INTRODUCTION

Why does the world need yet another book on innovation or leadership? Haven't both been studied in great depth?

Our answer is simple: it needs this book precisely because it's *not* another book on either of those familiar topics. It is, instead, a book about a topic much less discussed or understood—leadership *and* innovation, or the role of the leader in creating a more innovative organization.

Search the literature and you'll discover what we found—volumes of research on innovation and as many or more on leadership, but almost nothing on the connection between the two.[1] Why is this so? Perhaps practicing leaders and management thinkers have simply assumed a "good" leader in all other respects would be an effective leader of innovation as well. If that's the case, however, we must report it's a deeply flawed and even dangerous assumption. Leading innovation and what is widely considered good leadership, we found, are not the same.

We know this because for more than a decade we've been studying leaders who were proven masters at fostering organizational innovation. The people they led, from small teams to vast enterprises, were able to produce innovative solutions again and again.

To understand what they did, how they thought, and who they were, we sought them out, from Silicon Valley to Europe to the United Arab Emirates

to India and Korea, and we explored businesses as diverse as filmmaking, e-commerce, auto manufacturing, professional services, high-tech, and luxury goods. We spent hundreds of hours in total with them and their colleagues. In the end, we interviewed and observed sixteen and studied twelve in depth who included talented women and men of seven nationalities serving different functions at different levels in their organizations.[2] All this research, of course, was built on the foundation of the thousands of leaders and organizations the four of us have experienced, observed, and studied in our varied individual careers.

What we found in our research—confirmed, actually—was the critical role of the leader. That leadership matters to innovation should come as no surprise. Look beneath the surface of almost anything produced by an organization that is new, useful, and even moderately complex, and you'll almost certainly discover it came from multiple hands, not the genius of some solitary inventor. Innovation is a "team sport," as one leader told us, in which individual effort becomes something more. Somehow, in the language we've come to use, truly innovative groups are consistently able to elicit and then combine members' separate *slices of genius* into a single work of *collective genius*. Creating and sustaining an organization capable of doing that again and again is what we saw our leaders do.

They understood the nature of innovation and how it worked, and so they fully appreciated that they could not force it to happen or get it done on their own. Consequently, they saw themselves and their role differently. They focused their time and attention on different areas and activities. They made different choices when faced with the difficult trade-offs leadership constantly required of them. In studying these leaders, we found, above all, that leadership as it's widely understood and practiced today isn't what these leaders of innovation were doing.

The source of this discrepancy, we suspect, is that over the past few decades, the leader's role has become equated with setting out a vision and inspiring people to follow. This conception of the leader's role can work well when the solution to a problem is known and straightforward, but is counterproductive when it's not. If a problem calls for a truly original response, no one can know in advance what that response should be. By definition, then, leading innovation cannot be about creating and selling a vision to

people who are somehow inspired to execute that vision. So common is this notion of the leader as visionary that many of those we studied had to rethink and recast their roles before their organizations could become truly and consistently innovative.

What we observed across all the diverse individuals and organizations we studied was a surprisingly consistent view of the leader's role in innovation, which can be expressed this way: *Instead of trying to come up with a vision and make innovation happen themselves, a leader of innovation creates a place—a context, an environment—where people are willing and able to do the hard work that innovative problem solving requires.*

One of the leaders we studied neatly summed this up by repeating a line he had heard from a CEO he admired. "My job," he said, "is to set the stage, not to perform on it."

Based on what we saw in our research, we present in *Collective Genius* a framework that you and other practicing leaders can apply to "set the stage"—that is, to create a place where people are willing and able to innovate time and again.

That framework is reflected in the flow of chapters ahead.

Why Innovation Requires a Different Kind of Leader

The first three chapters open by looking in depth at Pixar Animation Studios, a company with a formidable innovation track record. During the period we studied, Pixar was able to produce hit film after hit film, each one an innovative tour de force. Because its work is so widely known, Pixar is an ideal choice for showing what's required to transform the individual efforts of hundreds of people—all those slices of genius—into a single, coherent work of collective genius. In chapter 2, we explore the unavoidable tensions and conflicts built into the innovation process, which explain both why innovation is so rare and difficult and why it requires leadership. But what kind of leadership? In chapter 3, we paint a detailed portrait of a CEO who went far beyond the conventions of "good leadership" to turn a declining Indian computer company into an international dynamo of IT innovation.

