How to Make Wealth

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If you wanted to get rich, how would you do it? I think your best  
bet would be to start or join a startup. That's been a   
reliable way to get rich for hundreds of years. The word "startup"   
dates from the 1960s, but what happens in one is   
very similar to the venture-backed trading voyages of the  
Middle Ages.Startups usually involve technology, so much so that the phrase  
"high-tech startup" is almost redundant. A startup is a small  
company that takes on a hard technical problem.Lots of people get rich knowing nothing more than that.  
You don't have to know physics to be a good pitcher. But  
I think it could give you an edge to understand the underlying principles.  
Why do startups have to be small?   
Will a startup inevitably stop being a startup as it  
grows larger?   
And why do they so often work on  
developing new technology? Why are there so many startups  
selling new drugs or computer software, and none selling corn oil  
or laundry detergent?The PropositionEconomically, you can think of a startup as a way to   
compress your whole working life into a few years. Instead  
of working at a low intensity for forty years, you work as  
hard as you possibly can for four. This pays especially well  
in technology, where you earn a premium for working fast.Here is a brief sketch of the economic proposition. If you're  
a good hacker in your mid twenties, you can  
get a job paying about $80,000 per year. So on average   
such a hacker must be  
able to do at least $80,000 worth of work per year for the   
company just to break even. You could probably  
work twice as many hours as a corporate employee, and if  
you focus you can probably get three times as much done in  
an hour.   
[1]  
You should get another multiple of two, at  
least, by eliminating the drag   
of the pointy-haired middle  
manager who would be your boss in a big company.  
Then there is one more multiple: how much smarter are you  
than your job description expects you to be?  
Suppose another multiple of three. Combine all these multipliers, and I'm  
claiming you could be 36 times more   
productive than you're expected to be in a random corporate  
job.   
[2]  
 If a fairly good hacker is worth $80,000 a year at a   
big company, then a smart  
hacker working very hard without any corporate  
bullshit to slow him down should be able to do work worth about  
$3 million a year.Like all back-of-the-envelope calculations, this one  
has a lot of wiggle room. I wouldn't try to  
defend the actual numbers. But I stand by the   
structure of the calculation. I'm not claiming  
the multiplier is precisely 36, but it is certainly more  
than 10, and probably rarely as high as 100.If $3 million a year seems  
high, remember that we're talking about the limit case:  
the case where you not only have zero leisure time  
but indeed work so hard that you endanger your health.Startups are not magic. They don't change the laws of  
wealth creation. They just represent a point at the far end of the curve.  
There is a conservation law at work here: if  
you want to make a million dollars, you have to endure a   
million dollars' worth of pain.   
For example, one way to  
make a million dollars would be to work for the   
Post Office your whole life, and save every penny of your   
salary. Imagine the stress of working for the Post   
Office for fifty years. In a startup you compress all  
this stress into three or four years. You do tend to get a   
certain   
bulk discount if you buy the economy-size pain,  
but you can't evade the fundamental conservation law.  
If starting a startup were easy, everyone would do it.Millions, not BillionsIf $3 million a year seems high to some people, it will seem  
low to others. Three million?   
How do I get to be a billionaire, like Bill Gates?So let's get Bill Gates out of the way right now. It's not  
a good idea to use famous rich people   
as examples, because the press only   
write about the very richest, and these tend to be outliers.  
Bill Gates is a smart, determined, and hardworking man,  
but you need more than  
that to make as much money as he has. You also need to be  
very lucky.There is a large random  
factor in the success of any company. So the guys you end   
up reading about in the papers are the ones who are very   
smart, totally dedicated, and win the lottery.  
Certainly Bill is smart and dedicated, but Microsoft also   
happens to have been the beneficiary of one of the most spectacular  
blunders in the history of business: the licensing deal for  
DOS. No doubt Bill did   
everything he could to steer IBM into making that blunder,   
and he has done an excellent job of exploiting it, but if  
there had been one person with a brain on IBM's side,  
Microsoft's future would have been very different.  
Microsoft at that stage had little leverage over IBM.  
They were effectively a component supplier. If IBM had   
required an exclusive license, as they should have, Microsoft  
would still have signed the deal. It would still have  
meant a lot of money for them, and IBM  
could easily have gotten an operating system elsewhere.Instead IBM ended up using all its power in the market  
to give Microsoft control of the PC standard. From   
that point, all Microsoft had to do was execute. They  
never had to bet the company on a bold decision. All they  
had to do was play hardball with licensees and copy more  
innovative products reasonably promptly.If IBM hadn't made this mistake, Microsoft would  
still have been a successful company, but it  
could not have grown so big so fast.   
Bill Gates would be rich, but he'd be somewhere  
near the bottom of the Forbes 400 with the other guys his age.There are a lot of ways to get  
rich, and this essay is about only one of them. This  
essay is about how to make money by creating wealth and  
getting paid for it. There are plenty of other ways to   
get money, including chance, speculation, marriage, inheritance,   
theft, extortion, fraud, monopoly,  
graft, lobbying,  
counterfeiting, and prospecting. Most of the greatest fortunes  
have probably involved several of these.The advantage of creating wealth, as a way to get rich,  
is not just that it's more legitimate   
(many of the other methods are now illegal)   
but that it's more  
straightforward. You just have to do something people want.Money Is Not WealthIf you want to create wealth, it will help to understand what it is.   
