TAMARA CARLETON, PhD

WILLIAM COCKAYNE, PhD

BUILDING MOONSHOTS

50+ WAYS TO TURN RADICAL IDEAS INTO REALITY

WILEY

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Introduction

This book focuses on how the world moves forward in huge leaps, built by the hard work of visionary teams. From our backyard of Silicon Valley to our time spent working with pioneering organizations in the world's innovation ecosystems—pick your list, and we will introduce you to an amazing team there—we have had a front seat into the many ways to imagine, invent, and deliver a radically better future. We have taught at the world's leading research universities and business schools, huddled with young teams pursuing outsized visions, and advised teams and leaders across the Global 1000 and six continents. Across all this work since the 1990s, the same questions keep surfacing, which we can shorthand as: are there proven ways to do this?

Moonshots are a class of innovation that drives humanity forward. We realized there is a need to collect the stories, share the examples we use regularly, and capture the questions that teams should ask themselves, all in their pursuit of how to build moonshots. In our goal to explain the how-to to teams, we realized it wasn't just a quick list of the best practices or a double-clickable process to follow. There is not one canvas for these types of radical ideas. Instead, there are numerous ways that have proved successful across different types of organizations seeking to go big, some of which relate to adopting a moonshot mindset, inventing what does not yet exist, and making the big bets. Which led us to 50+ ways for building moonshots. The world needs moonshot solutions more than ever, which can only happen when people like you imagine, invent, and build your big dreams.

Moonshots Change the World

Humans have long been fascinated and motivated by imagining the almost impossible, then making it happen. This class of innovation is often described as *moonshots*. Although the term's origin refers to literally going to the moon as the world's

first lunar landing—a giant leap for mankind following government decree as part of the US Apollo spaceflight program—a moonshot today has come to signify much more than this type of big government project.[1] Moonshots are world-changing breakthroughs. It couples the almost impossible vision—to one day land on the moon—to the actual achievement. A white paper isn't a moonshot. A vision statement isn't a moonshot. History tells stories about the teams who make big ideas real.

Moonshots are a special class of problem that fall under coordinated complexity. Moonshots mix long-range planning with grand scale, so understanding how to imagine, develop, and achieve these big ideas requires both knowledge of the long term and knowledge of producing extraordinary outcomes. Moonshots are not simply user-led or consumer-driven solutions. Moonshots require passion. They demand visionary leadership. What others view as unapproachable risks become a smart bet. In essence, a moonshot is an almost impossible vision with world-changing impact. Moonshots are distinctive for these three underlying elements:

- **Almost impossible.** A moonshot has an unknowable path at its start, which feels ambitious and extraordinary. Various moonshot definitions describe the executional challenge of this near impossibility, using phrases such as "pressing societal challenges," "intractable," and simply "hard to do." Based on what is known at the time, delivering that moonshot requires new knowledge and/or the invention of new technologies, often called as *breakthroughs* and typically shifting a current paradigm of thinking or doing in society.

- **Vision.** A moonshot presents a bold vision of what the future should be, which guides actions into achievement. When people describe moonshots, they use words such as *lofty*, *bold*, *visionary*, or *radical* to capture the magnitude of the vision. What makes a moonshot exceptionally big and hard is that it has not been tried before, so few, if any, precedents exist. The moonshot vision unites a team and sets the expectation that the moonshot will take time to build.

- **World-changing.** A moonshot creates the possibility for great change. A moonshot outcome is meant to be tremendous, making a better future for humanity, not just outrageous returns for only the investors. Bluntly, this means that many unicorns—startups with billion-dollar valuations—are not moonshot worthy. You often hear the expected scale of moonshot impact noted in grand terms such as *exponential*, *10X*, *transformational*, *disruptive*, *abundant*, or *a billion people*. The moonshot teams involved have the intention to build and see the value of making their moonshot happen for society.

