**RedZone Podcast Episode #102: How Do We Nurture Loonshots? with Safi Bahcall**

Safi Bahcall:00:00 Highlights since the book came out, is ... what's been fascinating to me is that in the last two months or so I just get calls every week, almost every day, from CEOs, or senior folks on executive teams ... well, they're one of two kinds of calls, we have a franchise and it's doing great, we want to make sure we don't lose the momentum and get stale, so how do we nurture loonshots. Or we have a franchise and it's sinking and doing terrible, because we've been attacked by competitors, so how do we nurture loonshots and save the day to rescue the ship.

So I have been called, it's been interesting, and I come in and meet with CEOs and executive teams, and the topics are we're doing franchises okay, how do we nurture loonshots better? And B, our artists and soldiers hate each other, how do we bring everybody together? Those are pretty much the two questions I get. And ... does those sound familiar?

Bill Murphy:01:10 It totally does. And what's really stunning is this has been talked about but not in the way you use language. And I think it's very refreshing to hear about soldiers and artists, because everybody really gets that. And then the real magic is in the champions. And so I think what I'm pushing the digital leaders, NCIOs, and CTOs, and those that really understand these concepts is someone has to usher these ideas ... like the Vannevar Bush, really kind of the modern first CIO for the United States in many respects. Your stories about the generals, and the artists, and how we ushered back and forth, and the back and forth, I think that was ... that's very powerful.

And so 100%, I want to talk about what's current for you, and what's getting you jazzed and pumped about this, and I'll certainly lead the conversations points, but feel free to go down a divergent path, tell a story. There's zero you can say wrong, in fact if you do say something wrong we'll just edit it out. I literally ... it's all meant to just accelerate and build momentum around your creation here. So I just want to ... you have ability to say, "Hey Bill, that really didn't work, can you take that out?"

Safi Bahcall:02:30 Got it, sure, that sounds good. And just remind me the ... the time length that you're going for?

Bill Murphy:02:39 I want to stay ... I want to keep this within an hour, so I usually ... I promise my guests that we start at 10:00 and I like to be wrapped up by 11:00 so you can on to other things. And so ultimately I think we'll probably have a good 45 minutes, 40 to 45 minutes of material.

Safi Bahcall:02:59 Sounds great.

Bill Murphy:03:00 Does that sound like a plan?

Safi Bahcall:03:01 Absolutely.

Bill Murphy:03:02 Okay, fantastic. And the ... if I pronounce your name correctly I would say Safi Bahcall, is that the way you would want me to pronounce it?

Safi Bahcall:03:14 Perfect.

Bill Murphy:03:14 Okay, fantastic. All right, Safi, well I want to welcome you to the show today.

Safi Bahcall:03:22 Thanks, delighted to be here.

Bill Murphy:03:23 Well, this is a real pleasure because I was ... I stumbled into you and your book through the Tim Ferris podcast, and through your good friend, and you had just released a book called Loonshots: How to Nurture the Crazy Ideas That Win Wars, Cure Diseases, and Transform Industries. And so I am really fascinated by your concepts and use of language within the book. And let's talk about this, can you just give ... and I'm going to introduce you prior to jumping in here, so you don't have to give a full biography, but I'm really interested in what was the genesis, what was the spark that launched you to think, "I'm going to create a book on this topic."

Safi Bahcall:04:11 Well about ... let's see, about 18, 19 years ago I started a biotech company, I'd been a scientist before, a physicist, and I'd worked on Wall Street, and consulting in Manhattan for a company called Mackenzie [inaudible 00:04:26], was a management consultant. But I got a little bored of just advising, and I wanted to build something of my own, and I also wanted to do something that was sort of bigger than myself, that could help others who were, for example, patients. I have a number of friends, and then eventually in my own family, my father got sick with cancer and for me it was just enormously motivating to feel that I ... every morning I was getting up and going to work, and I was doing something, working on something. At the time I had built a biotech company that was developing new drugs for cancer, and it was enormously motivating to get up in the morning and feel that if you worked hard, if you did your best, you had a shot at giving people more time on earth with their loved ones.

And so that was how I started, I was building a company, and when I started building a company I read everything I could find about how to be a better manager, be a better leader, and so on. And I started getting frustrated with all these books on culture, culture, culture. The first few of those were helpful, but I was, as a scientist, trying to see if there was something a little more solid I could sink my teeth into. I mean, I would hear culture, culture, culture, after a while I just started thinking yogurt.

And it became especially frustrating when I saw that there were problems that companies would just stuck, there were very promising ideas inside companies that were just stuck, not through any ill will of any individual, but there was some kind of collective problem. And that became very pronounced for me when my father got sick with a rare type of cancer, and I thought, "Well, I'm in the field, I'm in the industry, I'll just call up all the experts, do what I can," and nothing I did made any difference. He died within months.