Wealth is not the same thing as money.   
[3]  
 Wealth is as old as  
human history. Far older, in fact; ants have wealth.   
Money is a comparatively recent invention.Wealth is the fundamental thing. Wealth is stuff we want: food,   
clothes, houses, cars, gadgets, travel to interesting places,  
and so on. You can have wealth without  
having money. If you had a magic machine that  
could on command make you a car or cook you dinner or do your  
laundry, or do anything else you wanted, you wouldn't need money.  
Whereas if you were in the middle of Antarctica, where there is  
nothing to buy, it wouldn't matter how much money you had.Wealth is what you want, not money. But if wealth is the important  
thing, why does everyone talk about making money? It is  
a kind of shorthand: money is a way of moving wealth, and in practice  
they are usually interchangeable. But they are not the same thing,  
and unless you plan to get rich by counterfeiting, talking about  
making money can make it harder to understand how to   
make money.Money is a side effect of specialization.  
In a specialized society, most of the  
things you need, you can't make for yourself. If you want a potato  
or a pencil or a place to live, you have to get it from someone  
else.How do you get the person who grows the potatoes to give you some?  
By giving him something he wants in return. But you can't get  
very far by trading things directly with the people who  
need them. If you make violins, and none of the local  
farmers wants one, how will you eat?The solution societies find, as they get more specialized, is to  
make the trade into a two-step process. Instead of trading violins  
directly for potatoes, you trade violins for, say, silver,   
which you can then trade again for anything else you need. The  
intermediate stuff-- the medium of exchange-- can be anything that's  
rare and portable. Historically metals have been the most common,  
but recently we've been using a medium of exchange, called the dollar,  
that doesn't physically exist. It works as a medium of exchange,  
however, because its rarity   
is guaranteed by the U.S. Government.The advantage of a medium of exchange is that it makes trade work.  
The disadvantage is that it tends to obscure what trade really  
means. People think that what a business does is make money.  
But money is just the intermediate stage-- just  
a shorthand-- for whatever people want.  
What most businesses really do is make   
wealth. They do something people want.   
[4]The Pie FallacyA surprising number of people retain from childhood the idea  
that there is a fixed amount of wealth in the world.   
There is, in any normal family, a fixed amount of money at   
any moment. But that's not the same thing.When wealth is talked about in this context, it is often  
described as a pie. "You can't make the pie larger,"  
say politicians.  
When you're  
talking about the amount of money in one family's bank  
account, or the amount available to a government from one  
year's tax revenue, this is true.   
If one person gets more, someone else has to get less.I can remember believing, as a child, that if a few  
rich people had all the money, it left less for everyone else.  
Many people seem to continue to believe something like this  
well into adulthood. This fallacy is usually there in the   
background when you hear someone talking about how x percent  
of the population have y percent of the wealth. If you plan  
to start a startup, then whether you realize it or not, you're  
planning to disprove the Pie Fallacy.What leads people astray here is the abstraction of  
money. Money is not wealth. It's  
just something we use to move wealth around.  
So although there may be, in certain specific moments (like  
your family, this month) a fixed amount of money available to  
trade with other people for things you want,  
there is not a fixed amount of wealth in the world.   
You can make more wealth. Wealth has been getting created and  
destroyed (but on balance, created) for all of human history.Suppose you own a beat-up old car.   
Instead of sitting on your butt next  
summer, you could spend the time restoring your car to pristine condition.  
In doing so you create wealth. The world is-- and  
you specifically are-- one pristine old car the richer. And not  
just in some metaphorical way. If you sell your car,  
you'll get more for it.In restoring your old car you have made yourself  
richer. You haven't made anyone else poorer. So there is  
obviously not a fixed pie. And in fact, when you look at   
it this way, you wonder why anyone would think there was.   
[5]Kids know, without knowing they know, that they can create  
wealth. If you need to give someone a present and don't  
have any money, you make one. But kids are so bad at making  
things that they consider home-made presents to be a distinct,  
inferior, sort of thing to store-bought ones-- a mere expression  
of the proverbial thought that counts.   
And indeed, the lumpy ashtrays  
we made for our parents did not have much of a resale market.CraftsmenThe people most likely to grasp that wealth can be  
created are the ones who are good at making things, the craftsmen.  
Their hand-made objects become store-bought ones.   
But with the rise of industrialization there are fewer and  
fewer craftsmen. One of the biggest remaining groups is  
computer programmers.A programmer can sit down in front of a computer and  
create wealth. A good piece of software is, in itself,   
a valuable thing.  
There is no manufacturing to confuse the issue. Those  
characters you type   
are a complete, finished product.  
If someone sat down and wrote a web  
browser that didn't suck (a fine idea, by the way), the world  
would be that much richer.  
[5b]Everyone in a company works together to create  
wealth, in the sense of making more things people want.  
Many of the employees (e.g. the people in the mailroom or  
the personnel department) work at one remove from the   
actual making of stuff. Not the programmers. They  
literally think the product, one line at a time.  