The chapters that follow focus on what leaders of innovation actually do to foster creative genius. They are organized around the two great tasks

we saw our leaders perform. In part I, chapters 4 and 5, we show what they did to create organizations *willing* to innovate. In part II, chapters 6 through 8, we show how they created organizations *able* to innovate.

What Leaders Do: They Create Organizations *Willing* to Innovate

It's tempting to believe that people and organizations are naturally eager to create something new and useful, when, in fact, they often are not. The diversity innovation thrives on, the conflict of ideas and options it requires, the patience it needs to test and learn from multiple approaches, and the courage it demands to hold options open until possibilities can be integrated in new and creative ways—all these things can make innovative problem solving feel awkward, stressful, and even unnatural. Without leadership, internal forces common to virtually all groups will stifle and discourage innovation, in spite of everyone's rhetoric about how much they want it. In part I, we show how our leaders overcame these destructive forces by creating communities whose members were bound by common purpose, shared values, and mutual rules of engagement.

What Leaders Do: They Create Organizations *Able* to Innovate

The organizational ability to innovate is equally important and, unfortunately, equally difficult. In part II, we show how the leaders we studied focused on three key aspects of the innovation process: collaboration, discovery-driven learning, and integrative decision making. Each of these aspects has already been identified and studied by others, though typically in isolation from each other. Our contribution is to show how effective leaders actually build a key organizational capability in each of these areas—*creative abrasion* for collaboration, *creative agility* for learning through discovery, and *creative resolution* for integrative decision making. These are difficult for organizations to acquire, exercise, and maintain. They require leaders who can constantly balance the tensions and paradoxes built into the innovation process.

The final section of *Collective Genius* examines two forward-looking aspects of leading innovation. In chapter 9, we outline the leadership challenge of an increasingly common approach today—the innovation

ecosystem, which comprises disparate organizations and sometimes even competitors that join together for the purpose of developing something new. Given how hard innovation is within the same organization, it's easy to appreciate the supreme difficulty of crossing boundaries and getting diverse groups to collaborate creatively. In the epilogue, we look briefly at three organizations that have found effective ways of identifying and developing the leaders of innovation they will need tomorrow.

Because our goal is to provide practical and concrete guidance, we not only describe what leaders of innovation do, but we show it as well. Every chapter in *Collective Genius*, save one, is written around an in-depth portrait of one or more of the leaders we studied. In these stories and descriptions, we present both the art and practice of leading innovation by showing our leaders in action. Unless otherwise indicated, all quotations are based on our primary research, and because our leaders all believed that rhetoric matters, we have quoted them extensively. In this way, we hope to help practicing leaders bridge the knowing-doing gap between conceptual knowledge and an ability to apply that knowledge in everyday settings.

Some of our leaders worked in organizations widely considered hotbeds of innovation; others ran parts of firms rarely associated with the cutting edge. Some led start-ups; some led well-established companies trying to figure out how to sustain success, while others took over organizations that had lost their way and desperately needed rejuvenation. The innovations produced by their groups ran the gamut from new products and services to business processes, organizational structures, business models, and social enterprises. What their experience can teach us applies to organizations of all types and sizes and to leaders at all levels and in all functions.

Watching them at work, we hope, will not only inform but intrigue, challenge, and inspire you as well. These people are far from perfect and they would be the first to admit it. But they have mastered a difficult art and their examples can be highly instructive. We hope you will learn from them.

We don't claim to have cracked the code for leading innovation.[3] But we're convinced any leader can apply the lessons drawn from the experience of these accomplished leaders to make his or her group more innovative.

## Leaders of Innovation in *Collective Genius**

Section	Name	Title	Company
Chapter 1	Ed Catmull	Cofounder, CEO	Pixar Animation Studios
Chapter 3	Vineet Nayar	CEO	HCL Technologies
Chapter 4	Luca de Meo	Chief marketing officer	Volkswagen
Chapter 5	Kit Hinrichs and others	Partners	Pentagram
Chapter 6	Greg Brandeau	Senior vice president, systems technology	Pixar Animation Studios
Chapter 7	Philipp Justus	Country manager, then senior vice president, Europe	eBay Germany and eBay
Chapter 8	Bill Coughran	Senior vice president, engineering, infrastructure group	Google
Chapter 9	Larry Smarr	Founder, director	Calit2
	Amy Schulman	General counsel, executive vice president, business unit leader	Pfizer
Epilogue	Steve Kloeblen	Vice president, business development	IBM
	Jacqueline Novogratz	Founder, CEO	Acumen Fund
	Sung-joo Kim	Founder, chair, chief visionary officer	Sungjoo Group

All information as of time of story.