And over the years I just got frustrated seeing so many promising ideas with drugs or projects that could potentially help his type of cancer, or other types of cancer, just stuck. And again, not through the fault of any ill will of anybody. And so I was just wondering, and trying to think about what is it organizationally that keeps these ideas buried, and why they aren't ... brought into the world faster and better, and was there anything that I could do about that? And about seven or eight years ago I got a call to join President Obama's Council of Science Advisors on a project on the future of national research, how can the country innovate faster, and better, and especially in science and technology. And I was ... the first day, the chairman stood up and said, "Your job is to write the next generation of the Vannevar Bush report."

Unfortunately, I'd never heard of Vannevar Bush or his report. I was not really an expert in history, or certainly in science and science policy. And we had a couple months to write a recommendation to the President of the United States, so I had to do some fast reading. And I learned that Bush helped turn the course of World War II. He was an engineer who came in, who was number two at MIT, he helped turn MIT into the leading engineering university in the country, and the world. And just before the start of World War II had realized the US, the US military, were dangerously far behind Nazi Germany in the technologies that would make a difference in the outcome of the war.

And so he quit his job, moved to Washington, talked his way into a meeting with FDR, the President Franklin Roosevelt. And that 10 minute meeting probably changed the course of the war more than any other such meeting during the war, or since, so it helped shape the future of our country probably more than any other 10 minute meeting. And what I realized was that Bush had come up with a new system for innovating astonishingly fast. And that there were elements of that system that we could borrow today inside teams and companies. And as what he did and the history of that have been somewhat lost to history, even though he was ... and certainly in specialist engineering circles people realize what a contribution he made.

So that was the origin of the book, and then I realized that Bush had this ... he had a genius level feel not only for engineering and invention, but for organization. And I realized that ... he had an intuitive feel of something that you could actually quantify, you could put some science around it, you could understand how aspects of physics, which is what my previous career was when I was an academic, can be useful in helping think about why teams and companies have certain kinds of collective behaviors, especially why teams and companies will suddenly change from embracing wild new ideas, loonshots, crazy idea, ideas that make a big difference but are initially dismissed as crazy. So why teams and companies will suddenly shift from embracing those crazy ideas, to rigidly rejecting them. Which is something in science called a phase transition, when a group ... when a system or a group shifts from one kind of big behavior to another kind of big behavior.

So that's kind of the origin, was when I started with being frustrated running a company for a long time, about how can we develop these crazy ideas faster and better, and then realize that Bush during World War II came up with this great system and there were some lessons in there, and that led to the book.

Bill Murphy:10:26 Yeah, it's really powerful, I had forgotten that part about your father and you, and I knew you were in the industry of ... pharma, and I love that you're using this as a catalyst to help bring new ideas to ... new helpful ideas quicker to market. And what's interesting, the Vannevar Bush example, I remember from you talking about the radar, I guess one of the major innovations was invented in the early ... I think it was 1910, or 14, or 20, but it was well before the World War II. And it got stuck. So you're basically saying ... are you saying that there's some things that we can learn from these things ... inventions being stuck in the past that we can apply to the current timeframe?

Safi Bahcall:11:16 Yeah, that was one excellent example, but you see that over, and over, and over. There was sort of a general principle of what he did and why he did it that you can extract. The radar example is a good example. Despite a lot of stuff that you can read in popular history, it's like code breaking made a difference, for example, code breaking made no difference in the Battle of the Atlantic, which was the crucial turning point of the war when Nazi Germany for the first three or four years of the war had succeeded with their U boats, with their submarines to strangle the Atlantic. They were shooting down more ships every month than the Allies could build, and England, which was at that point the last remaining western European country ... was with three months ... by 1943, was within three months of oil. So they were ... they only had three months of oil left.

So Nazi Germany had succeeded in blocking the Atlantic, code breaking did very little, mostly because the German code breakers were actually reading all the British transcripts, and done actually a better job at breaking the British codes. But microwave radar was, in fact, the tool that allowed the pilots who were flying and patrolling the Atlantic to see the U boats, and eventually shoot them down, and within the course of a few weeks after microwave radar was first released over the Atlantic, the Allies sunk ... Allied pilots sunk probably ... sunk roughly a third of the entire U boat fleet within four weeks. And then the Battle of the Atlantic was over within another six weeks.

So that technology really did help change the course of the war, and it was developed by Bush and his team of loons. It was one of ... it wasn't the only crazy idea in new technology that made a big difference, but it was probably the most important one. And ... the popular histories that you read attribute the discovery of radar to ... some scientist in England in the mid 1930s, but in fact, the principles of radar and the technology that was used was discovered many years earlier inside the US Navy in the naval research lab, in the early 1920s. But it just sat there. It was like we were just talking about this incredibly important new technology that ended up making a difference in the course of the war, sat there for 18 years, without being developed in the way that it could. And in fact, it clearly would've made a big difference in Pearl Harbor, because the technology allowed you to see enemy planes.

