

Creativity 2.0*

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"The principal goal of education is to create men who are capable of doing new things, not simply repeating what other generations have done—men who are creative, inventive and discoverers."

- Jean Piaget (1896-1980), Swiss psychologist and pioneer in the study of child intelligence.

"Creativity often consists of merely turning up what is already there. Did you know that right and left shoes were thought up only a little more than a century ago?"

- Bernice Fitz-Gibbon.

Creativity 1.0

A dictionary definition of "creativity" is "[the] ability to produce something new through imaginative skill, whether a new solution to a problem, a new method or device, or a new artistic object or form." As someone who aspires to be creative by looking up to successful people, we find that there are a multitude of quotes and sayings: We will begin with one of the most creative minds of all time, Albert Einstein, who said, "The secret to creativity is knowing how to hide your sources." Then we have what drives creativity: "Creativity comes from zeal to do something, generally it is to make some money." (B. J. Gupta); a comparison of creativity: "CREATIVITY is thinking up new things. INNOVATION is doing new things." (Theodore Levitt); creativity in an active role: "A hunch is creativity trying to tell you something." (Frank Capra); creativity as *ad hoc* trials and errors: "Creativity is inventing, experimenting, growing, taking risks, breaking rules, making mistakes, and having fun." (Mary Lou Cook); a cautionary note: "Creativity is essentially a lonely art. An even lonelier struggle. To some a blessing. To others a curse. It is in reality the ability to reach inside yourself and drag forth from your very soul an idea." (Lou Dorfsman); portals of creativity: "Our senses are indeed our doors and windows on this world, in a very real sense the key to the unlocking of meaning and the wellspring of creativity." (Jean Houston); an advise: "Creativity, as has been said, consists largely of rearranging what we know in order to find out what we do not know. Hence, to think creatively, we must be able to look afresh at what we normally take for granted." (George Kneller); source of creativity: "The things we fear most in organizations—fluctuations, disturbances, imbalances—are the primary sources of creativity." (Margaret J. Wheatley); creativity as a contrarian: "Creativity represents a miraculous coming together of the uninhibited energy of the child with its apparent opposite and enemy—the sense of order imposed on the disciplined adult intelligence." (Norman Podhoretz)...

The above examples and others only go to show what varied and multifarious notions people have of creativity, so much so that, naively, we really wonder if there is any possible relationship between all these different “definitions”. I thus tried to sum up in an earlier article: “Creativity is sometimes used interchangeably in the stead of maturity. If maturity can be defined as seeing the world through eyes other than one’s own, creativity might be defined as seeing the world through sufficiently new eyes so that new solutions appear. In fact, creativity can take two forms: invention—in which we create totally new things, such as the invention of the computer; and innovation—in which we do old things in new ways, such as coming up with new ways of manufacturing the computer cheaply so that it is affordable. As such, a creative act, by definition, involves the introduction of novel elements into an established domain, and as such, creativity threatens the conventional way of doing things. In almost all instances, there will be much resistance faced by the creator. Instead of succumbing to the insidious pressure to conform, the creator must be ready to challenge and persevere in the face of obstacles.”¹

For the purpose of this article, I will use a good quote from an unknown source: “In an earthquake, the most dangerous place to be is in a tall building that is not flexible. Yet, one of the safest places is a tall building that has been stressed for earthquakes—in other words, one that has a deep foundation and is flexible. So, too, over the coming years, large organizations that remain rigid will crumble and fall, while those that succeed in adding flexibility, teamwork and creativity to their cultures will thrive.” I will now apply this quote to Silicon Valley, California—not only that it is in one of the most earthquake-prone areas, but also it is one of the most creative hubs that has led the world in a number of revolutions in computer and information technology.

Think of Silicon Valley as the “tall building”, the boom-and-bust cycles as the “earthquakes”, and the crucial ingredients that have kept the Valley at the center of tech innovations as the “stressed”.

Now let us see how Silicon Valley is playing out its role in the current Web 2.0 revolution, after the Internet bust of 2000.

Revival of the Fittest, à la Silicon Valley

On October 10, 2006, Google acquired Chad Hurley and Steve Chen’s eleven-month old video-sharing company YouTube for \$1.65 billion. The YouTube acquisition sent shock waves through the 50-mile stretch of the San Francisco Bay (California) known as Silicon Valley.

Eleven years and two months earlier on August 9, 1995 Netscape—an eighteen-month-old company with no profits or business model to speak of—had debuted on the NASDAQ Stock Exchange and got the biggest first-day pop in stock price ever. It was the opening of the floodgates: in the next five years more than a thousand high-tech start-ups would go public, raising \$66 billion—a phenomenon that could end only in fierce crash.²

Was YouTube the next Netscape? Concern had already been building in certain corners of Silicon Valley and pockets of the business world at large, growing with every report mentioning “eyeballs” (an industry term for the raw number of people who look at a Web site) and the reappearance of young, jean-wearing idealists aiming to upend industries with the Web. They had lived through the bursting of the first Web bubble, some just barely, and no one wanted to go through it again.