Frankly, all types of innovation are essential in propelling humanity forward, whether they are called *grand challenges*, *earthshots*, *longshots*, *loonshots*, or another name. As part of the overall innovation mix, moonshots matter because they pull

people out of operational mode, creating a lasting paradigm shift. "But that's impossible . . ." is a superb starting point for moonshot opportunities. As science fiction writer Arthur C. Clarke put it once, "The only way of discovering the limits of the possible is to venture a little way past them into the impossible."[2]

A Big Need for Moonshot Knowledge

In recent years, a growing number of groups have announced major efforts in pursuing, funding, and promoting innovation that focus on moonshots. As some offhand examples, these groups include Schmidt Futures, Alphabet's X the moonshot factory, and the Melinda and Bill Gates Foundation in the United States; the UK's Advanced Research and Invention Agency (ARIA) and the Royal Foundation of The Prince and Princess of Wales in Europe; and Japan's Science & Technology Agency and Yamauchi No 10 Family Office in Asia. Across organizations like these, there is no available go-to guide for building moonshots, which highlights more ways to achieve results beyond standard practices.

As we personally heard this need in our own circles, the growing volume of requests finally tipped us to make the time to write the book we know should exist. We deliberately take a positive and constructive tone, framing the work of moonshots and providing a rich reference list on what a team can do and how to do it. In this book, we often alternate between referring to moonshot leaders and moonshot teams as shorthand for the type of people who are pursuing a moonshot. We expect our readers' roles to range like the moonshot groups themselves, as many of you will be involved in government agencies, family offices, internal corporate units, new startups, foundations, associations, and more.

A shared thread across all these moonshot roles is the commitment to go bigger. This belief is foundational for the hard work of moonshots. Simply, the power of bigger thinking helps teams to move outside of their comfort zone and start seeing more possibilities ahead of them. In turn, this mindset shift helps to raise their ambition, and as the team's confidence and belief grow, they see that they can do things that they didn't think they could do before. When teams think bigger, they also ask more of themselves. They try harder and reach further because they feel part of something greater that they are directly responsible for creating. This affirmation provides its own reward, keeping teams motivated on a moonshot's long journey, because they know they are changing the world.

As important, the world needs this moonshot knowledge. From our experience teaching at different universities and other school programs these last few decades, the youth especially want to change the world—and often don't know where to start. They want a reliable source that encourages more "anything is possible" dialogues on how to solve the big challenges they see, as well as giving them actual tactics to make change happen. This book is their open door to finding a community of kindred spirits, especially others like them with all the wonderful hell-bent energy that youth tend to bring.

Why 50+ Ways

This book combines more than 50 different ways for building moonshots. Why this set of ways? Because these ways emerged from repeated questions that we heard in our circles, their extended networks, and across broader calls related to making moonshots real—when leaders and teams became serious and moved past the talking and dreaming and wanted to know how to really do it.

We call them *ways* because they describe a recognizable set of related activities and principles, often with corresponding tools and guidelines that have been developed and refined over years of experience. You can find examples of ways in action across history, which offers additional durable evidence on how to practice them in different contexts. At Stanford University—where we have run a summer moonshots program for several years—undergraduate students can choose nearly a dozen courses from a core set of "Ways of Thinking/Ways of Doing" that are foundational to Stanford's general education.[3] Other organizations in industry and the public sector we know have introduced ways of working that embody their unique organizational approach.

We prefer not to use the term *best practice* for these 50+ ways, because what is best for some groups is not necessarily best for all. Moreover, a best practice is typically understood as an accepted technique leading to superior results or a group of tasks that optimizes either work efficiency or effectiveness. In terms of moonshots, the reality tends to be much more complex and emergent.

To make the book easier to use and navigate, we have clustered similar ways into nine thematic categories or *meta-ways*. The order of meta-ways is not meant to be strictly sequential, so we have arranged them loosely from moonshot start to delivery.

   I. **Ways to adopt a moonshots mindset.** We start with six ways that underlie a mindset for moonshot innovation, including the importance of long-term thinking and cultivating a healthy sense of paranoia.
   II. **Ways to feed your curiosity.** The next six ways describe where to look for promising moonshot opportunities actively and intentionally, such as scouring widely across diverse sources such as hard science fiction, esoteric technical material, and more.
   III. **Ways to imagine a better tomorrow.** These six ways explain how to capture and communicate a moonshot opportunity so that a team can effectively engage others and help them understand why and when the moonshot is needed.
   IV. **Ways to plan your stepping stones.** These six ways offer some practical approaches in laying out a road map and staging various milestones, including how to anticipate future user needs and adopt bold metrics.