But it had ... the radar technology for detecting enemy aircraft had been launched ... had been developed just a few months before Pearl Harbor was actually in place in Hawaii, but the people there had no experience in it, and were unable to understand the early signals that they were seeing and so it came too late to save several thousand lives in Pearl Harbor.

But the bottom line is, there was a principle that Bush teased out ... which is that when you organize people into a team, or a company, or any kind of organization, you will always create two phases. Just like when you bring molecules of water together, they can assemble into two phases, liquid or solid. When you bring people together into a team, or a company, or a group, that has a mission and a reward system tied to that mission, for very similar reasons as the glass of water, there will be two phases. In one phase ... and this sounds like an analogy or a metaphor, but actually you can sort of quantify that mathematically and show why that happens.

In one phase, you can think of that as the artists, creating wild new ideas, the organization will embrace that. And the other phase you can think of as the soldiers, which is focused on discipline, execution, franchises. And the way to think of why that happens is that just like in a glass of water, whenever you assemble something together, you will create ... and you create two competing forces, whenever you bring let's say molecules together and you create two competing forces, as you adjust the balance of those two forces, you will get a sudden shift. In the case of a glass of water, for example, one of those forces makes molecules want to run around and be free, that's called entropy, it's just a fancy word for run around and be free. And the other is called binding energy, which wants to lock them rigidly in place. Every molecule 2.8 angstroms, not 2.7 or 2.9, from its neighbor.

And as you lower temperature, entropy gradually gets weaker and weaker and binding energy gets stronger and stronger, until at 33 Fahrenheit, boom, they cross. And the system suddenly snaps. You can think of culture as the pattern of behavior that you see. Molecules sloshing around, or molecules locked rigidly in place, you can stick your finger and swish it around in one case, but if you put your finger into a block of ice, of course it doesn't go through. Those patterns of behavior are entirely different, but the molecules are exactly the same.

And what's even more interesting, there's no CEO molecule. There's no CEO molecule with a bullhorn that says, "Oh, it's 33 degrees, everybody slosh around. Oh, wait, it's 31."

Bill Murphy:17:14 Right.

Safi Bahcall:17:15 "Everybody lock rigidly into place."

So you can think of culture as a pattern of behavior that you see. And you think of structure as those small changes in organizational design that can transform culture, transform those patterns of behavior. In other words, structure can drive culture. So there's this saying in business, culture eats strategy.

Bill Murphy:17:41 Drucker-

Safi Bahcall:17:41 For breakfast.

Bill Murphy:17:42 Yeah, I think Drucker came up with that, right?

Safi Bahcall:17:44 Yeah, it's certainly attributed to Drucker. It's always hard to track down these things, but the cliché is culture eats strategy for breakfast, so what I'm saying is structure eats culture for lunch. In other words, a guy yelling at a block of ice, yelling at those molecules, "Hey everybody, move around a little bit, slosh around," will do nothing.

Bill Murphy:18:06 So-

Safi Bahcall:18:07 On the other hand, a small change in temperature can get the job done, a small change in temperature can melt steel.

Bill Murphy:18:14 So if I could tease out the structure piece a bit, for our listeners, so you had talked about this concept of soldiers and artists, and you've just mentioned it, one of the thoughts that I had was how do you ... you also had brought up the concept of a champion, and ... is structure a bit deeper than those three concepts?

Safi Bahcall:18:41 Those three concepts are what you need to know to kind of implement this inside teams and companies. So one of the thing ... it's been kind of fascinating since the book came out, it may sound like we're talking a little technical, but of course as you saw the book is sort of practical stories and practical lessons you can use. But the reason it matters so much is that as everybody knows, fixing culture is hard. No amount of forcing people to watch two hour videos and sing Kumbaya, and hold hands is going to change culture. But fixing structure can be much easier.

And one of the things ... there's this sort of a series of principles or rules that you can apply, and I'm now getting called by so many, almost every day, CEOs or executive teams who have ... I get one of two calls. And it's kind of fascinating because I worked in biomedical research and cancer research for the last 15 or 20 years, and I'm getting calls from newspapers, tech companies, film industry, entertainment-

Bill Murphy:19:51 Wow.

Safi Bahcall:19:51 Manufacturing. Just so many ... real estate, so many CEOs or executive team folks, and it's one of two calls. Our franchise is pretty good but there are some threats we're worried about, how can we nurture loonshots better so we don't get stale and don't get surprised? Or our franchise used to be great, and now it's sinking fast. How do we nurture these loonshots, these crazy ideas, to help us rescue our business? So it's essentially the same call, we're good at franchises, how do we get better at loonshots, just the sign is different. In one case the franchise is growing, in the one case it's sinking.

Bill Murphy:20:38 Yeah, that's interesting-

Safi Bahcall:20:39 Yeah.