In fact, by the time YouTube got its payout, Web fever had already been bubbling back up in the Valley. Several (Web) sites had slowly but surely begun to emerge from Silicon Valley’s primordial soup and were catching the attention of investors, advertisers, and investment bankers. They were

doing something far different from the first wave of Internet companies. It was not about e-commerce or taking pre-packaged content from the offline world and throwing it onto a site. The new crop of companies was all about young geek-turned-hipster techies who were creating them. They were mostly social networking sites—built for them and their friends—that happened to become companies. There was no inventory; no huge staff of content creators; no expensive business development guys running around in crisp blue shirts brokering deals with old media power houses; no armies of coders whizzing around the office on Razor scooters. In fact, few of them even had offices.

In some ways, that is what changed the most in Silicon Valley in the years after the bust. A few crucial ingredients have kept the Valley at the center of tech innovations for forty years. One is more venture capital than anywhere else. The second is a critical mass of smart people, thanks to the area's preponderance of large high-tech companies and universities. A third is an infrastructure of attorneys, accountants, and publicists skilled at the guerrilla tactics necessary for starting something from scratch. The fourth and most impossible to replicate elsewhere is the culture of risk-taking. And fifth, of course, is creativity.

Let us take a look at some of these ingredients:

Webpreneurs

When consumer Web businesses started to bubble back up, some of the people were consciously setting out to build new businesses. The rest of what would become the Web 2.0 crew were merely experimenting with fun projects. People like Mark Zuckerberg of Facebook, Joshua Schachter of del.icio.us, Kevin Ross of Digg, Brad Fitzpatrick of LiveJournal, and Ben and Mena Trott of Six Apart were either in college, in jobs they hated, or laid off. They wanted to do something cool, because few new cool Web sites were being built by anyone else. The Google and News Corps of the world were not buying hot new Web properties when these people started playing around. There was no Web 2.0 wave. The term did not even exist yet. Most of them hoped to make enough money off advertisements or user donations to pay for the cost of running the sites or maybe pay their rent.

Web entrepreneurs (Webpreneurs) break down into generations. There are no hard-and-fast demarcations, but if you step back, you can see distinctions between the groups. The first generation were people like Marc Andreessen, who started Netscape (in 1994) before there was such a thing as an Internet start-up. This generation drew on a kinship with the young software and computer nerds from the 1980s like Bill Gates of Microsoft, Steve Jobs of Apple, and Larry Ellison of Oracle—largely dropouts and misfits.

Then there were the real first Internet guys: Jerry Yang and David Filo of Yahoo!, Steve Case of AOL, Jeff Bezos of Amazon, and Pierre Omidyar of eBay. They were mostly Ivy League educated geeks who loved algorithms and sticking a finger in the eyes of staid old-economy companies, even as they employed scores of business development executives to court these companies into partnerships. They generally played by modern Silicon Valley rules, raising hundreds of millions and enjoying celebrated public market success. People from companies such as Google and PayPal are sort of the sandwich generation, a small group. They started their businesses at the peak of the bubble, amid all the enthusiasm in the world, but unlike so many others had real enough businesses to survive the crash and still come out on top. They valued good engineering first and foremost, not sales, business development, or the lure of IPOs.

Then starting in about 2002 came the Web 2.0 crowd. Most of them finished college, although there were a few dropouts as in any Silicon Valley wave. They were a bit too young to be the

founders in the Web 1.0 wave, but were old enough to have been dotcom rank-and-file employees and shareholders. They graduated into the world of the late 1990s, in which they could make more money at their first job than their parents. But they were also most likely to get laid off. They like computers, but are of the generation when liking computers started to become okay, socially acceptable even. So while they may be late bloomers, they were not the pocket-protector-wearing nerds such as Bill Gates. This generation consisted of people like Mena and Ben, Kevin Rose, Mark Zuckerberg and Brad Fitzpatrick. Hip (sophisticated), irrelevant kids, but savvy, cautious ones.

Venture Capitalist

The relationship between a venture capitalist and an entrepreneur has traditionally been a tense one: the latter has an invention/innovation/creation and needs cash infusion to accomplish the idea; the former holds the purse-string. As we will see presently, the purse-string will become slack in the prevailing climate.

Within finance, most industries consolidate as they grow. The bigger companies buy up smaller ones in order to get more market share faster than opening new locations, hiring a new sales force, or building new products. But amassing pure market share does not matter so much in the venture capital business. It is more about getting those one or two deals that will become the big home runs, and that is best done with a small cadre of in-the-know partners. So as the overall amount of venture capital grows, the industry does not consolidate, it just gets bigger and more fragmented. Where there use to be about 300 firms several years ago, there are thousands today. And there is a huge discrepancy when it comes to returns. The top 10% of venture capital firms make nearly 90% of the money. That means there are a lot of posers, or in the language of disgruntled Valley folks, lemmings.