When it comes to innovation, leadership matters, and it's not leadership as commonly conceived today.

Every person in your group, whether that's a small team or a large corporation, contains a slice of genius. Your task as leader is to create a place where all those slices can be elicited, combined, and converted into collective genius. Our goal in *Collective Genius* is to provide the insights, guidance, and real-life examples you need to do that.

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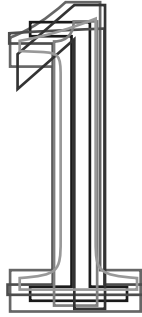
WHAT COLLECTIVE GENIUS LOOKS LIKE

Why are some organizations able to innovate again and again while others hardly innovate at all? How can hundreds of people at a company like Pixar Animation Studios, for example, produce blockbuster after blockbuster over nearly two decades—a record no other filmmaker has ever come close to matching? What's different about Pixar?[1]

This question is crucial. In a time of rapid change, the ability to innovate quickly and effectively, again and again, is perhaps the only enduring competitive advantage. Those firms that can innovate constantly will thrive. Those that do not or cannot will be left behind.

Pixar released *Toy Story* in 1995, the first computer-generated (CG) feature film ever produced. Since then, as we write this, it has released fourteen such movies, including *Toy Story 2* and *Toy Story 3*; *A Bug's Life*; *Monsters, Inc.*; *Finding Nemo*; *The Incredibles*; *Cars*; *Ratatouille*; *Wall-E*; *Up*; *Cars 2*; *Brave*; and Monsters University*. Virtually all have been critical, financial,

and technological successes. The winner of numerous awards, including twenty-six Academy Awards, Pixar is one of those rare studios that command the respect of filmmakers, technologists, and businesspeople alike.

CG movies are mainstream today, but Pixar's founders took two decades to realize their dream of creating a feature-length CG film. After years in academia, Ed Catmull and a handful of colleagues joined Lucasfilm, where Catmull led the effort to bring computer graphics and other digital technology into films and games. Catmull and team pushed the boundaries of what could be done, securing patents and providing producers like Steven Spielberg with the tools to create scenes like those of the dinosaurs in *Jurassic Park*. Ultimately, however, the division was too costly for George Lucas. In 1986, Steve Jobs bought it for $10 million, and Pixar Animation Studios was born.

Pixar has survived since then only because it has been consistently inventive. Every film it produced has been an innovative tour de force. But conventional wisdom about innovation cannot explain its extraordinary accomplishments. No solitary genius, no flash of inspiration, produced those movies. On the contrary, each was the product of hundreds of people, years of work, and hundreds of millions of dollars.

What has allowed Pixar to accomplish what it's done? We begin to see at least part of the answer in a personal comment by Catmull, the computer animation pioneer who cofounded and then led the studio as it produced hit after hit:

> For 20 years, I pursued a dream of making the first computer-animated film. To be honest, after that goal was realized—when we finished Toy Story—I was a bit lost. But then I realized the most exciting thing I had ever done was to help create the unique environment that allowed that film to be made. My new goal became ... to build a studio that had the depth, robustness, and will to keep searching for the hard truths that preserve the confluence of forces necessary to create magic.[2]

What Catmull discovered in making *Toy Story* was the critical role of leadership in creating an organization or context that fostered and enabled innovation. He understood innovation could not be compelled or commanded. Indeed, this most voluntary of human activities could only be, to use his word, "enabled."

To understand what Catmull and other effective leaders of innovation do, we begin by looking at what collective genius looks like. For that, there's no better example than Pixar, because most of us have seen at least one Pixar movie. So when we describe all the individual slices of genius that go into making a CG film, you will be able to appreciate the difficulty of converting those slices into the collective genius you see on the theater screen.

What Pixar does may seem different from the work of most other organizations. Certainly, the product it makes is different. But think of any other firm that offers a product or service that no individual could provide alone. Clearly, such a firm must grapple, in form though not substance, with the same kinds of challenges Pixar has had to overcome in every film it's made. Every example of innovative problem solving embodies exactly what Catmull described: hundreds and even thousands of ideas from many talented people.

How Pixar Innovates

Innovation is the creation of something both novel and useful. It can be large or small, incremental or breakthrough. It can be a new product, a new service, a new process, a new business model, a new way of organizing, or a new film made in a new way.

Whatever form innovation takes, people often think of it as a chance occurrence, a flash of insight, a brainstorm by one of those rare individuals who's "innovative" or "creative." It can be, but most often such things play no role or only minor roles, and the actual process of innovation is more complex. This becomes crystal clear when we return to Pixar and look more closely at how it works.