Bill Murphy:20:40 Just two ... just one ... or actually just a minute, if you could ... I'm using ... I think people get it when they listen and hear the word franchise, but I think we should take just a couple seconds and just define ... it's funny, we're defining this halfway in, and I think that's really, really cool because loonshots means something because most people hear the word moonshot. And they're like, "Okay, what does this mean, loonshot?" And then also, how do you define a franchise, because a franchise, is it a Subway franchise, or are we actually talking about something within an organizational structure?

Safi Bahcall:21:14 Sure. Let me do it even by example, by going back to World War II. So everybody knows what a moonshot it. A moonshot's a big goal, a destination, for example, Kennedy in 1961 told Congress, "We're going to put a man on the moon," and that was the original moonshot. Big goal, exciting destination. Kennedy at the time was widely applauded for saying that. But, how did we actually get the moon? Forty years before Kennedy there was a guy named Robert Goddard who suggested the idea and the principle that got us there, which is liquid fueled get propulsion. But for the next 20, 30 years Goddard was ridiculed. In fact, the New York Times took out an editorial and said, "Oh, this Goddard, this physicist doesn't understand the basic laws that we teach our children in high school, action and reaction, rocket flight will never work in space."

And it was 14 years after Goddard's death on July 11, 1969, the 50th anniversary is coming up, right after the successful Apollo launch to the moon the New York Times took out a retraction. And they said, "Well apparently rocket flight does not violate the laws of physics, and the Times regrets the error." So the moonshot, Kennedy's original declaration was a moonshot. Goddard's ideas were a classic loonshot. A moonshot is a destination. A loonshot is the crazy ideas, often written off for years or decades, that turn out to be very important. And so what we want to do ... declaring moonshots is just declaring a goal, it doesn't help us very much. What we want to do to figure out how to get there is nurture these ideas that challenge our accepted beliefs, that challenge our wisdom, like we can never launch a rocket, rocket flight will never work in space.

So that's what a moonshot is, and what a loonshot is. So I mentioned when we started that Vannevar Bush talked his way into a meeting with FDR, and that meeting turned out to be very important. What he told FDR was, "There's a war coming and we're going to lose this war. The Nazi's are far ahead of us in these technologies that are going to make a difference and the military will never catch up in time," and he told FDR, "I want you to authorize a new group in the federal government that will report only to me and I will report only to you, and I will develop the weapons the military's unwilling to fund."

So what Bush understood there is that the ... not only he couldn't change military culture, but he shouldn't. The military was excellent ar franchises, and by franchises I mean building more of the stuff faster and better that you already have. So they were terrific at building more guns, more planes, more ships, at directing millions of soldiers in battle across four continents. And you needed that. Bush absolutely understood that you needed that phase, that you can think of that as the solid phase, the ice phase, the rigid phase where you're trying to minimize risk. When you're making guns or directing soldiers in battle, you don't want a lot of risk and sloppiness, you want very high accuracy. On the other hand, you needed a completely different phase, let's say the liquid phase, when you are inventing the wild new ideas that will be very important. Because there you want a lot of risk. So for example, artists and soldiers. What Bush realized was that you need to separate those two because a system can't be in two phases at the same time. You can't have a glass of water that's both liquid and solid, it makes no sense.

Every now and then when I give this talk, I get asked, someone asks, "Well what about a Slurpee?" Just for the record, a Slurpee is a liquid, kind of a disgusting sugary liquid in which there are suspended particles of ice that are rapidly melting. If you wait five minutes, it'll be all-

Bill Murphy:25:16 Yep.

Safi Bahcall:25:16 Disgusting sugary liquid. So I'm talking about a stable situation, not one that if you wait five minutes it's gone.

So you need to separate your artists and soldiers, because they speak totally different languages, they're doing totally different things. For example, to a soldier the word risk is a terrible thing. Imagine you're going out onto a battlefield and it's a high risk situation. The commander of that battlefield, if he says to his general, "Well I've de-risked the situation," the general will be like, "That's fantastic, you've taken the risk out of that battle, that's excellent."

Now imagine going to an artist and saying, "You've taken all the risk out of your art." That's a horrible insult.

Bill Murphy:25:59 Right.

Safi Bahcall:25:59 So it sounds like ... the word risk is one word, four letters, it should mean the same thing to everybody but it doesn't. It means two completely different things to artists and soldiers. So the first thing you need to do, and this is very relevant to teams and companies, is separate your artists and soldiers because they speak different languages, they come from different places, and they're trying to maximize, they're trying to achieve different things. Artists, people working on really creative, risky projects need to try 10 different things, nine of which will fail, and that one pushed the envelope and succeeded, that's the big important breakthrough.

Soldiers, on the other hand, if your job as a soldier, for example, is to manufacture planes, you're not going to do very well if you say that your strategy is, "Here's what I'm going to do, you guys launch 10 planes into the sky, I'm going to sit back in my chair here and we'll see which nine fall down from the sky, and we'll keep the one good one." That's not a good strategy.