Calling venture capitalists lemmings all chasing one another blindly off a cliff may be the most overused insult in Silicon Valley history, followed closely by the term vulture capitalist. Vulture capital is one of the last vestiges of California Wild West. A partner in a venture firm decides to invest in a company on the basis of a lot of information—for example, detailed financials and extensive customer interviews—or on as little information as a breezy PowerPoint between friends. It is not a loan, so the money is never repaid. Rather the venture investor swaps stock and usually a board seat for the cash. They make their money by selling those shares whether the start-up sells to a publicly traded company or goes public itself. Then they pass the returns to their investors. They keep a good deal for themselves too.

Most venture capitalists (VCs) knew they were making some enemies in the bleak years soon after the year 2000 bust. They also knew things would come back in favor of entrepreneurs at some point, and such terms would ease. Entrepreneurs would have the power again, sure, but VCs would always have the money—the lifeblood of the high technology start-up game. It was simply how the Valley worked. But VCs made one big miscalculation: they assumed that when dotcoms came back, entrepreneurs would need their money. Webpreneurs did not!

Not even the most prescient venture capitalists could have predicted how cheap starting a Web business would become in just a few years. Sure to really build a big business, a Webpreneur would eventually need venture capital. But he could get pretty far on just a few million, and many could scrape that together from wealthy friends. By the time Webpreneurs really needed VC-level cash, their businesses would be far enough along that they could name the terms.

When Netscape was founded in 1994, entrepreneurs like Marc Andreessen and Jim Clark had to buy pricey Sun servers, Oracle database software, data storage equipment from EMC, Cisco routers, plus very very expensive bandwidth—the company power necessary to shove trillions of bits across telecom networks. They also had to lure a lot of expensive programmers to write millions of lines of code. It would take \$2 million just to prove it all worked, and another \$10 million or so to get the site launched. To make it a real business, it would need another \$30 million to \$40 million easy. The total was more than \$40 million.

By 1999, the only thing that had fallen in price was bandwidth, as trillions of dollars were being spent to build out more telecom networks to carry all the fast growing Internet traffic. But total costs actually went up. An entrepreneur still had to buy all that software and hardware from the tech elite, and probably more of it, given that many people were online. He would also have to add in substantially higher price tags for smart engineers (this was the peak of the salary curve, especially for engineers) and stratospheric rent (in Silicon Valley, at least \$80 per sq ft). And of course he would need lots of money for branding and marketing in such hyper-competitive market. Back then, it took \$5 million to prove it would work; another \$10 million to \$15 million to launch it, and another \$30 million to \$40 million to build it into a real business. The total was at least \$45 million. Cheaper bandwidth due to innovations in technology, but labor and real estate more than made up for the savings in bandwidth.

Four years later, Digg for instance, it took less than \$10,000 for Kevin Rose to prove it would work. He paid \$90 per month to a company to host it—cutting out much of the costs of servers and all that pricey software. And to build the site, he no longer required an army of highly paid engineers. In his case, he needed just one guy in Canada whom he met online and paid \$12 an hour for coding. By the time Digg even set foot on Sand Hill Road (where high profile venture capitalists are), Digg already had a well-defined product and hundreds of thousands of rabid users, all of that on just \$500,000.

Facebook is an even more extreme example. Mark Zuckerberg started Facebook in his dorm room. So real estate and employee costs: zip! Sure, there were still costs associated with bandwidth, servers, and keeping the site up and running as new colleges joined and traffic soared. But the costs had come down enough that Zuckerberg could slap a few banner advertisements on the site and cover those expenses easily. The site was profitable when it raised its first round of investor cash.

Friend-tors

Another miscalculation venture capitalists made was that a lot of entrepreneurs did make a good deal of money in the late 1990s. And that created a whole new generation of angel investors—angel investors with grudges against VCs, at that. These are the Friend-tors.

This earlier generation of entrepreneurs would play a huge role in the Internet lives of Web 2.0 entrepreneurs, ensuring that this wave of companies would go about their business on a manner totally different from those of a few years earlier. For every young gun with a cool new project, there was a guardian angel of sorts from previous start-up cycles, making sure he or she did not get screwed. These guardian angels would frequently find their young charges.

So-called angel investors, wealthy individuals who invest the first hundred thousand in innovative ideas, are not new in Silicon Valley. But these guys were different. They were more than angel investors. They were more than just advisors, mentors, and godfathers. The younger generation respected them because they had been there not twenty years before, but just less than a decade before.

And they were friends of the younger group. They were trustworthy. They were not just sources of cash and experience; they were “friend-tors.”²

These friend-tors told them things they had learned the hard way that this younger generation needed to know. These friend-tors explained: the importance of controlling, emphasizing that venture capitalists are not friends; the evils of giving up too much equity too soon; the dangers of filling their board with big industry names who were likely to be more loyal to investors than creators; why the younger generation should not raise as much money as possible, because with every dollar they take they lose more control of the company; why bringing in the “adult” CEO may not be the answer, even if he does have more experience.