Making a CG movie

Some have said that creating a CG animated film is like writing a novel because both start with a blank slate. The creator can do whatever he or she can imagine. Blow up the world? No problem. Hop over the Grand Canyon? Easy. In making a CG film, however, that freedom comes with a price. Everything in the film—*everything*, down to the tiniest speck of dust or the subtle flow of a shadow across a character's face—must be consciously chosen, created, and inserted by one of the hundreds of people involved. Every piece of it must be created, invented, innovated.

To explain the process in simple terms, we use a diagram produced by Greg Brandeau based on his experience running the systems group at Pixar (see figure 1-1).

Each block in the diagram represents not only a stage in the process but a group of highly talented people who perform some essential task.

The process begins with a director who has an idea for a story. He works with people in the story department over twelve to eighteen months to flesh out the tale in words and drawings, usually through many revisions. From the idea, they create a treatment or description of the story. From that, they produce a script. Once the script is approved, they put together thousands of individual storyboards (images) that are in turn cut together to produce reels. Meanwhile, the art department begins to work on the look and feel of the characters and film in general. The film's editor works with the director to cut together the storyboards and create reels that link together the art, dialogue, and temporary music. These reels are updated, revised, and refined as the production progresses. Now the work passes into the hands of various groups of artist-technicians who use sophisticated design software to create the thousands of digital elements that compose the final film. One group creates three-dimensional digital models of the story characters. Another builds and shades the digital settings—a bedroom, a racetrack, a city—where movie scenes will be placed and "shot." Another creates and places the digital objects—tables, chairs, books, beds—that appear in every scene. The layout group—the CG equivalent of cinematographers—roughs out how characters and objects will be shot as they move through each scene. Lighting specialists specify how light appears to fall in each scene.
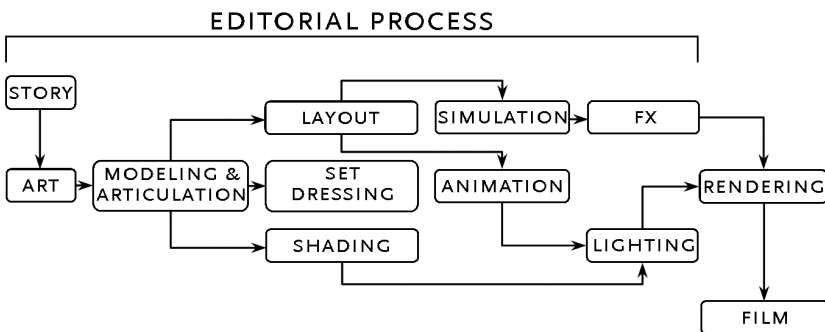

Figure 1-1 Core Activities of the Film Production Process

Animators specify the exact movements of characters in every scene to show not only what they do but also how they feel—happy, afraid, or angry, for example.

That's complicated enough, but there's even more. Yet another group creates the texture of surfaces, such as skin or hair, and how light interacts with the surface, which can be a major problem for a computer to recreate realistically. Simulators produce digital versions of various natural phenomena, such as hair blowing in the wind or the way a piece of loose clothing falls and drapes as a character moves. Special-effects specialists depict objects that move in complex ways, such as falling snow, wind, flames, sparks, and water. In the final step, called rendering, hundreds of computers run by systems experts use all the instructions created in earlier steps to compute each individual movie frame. At twenty-four frames per second, a feature film contains well over a hundred thousand frames, and each frame—*every one of them*—can require up to several hours of computer processing.

Reducing all this to a diagram seems to imply that producing a CG film is a simple series of steps these different groups take in a neat, sequential way. It fails to communicate how iterative and interrelated—in short, how messy—the steps of the process are, because the story can and usually does evolve throughout the making of the film. As it's being made, the thousands of digital objects in it, linked into shots and scenes, move through the production pipeline, but not in order. Different shots and scenes move through at different times and even at different rates. Some move quickly, while others take months or longer because they present difficult artistic and technical challenges, large and small, that require the joint efforts of many groups to resolve. For example, one gifted animator took six months to get ten seconds of the film *Up* right. Almost nothing is simple and straightforward.