V. **Ways to invent the future.** Although some experts say coming up with breakthrough ideas is the easy part of innovation, these six ways describe how to make the process a bit easier and more relevant to moonshot efforts.

VI. **Ways to make big bets.** As moonshots are full of unknowns and usually seen as high risk, another six ways address the mental state and techniques for prioritizing breakthrough efforts and wagering wisely.

VII. **Ways to finance for alpha.** We also discuss six ways specific to investing in moonshots, including how to seed new fields and fund the handoffs.

VIII. **Ways to galvanize your team.** Moonshot work relies on moonshot talent, so these six ways focus on how to find, reward, and keep the people needed.

IX. **Ways to win the future.** The last six ways—and tipping us over 50 ways total—address setting the broader conditions involved in building a strategic position in the world, including using sandboxes and playing an infinite game.

Each way follows a similar template that describes what it is, why it is important, how to start, some team considerations over time, and an example in action. Across all the ways, we have aimed to highlight a range of interesting examples that span different technologies, industries, and even eras so that you may see a diversity of approaches and groups. Although not all examples may be proper moonshots, we picked them because they each show a facet related to that moonshot way. Also in each way, we recommend several books or related materials for those interested in learning more.

We cross reference ways occasionally, so you can see where certain ways may overlap or complement one another. Last, this book is not meant to be a compendium or encyclopedia of all moonshot ways because, by their nature, moonshots defy any particular formula. Instead, we hope this book lays a solid knowledge base that others can use to mix, add to, and create their own dynamic playbook. Functioning more as a mega-listicle, this collection of ways is like a vast hall with many lobbies that open into deeper intricate palaces, as there is much more behind each way presented here.

How to Use This Book

The advantage of a resource book like this one is that you don't have to read the content in any set order and can keep it in (digital) arm's reach whenever needed. We also encourage readers who prefer familiar examples from their own sector to embrace seeing outside their box, as they may discover unexpected parallels and insights (see more in Ways 12: Consume Research and 17: Push the Boundaries of Your Work).

We find some readers like to go wide. As such, they will find a practical reference that reminds them of a range of options to consider when building moonshots so they can see the broader picture or what might be missing in their team's plans.

Other readers like to go deep. These people can jump to a specific way that is most pertinent in their moment of need, using the table of contents to orient quickly and then turning to the related section overview as an interim checklist. Given that there are dozens and dozens of moonshot ways cataloged in our book, everyone should find at least a subset of ways to fit their unique situation and context. (Or just ask our suggestion on where to start.)

Last, some readers seek novelty. No other book exists like this yet, so some people may enjoy discovering a new approach or model that they had not known about before related to building moonshots. And as moonshot work often requires going beyond the obvious—we even have a section dedicated to feeding your curiosity—there is equal value in chasing topics that strike interest, as one of these points may later emerge as a critical insight for your team.

Ultimately, our call to action is to spur more moonshot thinking and moonshot doing, more soul and substance to back the sizzle, adding more how to the wow. We invite you to join us in this exciting challenge.

Notes

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2. Clarke, A. C. (1973). *Profiles of the future: An inquiry into the limits of the possible* (rev. ed., p. 21). Harper & Row.
3. See more at https://ways.stanford.edu.

I

Ways to Adopt a Moonshots Mindset

A mindset describes the mental attitude and beliefs a person brings to any situation. Having a moonshots mindset becomes core to making moonshot decisions and making moonshot ideas real. Leaders and teams who have a moonshot mindset take the long view, believe in doing the impossible, and seize opportunities. Here are six ways that underlie a mindset for moonshot innovation.

Way 1   **Always Focus on the Long View**
Making the world a better place requires solutions that are not constrained by today, or even tomorrow.

Way 2   **Start from the Almost Impossible**
Moonshot leaders must manage across all four innovation horizons.

Way 3   **Never Be Surprised**
Being strategically paranoid enables an organization to move ahead of potential competition.

Way 4   **Fund for Breakthroughs**
Funding breakthrough ideas, inventions, and innovation requires you to adopt opportunistic financing methods.

Way 5   **Plan to Adopt Shiny Things**
Building an innovative team means you will always be learning new ideas and technologies.

Way 6   **Be an Optimist**
Choosing to have an optimistic outlook is a visionary's most powerful tool.