So you need to separate your artists and soldiers, and some companies get that, but the key, this is what Bush realized ... and where most companies fail, they just, let's say create an innovation lab and they put their crazy scientists, or artists, or engineers, and designers in the lab and they're focused on taking a lot of risks. And the soldiers, off on the battlefield, let's say it's product development people, or marketers, or regulatory people if you're in the biomedical world there's obviously a lot of regulatory stuff you have to deal with, as well as clinical trial, execution and operations. So you separate those two and then they're isolated. And what you have to realize is they never like each other, and that's fine, that's normal. Soldiers tend to resent ... are the ones who are bringing in the money, and they tend to resent the people who are just happily spending the money.

Bill Murphy:27:54 Right, right.

Safi Bahcall:27:55 They speak different languages, they can get very frustrated, especially if management or leadership, as is quite common, tends to prefer one or the other. If leadership says, "Oh," glorifies, as you often read in business magazines, in these color glossy articles, glorifies the new idea, and the creation, and everybody should be innovating, it really pisses off the soldiers who are focused often on what brings in 90, 95% of the revenue in the company, and delivering products on time, on budget, on spec, to customers consistently. And if leadership ... as one friend of mins who is putting out a major magazine said, the leadership, the management there was always focused on and paying attention to whoever was squeaking the loudest about some innovative shiny toy. Which really pissed off the 90, 95% of people who were doing the hard work of putting out a magazine every 30 days.

And when the CEO leaves the room, the only way products move forward is if the artists and soldiers collaborate. Anyone who's worked on an innovative new product knows that just having the concept the idea gets from you from your goal on to maybe your two yard line. And the other 98 yards down the field, it's the soldiers who are turning that concept into a product that you can manufacture and deliver on time, on budget, on spec. So they have to be able to collaborate, and it gives ... which gives you a different way of thinking about what it means to be a good manager or leader. There's this myth of the good manager or leader as a Moses that stands on top of a mountain, raises his or her staff and anoints the chosen loonshot, the crazy idea that's going to transform or save the company, the iPod, or whatever. But that's just a myth, that's not the reality.

The truly great organizations, and the truly great leaders, ones that have built sustainable, innovative organizations that move faster and better than their competitors in creating new products and getting them to customers, the leader, the management thinks of themselves more as gardeners, less like a Moses. Your job is to manage the touch and balance between the artists and soldiers. The artists may come up with the new ideas, the soldiers may develop them into products and get them to customers, but since they speak different languages, they don't understand each other, their incentives are not aligned, the artists creates some new idea and then it's like, "This is my baby, look how beautiful my baby is." It's not the soldier's baby, they just see this ugly thing covered in work that's squeaking and crying, and it's not fully formed, it's not an adult, it's not mature. If they take whatever product comes out of the artist and give it to their customers, half the time it'll blow up, nobody can understand how to use it, they have to cut lots of time out of their day, which is not what they're paid for, to give the feedback, and to try to get it to improve.

So the truly great managers and leaders realize that the failure point in innovation is not in the supply of new ideas, but in the transfer to the field. Both ways. And that's what I call dynamic equilibrium, because the one exception to the rule that a system can't be in two phases at the same time is right at 32 Fahrenheit. Right at the cusp of a phase transition, water can be both liquid and solid at the same time, and the way it works, the secret sauce, is two things. You separate those phases, you get blocks of ice and pools of liquid. And the second is you get dynamic equilibrium, you get molecules going back and forth between the two. And when you translate that into teams and companies, what it means is managers are focused on the transfer of ideas. How and when do we get those baby ideas out of the lab and into the field? How and when can we get the feedback from the field back to the scientist and the ... to the scientists, the designers, the programmers working on the product, because nothing ever works well the first time, and if you don't get the feedback appropriately and quickly enough, and in correct detail enough, that product is just going to die, because first versions are always terrible.

So, the two ingredients there are phase separation and dynamic equilibrium. Separate your artists and soldiers, manage the transfer, not the technology. And you mentioned project champions, one of the things that we've learned the hard way in the biomedical industry, and in large research labs, where the equivalent of our artists are the creative biologists and chemists who are coming up with new ideas, and new ways to treat diseases, and the equivalent of the soldiers are the people who run clinical trials, very large, a thousand person clinical trials, and operations, and eventually the regulatory people and the marketing people, who turn those concepts for new drugs and new treatments into products that you can deliver to hospitals, to physicians, to patients.

So you have the artists and soldiers in all the same kind of conflict that I talk about. And one of the mistakes that companies make all the time is they think about ... they think that, well, the scientist, or the designer, or the programmer, or the artist who comes up with a new idea should be the champion of that idea, it's his or her idea, so he should be able to go over to the soldiers and get them to use it. The problem is that most really creative scientists or engineers or designers are not very good project champions. What you need for a project champion is someone who speaks both languages. You need a bilingual specialist. And if you're, let's say, a biologist, you haven't been trained to speak in marketing, or product development, or regulatory language. And vice versa, if you're a regulatory guy, or an operations person you haven't been trained to speak in a language that the scientists understand and care about.