For that reason, we often present a slightly different version of the diagram that reflects its inherent messiness. In concept, this is the same as the previous diagram except it shows all the feedback loops and multiple iterations that actually occur (see figure 1-2). No wonder CG films require so much time (years), money (hundreds of millions of dollars), and the creative exertions of so many people (200–250) to make.
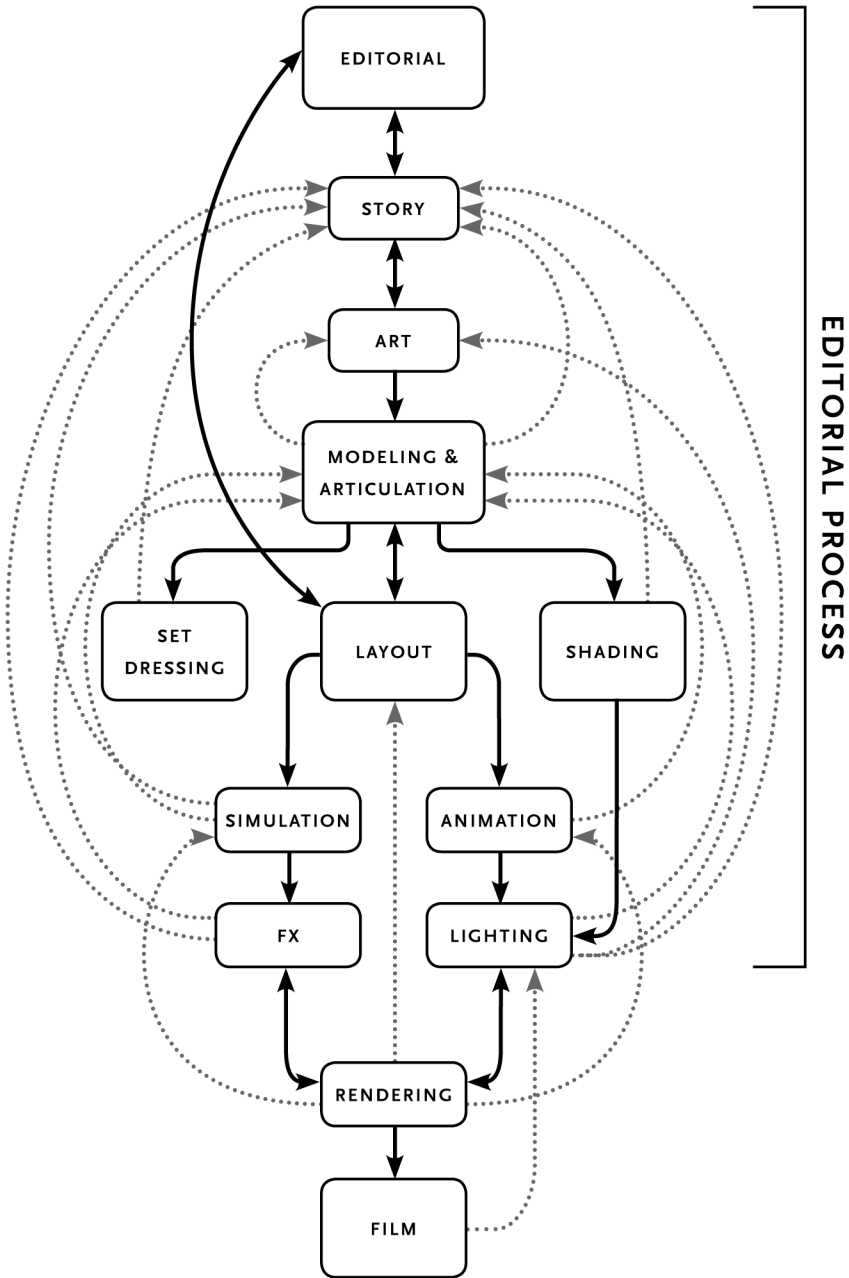
EDITORIAL

STORY

ART

MODELING &
ARTICULATION

SET
DRESSING

LAYOUT

SHADING

SIMULATION

ANIMATION

FX

LIGHTING

RENDERING

FILM

EDITORIAL PROCESS

Figure 1-2 The Reality of the Film Production Process

The analogy we drew earlier between making a CG film and writing a novel is fundamentally flawed. It would only apply if a novel were written not by one author but by hundreds of people, some in charge of the story, some others in charge of nouns, some in charge of adjectives, some in charge of sentences, some in charge of paragraphs, and some in charge of chapters. Yes, every movie has a director—in effect, the master storyteller, the one with the overall creative vision for the movie—who determines what is ultimately seen and heard on the screen. But it's impossible for the director, or any other individual, to specify everything that must be invented to make a CG film. She must rely on the creativity of everyone involved.

