Essentials of Venture Capital
by Alexander Haislip
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CHAPTER 7

Booms, Bubbles, and Busts

After reading this chapter, you will be able to:

- Understand the cycle of venture capital investing.
- Develop strategies for investing in and around major trends.
- Spot a boom before it takes off.
- Identify the warning signs of overinvestment.
- Anticipate a speculative bubble's burst.

San Francisco sits near major tectonic fault lines that periodically shake the foundations of every building in the city. The tech industry is similarly situated on ever-moving ground. Innovations constantly rumble the basis for businesses in Silicon Valley and beyond.

Entrepreneurs and venture capitalists try to keep the ground shaking. They each face incentives that perpetuate a constant state of boom, bubble, and bust. Understanding how these tectonic movements happen will help you anticipate the direction of change and profit from it.

A boom starts with just half a dozen venture capitalists making small investments into a sprouting industry, such as digital media or cleantech. These investments can be designed to take advantage of some major macroeconomic trend or to fill some new need from corporations or consumers.

Within several months, the number of venture capitalists looking for start-ups in this new industry will swell to 20 or 30. Perception of the new investment thesis starts to shift. Investors begin to develop a "Monte Carlo mentality" and become desperate to put their bets down while they still can get in.

After 12 to 18 months, several hundred start-ups may receive several billion dollars of venture capital financing. The boom is either in full swing at this point or starting to turn into a bubble. Knowing the difference isn't easy.

An investment bubble happens when venture capitalists put too many dollars into too few real innovations. The amount of money invested starts to exceed the actual value of the new opportunity. Start-ups compete with each other for engineering talent and customers. The pace of innovation in the industry slows.

Bubbles burst when reality catches up to hype. That can be the product of a macroeconomic shock, an exogenous event, a lack of resources to continue expanding, or just a turn in the tide of public sentiment.

Timing a bubble burst isn't easy. But there are several warning signs that indicate when an industry boom has become a bubble and is trending toward bust. Busts are like forest fires that clear out the tangled mess of overinvestment and unsuccessful variants of the same idea or business opportunity. A bust is a healthy thing that fertilizes the next iteration of innovation.

The cycle of boom, bubble, and bust is the invisible heartbeat of the market. A venture capitalist once told me that a big boom happens every 12 to 15 years. His proof was more anecdotal than statistical, but seems to track pretty well for the past three decades and includes both the Internet boom and the personal computer boom of the early 1980s.

If the cycle is regular and predictable, it's useful to know how to tell which direction an industry is trending and how to make money from the next boom.

Riding the Waves

There are many ways to make money investing during a major business cycle and one sure way to lose it.

The worst thing you can do is to invest after a boom has already turned into a bubble and get stuck buying high and selling low. Venture capitalists who invest during the middle of a bubble typically get stuck overpaying for mediocre companies that will eventually go out of business. In the winner-take-all market of technology start-ups, these investors go home with nothing.

Nobody wants to be caught there, so investors try to develop a sense for where a technology is in its process and then invest

accordingly. There are five major strategies on how to invest around trends:

1. Get in early.
2. Pick winners once they become obvious.
3. Back start-ups selling tools and services to boom chasers.
4. Get as far away from the booming industry as possible.
5. Pick up the pieces after the bust.

Get in Early

Investing early, before others realize that a new technology is gaining momentum, allows a venture capitalist to pick the best of whatever is available. He or she can select the best innovation, assemble a stellar team while talent is still cheap, and invest at a reasonable valuation.

Still, there are bound to be missteps along this path. Nobody has a full picture of any emerging technology. What features will resonate with customers? Who are the customers going to be? How much will it cost to produce?

It's a high-risk, high-reward strategy. Some investors believe they have the talent to discover the next big thing before everyone else sees it. Others "spray and pray," or try to put down as many bets as they can, gambling that one technology will make it big and make up for losses on other investments. A third group of investors actually tries to create booms after they have made their investments.

In the Real World

Growing Green Fools

In any bubble you need someone who believes that an asset is worth even more than what he or she pays for it. They pay an unreasonably high price for something, justified by the idea that somewhere out there is an even ‘‘greater fool’’ who will pay more for it than they did. Greater fools have an expectation that the price of a hot new stock, a condo in Miami, a tulip bulb, or whatever will continue going up after they’ve bought into it.

Foolish people buy high and sell low once the speculative bubble collapses.

Some venture firms move markets and can create an investment bubble just by hyping a new technology. Few do this better than Kleiner Perkins Caufield & Byers (KPCB). The firm most recently led the charge to stimulate cleantech investment and interest early in the industry’s development.

KPCB determined that alternative energy and resource efficiency were attractive sectors primed for innovation and investment. The firm began quietly putting money into start-ups working on these technologies. After it had snapped up some of the most promising potential investments, it publicized its actions and heralded cleantech as the biggest thing since the Internet.