So one of the things that a lot of companies in my field have learned the hard way, is that you need to create a new role, which is essentially a project champion, which is someone who is bilingual.

Bill Murphy:34:28 Makes sense.

Safi Bahcall:34:28 Who can ... yeah.

Bill Murphy:34:30 And that's the role that Vannevar Bush played between the generals and his innovation group that he set up, correct?

Safi Bahcall:34:41 That's right, and that's ... so what Bush was terrific at was ... and one of the things that made him succeed where almost everyone else before him failed, is that he loved both sides equally. He understood that you need to love your artists and soldiers equally. And if, very often, let's say a scientist or a product person, or engineer has this idea that I do the really hard work, I have the invention, I have the new idea, and those folks are all sort of the grunts who get it down. Well, if that's your attitude, how much impact do you think you're going to have? Zero.

Bill Murphy:35:21 Well yeah, and it's interesting, you made the ... bringing ... kind of fast forwarding to the current day, we celebrate Steve Jobs, but he was a pretty flawed character in many respects, and learned the hard, and you make the point in the book that now, when he came back to Apple to resurrect the dying franchise, he had Jony Ive and Cook, right, Steve Cook? Is that ... are those the two people he balanced himself out with?

Safi Bahcall:35:49 Right, so when I ... sort of the short answer of what you can do, the three things I talk about ... this is I don't remember words very well, I think of them visually, is the ice cube, the garden hoe, and the heart.

Bill Murphy:36:04 Okay.

Safi Bahcall:36:05 The ice cube means separate your artists and soldiers, and then I'll come back to how this played out in Steve Jobs' case and what the popular histories get so wrong. The ice cube is separate your artists and soldiers. The garden hoe means be a gardener, not a Moses. Manage the touch and the balance between those two groups, the transfer not the technology. And the heart may be the most important. The heart means love your artists and soldiers equally.

So, in the Steve Jobs ... sort of popular versions of this story, what they miss is that when Steve Jobs was this myth of this person who championed innovators and crazy new ideas, and was kind of this Moses that stood on top of a mountain and anointed the chosen projects. When Jobs led like that, it was a disaster. So in this first version ... first time at Apple, when he was in his 20s and working with Wozniak in the 80s and had built the Apple 2, which was a hit initially, and then started to struggle as other competitors soon passed them by pretty quickly with other personal computers, they needed a follow on product that was their franchise, the Apple 2. They needed a follow on product and so there was someone working in the corner on a project called the Macintosh, and Jobs took it over. He had not done well on the Apple 3, another franchise project. And he said, "All right, you guys are the artists. You're the pirates, you're the crazy working on the crazy new ideas, and everybody else working on the franchise are a bunch of bozos. They're regular navy, regular soldiers."

The hostility he created between those two groups was so bad that the folks working on the franchise, which brought in 90, 95% of the revenue of the company, was so bad, they took to wearing a button with Bozo the Clown in a red circle and a slash through it saying, "We're not bozos." And it really ... it got to the level where the street between their buildings was called the DMZ, the demilitarized zone.

Bill Murphy:38:16 Oh, no.

Safi Bahcall:38:18 And people were leaving on ... when you create that kind of hostility, people were leaving on both sides, his co-founder, Wozniak left and so on. And people started leaving his group, and when the Macintosh launched, it was a flop. It had a great ad, the Super Bowl ad, but the product was too slow, too hot, didn't have a hard drive, it just wasn't useful. So Apple ... and they didn't have a good franchise product, a follow on to the Appl 2 ready, so Apple started sinking and Jobs was justifiably asked to leave. But when he came back 12 years later, what did he do, he appointed Jony Ive, kind of the ultimate artist, product designer, if you have something in your pocket or wrist from Apple, it was probably designed by him or his group. And then he brought in, to run operations, a guy named Tim Cook, whose title at his previous company, Compact, and his previous job as head of operations there, was the Atilla the Hun of inventory. And if there's a better name for a soldier inside a company, I don't know it.

And so Jobs led not by as a Moses and saying the artists and great, and the soldiers suck, but loving both sides equally. Both his artists and his soldiers. And when he died, who was it that took over? Not the ultimate artist, but actually the soldier, Tim Cook.

So the ice cube is separate your artists and soldiers, the garden hoe is lead like a gardener, not a Moses. And the heart is love your artists and soldiers equally. There's, of course ... there's a lot more to it, and certainly when I come in and talk to teams and companies there's a whole nother ... whole additional level of detail on how to make that happen in practice, but that's kind of the big picture, the ice cube, the garden hoe, and the heart, about how to bring your artists and soldiers together so that you can both deliver franchise, and nurture these loonshots, these crazy ideas simultaneously in parallel. So you can defend your turf, grow your turf, as well as succeed over the next five or 10 years.