As Catmull said, each Pixar film "contains tens of thousands of ideas."

They're in the form of every sentence; in the performance of each line; in the design of characters, sets, and backgrounds; in the locations of the camera; in the colors, the lighting, the pacing. The director and the other creative leaders of a production do not come up with all the ideas on their own; rather, every single member of the 200- to 250-person group makes suggestions. Creativity must be present at every level of every artistic and technical part of the organization.[3]

Now, with your understanding of how Pixar makes movies, put yourself in a theater and imagine you're watching a Pixar movie—the final outcome of this long, complicated, arduous process. What do you actually see and experience? The engaging images and sounds flow by seamlessly, as though created effortlessly by a single master storyteller. Every part fits into a coherent whole. There's no indication of the process or the many disparate individuals who created what you're watching.

In this contrast between the simple coherence of the outcome and the complexity of the process that produced it, we can see the ultimate challenge of all organizational innovation: to create a coherent work of singular collective genius from the diverse slices of genius brought to the work by all the individuals involved. This is what all innovative organizations are able to do well, over and over.

Talent is critical, of course. Conventional wisdom at Pixar says that great people can turn a mediocre idea into a great movie, while mediocre people will ruin even a great idea. But the ultimate challenge of innovation

extends far beyond finding creative people. Pixar does have such people; it works hard to find and keep them. Unlike most film studios, which hire talent movie by movie, Pixar hires employees who stay and work on movie after movie. But Pixar certainly doesn't employ the only talented people in the world. Any organization that wants to innovate again and again must do more than hire a few "creative individuals" because, even with the right people, there's still the huge problem of getting them to work together productively.

That is the job of leaders who seek innovation. In the way they behave and structure an organization where talented people work, leaders create the environment that somehow draws out the *slice of genius* in each individual and then leverages and melds those many slices into a single work of innovation—a new product, a new process, a new strategy, a new film—that represents *collective genius*. This is what happens when organizations innovate.

Leading Innovation

Though each of our leaders and their firms differed in key ways, all leaders paid particular attention to making sure their organizations were able to:

- Collaborate
- Engage in discovery-driven learning
- Make integrative decisions

Our leaders' uniform emphasis on fostering these three capabilities will not surprise anyone familiar with existing research on innovative problem solving. Much evidence exists for the importance of each. However, they have been most often studied separately. Because our focus was on leadership in action, we were able to observe how these three interrelated organizational skills work in concert as leaders and their groups undertake to create something novel and useful. Based on those observations, we have developed an integrated framework for understanding, describing, and prescribing how leaders build organizations capable of consistent innovation by focusing on these essential abilities.

Leaders create collaborative organizations

Lore perpetuates the myth of innovation as a solitary act, a flash of creative insight, an Aha! moment in the mind of a genius. People apparently

prefer to believe in the rugged individualism of discovery, perhaps because they rarely get to see the sausage-making process behind every breakthrough innovation.

Three decades of research has clearly revealed that innovation is most often a group effort.[4] Thomas Edison, for example, is remembered as probably the greatest American inventor of the early twentieth century. From his fertile mind came the light bulb and the phonograph, along with more than a thousand other patented inventions over a sixty-year career. But he hardly worked alone. As many have observed, perhaps Edison's greatest contribution was his artisan-oriented shops—a new way of organizing for innovation he created that has evolved into today's R&D laboratory with its team-based approach.[5]

The process of innovation needs to be collaborative because innovations most often arise from the interplay of ideas that occur during the interactions of people with diverse expertise, experience, or points of view. Flashes of insight may play a role, but most often they simply build on and contribute to the collaborative work of others. Edison may get the credit for his inventions—it was his laboratory, of course—but each one typically arose from years of effort that included many others. Certainly he contributed many ideas himself, but he was equally an inventor and a leader of invention.

Collaboration was obviously a hallmark of Pixar's approach. Without the interplay and collaborative contributions of large numbers of people, it could not make a CG movie. One of Pixar's unusual features as a studio was that all three functions of the organization—art, technology, and business—were considered equal partners in the process of making great films. No one voice dominated, as often happened at other studios.

Another major shortcoming of the diagram in figure 1-1 is that it fails to convey how collaborative the process of making a CG film at Pixar actually was. Pixar instituted a number of practices that fostered collaboration among all the groups and individuals involved. Key among them was the "dailies"—gatherings of Pixar staff to watch and discuss presentations of work in progress. Such meetings occurred at other studios too, but at Pixar a wide array of those working on the production, not just a select few, attended and contributed ideas and comments regardless of their role or level. Thus, not only did individuals receive feedback and guidance on their own work,

but they were also able to see the work of others and understand how that work related to their own.