The firm held a cleantech innovation summit at San Francisco’s Four Seasons Hotel in May of 2006, inviting 50 scientists and offering a $100,000 prize to anyone who could develop a major environmental policy or technology innovation. The firm announced that it had already invested $150 million into some 15 start-ups in the cleantech space.

The KPCB partners, usually taciturn, started talking about their newfound fervor for the field of cleantech to any journalist who

In the Real World (continued)

would listen. Perhaps the most iconic image to come out of the media maelstrom was Partner Bill Joy's ecoboat, a 58-meter, $50 million testing platform for any number of green innovations that was photographed for *Newsweek*[a] and *Fortune*[b] within a matter of months. (As of this writing, you can charter the yacht for €225,000 a week from Camper & Nicholsons International.[c])

Then, in November of 2007, KPCB hired Al Gore as a partner. Gore went on to share the 2007 Nobel Peace Prize for informing the world about the dangers of climate change. His role inside KPCB is not clear, as the firm's web site does not list Gore as a board member on any of its portfolio companies.

These moves excited public sentiment about cleantech and its business viability. Other venture capitalists followed KPCB's lead and poured billions of dollars into cleantech start-ups. More importantly, public market investors have started salivating for cleantech IPOs, believing the KPCB hype.

[a] "The Color of Money," *Newsweek*, November 6, 2006, http://bit.ly/98nech.
[b] "The Green Sailor," *Fortune*, August 25, 2006, http://bit.ly/9UszUf.
[c] Camper & Nicholsons listing, December, 2009, http://bit.ly/bCOLQE.

Wait for Winners

Putting down bets before a bubble gets underway isn't for everyone. It takes either an iron stomach for risk or an almost irrational belief in one's ability to project which companies will be successful in the future.

Of course, some races have clear winners and losers after just one lap around the track. Investors can wait until a boom is in full swing and then try to pick the start-ups or industry segments that are most likely to come out winners.

Waiting for winners to emerge is less risky, but it also means buying start-up shares at a higher price. That can seriously cut into the returns that an investor expects to see. That makes this strategy particularly appropriate for late stage venture capitalists. They already spend their time deciding which start-ups deserve capital to continue growing and which should fall by the wayside.

Sell Tools

One of the most immediately lucrative ways to invest in a trend is to find and finance start-ups that sell shovels, picks, and denim blue jeans to the miners as they rush off digging for gold.

A venture capitalist who follows this strategy looks for what everyone else is going to need and then tries to invest in that. This concept can cut both ways. Selling shovels is a great business when there's a gold rush on, but what happens when the bubble bursts?

Avoid Booms

Some investors prefer to avoid fast-moving industries altogether. If you invest too early in a bubble, you may find that you've bet on the wrong horse. If you invest too late, you may be buying in when the bubble is at its peak and will only ever see your investments lose value.

Just as some people are content to go to Las Vegas and skip the casino, these investors are happy to stay away from the high-risk proposition of timing the business cycle. Of course, that can mean missing out on big rewards.

Or it can mean just picking a different type of risk to invest in. Venture capitalists who work in rapidly trending industries may

not have time to train an untested CEO or coax a technical founder away from a cushy university research position. Yet avoiding a boom allows a venture capitalist the opportunity to deal with these and other problems. The payout from opting for this kind of risk may be just as lucrative.

Pick Up the Pieces

When the party's over, somebody has to clean up. In the venture capital business there's good money to be made investing in companies that have survived the aftermath of a bubble.

Busts are a lot like hangovers in that they cause people to stay away from whatever industry was booming. They may even irrationally avoid the place where money was lost, which is like walking around the block to avoid a bar where they once got sick from drinking too much.

That leaves opportunities for investors willing to stomach the memory of recent hardship. They're likely to see irrationally low valuations on companies that have real revenue and an opportunity for rapid growth even without a bubble pushing them forward.

Consider Amazon.com. The online retailer was soundly smacked down during the dot-com bubble's burst. By 2001, the company had seen its stock drop from over $105 per share to less than $6 per share. That would have been the right time to buy in. Ten years after the dot-com bubble burst, Amazon is trading at $130 per share.

Boom Beginnings

Since so much investment strategy depends on what stage an industry is in, it's important to know how the business cycle starts.

Booms begin when a new opportunity opens for companies to create real value and satisfy customer needs. There are five things which kick-start booms:

1. Macroeconomic shifts
2. Major news
3. Changing needs of big businesses
4. Evolution of consumer tastes
5. Some major proof that a new industry will be profitable, a flash-point that gets everybody's attention

These factors can act in tandem or alone, but the more they manifest themselves, the bigger the boom will be. Any one of them can cause venture capitalists to slough off skepticism in favor of optimism and to begin investing.

Macroeconomic Shifts

Any time the economy shifts, it opens opportunities for new products and services. The best recent example of this is the clean-tech boom.