These Webpreneurs who had arisen from the dotcom rubble turned to friend-tors not just because they were like-minded. These were only the people to turn to. In 2002 and 2003, most venture capitalists simply were not interested in funding the next crop of consumer Internet companies. So before companies like Digg, Six Apart, Yelp, Slide, YouTube, and Facebook would become the Web darlings of 2006, they were just low-key clusters of ideas and projects between friends. It was an incestuous little group, and a microcosm for how Silicon Valley works at its best, that *je ne sais quoi* that no other region can replicate.

If it had been up to venture capitalists or politicians to jumpstart the next wave of Internet companies in the Valley, we would likely still be waiting.

Technological Innovations

It was simply a new world, and in the venture capitalists’ haste in 2000 and 2001 to cut losses, many of them had made a crucial error in thinking. They miscalculated how fast deep pockets could become irrelevant.

The cost of running a start-up business—even a dramatically lower one—is just one side of the balance sheet. If founders wanted to keep the lemmings at bay for long, they would need some sort of income too. Since costs were so much lower, they did not need much. But they did need something, and the easiest way to get it was by slapping advertisements on their sites. Many of the late 1990s class of Internet companies also sought to build businesses with advertising revenues. But this time around, it was far easier.²

Part of it was the mere fact that time had passed. By the early 2000s, more than 1 billion people were spending copious amounts of time online, increasingly with high-speed broadband connections. Even old economy companies who spent the year after the bust gloating over the humbling of the Internet soon realized online advertising had not been simply a fad. If big consumer brands wanted to reach people—especially young people—they needed to start shifting a sizable chunk of their advertisement budgets back online.

Ads That Make Sense

Meanwhile, in about 2000, Google quietly changed everything by cracking the search advertising code. To be fair, a company named Overture, later bought by Yahoo!, figured it out first, but Google applied the idea to its superior search engine, and perfected it. For a small fee, advertisers could buy search key words. This was the genius. Google had safeguarded the integrity of its search results by keeping them not for sale, but gave companies a way to buy their way to the top of the list at the same time. And the system for bidding for keywords would ensure that more coveted keywords got a

higher price, while less popular ones at least brought in something. And because it was broken up into per-word chunks, paid search advertisements were a rare advertising market for both big companies with billions to spend and small businesses that could not afford more than a hundred dollars or so. Both groups ate it up and a new multibillion-dollar market was born.

Paid search advertising also truly exploited the Web's interactivity for the first time. Advertisers had lost faith in boring banner advertising, assuming people just tuned out the top of their Web pages. But search advertisements could be aimed directly at users looking for a particular thing. People could click on them and be directed to the advertiser's site. Advertisers paid by the click and could track where those clicks went. They could easily see how much their marketing was costing and exactly how much it yielded. And in the early days, paid search advertisements were cheap enough that marketers could experiment with them without much risk. Today, paid search accounts for more than 40% of the online advertising market, and those dollars are still growing along with the overall market.

What is more, Google would use its search engine to match appropriate sites with appropriate advertisers. Say Hewlett Packard wanted to advertise a new printer on blogs that do gadget reviews. Google would price the ads based on how many people click on them or how many people flock to a given site. And then at the end of the month, Google would send the site a check. For the advertiser, it was like buying keywords, only they were buying key sites; for the Web site, it was a dream come true: revenue without having to lift a finger. To be sure, smaller sites might generate just pennies per ad. But for larger sites with a lot of traffic, Google ads can mean hundreds of thousands of dollars in annual income, even millions. It was the early lifeblood for sites like Digg and YouTube, giving them a stream of income from the beginning.

And as Internet advertising continued to mature, this outsourcing of ads sales was only the beginning. Other firms would soon launch, taking the AdSense idea of Google and tailoring it for specific types of Web sites. By 2006, an infrastructure had grown up to support online advertising.

Just as important as the cash, these quick and easy revenue streams enabled a psychological shift in Web thinking. No one wants to be advertised to, so on any site there was a natural tension between so-called user experience and the advertisements that paid for it.

User-Generated Content

After the crash, venture capitalists started demanding that Web businesses have a business model from day one—the whole “let's build an audience first” experience had proved just too risky. But this focus on revenues made for some pretty lackluster sites littered with flashy pop-up ads, pop-under ads, and annoying ads that would load in between pages.

The new kind of ads meant that just by setting aside a tiny bit of space on the page entrepreneurs could frequently bring in enough cash to cover their low expenses. If they needed more money, they would just free up more space or raise their rate as traffic grew. It almost ran on autopilot, freeing them up to once again focus on building a killer product that users would love. Everything they did was all about the user and innovation. Entrepreneurs became rabid about this.

This also meant that the blue-shirt-wearing MBA types did not have the same role they did when they first flooded out of Ivy League schools and swarmed San Francisco during the bubble. They were the business development or “biz-dev” guys. Their job was to jet around making deals with large old economy companies while the coders stayed back at the office, toiling all night to make sure the sites worked.