And so it's clearer to programmers that wealth is something  
that's made, rather than being distributed, like slices of a  
pie, by some imaginary Daddy.It's also obvious to programmers that there are huge variations  
in the rate at which wealth is created. At Viaweb we had one  
programmer who was a sort of monster of productivity.   
I remember watching what he did one long day and estimating that  
he had added several hundred thousand dollars  
to the market value of the company.   
A great programmer, on a roll, could   
create a million dollars worth of wealth in a couple weeks.  
A mediocre programmer over the same period will generate zero or  
even negative wealth (e.g. by introducing bugs).This is  
why so many of the best programmers are libertarians.  
In our world, you sink or swim, and there are no excuses.  
When those far removed from the creation of wealth-- undergraduates,  
reporters, politicians-- hear  
that the richest 5% of the people have   
half the total wealth, they tend to think injustice!  
An experienced programmer would be more likely to think  
is that all? The top 5% of programmers  
probably write 99% of the good software.Wealth can be created without being sold. Scientists, till  
recently at least, effectively donated the wealth they   
created. We are all richer for knowing about penicillin,  
because we're less likely to die from infections. Wealth  
is whatever people want, and not dying is certainly something  
we want. Hackers often donate their work by   
writing open source software that anyone can use for free.  
I am much the richer for the operating system  
FreeBSD, which I'm running on the computer I'm using now,  
and so is Yahoo, which runs it on all their servers.What a Job IsIn industrialized countries, people belong to one institution or  
another at least until their twenties. After all those years you get  
used to the idea of belonging to a group of people who all get up  
in the morning, go to some set of buildings, and do things that they  
do not, ordinarily, enjoy doing. Belonging to such a group becomes  
part of your identity: name, age, role, institution.  
If you have to introduce yourself, or  
someone else describes you, it will be as something like, John  
Smith, age 10, a student at such and such elementary school, or  
John Smith, age 20, a student at such and such college.When John Smith finishes school he is expected to get a job. And  
what getting a job seems to mean is joining another institution.  
Superficially it's a lot like college. You pick the companies you  
want to work for and apply to join them. If one likes you, you  
become a member of this new group. You get up in the morning and  
go to a new set of buildings, and do things that you do not, ordinarily,  
enjoy doing. There are a few differences: life is not as much fun,  
and you get paid, instead of paying, as you did in college. But  
the similarities feel greater than the differences. John Smith is  
now John Smith, 22, a software developer at such and such corporation.In fact John Smith's  
life has changed more than he realizes. Socially, a company  
looks much like college, but the deeper you go into the  
underlying reality, the more different it gets.What a company does, and has to do if it wants to continue to  
exist, is earn money. And the way most companies make money  
is by creating wealth. Companies can be so specialized that this  
similarity is concealed, but it is not only manufacturing   
companies that create wealth. A big component of wealth is  
location.   
Remember that magic machine that could  
make you cars and cook you dinner and so on? It would not be  
so useful if it delivered your dinner to a random location  
in central Asia.   
If wealth means what people want, companies that move  
things also create wealth. Ditto for  
many other kinds of companies that don't make anything  
physical. Nearly all companies exist to do something people  
want.And that's what you do, as well, when you go to work for a company.  
But here there is another layer that tends to obscure the underlying  
reality. In a company, the work you do is averaged together with  
a lot of other people's.   
You may not even be aware you're doing something people  
want. Your contribution may be indirect. But the company as a  
whole must be giving people something they want, or they won't make  
any money. And if they are paying you x dollars a year, then on  
average you must be contributing at least x dollars a year worth  
of work, or the company will be spending more than it makes,  
and will go out of business.Someone graduating from college thinks, and is told, that he needs  
to get a job, as if the important thing were becoming a member of   
an institution. A more direct way to put it would be: you need to  
start doing something people want. You don't  
need to  
join a company to do that. All a company is is a group of people  
working together to do something people want. It's doing something people  
want that matters, not joining the group.   
[6]For most people the   
best plan probably is to go to work for some existing  
company. But it is a good idea to understand what's happening   
when you do this. A job means doing something people want,  
averaged together with everyone else in that company.Working HarderThat averaging gets to be a problem.  
I think the single biggest problem afflicting large companies is the   
difficulty of assigning a value to each person's work.   
For the most part they punt. In a  
big company you get paid a fairly predictable salary for working   
fairly hard. You're expected not to be obviously incompetent or  
lazy, but you're not expected to devote your whole life to your  
work.It turns out, though, that there are economies of scale in how much of your  
life you devote to your work. In the right kind of business,   
someone who really devoted himself to work could generate ten or  
even a hundred times as much wealth as an average  
employee. A programmer, for example, instead of chugging along  
maintaining and updating an existing piece of software, could write  
a whole new piece of software, and with it create a new source of  
revenue.Companies are not set up to reward people who want to do this.   