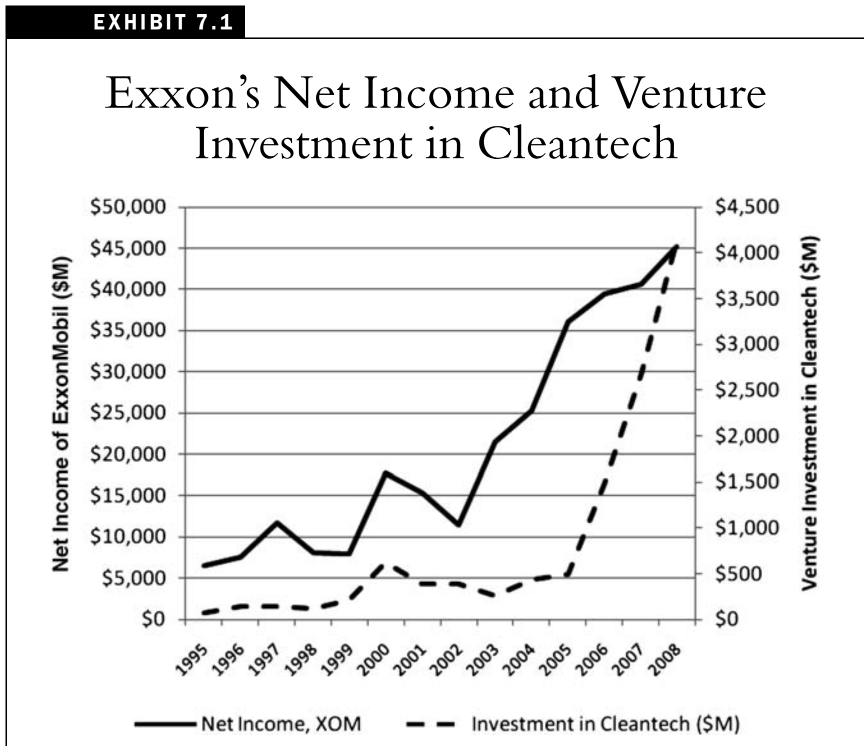
It would have been impossible for novel forms of energy generation, fuel creation, or resource efficiency to take off during the 1990s. Oil was cheap. California had yet to experience rolling brownouts. China's industrial boom had yet to create massive demand for energy resources.

Fast-forward a decade and the need for energy innovation is obvious. Gasoline prices in California surged over $4 per gallon. The average price per kilowatt of electricity increased nearly 45 percent

from 1998 to 2008.[1] As the price of energy increased, the demand for novel energy sources did as well. This became an unmistakable opportunity for entrepreneurs.

The rise of venture capital investment in cleantech was preceded by the immense success of industry incumbents who were able charge more than ever for their products and services. Success attracts competition and it is easy to see why entrepreneurs would have wanted to compete with large energy corporations such as Exxon. Exhibit 7.1 shows how a dramatic rise in Exxon's net income immediately preceded a rapid increase in venture capital investment in cleantech.

EXHIBIT 7.1



Major News

The world changed when terrorists flew airplanes into New York's World Trade Center towers in 2001. For the next four or five years, start-ups pitched venture capitalists on "security" technologies to solve all kinds of problems, both real and imagined.

Venture capitalists invested heavily in antispam, antispyware, and antivirus software. These digital security start-ups were hardly going to protect anyone from another terrorist attack. Instead, they played into an emerging national paranoia and attracted venture investment.

Another example of the power of news to insight an investment boom may be found in the market for vaccination technology. There's quite a bit of innovation in this business, especially in how to rapidly develop vaccines for new strains of flu.

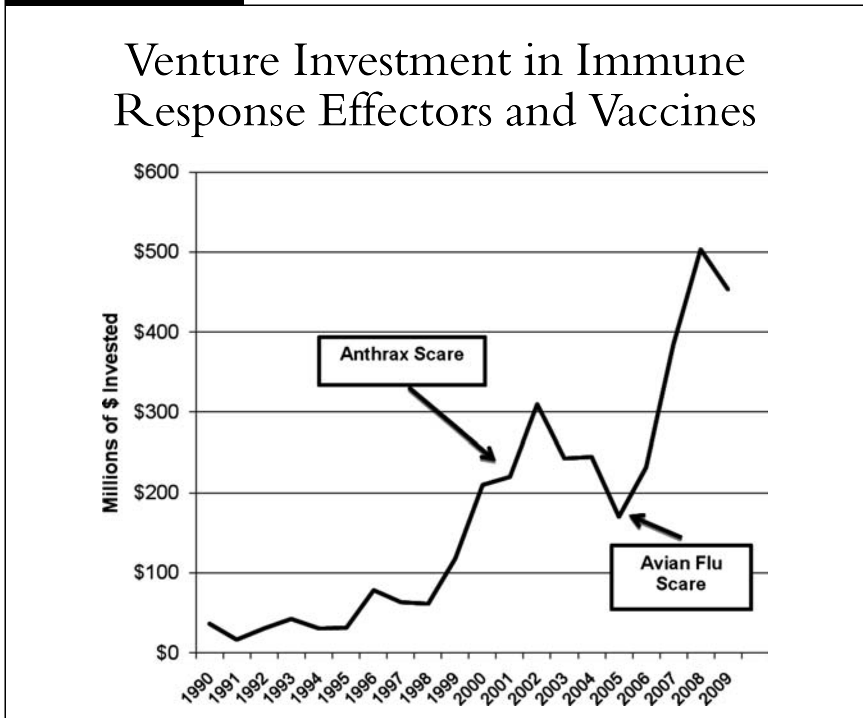
Each time a flu scare hits the front pages of the newspaper, venture capital investment into the sector spikes up. See Exhibit 7.2 for a chart of the venture investment in immune response effectors and vaccines. The first spike comes after the anthrax scare of 2001. The next follows the avian flu scare of September 2005, when a United Nations official said it could kill 5 million to 150 million people. Venture capital investment in this industry more than doubled from 2005 to 2007.