1 Always Focus on the Long View

Making the world a better place requires solutions that are not constrained by today, or even tomorrow.

About the Way

Patience is a word that is not regularly associated with innovation. Patience is almost a prerequisite for radical, world-changing innovation. Transferring moonshot-class ideas out of the lab and into the hands of customers can take decades. This is the story of the transistor, GPS navigation, fMRIs, mRNA, fusion power, and a long list of things that we take for granted today. Having a long view lets moonshot leaders and teams consider what lies ahead and know it is worth the time it will take to get there. More than just delayed gratification, taking the long view means working toward possible future outcomes than just the immediate reward—and having the patience to even begin this type of journey.

John Hennessy, an acclaimed inventor, industry leader, and former university president, spoke about this reality at a 2022 global energy forum held at Stanford University. Addressing a room full of energetic, young researchers and inventors,

Hennessy said that entrepreneurs with a long view are a growing need for energy startups. In contrast to software startups, where the supply chain is simple and scaling is easy, he said, "It's challenging in the energy field. It takes longer."[1] He explained how energy startups need to understand that it will take 10 to 15 years to scale their businesses, twice the time needed for a typical Silicon Valley startup. He added, "Early on, the venture community didn't have as much patience as necessary."[2]

The concept of a long view has its roots in military and government planning. A good example is the Marshall Plan, an ambitious US program that gave some $13 billion worth of economic aid to Western European nations in the late 1940s. After the devastation of WWII, world leaders knew rebuilding their nations would take years, yet the US wanted to help accelerate their growth and had a vision to help remake a new world. A similar sentiment was echoed several decades later by US President John F. Kennedy. In his 1961 inaugural address, JFK set the American public's expectations for taking the long view: "All this will not be finished in the first 100 days. Nor will it be finished in the first 1,000 days; nor in the life of this Administration; nor even perhaps in our lifetime on this planet. But let us begin."[3] Or Nelson Mandela, South Africa's first Black president, who used the language of a "long walk to freedom" to help others understand the extended time it would require for achieving his vision of a country free of apartheid and suffering.

In the 1980s through 1990s, it became popular to talk about the long view as an art. A major champion was the Global Business Network, a consultancy set up by a group of entrepreneurs, including Peter Schwartz, that specialized in scenario planning. By 1991, Schwartz encapsulated this thinking in the book *The Art of the Long View*, which considered the long view as a path for strategic insight.[4] His contemporary Arie de Geus studied corporate longevity, including identifying the key traits of companies that had prospered for 50 years or more.

In recent years, companies such as Amazon, Alphabet, and Lenovo have emphasized the importance of taking the long view as a strategic advantage. For example, in the 2004 IPO filing of Google, a subsidiary of Alphabet, founders Sergey Brin and Larry Page included a letter to shareholders, describing a foundational value of taking a long-term focus—and they also asked that "our shareholders take the long-term view."[5]

Value of the Way

Taking the long view in building moonshots is a mindset that values patience. When it comes to innovation, the mindset we hold influences the decisions and attention we give to future possibility. By focusing on a long view, we are committed to the long term—thinking in years, not project weeks or shareholder quarters—that achieve the bigger outcomes we seek. By thinking in years, one benefit is that we can accept changing the future takes time, so we then put efforts in perspective. Another benefit is that a long view helps us to anchor our vision in the future. We work from what could be instead of using today's perceptions as blinders.

More than an art or executive stance, the work for building moonshots is a long-term focus that requires converting insight into innovation. Various studies show the economic value of taking the long view. For example, McKinsey Global Institute examined the recent rise of corporate "short-termism"—the opposite of taking a long view—and found that companies with long-term planning horizons exhibit stronger fundamentals, deliver superior financial performance, and add more to economic output and growth than other companies.[6]

Starting the Way

Taking the long view rests on three pillars: embracing uncertain outcomes, working with good intentions, and beginning to act today. This approach mixes a long-term view alongside long-term management, long-term organizational structures, and long-term incentives. If you want to bring the long view into your team or company, that means investing—both in projects and people—in the long term. It also means embedding the value of long-term thinking into your group's values. Consider the long-lasting and seminal "Toyota Way," a manifesto that lists 14 corporate principles. Principle 1 is "Base your management decisions on a long-term philosophy, even at the expense of short-term financial goals."[7]

At a personal level, spend some time visualizing and thinking about your future at least weekly. For many, what is scheduled gets done, so block some free time to cultivate your long-term thinking and purposefully spend time wandering into the future that you want. As the saying goes, we become what we think about.

