Jobs leads a group to design iMac. With much fanfare iMac released and is a hit.
- 1999 iBook released. Jobs becomes Apple's CEO.
- 2001 iPod music player released by Apple and is a success. Apple becomes an entertainment electronics company.
- 2003 Job negotiates with music producers. Opens Apple's iTunes music store to sell music legally. Jobs diagnosed with pancreatic cancer.
- 2004 iPod mini becomes the world's best-selling MP3 player. Jobs undergoes surgery.
- 2007 Jobs launches iPhone with a touch screen interface – it is highly acclaimed.
- 2008 MacBook Air launched as world's thinnest laptop computer.
- 2010 Jobs unveils iPad tablet computer. It runs the same OS as iPhone.
- 2011 Passes away on 5th October.



iPad ran the same operating system as the iPhone, had a high resolution screen, virtual keyboard, and an excellent user interface. By April 2014, 200 million iPads were sold.

a delay of 9 months and the cancer went into recession. He took leave but continued to keep in touch with the iPhone team. He returned to guide the iPhone project to its successful conclusion in 2007. (The iPhone went through 8 models and has sold 450 million units by March 2014.)

Jobs' health was not good. In spite of it on January 27, 2010, he introduced iPad, (*Figure 6*), the much anticipated Apple Tablet Computer. iPad ran the same operating system as the iPhone, had a high resolution screen, virtual keyboard, and an excellent user interface. By April 2014, 200 million iPads were sold. A unique feature of iPhone and iPad is the availability of a large number of applications called Apps which could be downloaded from Apple stores. Users could also develop Apps which were thoroughly tested by Apple before they were sold and a royalty given to the developers. As of 2012 a million apps were available in Apple's store. iPad was the last product Jobs launched. His health slowly deteriorated and he passed away surrounded by his wife Laurene and children Lisa, Reed, Evin and Eve on October 5, 2011.

10. Conclusions

Steve Jobs was neither a good electronics engineer nor a good programmer. He, however, had a finely honed intuition which enabled him to visualize innovative products which captured the imagination of consumers. He believed in Leonardo da Vinci's adage, "Simplicity is the ultimate sophistication". He worked at the intersection of art and engineering and inspired his designers to produce electronic gadgets which were not only excellent functionally but also had strikingly good looks. He was a marketing genius with flair for public speaking. His negotiating skills were legendary. To sum up he was a great manager who defied the existing norms. When he was diagnosed with cancer and knew death was not far off, his advice to students graduating from Stanford University was [5]:

"No one wants to die. Even people who want to go to heaven don't want to die to get there. And yet death is the



destination we all share. No one has ever escaped it. And that is as it should be, because Death is very likely the single best invention of Life. It is Life's change agent. It clears out the old to make way for the new. Right now the new is you, but someday not too long from now, you will gradually become the old and be cleared away. Sorry to be so dramatic, but it is quite true.

Your time is limited, so don't waste it living someone else's life. Don't be trapped by dogma – which is living with the results of other people's thinking. Don't let the noise of others' opinions drown out your own inner voice. And most important, have the courage to follow your heart and intuition. They somehow already know what you truly want to become. Everything else is secondary.”

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Suggested Reading

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“Have the courage to follow your heart and intuition. They somehow already know what you truly want to become. Everything else is secondary.”

– Steve Jobs

Address for Correspondence
V Rajaraman
Supercomputer Education
and Research Centre
Indian Institute of Science
Bangalore 560 012, India.
Email: rajaram@serc.iisc.in