The news changes people's perceptions and expectations. For venture capitalists, it signals a new opportunity that can be the beginning of a booming new market.

Changing Needs of Big Business

Large corporations are often a start-up's first customers. They can also be important strategic acquirers later in a start-up's life.

EXHIBIT 7.2



Entrepreneurs quickly develop a keen sensitivity to what technologies these big businesses need.

When a group of large corporations all need the same type of technology, a venture capital investing boom may take root. This is what happened in the second half of the 1990s, when the large telecommunications companies needed better equipment. They were handling a massive increase in the use of their data networks coming from customers surfing the Internet and operating their first mobile phones. Start-ups came through with all kinds of innovations in fiber optics communications processing, and venture capitalists invested billions of dollars in their development.

The big telecommunications corporations paid for the new products and sometimes bought the start-ups. Eventually, the demand for additional bandwidth slowed. Telecommunications companies consolidated, the pace of entrepreneurship in this sector slowed, and venture capital investment ground to a halt.

Evolution of Consumer Tastes

Big businesses aren't the only customers start-ups sell to. Some focus exclusively on marketing to regular people. Booms can begin when folks start liking different things than they used to.

Tastes and preferences change subtly over time and can be difficult for entrepreneurs and venture capitalists to pick up on. Often, consumers don't know what they want until they see it.

An example of a changing consumer preference that launched a venture capital boom is the desire people had to "time-shift" television shows. A start-up called TiVo made it exponentially easier for people to record their favorite television programs and watch them later. The new technology changed people's perception of how television should be experienced: They wanted to watch whatever had been recently broadcast whenever they wanted to watch it.

The changing preference to "anytime" television led entrepreneurs to pitch related technologies. Video podcasting start-ups, video blogging start-ups, and Internet video sharing start-ups proliferated. Start-ups such as SlingBox offered consumers the opportunity not only to time-shift their television shows, but also to swap them between different media players.

It's difficult to say exactly how much venture capitalists invested in such technologies, but it is easy to see how a change in consumer preferences led to a boom in television-related start-ups.

Flashpoint

The Internet boom began with Netscape's initial public offering (IPO) in August 1995. The stock jumped 108 percent during the first day of trading and made everybody associated with the company rich—seemingly overnight. Netscape made it glaringly obvious that there was easy money to be made for investors willing to back Internet start-ups.

The stock market responded to the real demand consumers had to use the Internet. Netscape offered them what they wanted, albeit for free.

There were other factors at work beyond the success of a single company that led to the Internet boom. Still, Netscape stands out as the point from which every other dot-com dream was launched and its name was often evoked when entrepreneurs pitched venture capitalists on new start-ups to invest in.

Not all industries need a Netscape. But one proof point can help sway many investors who may be on the fence about the profit potential of an unknown and unproven business idea.

A different kind of flashpoint is the launch of a major new platform or successful product. The release of Apple's iPhone in 2007 is a perfect example. The company launched the device to much fanfare and it rapidly became successful with consumers.

Soon afterwards, Apple opened a programming platform for the device and invited software engineers to sell their creations through

Apple's iTunes store. It was like the sound of a gun going off at the beginning of a race. Entrepreneurs started dozens of companies to take advantage of this new opportunity and major venture financing soon followed.

Bubbles

Bubbles are characterized by a disregard for business metrics, rapidly escalating company valuations, and decreasing rates of technological or economic progress. They create winners and losers and are the inevitable product of the incentives entrepreneurs and venture capitalists face.

Bubbles also make people ridiculously rich. For example, Mark Cuban benefited big during the dot-com bubble. He started Broadcast.com, a company that hoped to stream audio over the Internet. He took it public in January 1998 and the stock rose 249 percent on the first day of trading. In April 1999, he sold the company, much of which he still owned, to Yahoo for $5.7 billion worth of stock. Yahoo never got the product integrated into its online offerings, but Cuban has gone on to own the Dallas Mavericks basketball team and several other businesses.