The collaborative nature of innovation is what leads us to talk of slices of genius that come together to create collective genius. No individual contribution will suffice to create a final solution, especially for large, complex problems. But each contribution—through collaboration—plays its part in creating collective genius. In the right organizational context, with the right leadership, a group can amplify the diverse talents and ideas of its individual members.

Leaders foster discovery-driven learning

Innovation usually arises from an often lengthy period of conscious experimentation and repeated trial and error.[6] As intuitive as it sounds, this characteristic also contradicts yet another myth of innovation, that great new ideas spring in full and final form from the mind of the inventor, ready to be applied. Innovation rarely works that way, and that's why the innovation process is usually so messy, which is what we tried to convey in figure 1-2 of the real CG movie-making process.

Since innovation is a problem-solving process, it's really about searching for a solution by creating and testing a portfolio of ideas. It often takes time even to frame a problem in the right way, especially if it's complex. Consequently, innovation is a process of trial and error, often to embarrassing degrees, even for the most skilled innovators. Thomas Edison used a cut-and-try method—test out an idea to see if it works, reject or refine it, and try again. Hence, Edison's famous definition of genius: "1 percent inspiration; 99 percent perspiration." Missteps, dead ends, and rework are inevitable and must be accepted, even encouraged. Innovation requires a mind-set of try, learn, adjust, try again. In a conversation we had with Catmull about Pixar's enviable track record, he reminded us that "our appetite always exceeded our ability" and that they are in the "business of hitting home runs." He went on to add, however, that if Pixar had "no failures," which he defined as a "less than spectacular outcome," then that would suggest it had lost its passion for doing cutting-edge work. This is why at Pixar, no one got beat up for making a mistake or for trying something that didn't work.

Some who study innovation make much of the difference between idea generation and idea implementation. That's understandable, because ideas must be created before they can be tested or implemented. However, once experimentation begins the distinction quickly makes less sense. Ideas beget experiments and experiments beget more ideas, and any difference between ideation and implementation quickly fades. We know that none of the many innovative companies we studied made much of the difference between the two.

Pixar certainly followed the discovery-driven approach. Yes, it prepared scripts and storyboards in advance of production, but even that process was iterative. People acted out scenes and drew characters again and again, until the characters and story seemed exactly right. But after that, during production, every story element continued to be tested and to evolve based on frequent reviews of work in progress.

Leaders support and encourage integrative decision making

Leaders and their groups can resolve problems, disagreements, and conflicting solutions in one of three ways. The leader or some dominant faction can impose a solution. Or the group can find a compromise, some way of splitting the difference between opposing options and viewpoints. Unfortunately, domination or compromise often leads to less than satisfying solutions.

The third way, integrating ideas—combining option A and option B to create something new, option C, that's better than A or B—tends to produce the most innovative solutions. Making integrative choices, which often combine ideas that once seemed in opposition, is what allows difference, conflict, and learning to be embraced in the final solution.[7]

Albert Einstein hinted at the integrative nature of the process when he said, "To raise new questions, new possibilities, to regard old problems from a new angle, requires creative imagination and marks real advance in science."[8] For him, innovation was about "'combinational chemistry' ... about taking ideas, half-baked notions, competencies, concepts, and assets that already sit out there and recombining them ... What's new in many instances is the new mix."

So important is integrative decision making that innovative organizations and their leaders don't just allow it, they actively encourage it. They

keep opposing options on the table as long as possible because they know fruitful integration can occur only after people have devoted sufficient time to debating options or testing them through trial and error. They also refuse to make trade-offs or accept compromises that merely produce a least-bad solution or allow people to feel good.

The CG process at Pixar was based on the use and value of integration because that process followed a simple principle: *no part of a movie is finally done until the entire movie is all done.* Anything and everything remained open to revision until the very end. People at Pixar knew that integrative decision making often involved more than simply and mechanically combining ideas.

For example, at a point midway through making a Pixar movie, an animator gave a character a sideward glance and a slightly arched eyebrow. Only a split-second long, it nonetheless hinted at some slyness or irony in the character; maybe he didn't mean exactly what he just said. It was an aspect of the character's personality that hadn't been seen before that scene. The director saw this moment in the daily review of work in progress and said, "No, no. That's out of character. This is the most innocent, straightforward guy you'd ever meet. What you see and hear is what you get. Nicely done, but it doesn't fit here. Lose it, please."