The biz-dev guys were once gods at dotcoms. The Web was so new and there was such an emphasis on amalgamating eyeballs that dotcoms would sign sometimes expensive partnership deals to be the dotcom presence for a bevy of old economy companies. This was the kind of thinking that led to the January 11, 2000 AOL-Time Warner merger. AOL was then a favorite of dotcom investors and a pioneer of dial-up Internet access; Time Warner was then the world's largest media company. This transaction is now described as the worst in history.

But because this new wave of Web companies was so focused on user-generated content and building communities of everyday people, they hardly cared what old media or any other stodgy business thought. These new Web businesses were started by coders, and the businesses were focused on product and engineering.

And while Google-style contextual ads worked great on a search engine where people were trying to find something, they were not nearly as powerful on a site where people just wanted to connect with friends.

Social Networking

During the Web 1.0 days, the Internet was a new, distinctive thing. Going online was seen as reclusive, socially detached experience. These were the days when the term virtual reality was big. Internet users were stereotyped as pasty-faced geeks terrified to go out in public, typing away in chat rooms and using code-like, inscrutable lingo...

By the time Web 2.0 came around, the Internet was no longer its own distinct land. It was woven into people's everyday lives. This was partially due to innovative advances in networking and computer technology. As high-speed connection, wireless Internet routers, WiFi-enabled laptops, and Web-enabled cell phones became more common, people could be online instantly, and anywhere, not just at a desk. It changed how they used the Web. Instead of opening an encyclopedia, you could open up Wikipedia; instead of checking a newspaper for a movie listing, you could just click on Yahoo!; and when sites such as MySpace, Facebook, LiveJournal popped up, they gave people a way to access friends, family, and coworkers online more efficiently too.

The creative part is that a good social networking site makes all the intangible things that go along with being friends—like staying in touch, organizing get-togethers, and swapping photos—more efficient than in the regular, offline world, just as the telephone did for people a hundred years earlier. A great site enables connections that might never have happened in the offline world, but should. Suddenly socializing online was no longer about hiding from the real world, because the two were becoming indistinguishable. Facebook is not trying to create a social graph; it is trying to mirror or depict the social graph that already exists in the real world.

Of course, it is not easy. Technical factors such as innovation, design, and technology get these companies only so far. A great Web 2.0 site needs a mob of people who use it, and live by it—and convince their friends and family to do the same. Mobs will devote more time to a site they love than they will to their jobs. They will frequently build the site for the founders for free, because they get something out of that site that is far greater than money.

And here is another creative component. When done well, social networking, media, and user-generated content sites tap into—and exploit—core human emotions. Blogs and sites such as YouTube, Yelp, Revision 3, and Digg are ostensibly about getting the entertainment and news you want. But it is the stroking of your ego that makes them so powerful: Having thousands of people

read your opinion on something or your minute-by-minute life story; having dozens of people mark your Yelp review as “funny” or “cool”; your video clip becoming a YouTube sensation or your Digg submission getting voted front-page worthy; and people you do not even know love you...

But more important than entertainment, self-expression, or ego-boosting is the human need to connect. This is far more powerful use of the Web than for something like buying a book online. That is why these sites are sometimes described as addictive. Only a certain subset of people is addicted, to say, online gambling or online shopping, but everyone is addicted to validation and human connections. This is real though we normally like to deny it, and machines are used to exploit what makes humans so uniquely human.

And as Web 2.0 came around, the Internet was also becoming more mainstream. Soon it was not just for geeks, as in the Web’s early days, or teenagers, as in the early days of social networking. One billion and a quarter people are online. In the U.S. alone, the percentage of people online had grown from 10% in 1995 to 70% ten years later, nearly half with high-speed connections. Forty-eight million have posted content online—that is more people than watch any primetime reality show in a given week.

Sure the first generation of Web businesses took advantage of a lot of the medium’s inherent uniqueness. E-tailers had the advantage of not having to build out a chain of brick and mortar stores. eBay dealers got the plus of eBay’s vast global community of shoppers. Media companies could cut out costs like paper printing and distribution, some 70% of a daily newspaper’s expenses. And all of these vendors would enjoy the huge reach of the Web. But few sites in the Web’s early days were really using all of the Internet’s potential for interaction. At best, sites like Amazon.com might track what you browsed and purchased to make recommendation for you in the future; or Yahoo! might remember where you live and automatically bring up local weather and sports scores the next time you logged on. Such behind-the-scene customizations were considered groundbreaking at the time. But that was nothing compared to having audience actually creating, fueling, and proselytizing for the site.

A Creative Tortuous Path

This may seem like a curious path for the Web to take, from companies pushing goods, services, or information via the Web to companies building sites that would allow everyone to push them to each other. It was hardly one that seemed obvious or planned, but just as the business models of the first bubble laid the foundation for Web 2.0 economics, so too did a handful of early sites like eBay, Craigslist, KaZaA, and Napster create the first seeds of community online. The two greatest innovative influences were a couple of underground movements called open-source (OS) software and peer-to-peer (P2P) file sharing. And ironically, both were mostly born in stodgy old Europe, not in the Valley.