For a quick comparison, fast-forward to 2006. The dot-com bubble was a thing of the past when Google spent $1.6 billion to purchase YouTube. It paid less for something that actually worked a lot better. The Internet video sector was attracting a lot of attention but was not yet frothy with bubble speculators.

It's this difference that makes spotting a bubble a critical skill for venture investors.

Bubbly Start-ups

"When something generates a ton of excitement, at a certain point people are entering it because of the excitement not because there's anything solid there," iPhone application developer Dave Castelnuovo told the BBC.[2] He should know. Castelnuovo was one of the first programmers to develop a successful game for Apple's iPhone platform and has seen tons of people pile behind him, developing all kinds of games, tools, and miscellaneous junk.

Castelnuovo's insight is straightforward. Entrepreneurs with little innovation to offer push a booming industry to become a bubble. This process accelerates when entrepreneurs stop focusing on customer needs and try solely to make themselves attractive financing targets for venture capitalists.

Founders are hypersensitive to where growth capital is going and may choose to work on a problem they know venture capitalists are interested in solving. Early stage companies seldom have customers, so it can be easy for entrepreneurs to quickly pivot and tackle whatever market they believe venture capitalists will finance.

IN THE REAL WORLD

Boom Chasers

Some entrepreneurs are so desperate to get in on a boom that they will try to pitch venture capitalists on whatever appears to be hot at the moment. This is one of the things that turn a boom into a bubble.

I saw this firsthand in a start-up that had developed software for keeping track of and analyzing rapidly recurring data on

computer networks. Such technology may sound wonky, but it was useful and could be applied to all kinds of problems.

When digital security was hot, the start-up said its technology was a great way of tracking cyberattacks in progress. The founders pitched it to more than 80 venture firms before finding financing.

But they were late to the digital security boom. The industry was already crowded with other start-ups and theirs didn't survive.

So one of the founders split off and recast the company's technology as a way of tracking a user's interaction with increasingly data-intensive web sites. His strategy was to get in on the Web2.0 boom that venture firms had just recently been frantic to finance.

But the entrepreneur was late to that party, too. The Web2.0 companies were making plenty of progress without the type of product he was offering so he never connected with customers and was unable to raise venture capital.

The experience of this unfortunate start-up highlights a major accelerant in the creation of overinvestment bubbles: entrepreneurs who chase venture capital trends instead of connecting with customers.

Bubbly Investors

But entrepreneurs aren't the only ones guilty of pushing booms into bubbles. Venture capitalists do it too. They invest in too many similar start-ups with too few real innovations. But why would a venture investor bet on a company knowing full well that it already has competitors and may be playing into an over-investment scenario?

There are two possible explanations. The first is that an investor may simply not know what his or her competitors are financing. Journalists generally do a good job of keeping track of what gets

financed, and there are many free publications that can help people follow where venture dollars are flowing.[3] But a few stealthy start-ups can fly "under the radar" with only a handful of people aware of their existence for years after venture capitalists invest.

The second explanation seems more plausible. Venture capitalists invest in certain companies because it will look good to limited partners. It's a form of "resume padding" for the venture firm to be invested in areas that are perceived to be hot. A venture capitalist that can point to one or two portfolio companies in a promising sector may be perceived to be savvy.

Venture firm investment returns suffer when their partners come into sector-specific technology trends mid-bubble. They buy high and sell low. But the reputational value afforded to a firm for being involved in a rocketing trend may help it impress limited partners and raise bigger funds.

Tips and Techniques

Spot the Splurge

Comfortable Employees

One of the warning signs that venture capitalists may have over-invested in an industry is the sight of comfortable employees working for start-ups. The employees of a start-up should always be a little afraid of losing their jobs if the company's innovation doesn't commercialize well or sales are too slow. Fear is a good thing in this context because it motivates the team to produce at its utmost ability.

It's like the old maxim about the rabbit and the fox. Which runs faster? Well if the fox slows down, he loses dinner. If the rabbit

slows, he loses his life. Start-up employees should always feel more like the rabbit than the fox.

Employees stop feeling like the rabbit when they realize they have options. If one start-up fails, they can always go to work at one of its competitors. The people who work at start-ups are typically hyperaware of exactly what their company's competition is and how well it is doing. They watch closely for opportunities to hop from one company to another to get a pay raise or a promotion.

Watching start-up employees closely can give you an idea of just how many start-ups are competing in a given industry. Do they come to work late or go home early? Do they spend more time playing ping-pong than programming computers? Do they look worried?

It's important to distinguish ''comfortable'' from ''confident.'' It's a good thing to have confident employees. They understand the risks and work hard, knowing they will win as long as they don't slow down.