Bill Murphy:40:43 We only have a couple minutes left, and I ... there's a couple ... there's one concept in particular that ... I love the way you deconstruct popular concepts, and one of them is you really throw this idea ... you really challenge the concept of teamwork, and let me just give some ... I stumbled into your book while I was also reading a simultaneous book on ... called The Formula by Lazlo, and the irony is I know you referenced, at one point, him in the book and then you have this whole really section based on ... teamwork, and I think the popular myth that a lot of people ... that we need innovation, we need teamwork, and we need ... we need to separate these people, and everybody has to work as a team, but it's much more nuanced than that. And I'm just wondering what your thoughts are on this role of the champion in leadership, and how people can play ... what the role of a leader is in nurturing loonshots within organizations.

Safi Bahcall:41:51 Well I think you have to ... understand, if you're a very large company like the US military, you can separate into a group of soldiers that's focused on manufacturing planes, or delivering munitions, and then you have DARPA, that's working on crazy ideas. You could clearly separate that in time and place and have very different people. But if you're a smaller or a medium sized company, and a lot of groups that I talk to are smaller or medium sized, you can't necessarily separate ... create a DARPA for your own organization very easily.

But what you can do is separate the role in time. So you can have groups of folks that work on getting the product out on time, on budget, on spec, and then take a break, whether it's one day a week, or a couple days a month, or one week a year, to take off their soldier hat and put on their artist hat where they flip 180 about how they think about their job and what they're doing, rather than trying to minimize risk, they're actually trying to maximize it. They're trying to push the boundaries of all the things that they're sure is true, all their assumptions and embedded beliefs, and flip them 180. What if they weren't true? How would we make it work?

And if you create ... I sort of hate the word of sort of safe space, and blah, blah, because it sounds politically correct, but what you really need to do is create a safe space for people to take off their soldier hat, and the way to save that concept is to understand it's a limited time, you're going to be wacky and crazy, and risky, and try things that seem nuts for a week. We're going throw as many crazy ideas as we can out there, and at the end of the week, we're going to test them, get as much data as we ... early, early stage data, prototype data, as we can. And at the end of the week we're going to pick, let's say, three things and then we're going to take off our artist hat, put back on our soldier hat, and develop those next several things.

So as a manager of leader your job is to separate your artists and soldiers, either by group, or by time. And then manage the transfer, manage the nurturing of the baby state idea, you help it grow up into an adult, you help it get the feedback that it needs to grow and mature. So the role of the manager is a little different than what we usually think. There are a lot of these sort of books that say, "Oh, the CEO must be the CIO, and everybody should innovate." Well, it's not true that everybody has to innovate. If someone's just answering the phone, and that's their job is to take care of customers, sometimes you just want them to answer the phone. You don't have to innovate how you pick up the phone and how you pull it to ear, and what you say to a-

Bill Murphy:41:51 Right, right.

Safi Bahcall:44:50 Just answer the phone and try to do a good job with your customers. Somebody else can invent a whole new kind of phone, that's not your job. So you need to separate those processes.

Bill Murphy:45:03 Well, I think that's one of the things that people are looking for today, especially with my audience, and there's just countless examples that there's no doubt that this book has accomplished your mission of being able ... I believe, in order to speed up innovation by giving a new lens, I just think the word is so overused, and it's so Silicon Valley-esque, and this has made it very, very practical with actually grounding these concepts in history, and then bringing in them ... it's like bringing them backwards and forwards, and backwards and forwards, because you give an example ... and then we can wrap up with this because it's so much fun, it's ... I didn't even know this, and I love history, is China and India were so far in front of us, or in front of the western world. And maybe you can just give, as a wrap up, that story, and then we can ... and we can bring this to a closure.

Safi Bahcall:45:59 Sure. And it's interesting because probably in the last week or two I've been on a tour of ... quite a few Silicon Valley companies, many of whom who have engineers who are either first generation or second generation descent from China or India, and so this story has really resonated with them. But when I grew up here in the US, I'd very often hear ... well, the way the world got modern, the way we learn modern science and industrialized was there was the Greeks, the Nothing, the Newton, then boom, we're done. That's like the 30 second version of-

Bill Murphy:46:40 Of history.

Safi Bahcall:46:42 Of history. Of the history of science, and history of industrialization. And that's just so far wrong on so many levels of what really happened. What really happened was that China, India, and Islam were so far ahead of western Europe. Enormously far ahead of Western Europe on the early versions of science, and technology, and organization, and education, for about a thousand years, from the middle of the first millennium, around 500 AD, to the middle of the second millennium, around 1500, 1600. For example, paper and printing was invented in China about a thousand years before Western Europe, the compass, gun powder, the advanced irrigation, advanced mining. The kind of things that didn't appear in Europe for centuries were already in place in China.

The education system was training a class of scholar elites for 700 years. The Imperial Civil Service Exam, 700 years before anything comparable ever appeared in Western Europe, before the first university ever opens its door, seven centuries.

Bill Murphy:46:42 Just amazing.