Open Source Software

The more important of the two was the open source (OS) software. Call it the last bastion of romanticism in the maturing, increasingly cutthroat world of the business software. OS programs are typically written by far-flung coders working all over the globe to solve some problem, frequently for the intellectual challenge of it alone.

In the past, when you bought a piece of software, you got only the finished products, such as iTunes or Microsoft Word. You take what they give you. With OS software companies you get that, but also all the underlying code that makes the program work. The idea is that the user can monkey

around with the code, fixing any bugs, adding features, tailoring it to meet his or her needs. And frequently users submit these fixes to the code back to the community for approval, making it better for everyone. There is another big benefit too: OS software is cheap—sometimes free—because it is written in this highly collective manner. Frequently, people just download it and get to work.

The best known example is Linux, an operating system for computers, servers and even mobile phones and calculators. It was created by a Finnish student, Linus Torvalds, in the early 1990s.

Another example is Firefox. When Mozilla, the nonprofit maker of the open source Web browser Firefox, started in 2002, it had a skeleton crew of full-time coders, an army of volunteers, and a modest goal: take down Microsoft's ubiquitous Internet Explorer. The same Internet Explorer that had run Netscape out of business years earlier, which was appropriate because Firefox was based on the old Netscape code.

When the browser was ready to go, it occurred to one of Mozilla's founders that if a sprawling network of volunteers could write and debug the browser, why could not a sprawling network of volunteers market it? Surely there were advertising executives, PR people, and college kids who were just as into this mission and could not write code. Why could not they be mobilized into a grassroots army to spread Firefox? The mobilization worked. As a result, Firefox grabbed 10% of the worldwide browser market share in about a year, while a rival browser sponsored by deep-pocketed Apple struggled to get just one percentage point.

Clearly, the Web enabled the rise and proliferation of OS. With high-speed, always-on Internet connections, anyone could be part of a movement, and companies in turn could use these connections to download the fruits of this collective labor. But the rise of OS enabled the rise of Web 2.0 just as much. The most obvious way was the drop-dead cheap software, a must in the early days of the Web's resurgence, when founders were lucky to cobble together a few thousand dollars from friends. Almost all of the Web 2.0 uses OS databases, application servers, and coding languages, not to mention cheap, no-frills servers running Linux. It is the biggest single reason costs fell 90% in a matter of years.

But inexpensive, flexible software was not the only thing Web 2.0 got from the OS movement. In its reliance on a far-flung community of mostly unpaid rabid contributors, it borrowed from the OS movement's very ethos and soul—no other place had mastered and utilized the community the way the world of OS software had. It had managed to knock every big software company back on its heels one way or another; it forced them to change, mostly for the better. By 2006, big and more beleaguered companies started giving away codes for free in the hope of enjoying some of those good community vibes. Both Linux and Mozilla succeeded because they made people feel like they were part of a movement, something bigger than themselves. That is hard to do, but it is a far bigger motivator than a paycheck.

It is about the wisdom of the crowds in the Web 2.0 and OS worlds. Had OS not taken off, Web 2.0 might still have emerged. But it would have taken longer, cost more, and the cautious, tight-fisted hackers who came up with its greatest ideas likely would not have been part of it. It probably would have looked a lot more like Web 1.0.

P2P Networks

At the same time OS was taking off in serious geek circles, peer-to-peer (P2P) networks like Napster, KaZaA, and BitTorrent were using far-flung communities to swap music and movies for free all over the world. OS was using community to make the Web work; Napster and KazaA were using it to

make the Web cool. Although these sites were called havens of piracy, their explosive growth provided one of the earliest examples to everyone—venture capitalists, everyday Web surfers, and big media—of how powerful networks of average everyday folks could reshape whole industries overnight.

We cannot talk about P2P without talking about Niklas Zennström and Janus Friis. These European duo have been at the forefront of every bite the Web has taken out of big traditional industries, and they have always used sprawling networks of everyday folks linked together online to beat large companies at their own game. The first was KaZaA.

In 1999, as Internet fever spread to Europe, the two started to wonder why they were working for someone else. They quit their day jobs and started KaZaA. Although a bit late to the dotcom game, KaZaA was very forward-thinking. Most of the Internet world at the time was still obsessed with the idea of portals: Sites such as AOL or Yahoo!, which aggregate a large amount of information—stock quotes, weather, news, links to other sites, and so forth—would put all this media and information on one page that would essentially be your gateway to the Internet. The AOL-Warner merger was all about shoving some of the world's greatest content into this portal.

Niklas and Janus thought that notion was absurd. The creative twist is, instead, KaZaA would be a platform where anyone could put content online and have distribution of it worldwide. Unlike Napster, the focus was not strictly on music. The idea was that millions (today more than a billion) of people connected online could collectively be a better news and entertainment service than any one company. Clearly, there is a European *socialist* basis to the idea, obviously targeting the *capitalist* U.S. media conglomerates. But whatever the source, KaZaA and other P2P networks like Napster were the first instances of user-generated content on the Web.