You can't go to your boss and say, I'd like to start working ten  
times as hard, so will you please pay me ten times as much? For  
one thing, the official fiction is that you are already working as  
hard as you can. But a more serious problem is that the company  
has no way of measuring the value of your work.Salesmen are an exception. It's easy   
to measure how much revenue they generate, and they're  
usually paid a percentage of it. If a salesman wants to work harder,  
he can just start doing it, and he will automatically  
get paid proportionally more.There is one other job besides sales where big companies can  
hire first-rate people: in the top management jobs.   
And for the same reason: their performance can  
be measured. The top managers are  
held responsible for the performance of the entire company.  
Because an ordinary employee's performance can't usually  
be measured, he is not expected to do  
more than put in a solid effort. Whereas top management, like  
salespeople, have to actually come up with the numbers.  
The CEO of a company that tanks cannot plead that he put in   
a solid effort. If the company does badly, he's done badly.A company that could pay all its employees so straightforwardly   
would be enormously successful. Many employees would work harder  
if they could get paid for it. More importantly,  
such a company would attract people who wanted to work  
especially hard.   
It would crush its competitors.Unfortunately, companies can't pay everyone like salesmen. Salesmen  
work alone. Most employees' work is tangled together. Suppose  
a company makes some kind of consumer gadget. The   
engineers build a reliable gadget with all kinds of new features;  
the industrial designers design a beautiful case for it; and then  
the marketing people convince everyone that  
it's something they've got to have. How do you know how much of the  
gadget's sales are due to each group's efforts? Or, for that  
matter, how much is due to the creators of past gadgets that gave  
the company a reputation for quality? There's no way to   
untangle all their contributions. Even if you could read the minds  
of the consumers, you'd find these factors were all blurred together.If you want to go faster, it's a problem to have your work  
tangled together with a large number of other people's. In a   
large group, your performance is not separately measurable-- and   
the rest of the group slows you down.Measurement and LeverageTo get rich you need to get yourself in a situation with two  
things, measurement and leverage. You need to be in a  
position where your performance can be measured, or there is  
no way to get paid more by doing more. And you have to  
have leverage, in the sense that the decisions you make have   
a big effect.Measurement alone is not enough. An example of a job with  
measurement but not leverage is doing piecework in a  
sweatshop. Your performance is measured and you get paid   
accordingly, but you have no scope for decisions. The only  
decision you get to make is how fast you work, and that  
can probably only increase your earnings by a factor  
of two or three.An example of a job with both measurement and leverage would  
be lead actor in a movie. Your performance can be measured in the  
gross of the movie. And you have leverage in the sense that your  
performance can make or break it.CEOs also have both measurement and leverage. They're measured,  
in that the performance of the company is their performance.  
And they have leverage in that their decisions  
set the whole company moving in one direction or another.I think everyone who gets rich by their own efforts will be  
found to be in a situation with measurement and leverage.   
Everyone I can think of does: CEOs, movie stars,   
hedge fund managers, professional athletes. A good hint to the  
presence of leverage is the possibility of failure.  
Upside must be balanced by downside, so if there is   
big potential for gain there must also be a terrifying  
possibility of loss. CEOs, stars, fund managers, and athletes  
all live with the sword hanging over their heads;  
the moment they start to suck, they're out. If you're in  
a job that feels safe, you are not going to get rich,  
because if there is no danger there is almost certainly no leverage.But you don't have to become a CEO or a movie star to  
be in a situation with measurement and leverage. All you   
need to do is be part of a small group working on a  
hard problem.Smallness = MeasurementIf you can't measure the value of the work done by individual   
employees, you can get close. You can measure the value  
of the work done by small groups.One level at which you can accurately measure the revenue  
generated by employees is at the level of the whole company.   
When the company is small, you are thereby fairly close to   
measuring the contributions of individual employees. A viable  
startup might only have ten employees, which puts you within a  
factor of ten of measuring individual effort.Starting or joining a startup is thus as close as most  
people can get to saying to one's boss, I want to work ten times  
as hard, so please pay me ten times as much. There are two  
differences: you're not saying it to your boss, but directly to the  
customers (for whom your boss is only a proxy after all), and  
you're not doing it individually, but along with a small group  
of other ambitious people.It will, ordinarily, be a group. Except in a few unusual kinds  
of work, like acting or writing books, you can't be a company   
of one person.   
And the people you work with had better be good, because it's their work that  
yours is going to be averaged with.A big company is like a giant galley driven by a thousand rowers.  
Two things keep the speed of the  
galley down. One is that individual rowers don't see any  
result from working harder.   
The other is that, in a group of a  
thousand people, the average rower is likely to be  
pretty average.If you took ten people at random out of the big galley and  
put them in a boat by themselves, they could probably go   
faster. They would have both carrot and stick to motivate   
them. An energetic rower would be encouraged by the thought  
that he could have a visible effect on the speed of  
the boat. And if someone was lazy, the others would be more likely  
to notice and complain.But the real advantage of the ten-man boat shows when   
you take the ten best rowers out of the big galley  
and put them in a boat together. They will have all  
the extra motivation that comes from being in a small group.  