Conferences

Another symptom of overinvestment is the emergence of industry-specific conferences. It is a good indicator of how bubbly a technology sector has become. I have put on several industry conferences during my career and one of the first questions we always ask is ''Will people come to this event?'' There has to be a critical mass of entrepreneurs, investors, and executives interested in a sector or technology before you can sell enough tickets to make the event profitable.

If you lived in Silicon Valley in 2004, you would have been able to go to a handful of conferences related to various aspects of clean energy production each year. By 2007, you might have gone to a major, well-attended conference each week.

Busts

Once overzealous entrepreneurs and venture capitalists have pushed a boom to become a bubble, a rapid devaluation or bust is inevitable. Bubbles burst when one of three things happens: companies stop adapting, the economy takes a nosedive, or the people involved regain their sense of reason.

The first cause of a bust might be called "dinosaur disease." It's an inability of companies to rapidly adapt when the world around them changes. Sometimes it can be as simple as a key element of the environment disappearing or an assumption that executives held going up in smoke. Inflexible companies should expect extinction.

A macroeconomic shock, such as a major recession, can feel like an extinction-inducing meteor, and is the second big cause of a bust. It scares off would-be customers and can drastically impact start-ups' ability to either connect with strategic acquirers or go public.

The third cause of a bust is the "greater fools" getting wise to the idea they may be investing into nothing more than pixie dust and promises. Public sentiment is an ephemeral and elusive thing. Why people decide that they want a piece of the action one day and change their minds the next is anybody's guess.

Things Change and Companies Don't

A good business plan helps entrepreneurs to think through the assumptions that their start-up is based on. It also forces them to imagine alternative strategies if the environment changes rapidly. That's the whole idea of making the plan in the first place.

But it's not a perfect system. Some assumptions are so firmly established in our minds that we are unable to imagine a world without them. Entrepreneurs pitch an idea that is based on such a bedrock assumption and venture capitalists who share that view of the world finance the start-up without question.

A recent example of this is the rapid bust in ethanol investing. Ethanol, which is made from corn, can be used to power certain types of cars and trucks as a replacement for gasoline. Venture capitalists and entrepreneurs agreed on two major assumptions: the price of oil would continue to rise and the price of corn would remain relatively flat. Between 2005 and 2007, venture investors plowed over $1.3 billion into start-ups looking at distilling ethanol, according to data from Thomson Reuters.

The problem came in 2008, when the price of oil rose, but not nearly as fast as the price of corn. Suddenly the ethanol producers felt a tremendous squeeze on their margins. They had locked themselves into supply contracts that were no longer profitable and some start-ups went bankrupt. Venture capitalists lost boatloads of money.

The ethanol investment bubble burst when the environment changed and the assumptions that had driven it proved to be wrong. The companies that lost money were the ones that were unable to pivot when the margins from fuel production started to shrink.

A handful of start-ups were able to abandon the ethanol production market for a lower-volume, higher-margin alternative. They took their know-how and applied it to making chemicals for use in other products. Big consumer-focused companies, such as Procter & Gamble, had a great desire to make their products from

"renewable" sources instead of petroleum and were willing to pay a premium for it. The former ethanol producers had just the solution for them.

Bringing down an investment bubble takes more than just faulty assumptions. It also requires inflexible companies unwilling to change or adapt in the face of a major market movement.

TIPS AND TECHNIQUES

Stay Paranoid

Our minds are hardwired to underestimate both the potential for adverse events and the magnitude of negative outcomes.[a] If a normal person is an optimist, then entrepreneurs and venture capitalists might be deemed ''superoptimists.'' That can be a problem when it comes to evaluating the world and imagining where technology will take it.

Andy Grove, the former CEO of semiconductor maker Intel, is a master of anticipating negative outcomes and preparing for them accordingly. His maxim, later formulated as a book, was ''Only the paranoid survive.''[b] It's a good way of thinking about markets because it forces you to work through what would happen in any number of negative scenarios.

When investors stopped asking ethanol entrepreneurs what would happen if the price of oil went down and the price of corn rose, they walked into a bear trap. Both venture investors and start-up executives should be prepared to answer any number of what-if scenarios.

As I write this, it's currently popular for venture capitalists to put money into start-ups offering ''social games'' that you can play with your friends on networking sites such as Facebook. When

the trend first emerged, some people were skeptical that Facebook would play nice with the ecosystem of start-ups trying to ride on its coattails. But two years later, nobody seems concerned that Facebook could change its rules overnight, could be eclipsed by some new social network, or could suddenly and unexpectedly go out of business.

And that all takes for granted that people want to continue playing social games. But what if they lose interest?

Healthy paranoia can be a good way for entrepreneurs and venture capitalists to stay prepared for rapid change.

[a] For more on the phenomenon of loss aversion and its effects on our ability to estimate value, see Dan Airely, *Predictably Irrational* (New York: HarperCollins, 2008).
[b] A brief synopsis is available from Intel's web site, (http://bit.ly/coMy40). The book is *Only the Paranoid Survive, first edition* (Doubleday, 1996).