Living the Way

Some prompts for team discussion:
- Are we making a short-term or long-term decision in this project?
- What long-term payoff can we expect from this action?
- Will our future selves thank us or criticize us for this decision?

Example in Action

Jeff Bezos started Amazon in the mid-1990s with a strong focus on long-term thinking. In Amazon's 1997 annual report, Bezos stated that "It's all about the long term" and explained that this outlook meant their management team would make decisions and weigh trade-offs differently than other companies.[8] Amazon has codified this view in its leadership principles, emphasizing that its leaders "think long term and don't sacrifice long-term value for short-term results."[9] Every year as CEO, Bezos republished his original 1997 letter to shareholders, underscoring Amazon's unwavering commitment to always focusing on the long view. As he told *Wired* magazine:

If everything you do needs to work on a three-year time horizon, then you're competing against a lot of people. But if you're willing to invest on a seven-year time horizon, you're now competing against a fraction of those people, because very few companies are willing to do that. Just by lengthening the time horizon, you can engage in endeavors that you could never otherwise pursue. At Amazon we like things to work in five to seven years. We're willing to plant seeds, let them grow—and we're very stubborn.[10]

Discover More

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Start from the Almost Impossible

Moonshot leaders must manage across all four innovation horizons.

About the Way

As part of fostering a moonshots mindset, a critical leadership skill is the capability to simultaneously manage four innovation horizons. Good leaders can build great groups by extending their outlook to include the fourth innovation horizon to the almost impossible. This fourth horizon is the wellspring for your group's vision.

Reaching for the impossible future has long thwarted decision-makers. Early in Peter Drucker's career, when he began building the foundations of business management as a field in the mid-1950s, he recognized the dilemma facing business leaders: "To make decisions ten or fifteen or twenty years ahead, as everyone of us is forced to do almost every day, is therefore by definition an impossible, if not an insane, undertaking. Yet we have to do it."[1] Or as Daniel Schrag, an earth scientist at Harvard University who was a White House scientific adviser during Barack Obama's presidency, asked incredulously in late 2022: "Who believes that we can halve global emissions by 2030? It is so completely outside the realm of the technology and economics and politics of the world. Is it technically feasible? I guess. But it's so far from reality that it's kind of absurd."[2]

Leaders of all types still search for aids—models, methods, and tools—that help them to tackle the difficult task of planning long term, especially for what feels near impossible. Responding to this industry need, a trio of leaders at the consulting firm McKinsey described a corporate model of managing three horizons of growth, which soon became popular among the Fortune 500.[3] Their three-horizon framework has helped managers visualize innovation activity in terms of times:

- Horizon 1 (H1) is focused on extending and defending core businesses.
- Horizon 2 (H2) is focused on building and testing emerging businesses.
- Horizon 3 (H3) is active investment in research, partnerships, and memorandums of understanding that could be the seeds for future businesses.

You can find variants of these horizon labels in various corporate road maps today, such as now/next/new, defend/build/invest, or trees/plants/seeds. The McKinsey team ends with an afterthought in their book: "Without deliberate initiatives to develop good ideas into horizon 3 opportunities, a company's long-term growth prospects will fade."[4] This leads to a curious and unaddressed conundrum: what feeds into horizon 3?

By necessity, we have added a fourth horizon. See Figure 2.1 for our four horizons model of innovation. Horizon 4 (or H4) has long been the source of world-changing, once-unimaginable changes that drive the work of blue-sky research centers, university science labs, and teams seeking to create entirely new industries. The boundary between H3 and H4 is where you find tomorrow's breakthroughs, inventions, and paradigm-changing innovations. H4 addresses the activities where teams explore, find, and convert new ideas into H3 seeds as part of wandering, being curious, and following sources of inspiration. Innovation leaders who want radical growth include this fourth horizon as an important element of their team's vision setting and strategy as part of managing across all horizons simultaneously.
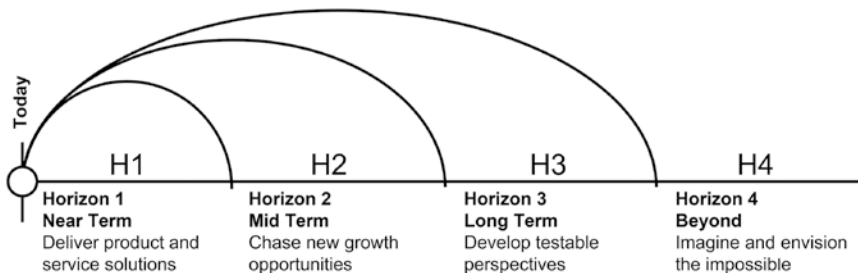