But more importantly, by selecting that small a group  
you can get the best rowers. Each one will be in  
the top 1%. It's a much better deal for them to average   
their work together with a small group of their peers than to   
average it with everyone.That's the real point of startups. Ideally, you are getting  
together with a group of other people who also want to work  
a lot harder, and get paid a lot more, than they would in  
a big company. And because startups tend to get founded   
by self-selecting groups of ambitious people who already   
know one another (at least by reputation), the level of   
measurement is more precise than you get from smallness alone.  
A startup is not merely ten people, but ten people like you.Steve Jobs once said that the success or failure of a startup  
depends on the first ten employees. I agree. If   
anything, it's more like the first five.  
Being small is not, in itself, what makes startups kick butt,   
but rather that small groups can be select.  
You don't want small in the sense of a  
village, but small in the sense of an all-star team.The larger a group, the closer its average member will be to the average  
for the population as a whole. So all other things being  
equal, a very able person in a big company is probably  
getting a bad deal, because his performance is dragged down by  
the overall lower performance of the others. Of course,  
all other things often are not equal: the able person may   
not care about money, or may prefer the stability of a large  
company. But a very able person who does care about money  
will ordinarily do better to go off and work with a small  
group of peers.Technology = LeverageStartups offer anyone a way to be in a situation with  
measurement and leverage.  
They allow measurement because they're small,  
and they offer leverage because they  
make money by inventing new technology.What is technology? It's technique. It's the way   
we all do things. And when  
you discover a new way to do things, its value is multiplied  
by all the people who use it. It is the proverbial fishing  
rod, rather than the fish. That's the difference between a  
startup and a restaurant or a barber shop. You fry eggs or cut   
hair one customer at a time. Whereas if   
you solve a technical problem that a lot of people care about,  
you help everyone who uses your solution.   
That's leverage.If you look at history, it seems that most people  
who got rich by creating wealth did it by developing  
new technology. You just can't fry eggs or cut hair fast enough.  
What made the Florentines rich in 1200   
was the discovery of new techniques for making the high-tech   
product of the time, fine woven cloth. What made the  
Dutch rich in 1600 was the discovery of shipbuilding and  
navigation techniques that enabled them to dominate the seas  
of the Far East.Fortunately there is a natural fit between smallness and  
solving hard problems. The leading edge of technology moves  
fast. Technology that's valuable today could be worthless  
in a couple years. Small companies are more at home in this  
world, because they don't have layers of bureaucracy to  
slow them down.  
Also, technical advances tend to come from unorthodox approaches,  
and small companies are less constrained by convention.Big companies can develop technology. They just can't do it  
quickly. Their size makes them slow and prevents  
them from rewarding employees for the extraordinary  
effort required. So in practice big companies only get to develop   
technology in fields where large capital requirements prevent startups from  
competing with them, like microprocessors, power plants,   
or passenger aircraft. And even in those fields they depend heavily  
on startups for components and ideas.It's obvious that biotech or software startups exist to solve  
hard technical problems, but   
I think it will also be found to be true   
in businesses that don't seem to be about technology. McDonald's,  
for example, grew big by designing a system, the McDonald's   
franchise, that could then be reproduced at will all over the   
face of the earth. A McDonald's franchise is controlled by rules  
so precise that it is practically  
a piece of software. Write once, run everywhere.  
Ditto for Wal-Mart. Sam Walton got rich not by being a   
retailer, but by designing a new kind of store.Use difficulty as a guide not just in selecting the overall  
aim of your company, but also at decision points along the way.  
At Viaweb one of our rules of thumb was run upstairs.  
Suppose you are a little, nimble guy being chased by a big,  
fat, bully. You open a door and find yourself in a   
staircase. Do you go up or down? I say up. The  
bully can probably run downstairs as fast as you can.  
Going upstairs his bulk will be more of a disadvantage.  
Running upstairs is hard for you but even harder for him.What this meant in practice was that we deliberately sought   
hard problems. If there were two features we could add to our  
software, both equally valuable in proportion to their difficulty,  
we'd always take the harder one. Not just because it was   
more valuable, but because it was harder.  
We delighted in forcing bigger, slower competitors  
to follow us over difficult ground.  
Like guerillas, startups prefer the difficult terrain of the  
mountains, where the troops of the central government  
can't follow. I can remember times when we were just  
exhausted after wrestling all day with some horrible technical  
problem. And I'd be delighted, because something that was   
hard for us would be impossible for our competitors.This is not just a good way to run a startup. It's what  
a startup is.  
Venture capitalists know about this and have a phrase for it:  
barriers to entry. If you go to a VC with a new   
idea and ask him to invest in it, one of the first things  
he'll ask is, how hard would this be for someone else to   
develop? That is, how much difficult ground  
have you put between yourself and potential pursuers?   
[7]  
And you had better have a convincing explanation of why   
your technology would be hard to duplicate. Otherwise as  
soon as some big company becomes aware of it, they'll make  
their own, and with their brand name, capital, and  
distribution clout, they'll take away your market overnight.  
You'd be like guerillas caught in the open field by regular  
army forces.One way to put up barriers to entry is through patents.   
But patents may not provide much protection.   
Competitors commonly find ways to work around a patent.  
And if they can't, they   
may simply violate it and invite you to sue them.  
A big company is not afraid to be sued; it's an everyday thing  
for them. They'll make sure that suing them is expensive and  
takes a long time.  