Then, two weeks later, the director came back with a different reaction. "I've been thinking about that moment, that little revelation, where we see a side of this guy we've never seen before. It makes his character richer and more interesting. In fact, it will help set up and explain some events that happen later. Let's keep it. Tone it down a notch. But put it back."

Though it was a small thing, adding that touch of irony improved the character and the story. It happened because an animator almost inadvertently added his understanding of the character, his slice of genius, in the process of animation, and that led the director to reconceive the character in a subtle but important way.

The problem, as it emerged in subsequent discussions, was that this new character twist couldn't just appear suddenly halfway through the story. The viewer would react the way the director reacted initially. So earlier scenes had to be adapted to hint at this aspect of the character so that the viewer's reaction would be, "Oh, yeah, I saw that coming," rather than,

"What!? I'm confused!" Also, of course, later scenes, which were already in various stages of production, had to be revised to take advantage of this new character element. If the story had been fixed and immutable, if the director hadn't been able to hold opposing views of the character in his mind until they could merge, none of that could have happened and the story would have been worse for it.

At Pixar, people knew the heart of a good movie was a good story, and they knew stories would get better throughout the process of making them. The stories got better through constant iteration; through trying different approaches, including approaches that at first seemed inconsistent; through the involvement of lots of talented people, like that animator; and through a willingness to wait and see what worked and what needed tightening or expanding.

When Pixar finished *Toy Story 2*, which took an incredible toll on all involved, it assembled a cross section of people to explore ways of avoiding so much pressure in making future films. One of the key suggestions was to lock the story—not allow any further changes after some point early in the process. Constant story iterations and changes are the source of much stress because they almost always have implications that ripple throughout the film and force multiple changes, as we just saw.

In that postmortem, one employee recalled that John Lasseter, director of the film and a cofounder of Pixar, responded to the idea by saying, "We need to focus on quality and that only happens by iterating. If we lock in the story, we will be disappointed. I can't do it. I know it would save us pain, but Hollywood is littered with films that refused to change." By refusing to lock a story, Pixar was able to put a variety of ideas on the table and keep them there until they began to gel, often in ways that no one could ever have anticipated.

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The three characteristics reinforce our earlier point that innovation requires more than talented people. History, and not just Hollywood, is littered with star-studded teams that failed. So it's not just about talent, but it *is* about talent *in the right context*. We all know, perhaps from firsthand experience, that it's not easy to get people to collaborate on a straightforward

task, let alone to create something new and useful. Almost all cultures have some version of the saying, "Too many cooks in the kitchen."[9] We know how hard it is to keep testing possibilities before choosing one. It's often easier to make an initial choice and move on. And we know how hard it is to do what that Pixar director did—keep a wrong idea in mind until it's no longer wrong. The job of the person leading innovation is to create the conditions that allow and encourage all these things to happen again and again.

Catmull and other leaders at Pixar were able to create an organization superbly able to collaborate, learn through testing and iteration, and find integrative solutions. By focusing on those aspects of the innovation process, they made Pixar a place that could take the "tens of thousands of ideas" Catmull mentioned and make of them the seamless work of art you see in a theater.

That's why, in recognition of all the individual contributions, the credits for each of Pixar's first dozen or so movies named *everyone* in the organization who played a role, including the cooks in the company cafeteria and babies born to employees during production.[10] This was no trivial matter. In the film business, credits are serious stuff, not given lightly. As Ed Martin, Pixar vice president of human resources at the time, told us:

> *Pixar has always erred on the side of having people feel like they're a part of the process. I know of very few employees who don't immediately go to the theater just to see how many people are lined up when a film first comes out. You'd be hard pressed to find that at any other business, and I would say any other studio. Imagine the receptionist going to do that. People are so engaged.*

We asked Jim Morris, then a relatively new senior executive at the studio, what he thought made it tick. Morris had joined Pixar from Lucas Digital, where as president he oversaw Industrial Light and Magic, the company that produced special effects for the *Star Wars* and *Harry Potter* films, among others. Without hesitating, he said, "Ed and John." In the remainder of *Collective Genius*, we will explore exactly what Ed Catmull, John Lasseter,

and other leaders of highly innovative groups actually did, as well as the thinking behind their actions that enabled their organizations to innovate over and over. In particular, we will look at how they fostered the willingness and ability of their organizations to collaborate, learn through discovery, and make integrative decisions—the three skills that all innovative organizations possess.