Figure 2.1   Four horizons model of innovation

Source: Tamara Carleton & William Cockayne

Value of the Way

By taking H4 into account, leaders understand why they want to change the future and where to take their group or organization. Leaders can also provide clearer guidance that help frame common activities in H3—such as R&D proof of concepts, internal pilots, corporate lab demos, and employee idea competitions—that then will lead to more intentional, more focused, and more organized efforts from H3 into H2.

Certain groups are designed to live at the boundary between horizons 4 and 3, aiming to transform the fantastical into the feasible. They give us excellent examples of innovation practices, as well as talent, that thrive in this boundary-crossing zone. Consider DARPA, founded by the US Government in 1958 with a singular mission: to make pivotal investments in breakthrough technologies for national security. DARPA's strategic plans address closing the gap between H3 and H1, specifically "to find the people and ideas on the Far side, and accelerate those ideas to the Near side as quickly as possible."[5] DARPA's ability to imagine and accelerate breakthrough ideas have led to global benefits beyond defense, such as the internet, GPS navigation, and self-driving cars, as well as contributed to other major inventions such as mRNA vaccines. Moreover, DARPA's model has been replicated beyond defense in energy (ARPA-E as part of the US Department of Energy) and information (I-ARPA within the Office of the Director of National Intelligence), plus new proposals—at the time of this writing—to adapt the DARPA model to health (ARPA-H under the US Department of Health & Human Services) and infrastructure (ARPA-I within the US Department of Transportation) and similar organizations around the globe.

Starting the Way

The first step is to add the pursuit of the "almost impossible" into your group's lexicon! Create a four horizons innovation map to document the activities your team or organization is pursuing today in support of innovation and growth. Place these activities in their corresponding horizon, remembering that some activities might cross or sit on a horizon boundary. Make the map visual and big, either physically or digitally, so that everyone can see and contribute to it. Also discuss and capture the criteria for when an activity moves to the next horizon—factors such as optimal or maximum timing needed, who approves the change, and what requirements are needed. Revisit this innovation map as part of regular team meetings, reassessing portfolio progress and adding new possible sources—especially at H4.

Living the Way

Some prompts for team discussion:

- Who is incentivized and empowered to look beyond our group's current opportunities to make the case for bringing the "almost impossible" inside? Who on our team needs to do this?
- Does our group (or organization) search for H4 opportunities today, and how can we boost this process?
- How do we support our group's search for H4 talent and their growth/ transition across the other innovation horizons?
- How do we fund the search for H4-level ideas, and how can we facilitate (even accelerate) the migration of these ideas across the other innovation horizons (i.e., speed an "insane" opportunity to gain market leadership)?

Example in Action

In 2016, Facebook—now part of Meta Platforms—used a horizon model to officially present its 10-year road map at the F8 developer conference, shown in Figure 2.2. The first horizon was labeled *Ecosystems*, describing profitable platforms of at least a billion users; the second horizon was marked as *Products*, describing standalone solutions for specific customer segments; and the third horizon was marked as *Technologies*, describing specific R&D areas to follow and likely invest in. In his conference keynote, CEO and founder Mark Zuckerberg described how Facebook operated internally to move technologies to market: "First, we build a new technology that can help people share and connect in some new ways. Then we take that technology, and we build it into a product that we think a billion or more people could use and benefit from. And then finally, once the product is at scale, we build a full ecosystem around that product—of developers and businesses and partners."[6]

Figure 2.2   Facebook 10-year roadmap in 2016

Source: Meta Platforms

Facebook's fourth horizon was not shown in this public road map, which raises the question: where were they looking for their next seeds of growth, and who might they be wandering with on this mission? Facebook continued using this horizon model internally as a strategy guide and shared updates publicly for at least the next two years. The company kept the same horizons while changing the map placement of several existing efforts—as well as introducing a few new items that marked some long-term focus areas.