Janus and Niklas hoped KaZaA would be big, even socially transformative. But they had no idea they would be pulled into a revolution. More than 300 million people downloaded KaZaA's software and opened up their personal stores of media to strangers everywhere. Unfortunately, big media still had a say in all this, and the Recording Industry Association of America (RIAA) declared war on these so-called P2P networks. When Napster was shut down, KaZaA only got bigger. And unlike Napster, KaZaA was not run on a central server, and so shutting it down was not as easy. KaZaA won its case in Sweden's Supreme Court, thus as long as the company had no business dealings in the U.S. there was little the RIAA could do to thwart them.

That said, KaZaA was not much of a business. From the get-go Niklas and Janus had hoped to sign deals with all the content providers, but clearly this was not going to happen. And to stay legally safe, they had opted not to travel to the U.S., making any potential negotiation tougher. So they sold KaZaA rather than keep fighting the battle. Still, the power of P2P networks had impressed them.

After KaZaA, the two founded Joltid, a company that built P2P networks for others. Joltid was being run by Niklas in Sweden, a development team in Estonia, and Janus working out of his home in Denmark. They were a bare-bones operation, and by far their biggest cost was all those international calls. Niklas assumed they had to be a cheaper option. Before KaZaA he had personally worked on developing something called voice over Internet protocol, or VOIP. The idea was to make phone calls over high-speed Internet networks instead of antiquated copper phone lines. It was something that seemed great in theory, but back in the 1990s no one seemed to be able to make it work. Niklas assumed the problem had been solved by someone, and started trying out different VOIP services on the market, most offered by big telecommunications or Internet companies.

But neither Niklas nor his engineers could get any of them to work. The problem was techy. In short, too many calls would max out a system, but it was too expensive and would take too long to build out a network of so-called access points to ease the burden of all the traffic. That is when it hit Niklas and Janus: P2P network would instantly and inexpensively solve that problem. They quickly built out a solution and gave it the quirky name Skype.

On Skype, people can make free or low cost calls in exchange for sharing some of their personal bandwidth to help others make calls. The idea is similar to someone generating power for his home with solar roof panels and selling what he does not need back to the grid.³

The notion was radical enough that no one would fund it. Niklas tried to raise money for an entire year, mostly in Europe, since he still could not travel to the U.S. without risking KaZaA-related legal woes.

But by August 2003, Niklas sent some text messages to his friends telling them to check out Skype.com. The friends told their friends. That was the extent of the marketing. Within a month, they had 1 million users. Two years later, Skype had grown in value enough for everyone to notice. By 2005, thriving business flush with all the venture capital investors it could ask for, it was emerging as the VOIP player to beat. By the fall of that year, eBay made Niklas and Janus a \$2.6 billion offer they could not refuse. Today, Skype has had more than half a billion downloads.

If P2P networks could take on something as non obvious as a telephone company, Niklas and Janus could not help but think back to their original vision of KaZaA: Upending the world of entertainment. Although their day jobs were still working for Skype, in 2006 the two started Joost, a start-up aiming to merge television and the Internet, tapping the old CEO of Joltid to run it. Unlike KaZaA, and even YouTube, they are seeking out content agreements with big media companies first. Now it is such an obvious business they have to jockey for position with Amazon, Google, and a host of other start-ups. But amazingly, Joost is one of the few using P2P technology to skirt a lot of the technical problems, just as they did with Skype. It is a highly competitive market, but Janus and Niklas have proven they got community. In today's power-to-the-people Web era, that makes them a force that cannot be ignored.

The Community

The communities that drive open source (OS) software and peer-to-peer (P2P) file sharing may have been socially and economically transformative, but they were hardly mainstream. Despite Mozilla's experiments with marketing Firefox, OS was mostly the province of geeks who could code. And most P2P networks were still considered shady and unstable. Many people do not want to open up their computer and its contents to the world. Plus, most P2P networks require a software download, as opposed to working solely over the Web. It was largely the Web 2.0 movement that took the powerful idea of community and made it legal, palatable, and easy for a mass market.

Just as P2P networks, user contributions are key: Blogs need everyday folks to write them; Yelp has no content if people do not post reviews; Digg is nothing unless people contribute and vote on stories; MySpace, Facebook, and LinkedIn all need people to post their lives on those millions and millions of profile pages; without people's photos, Slide would be an empty slide show. But you can also be a passive user in the Web 2.0 world: you could just use Yelp as a Yellow Page while others write the reviews; you do not have to spend hours searching the Web for cool stories to be part of the Digg mob, you could just read the site. In other words, in the Web 2.0 world, people creating content and consuming content are all part of the community.

We have seen that digitization of media was inevitable—Napster was just the one happened to spark much of it. Now we foresee the true power of the Web would come from digitization of identity. What does that mean? Basically, getting a true picture of who you are as a person represented online. It includes not only tangibles like your favorite movies and music and who your friends are, but also all the fuzzy gray area in between that is harder to define—your essence. If the Web could capture that, it could unlock all kinds of new, powerful applications from meeting the perfect mate to finding the perfect job. The Web would know you, and as a result what you would like.