Ever heard of Philo Farnsworth? He invented  
television. The reason you've never  
heard of him is that his company was not the one to make  
money from it.   
[8]  
The company that did was RCA, and  
Farnsworth's reward for his efforts was a decade of  
patent litigation.Here, as so often, the best defense is a good offense. If  
you can develop technology that's simply too hard for  
competitors to duplicate, you don't need to rely on other  
defenses. Start by picking a hard problem, and  
then at every decision point, take the harder choice.   
[9]The Catch(es)If it were simply a matter of working harder than   
an ordinary employee and getting paid proportionately, it would  
obviously be a good deal to start a startup. Up to a point it  
would be more fun. I don't think many people   
like the slow pace of big companies, the interminable meetings,  
the water-cooler conversations, the clueless middle managers,  
and so on.Unfortunately there are a couple catches. One is that you  
can't choose the point on the curve that you want to inhabit.  
You can't decide, for example, that you'd like to work just  
two or three times as hard, and get paid that much more. When  
you're running a startup, your competitors decide how  
hard you work. And they pretty much all make the same decision:  
as hard as you possibly can.The other catch is that the payoff is only on average proportionate  
to your productivity. There is, as I said before, a large  
random multiplier in the success of any company. So in  
practice the deal is not that you're 30 times as productive and get   
paid 30 times as much. It is that you're 30 times as productive,  
and get paid between zero and a thousand times as much.  
If the mean is 30x, the median is probably zero.  
Most startups tank, and not just the dogfood   
portals we all heard about during  
the Internet Bubble. It's common for a startup  
to be developing a genuinely good product, take slightly  
too long to do it, run out of money, and have to shut down.A startup is like a mosquito. A bear can absorb a hit and a crab  
is armored against one, but a mosquito is designed for one thing:  
to score. No energy is wasted on defense. The defense of mosquitos,   
as a species, is that there are a lot of them, but this is little   
consolation to the individual mosquito.Startups, like mosquitos, tend to be an all-or-nothing proposition.  
And you don't generally know which of the two you're going to  
get till the last minute.   
Viaweb came close to tanking several times. Our trajectory  
was like a sine wave. Fortunately we got bought at  
the top of the cycle, but it was damned close. While we were  
visiting Yahoo in California to talk about selling the company  
to them, we had to borrow a conference room to reassure  
an investor who was about to back out of a new round of funding   
that we needed to stay alive.The all-or-nothing aspect of startups was not something we wanted.  
Viaweb's hackers were all extremely risk-averse.  
If there had been some way just to work super hard and get  
paid for it, without having a lottery mixed in, we would have  
been delighted. We would have much preferred a 100% chance of  
$1 million to a 20% chance of $10 million, even though   
theoretically the second is worth twice as much. Unfortunately,  
there is not currently any space in the business world where  
you can get the first deal.The closest you can get is by  
selling your startup in the early stages, giving up upside   
(and risk) for a smaller but guaranteed payoff. We had a   
chance to do this, and stupidly, as we then thought, let it slip by.  
After that we became comically eager to sell.  
For the next year or so,  
if anyone expressed the slightest curiosity about Viaweb  
we would try to sell them the company. But there were no takers,  
so we had to keep going.It would have been a bargain to   
buy us at an early stage, but companies doing acquisitions are not  
looking for bargains. A company big enough to acquire   
startups will be big enough to be fairly conservative, and   
within the company the people in charge of acquisitions will  
be among the more conservative, because they are likely to be  
business school types who joined the company late.   
They would rather overpay for a safe choice. So  
it is easier to sell an established startup, even at a large  
premium, than an early-stage one.Get UsersI think it's a good idea to get bought, if you can. Running a  
business is different from growing one.  
It is just as well to let a big company take over once you reach   
cruising altitude. It's  
also financially wiser, because selling allows you to diversify.  
What would you think of a financial advisor who put all his  
client's assets into one volatile stock?How do you get bought? Mostly by doing the same things   
you'd do if you didn't intend to sell the company. Being   
profitable, for example. But getting bought is also an art  
in its own right, and one that we spent a lot of time trying  
to master.Potential buyers will  
always delay if they can. The hard part about getting  
bought is getting them to act. For most people, the most powerful motivator  
is not the hope of gain, but the fear of loss. For potential  
acquirers, the most powerful motivator is the prospect that   
one of their competitors will buy you. This, as we found,   
causes CEOs to take red-eyes.   
The second biggest is the worry that, if they don't buy you   
now, you'll continue to grow rapidly and will cost more to  
acquire later, or even become a competitor.In both cases, what it all comes down to is users.   
You'd think that a company about to buy you would do a lot of  
research and decide for themselves how valuable your technology  
was. Not at all. What they go by is the number of users you  
have.In effect, acquirers assume the customers know who has the  
best technology. And this is not as stupid as it sounds. Users   
are the only real proof that you've created wealth. Wealth is   
what people want, and if people aren't using your software,  
maybe it's not just because you're bad at marketing. Maybe it's  
because you haven't made what they want.Venture capitalists have a list of danger signs to watch out for.  