By late 2021, Facebook took the bold step to update its vision, going beyond its current plans to present a metaverse, which led them to change the company name to Meta. As Zuckerberg explained in a public founder's letter, "We are at the beginning of the next chapter for the internet, and it's the next chapter for our company too."[7] Critics declared the move one born of desperation, while others were quick to dismiss even the idea of a metaverse. Zuckerberg noted that Meta would need a decade or more to bring this metaverse to market. (See Way 1: Always Focus on the Long View.) As moonshots take time, and not all work out as planned, this was an audacious decision. Zuckerberg closed his letter by writing, "If this is the future you want to see, I hope you'll join us. The future is going to be beyond anything we can imagine."[8]

Discover More

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3 | Never Be Surprised

Being strategically paranoid enables an organization to move ahead of potential competition.

About the Way

When your teams are heads down building a moonshot, you as leaders should not be. World-changing breakthroughs often become yesterday's news when the next shiny, new idea promises to change the world. The organizations and leaders whose survival depends on these breakthroughs can quickly find themselves on page two in the newspaper, hidden below the scroll, or simply ignored by their once-awed customers, investors, and others. It is incumbent on those aiming for moonshots to maintain a healthy dose of paranoia about their technologies, businesses, and customers so that the "new, new thing" does not upend them.

You can find instances of strategic paranoia across government and industry. In the US, ARPA—or Advanced Research Projects Agency, later renamed as DARPA—was formed in 1958 as a response to the USSR's unexpected launch of the Sputnik satellite. The fear and paranoia sparked by Sputnik led the US government to choose that "in the future we would be the initiator and not the victim of strategic technological surprises."[1] Since that point, and well beyond American defense, DARPA's influence has been felt worldwide, as the agency has "ended up shaping the modern world, helping to create missile defence and stealth technology, as well as the internet, the personal computer, the laser and GPS."[2] Today, DARPA evens calls its fundamental research programs "seeds of surprise."[3]

You want to cultivate a healthy dose of paranoia. William Shockley, namesake founder and CEO of the historic Shockley Semiconductor Laboratory—which manufactured the first silicon devices in what later became known as Silicon Valley—was shocked one day to discover that his core technical team had quit to start a direct competitor. Somewhat ironically, "Shockley's paranoid, micromanaging personality, which caused him to leave Bell [Labs] and kept his company from producing any viable commercial product, also drove out eight of his best engineers and physicists." [4] These so-called "traitorous eight" founded the much more successful Fairchild Semiconductor in 1957, a company that pioneered the manufacturing of transistors and integrated circuits.

Gordon Moore, head of R&D at Fairchild and later known for Moore's law in computing power, teamed up with Robert Noyce to leave Fairchild. They established Intel in 1968, which introduced the world's first single-chip microprocessor. Intel's third employee was Andy Grove, a chemical engineer who later became CEO of Intel through the mid-1980s and 1990s. Grove wrote a classic book in high-tech strategy entitled *Only the Paranoid Survive*.[5]

In his book, Grove tells the story about how Intel's leadership team would soon become besieged by competitors who, while not at the level of Intel's technical capabilities, were going to bring good-enough replacement products to market. What would the business landscape look like at the point where Intel was competing head-to-head with better funded, aggressive competitors? Intel's leadership did not want to want it; surprises were likely to abound. As such, Intel, a world leader in the memory chip business, could possibly become yesterday's news. Intel's leaders exhibited a sensible paranoia to imagine: if they were entering the market as a young, breakthrough-seeking company, would they want to be in the business Intel currently owned? Grove recalls his conversation with Moore, then-CEO and chairman, in 1985:

> I asked, "If we got kicked out and the board brought in a new CEO, what do you think he would do?" Gordon answered without hesitation, "He would get us out of memories." I stared at him, numb, then said, "Why shouldn't you and I walk out the door, come back and do it ourselves?" With that comment and with Gordon's encouragement, we started on a very difficult journey.[6]

Intel chose to pursue an entirely new, potentially breakthrough business in high-end microprocessors, building on their strengths as memory chip pioneers, and deliberately letting other competitors take over Intel's original—and now former—successful business. This leadership paranoia then buoyed a 10-year period of unprecedented growth for Intel, as they became a profitable and dominant supplier of microprocessors to the personal computing industry.