Macroeconomic Shock

When I first moved to Silicon Valley, the people there seemed to believe that their businesses were more or less immune to federal monetary and fiscal policy.

The truth is that what goes on in Washington, Wall Street, and the rest of the world has a profound impact on Silicon Valley and the business of start-ups. Nowhere does this figure more strongly into the equation than in the burst of an investment bubble.

When the economy gets squishy, start-ups have a tougher time connecting with customers. Consumers drop nonessential spending and corporations lock down budgets. That slows start-up sales substantially.

Falling stock prices make it more expensive for strategic acquirers to buy start-ups and less attractive for start-ups to go public. The lack of a clear path to liquidity slows the pace of venture capital investment.

The financial crisis of 2008 seemed to be a world away from Silicon Valley when it first started.

The *Venture Capital Journal* surveyed over 60 venture capitalists and other service providers for their estimates of what impact the financial crisis would have in the industry.[4] This was a week after Lehman Brothers declared bankruptcy and about three weeks before Sequoia Capital gave its famous "R.I.P. Good Times" presentation to CEOs.

At the time, more than 80 percent of the investors surveyed said they didn't think the Wall Street crisis would cause them to slow their current investment pace. Some 16 percent planned to actually increase their rate of investment.

Yet the amount of money committed to start-ups fell 37 percent during 2009, according to data from the National Venture Capital Association.[5]

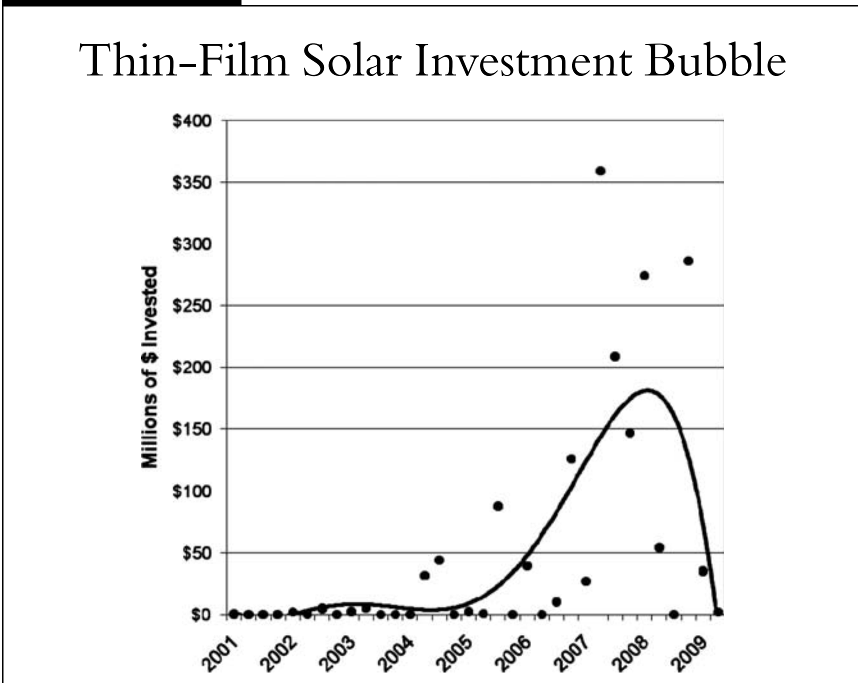
Investors had predicted that just 24 percent of their companies would see a lower valuation in their next round of financing. The reality was much worse. The majority of the investments made during 2009 came in either at flat valuations or as down rounds, according to data from Fenwick & West.[6]

The investors surveyed by the *Venture Capital Journal* were optimistic that cleantech would ride out the economic turmoil even if other sectors took a hit. "Our cleantech sector is looking a bit counter-cyclical, which may make our story a bit different than what you might hear from other sectors," one investor said at the time. It was a sentiment echoed by another survey participant as well: " . . . this really only affects a few of our portfolio companies. We invest across industries and think our industrial and health care companies will feel less of an impact than our IT portfolio companies."

Yet their optimism was misplaced. Big cleantech investments were the first casualty of the financial crisis. The "project finance" professionals that arrange loans for energy production facilities shut their wallets tight. Financing dollars for the sector fell by nearly half from 2008 to 2009. Cleantech ended up being one of the worst affected areas due to its reliance on large financing syndicates and big loans.

You can see the trend clearly defined in one of the most capital-intensive sectors in cleantech: thin-film solar investments. Thin-film solar companies promised to manufacture inexpensive photovoltaic panels based on breakthroughs in polymer science. You can see that the investment bubble crashed in this sector shortly after a handful of the major investment banks went belly-up in Exhibit 7.3.