Near the top is the company run by techno-weenies who are   
obsessed with solving interesting technical problems, instead  
of making users happy. In a startup, you're not just trying to  
solve problems. You're trying to solve problems that   
users care about.So I think you should make users the test, just as   
acquirers do. Treat a startup as an optimization problem   
in which performance is measured by number of users. As anyone  
who has tried to optimize software knows, the key is measurement.  
When you try to guess where your program is slow, and what would  
make it faster, you almost always guess wrong.Number of users may not be the perfect test, but it will   
be very close. It's what acquirers care about. It's what   
revenues depend on.   
It's what makes competitors unhappy.  
It's what impresses reporters, and potential  
new users. Certainly it's a better test than your a priori  
notions of what problems are important to solve, no matter how  
technically adept you are.Among other things, treating a startup as an optimization  
problem will help you avoid another  
pitfall that VCs worry about, and rightly-- taking a long time  
to develop a product. Now we can recognize this as something  
hackers already know to avoid: premature optimization. Get a version   
1.0 out there as soon as you can. Until you have some users to  
measure, you're optimizing based on guesses.The ball you need to keep your eye on here is the underlying  
principle that wealth is what people want. If you plan to get   
rich by creating wealth, you have to know what people want.   
So few businesses really pay attention to making customers happy.  
How often do you walk into a store, or call a company on the  
phone, with a feeling of dread in the back of your mind?  
When you hear "your call is important to us, please stay on  
the line," do you think, oh good, now everything will be all right?A restaurant can afford to serve the occasional burnt dinner.  
But in technology, you cook one thing and that's what everyone  
eats. So any difference between what people want and what  
you deliver is multiplied.   
You please or annoy  
customers wholesale. The closer you can get to what they want,  
the more wealth you generate.Wealth and PowerMaking wealth is not the only way to get rich. For most of  
human history it has not even been the most common. Until  
a few centuries ago,  
the main sources of wealth were mines, slaves and serfs,  
land, and cattle,  
and the only ways to acquire these rapidly were by inheritance,  
marriage, conquest, or confiscation.   
Naturally wealth had a bad reputation.Two things changed. The first was the rule of law. For most of the world's  
history, if you did somehow accumulate a fortune, the ruler or his   
henchmen   
would find a way to steal it.  
But in medieval Europe something new happened.  
A new class of merchants and manufacturers  
began to collect in towns.   
[10]  
Together they were able to withstand the local feudal  
lord. So   
for the first time in our history, the bullies stopped stealing the  
nerds' lunch money.  
This was naturally a great incentive,  
and possibly indeed the main cause of the second big change,  
industrialization.A great deal has been written about the causes of the Industrial   
Revolution. But surely a necessary, if not sufficient, condition  
was that people who made fortunes be able to enjoy them in peace.  
[11]  
One piece of evidence is what happened to countries  
that tried to return to the old model, like the Soviet  
Union, and to a lesser extent Britain under the labor  
governments of the 1960s and early 1970s. Take away the incentive  
of wealth, and technical innovation grinds to a halt.Remember what a startup is, economically:   
a way of saying, I want to work faster. Instead of accumulating  
money slowly by being paid a regular wage for fifty years, I   
want to get it over with as soon as possible. So governments  
that forbid you to accumulate wealth are in effect decreeing  
that you work slowly. They're willing to let you earn $3 million over  
fifty years, but they're not willing to let you work so hard that  
you can do it in two. They are like  
the corporate boss that you can't go to and say, I want to work  
ten times as hard, so please pay me ten times a much.  
Except this is not a boss you can escape by starting your own  
company.The problem with working slowly is not just that technical  
innovation happens slowly. It's that it tends not to happen at all.  
It's only when you're deliberately looking for hard problems,  
as a way to use speed to the greatest advantage, that you take  
on this kind of project. Developing new technology is a   
pain in the ass. It is, as Edison said, one percent   
inspiration and ninety-nine percent perspiration.   
Without the incentive of wealth, no one wants to do it.  
Engineers will work on sexy projects like fighter planes and moon  
rockets for ordinary salaries, but more mundane technologies  
like light bulbs or semiconductors have to be developed by entrepreneurs.Startups  
are not just something that happened in Silicon Valley in   
the last couple decades. Since it became possible to  
get rich by creating wealth, everyone who has done it has  
used essentially the same recipe: measurement and leverage,  
where measurement comes from working with a small  
group, and leverage from developing new techniques.  
The recipe was the same in Florence in 1200 as it is   
in Santa Clara today.Understanding this may help to answer an important question:  
why Europe grew so powerful.  
Was it something about the geography of   
Europe? Was it that Europeans are somehow racially superior?  
Was it their religion? The answer (or at least  
the proximate cause) may be that the  
Europeans   
rode on the crest of a powerful new idea: allowing those who  
made a lot of money to keep it.Once you're allowed to do that,   
people who want to get rich can do it by generating  
wealth instead of stealing it.  
The resulting technological growth translates not only   
into wealth but into military power. The theory that led to  
the stealth plane was developed by a Soviet mathematician.  