There are other ways to avoid surprise, such as taking a distributed approach. In the 1945 book *Tomorrow's House*, architect George Nelson and Henry Wright introduced the cutting-edge concepts of the "family room" and the "storage

wall" to American readers.[7] D. J. Depree, then chairman of US-based furniture manufacturer Herman Miller—now known as MillerKnoll—was inspired by this visionary thinking and invited Nelson to serve as the company's next design director, despite Nelson's lack of experience in industrial design.[8] While at Herman Miller, among other ideas, Nelson invented the office cubicle to accommodate the growing rise of knowledge workers in the late 1960s. What is less known is that Nelson influenced the company to adopt a different model of innovation and product development. Instead of hiring R&D talent as was customary in the industry, like its competitors Steelcase and Haworth, Herman Miller created a network of independent crafters, inventors, and designers, all of whom could partner with the company. Herman Miller shared its goals openly with members in the extended network, who in turn, brought new ideas outside the sphere of Herman Miller onto its radar. This collaborative and distributed model enabled the senior team at Herman Miller to reduce its chances to miss unexpected changes in consumer behavior, new materials and manufacturing techniques, and offbeat design trends.

Value of the Way

Changing the world is no easy task. It is often a long journey filled with dead ends, new discoveries, staff changes, and multiple decisions made under varying levels of ambiguity to uncertainty. Across this long journey, it is very easy to lose sight of potential new competitors, related and possibly impactful breakthroughs, and myriad consumer changes that could make your team's entire effort moot. A healthy paranoia empowers your team or organization to never be surprised. By staying alert and vigilant about changes in the landscape, your team can keep your moonshot vision relevant and attuned to a state of prudent paranoia,[9] as Stanford business professor Roderick Kramer calls it, or productive paranoia,[10] as business expert Jim Collins terms it for the 10X leaders who run exceptionally great companies. Regardless, staying paranoid checks any starry-eyed optimism and injects some realism into your team's efforts so that as you reach and celebrate major milestones, you make sure not to become too comfortable in your success.

Starting the Way

Adopt the premortem technique to imagine what happens if your moonshot idea fails completely. Organize a blunt and open discussion with your team and discuss all the possible, plausible causes that could create a nightmare situation. What could go wrong, and why? What is failure, and are there levels of failure? What could take your team wholly by surprise at various milestones? Gather your thoughts on a shared whiteboard. Then start proposing solutions to major roadblocks, adding new information to the whiteboard so everyone can see. Use this session to consider

which contingency steps matter now. Even if you don't draft a risk plan, the process of discussion itself will raise the team's awareness and positive paranoia level as they move the idea forward.

Living the Way

Some prompts for team discussion:

- If we walked out the door today—as Andy Grove and Gordon Moore imagined they might at Intel—which customers and business do we want to walk back in the door with?
- How do we work with our close partners to enable them to show us what we cannot see, and vice versa?
- How might we build a healthy paranoia that empowers our entire organization to stay ahead of our competitors?

Example in Action

Facebook (now Meta Platforms) was founded in 2003, and as the company grew, it became harder to explain its mission, history, and culture to new employees. Ben Barry joined Facebook in 2008, soon earning the moniker of Facebook's Minister of Propaganda.[11] He led a small team to distill a number of the company's essential stories and ideas in one place, creating a little book that Facebook's founder and CEO Mark Zuckerberg approved. In late 2012, when Facebook reached a billion users, the book began appearing on the desks of all its employees. The book ends with a paranoid challenge to employees:

> If we don't create the thing that kills Facebook, someone else will. "Embracing change" isn't enough. It has to be so hardwired into who we are that even talking about it seems redundant. The internet is not a friendly place. Things that don't stay relevant don't even get the luxury of leaving ruins. They disappear.[12]

Discover More

Collins, J., & Hansen, M. T. (2011). *Great by choice: Uncertainty, chaos, and luck—why some thrive despite them all*. Harper-Collins Publishers.

Grove, A. (1996). *Only the paranoid survive: How to exploit the crisis points that challenge every company*. Doubleday Business.