EXHIBIT 7.3



TIPS AND TECHNIQUES

Economic Warning Signs

You can track the general economy using any number of indicators, or by hanging on every word each of the Federal Reserve governors say. But those measures may not be as useful as more obvious warning signs.

One of the best indicators of an impending bust is a fluctuating stock market. A Dow Jones Industrial Average yo-yoing up and down makes people worry. It is like a patient that starts screaming in the emergency room: Nobody quite knows what's the matter, but things are going to get worse before they get better. Bizarre stock performance is the sort of thing that indicates something big is going on with the overall economy that will likely have a major impact on start-ups and venture firms.

Venture capitalist enthusiasm for thin-film solar and alternative energy production projects seemed to evaporate overnight. The macroeconomic shock and the fall of the major investment banks popped the emerging cleantech bubble and ambitious plans for solar panel installations, wind farms, and geothermal developments.

Greater Fools Get Wise

During the dot-com bubble, the general public engaged in a willful self-deception about the nature of the Internet. Most people wanted to believe that computers, linked together over telephone networks, were completely rewriting the rules of business. Web *wunderkinder* were making billions of dollars by simply connecting people. Fortunes were there for the taking, all that was required was an e*Trade account.

For whatever reason, it was an attractive fantasy. Until it wasn't.

Nobody knows for sure what causes a rapid change in public sentiment. There's always somebody pointing out the fact that the emperor isn't wearing any clothes. The problem is that during a bubble nobody listens. At least not until greed gives way to fear.

The cleantech boom nearly turned into a bubble when people started believing that Silicon Valley and American innovation had come to save them from the boogeymen of foreign oil and global warming. For a few months in 2007, prices at the gas pump spiked and Al Gore's "Inconvenient Truth" won an Academy Award. It seemed, briefly, that anything cleantech-related was a good investment idea.

But the euphoria was short-lived. Too many people were too focused on the underlying economics of the cleantech businesses. Could solar start-ups survive without government subsidies? Did growing corn to make gasoline really make financial sense? Could technology ever provide energy that would be cheaper than coal? At the time when the boom might have bubbled over, people were still skeptical about the new green technologies. Those who would have been the greater fools were not feeling foolish.

Summary

The process of boom, bubble, and bust is as central to the venture capital industry as a heartbeat. It measures off the rhythm of investment and dictates its nature. The process writes itself both large and small across industries and technology subsectors. It's impossible to

say just how many little bubbles happen in venture capital investing during a given year, but the cycle manifests itself as a tradeoff between investor greed and fear.

There are several major strategies for investing in and around markets going through the business cycle. A venture capitalist can get in early and put down bets before prices become unreasonable; pick winners once they become obvious; or invest in start-ups selling tools and services to those chasing a boom. Some venture capitalists get as far away from a booming industry as possible, while others prefer to wait for the inevitable bust and invest in the remaining companies at a discount.

Booms create value for customers by rapidly creating new products and services that they need. They begin when conditions create a major opportunity for change. That can be the product of a macroeconomic trend, major news, the changing needs of big businesses, or a shift in consumer preferences. Yet few things stimulate a boom as much as a single big success, such as the Netscape IPO that kicked off the dot-com boom, or a major new platform such as Apple's iPhone.

Booms create wealth and bubbles redistribute it. The entrepreneurs and investors who get in before a booming industry starts to bubble stand to make massive profits from the irrational behavior of others.

Booms become bubbles when entrepreneurs try to pitch ideas they think will be attractive to venture capitalists instead of products people will actually pay for. These "me too" investments may be attractive to second-tier venture capitalists who are anxious to demonstrate to their limited partners that they are hip to the new

thing, whatever it is. Such an investment may be a money loser in the long run, but can help a venture firm raise its next fund in the short run.

All bubbles eventually deflate or burst. This is a natural process that can clean out the excesses of over-investment and restore reason to the market.

Some busts happen when companies are unable to rapidly adapt to changes in the marketplace. Others are the product of macro-economic shocks that nobody could have predicted.

These reasons are relatively straightforward compared to busts that come from changes in public sentiment. Nobody knows quite how or why this happens, but at some point the "greater fools" get wise and stop buying into the idea of ever-increasing company valuations.

Notes

1. "Electric Power Industry 2008: Year in Review," *U.S. Energy Information Administration*, January 2010, http://bit.ly/bQbLbr.
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3. Thomson Reuters runs a free newsletter called *PEHub Wire* that tracks deals in the venture capital and private equity industries. You can sign up for it at www.pehub.com.
4. "From Wall Street to Sand Hill Road," *Venture Capital Journal*, October 1, 2008, http://bit.ly/aaLgGV.
5. "PricewaterhouseCoopers/National Venture Capital Association MoneyTree™ Report, Data: Thomson Reuters Total U.S.

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6. "Trends in Terms of Venture Financings in Silicon Valley (Fourth Quarter 2009)," *Fenwick & West*, February 16, 2010, http://bit.ly/9Kdk2y.