But because the Soviet Union didn't have a computer industry,  
it remained for them a theory;  
they didn't have hardware capable of executing the calculations  
fast enough to design an actual airplane.In that respect the Cold War teaches the same lesson as  
World War II and, for that matter, most wars in recent history.  
Don't let a ruling  
class of warriors and politicians squash the entrepreneurs.  
The same recipe that makes individuals rich  
makes countries powerful. Let the nerds keep their lunch  
money, and you rule the world.Notes[1]  
One valuable thing you tend to get only in startups is  
uninterruptability. Different kinds of  
work have different time quanta. Someone proofreading a  
manuscript  
could probably be interrupted every fifteen minutes  
with little loss of productivity. But the time quantum for  
hacking is very long: it might take an hour just to load  
a problem into your head. So the  
cost of having someone from personnel  
call you about a form you forgot to fill out can be huge.This is why hackers give you such a baleful stare as they  
turn from their screen to answer your question. Inside  
their heads a giant house of cards is tottering.The mere possibility of being interrupted deters hackers  
from starting hard projects. This is why they  
tend to work late at night, and why it's next to impossible  
to write great software in a cubicle (except late at night).One great advantage of startups is that they don't yet have  
any of the people who interrupt you. There is no personnel  
department, and thus no form nor anyone to call you about it.[2]  
Faced with the idea that people working for startups might be  
20 or 30 times as productive as those working for large companies,  
executives at large companies will naturally wonder, how could  
I get the people working for me to do that? The answer is  
simple: pay them to.Internally most companies are run like Communist states.  
If you believe in free markets, why not turn your company into one?Hypothesis: A company will be maximally profitable when each  
employee is paid in proportion to the wealth they generate.[3]  
Until recently even governments sometimes didn't grasp the  
distinction between money and wealth. Adam  
Smith (Wealth of Nations, v:i) mentions several  
that tried to preserve their  
"wealth" by forbidding the export of gold or silver.  
But having more of the medium of exchange would not make  
a country richer; if you have more money chasing the same  
amount of material wealth, the only result is higher prices.[4]  
There are many senses of the word "wealth," not all of  
them material. I'm not trying to make a deep philosophical  
point here about which  
is the true kind. I'm writing about one specific,  
rather technical sense of the word "wealth." What  
people will give you money for.  
This is an interesting sort of wealth to study, because  
it is the kind that prevents you from starving.  
And what people will give you money for depends on them,  
not you.When you're starting a business,  
it's easy to slide into thinking that customers  
want what you do. During the Internet Bubble I talked  
to a woman who, because she liked the outdoors, was  
starting an "outdoor portal." You know what  
kind of business you should start if you like  
the outdoors? One to recover data from crashed hard disks.What's the connection? None at all. Which is precisely my point.  
If you want  
to create wealth (in the narrow technical sense of not  
starving) then you should be especially skeptical about any  
plan that centers on things you like doing.  
That is where your idea of what's valuable is least  
likely to coincide with other people's.[5]  
In the average car restoration you probably do make everyone  
else microscopically poorer, by doing a small amount of damage to  
the environment. While environmental costs should be taken  
into account, they don't  
make wealth a zero-sum game. For example, if you repair  
a machine that's broken because a part has come unscrewed,  
you create wealth with no environmental cost.[5b]  
This essay was written before Firefox.[6]  
Many people feel confused and depressed in  
their early twenties. Life seemed so much more fun in college.  
Well, of course it was. Don't be fooled by the surface similarities.  
You've gone from guest to servant.  
It's possible to have fun in this new world.   
Among other things, you now get to go behind the doors that say  
"authorized personnel only."  
But the change is a shock at first, and all the worse  
if you're not consciously aware of it.[7]  
When VCs asked us how long it would take another startup  
to duplicate our software, we used to reply that they probably  
wouldn't be able to at all. I think this made us seem naive,  
or liars.[8]  
Few technologies have one clear inventor. So as  
a rule, if you know the "inventor" of something  
(the telephone, the assembly line, the airplane,   
the light bulb, the transistor) it is because their  
company made money from it, and the company's PR people worked  
hard to spread the story. If you don't know who invented  
something (the automobile, the television, the computer,  
the jet engine, the laser), it's because other companies  
made all the money.[9]  
This is a good plan for life in general.  
If you have two choices, choose the harder.  
If you're trying to decide whether to go out running or  
sit home and watch TV, go running.  
Probably the reason this trick works so well is that  
when you have two choices and one is harder, the  
only reason you're even considering the other is laziness.  
You know in the back of your mind what's the right thing  
to do, and this trick merely forces you to acknowledge it.[10]  
It is probably no accident that the middle class  
first appeared in northern Italy and the low countries,  
where there were no strong central governments. These two  
regions were the richest of their time and became the twin  
centers from which Renaissance civilization radiated.  
If they no longer play that role, it is because  
other places, like the United States, have been truer to the  
principles they discovered.[11]  
It may indeed be a sufficient condition. But if so, why didn't  
the Industrial Revolution happen earlier? Two possible (and  
not incompatible) answers: (a) It did.   
The Industrial Revolution was one in a series.  
(b) Because in medieval towns, monopolies  
and guild regulations initially slowed the development of new means  
of production.  
  
Comment on this essay.