And hence here lies a big money-making opportunity: if the Web knew what you liked, a site could carefully pick and choose what ads to show you. It was the ultimate Holy Grail for advertisers. Instead of wasting millions of dollars mass-broadcasting messages and hoping to find a few potential customers, messages would be so targeted that every one would be almost guaranteed to result in a real interest.⁴

Amazingly through this idea of digital identity, the Web is groping its way back to the early Internet idea of the portal—the one place you could come to every morning to get all the information that mattered to you. Only this time you are creating your own portal. You are adding your friends, your photos, news feeds you are interested in, even contents from other people's blogs and sites.

Creativity in Webpreneurs

These entrepreneurs in the Web 2.0 revolution all have the same vision, just through different lenses. They had an endless flow of ideas for new applications they could build; it was just a matter of prioritizing which were the most important. And they were right; the digitization of identity is that powerful and each of these sites has a piece of it.

To move beyond, we have to differentiate “pull” and “push” technologies. Now think of push technology as a step beyond a search engine like Google. With Google (and Yahoo! for that matter), you can find almost anything. But you still have to go to the site, manually type in a query, and plow through the results (less so in Yahoo! than in Google. In my opinion, the latter always yields too much, relevant or irrelevant). In these search engines, you are pulling the data. With push technology, you tell the engine broadly what you are interested in and it does the rest of the work for you, delivering a stream of results to your desktop.

By mid 2007, increasingly people wanted their stuff pushed to their Web sites, blogs, or social networking pages, not to their desktops. And this can be applied to the advertising world. In the real world, advertisers spend a lot of money getting people to discover they want something, whether it is via TV ads, billboards, or glossy pages in a magazine, and spend far less money hooking up people who want to buy something with, say, a coupon or list of stores selling the product. It is roughly \$250 billion for so-called demand creation and \$30 billion for so-called demand fulfillment.

Somehow on the Web, those statistics had gotten flipped. The vast majority of online advertising is in demand fulfillment. But to tap into this, one has to be relatively intelligent. Thus, in an earlier article, I redefined “intelligence” as something that “may be gauged as the ability to connect the seemingly unrelated isolated islets of information and to put the whole thing in proper perspective. An intelligent person is a generalist with a specialty. Being a consummate generalist the intelligent person knows how to connect islets of information from many diverse areas and apply in the field for which he or she is a specialist.”⁵

These webpreneurs are successful because they are reasonably intelligent people, and with a little bit of luck, when opportunities knock on their doors, they open the door and let their creative juices flow. Jonathan Schattke puts this succinctly: “Necessity is the mother of invention, it is true—but its father is creativity, and knowledge is the midwife.”

References

- * Parts of this article are based on a book, Hwa A. Lim, *CHANGE: In business, corporate governance, education, scandals, technology, and warfare*, (EN Publishing Inc., Santa Clara, California, USA, 2003).
1. Hwa A. Lim, “Creativity, culture, and entrepreneurship”, *Symbiosis*, February 2004, pp. 4-10.
 2. Sarah Lacy, *Once You’re Lucky, Twice You’re Good: The rebirth of Silicon Valley and the rise of Web 2.0*, (Gotham Books, New York, USA, 2008).
 3. Hwa A. Lim, “Eco-friendlily Yours: The way forward”, *Asia Pacific Biotech*, 14(7), July 2010, pp. 17-25.
 4. Hwa A. Lim, “Bioinformatics in Communicable Diseases: The way forward”, *Asia Pacific Biotech*, 14(11), November 2010, (In press).
 5. Hwa A. Lim, “Education: A life-long process”, *Symbiosis*, December 2002, pp. 13-17.

About the Author



The author, Dr. Hwa A. Lim, lecturing on “Let your creative juices flow” to PELTAC students at University Technology Malaysia, Johor, Malaysia. (Hal Archives, Skundai, Johor, Malaysia, 2004).

Dr. Hwa A. Lim obtained his Ph.D. (science), M.A. (science), and MBA (strategy and business laws) from United States, his B.Sc. (Hons.), ARCS from Imperial College of Science, Technology & Medicine, University of London. He is sometimes also known as “The Father of Bioinformatics.” Most of the work that led to this recognition was performed at a U.S. Department of Energy (DoE) supported supercomputer institute, where he was program director, and tenured state-line faculty (1988–1995). Hal has served as a bioinformatics expert for the United Nations, a review panelist for the U.S. National Cancer Institute, and as an expert consultant for different companies. He was appointed a member of the International Expert Panel for BioValley Malaysia in March 2004.

His career started with short stints at the Strong Memorial Hospital, New York, then at the Laboratory for Laser Energetics (LLE) at the University of Rochester, and later computational work using computers at the John von Neumann Center at Princeton University. In 1995, he advanced his career to California after having been at Florida State University for eight years.

Hal currently resides in Santa Clara, “The Heart of Silicon Valley”SM, California, USA. His den is within driving distance (~10-mile radius) of most of the excitements of the Web 2.0 revolution.