Safi Bahcall:47:54 The most widely used textbook in Western Europe, a medical textbook, was written by Ibn Sina, an Islamic scholar from the 11th century, and it was used for 700 years. Imagine using a textbook today for even seven years. Seven years would be out of the question, that was 700 years, so many of the early advances in astronomy, and optics, and certainly in mathematics, the algebra, which originated in ... and the numeral system which originated in India and traveled through Islam, arrived in Western Europe more or less fully formed, and in fact many of the advanced mathematical techniques in Copernicus's early work were taken straight from advanced Islamic astronomers.

So why did modern science originate in Western Europe? Why did modern science, and all these tools and ideas that helped a tiny little nation like England, and the Western European nations essentially overturn these massive empires, China and India? Why Western Europe? China and India had 50%, more than 50% of the world GDP. England had about half a percent. It was almost an irrelevant backwater.

Well what you and I have been talking about is how do you nurture loonshots inside teams and companies. The reason ... and why teams and companies and industries separate into these large global players that develop franchises, and these small little companies that nurture loonshots. So just to ... I'll mention in industries, because that kind of gives you the sense of what happened in world history, but in industries, let's say in the film industry, you have Columbia, Universal, and Paramount that develops franchises. Let's say the next Avengers movie in the case of Disney, or the next Transformers movie, or the next James Bond movie, those are big franchises. Then you have the hundreds of small production shops in Hollywood that nurture loonshots, things that are written off by the major studios. My Big Fat Greek Wedding, or Juno.

Bill Murphy:50:06 Right.

Safi Bahcall:50:08 In my industry, you have the Merch, Phizer, Novartis that develops franchises, the next statin drug, the next ulcer drug. Then you have the hundreds of small biotechs in let's say Boston, or San Francisco, that develop the crazy ideas, the crazy new drugs that nobody thinks will work. Well at Merck, Phizer, and Novartis, they need those small biotech companies, they develop those franchises, they're very good at them, but they struggle to develop loonshots. And those large companies often get taken out when one of those loonshots succeeds.

So China, India, and Islam were the Merch, Phizer, and Novartis of the day. They were the Columbia, Universal, and Paramount of their day. They were fantastic at franchises. They built the Great Wall in China. Nothing like that existed in Western Europe. The Grand Canals and Canal Locks were invented in China, that allowed massive, massive scale irrigation. Nothing like that existed in Western Europe. Advanced mining techniques which didn't exist in Europe until centuries later. They were phenomenal, China was phenomenal at franchises, as was India, building the Taj Mahal, for example. But they were not good at loonshots. Just like Merck, Phizer, and Novartis, or Columbia, Universal, and Paramount, because those loonshots struggle inside these global, major franchise organizations. But they do well inside loonshot nurseries. In Western Europe, with its hundreds of tiny little kingdoms and nation states, was the loonshot nursery of world history. That's where a crazy idea might have a chance at succeeding.

Here's an example of a crazy idea, the earth travels around the sun, not the other way around. That's obviously a crazy idea. Because anybody can see if you look into the sky, you shouldn't look directly at the sun, but anybody can see that the sun and the stars and the planets travel around the earth.

Bill Murphy:52:10 Right.

Safi Bahcall:52:11 Well, and if you suggest, as Copernicus did in the early 1510s, if you suggest that maybe it's the other way around, that the earth is spinning on its axis, well, if the earth is spinning so fast on its axis, an entire revolution every 24 hours, why aren't birds flung from their nests? There are all these ... loonshots always look crazy when they first start. Nobody had an answer, that's why Copernicus's idea was buried for 80 years. In fact, that same idea, that the earth rotates on its axis, had appeared in India about a thousand ... well maybe six, seven centuries earlier. But it was quashed, because at the time that was an empire. So-

Bill Murphy:52:59 Yeah, that's amazing.

Safi Bahcall:52:59 Western Europe was the loonshot nursery of world history, and that's where the mother of all loonshots, this idea that there are laws of nature and we can understand them, took hold, and ignited, and gave us things like the compression of gases, the steam engine, and that led to industrialization, and that led to defeating these much larger empires. So the emperors of China, Islam, and India learned the hard way the lesson that so many rulers have been learning today. Missing loonshots can be fatal.

Bill Murphy:53:34 Well, with that, that's literally ... this is a primer, this is a ... I'm sure this book is going to make its way into every major university, because it's ... it just changes our whole language around innovation, and using this loonshot principle, and Safi, I'm just very ... you've achieved your goal and I'm so ... we had talked about what the purpose of developing this book is in the beginning with the death of your father and how you could exponentially make a change in the world, and this book is going to do that. And I really appreciate you for your time sharing your wisdom, and I'm going to write up on our show notes how people can access the book, they can buy in on Amazon, and support your work as best as I can.

Safi Bahcall:54:22 Great, thanks, I enjoyed talking to you, Bill.

Bill Murphy:54:24 Thank you, Safi, and hopefully we can do this again someday and I appreciate your time very much.

Safi Bahcall:54:24 Absolutely.