

Praise for *Innovating with Impact*

“A potent antidote to the personality cult of the mercurial visionary, this work shows how anyone with determination and discipline can harness the craft of innovation.”

– Olaf Groth, UC Berkeley Haas School of Business and author of *Solomon’s Code*

“In an era when innovation is like oxygen Ted Ladd and Alessandro Lanteri have written an excellent book on the subject – the culture, mindset, methods and tools to drive innovation and have an impact. Combining frameworks, research and entertaining stories spanning hundreds of years of innovation, this is a riveting read and applies to all industries across all economies.”

– Gopi Kallayil, Chief Evangelist, Digital Transformation and Strategy at Google and author of *The Internet to the Inner-net* and *The Happy Human*

“Innovation can be frightening. This book unpacks the complexities of the process like nothing else in the last ten years. Its stories and ideas for multiple levels of innovators – individuals, teams and organisations – are all supported by research, but delivered in a style that everyone, professors and practitioners alike, can absorb and enjoy.”

– Feng Zhu, Professor of Business Administration at Harvard Business School

“With a compelling mix of cutting-edge insights and practical framing, Ladd and Lanteri have produced a truly remarkable book. It equips readers with the tools to drive innovation across a wide array of contexts – in their organisations, in society and ultimately in themselves. While highly pragmatic in nature, the book’s interdisciplinary focus provides a comprehensive perspective on innovation’s role in the world. The end result is a truly engaging read that will leave you more thoughtful, more creative and better prepared for the challenges of the modern business environment.”

– Matt Johnson, author of *Branding that Means Business*

“Innovation has been a buzzword in management for several years. Navigating the fog of definitions, approaches and theories was daunting until Ladd and Lanteri came up with this brilliant, theoretically rigorous and practical book. It should be on the reading list of students, business leaders and policy makers, to guide them to think of innovation as a future-ready concept. *Innovating with Impact* is a true contribution to a new understanding of why innovation matters.”

– Mark Esposito, Professor at Hult International Business School and author of *The AI Republic*

“Ted Ladd and Alessandro Lanteri believe that innovation is behind every aspect of our lives. Working through the right mindset, processes and tools, they show us that anyone can foster it and – most importantly – make a significant impact.”

– Daniel Trabucchi and Tommaso Buganza, Politecnico di Milano and authors of *Platform Thinking*

Innovating with Impact

Ted Ladd and Alessandro Lanteri

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To the unsung innovators whose products make our lives better every day: comfortable office chairs, electric scooters and microwaveable dishware to name a few.

To our students, including our executive education clients, who strive individually so that we can thrive collectively.

To our spouses, who teach us how to become the people that you think we can be, which is higher than what we would or could envision for ourselves. And who let us sit endlessly in the comfortable chairs to write, ride the electric scooters to work at dawn, and ignore how much microwaveable food we eat when you're not looking.

About the authors

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Introduction: Innovation everywhere

In 1815, the volcano Mount Tambora in Indonesia erupted, throwing enough ash into the atmosphere to block sunlight from reaching the earth. The event pushed much of the planet into a premature winter, precipitating a significant crop failure across Northern Europe in 1816. With limited fodder, farmers opted to feed cows, which could supply food, instead of horses, which were used primarily for transportation. People were forced to walk instead of ride, requiring more time and energy to travel.

Two years later, Karl von Drais mounted a flat board between two wooden wheels a few feet apart. His device allowed a person to sit astride the board and plant their feet on the ground to run uphill or lift their feet to coast downhill. In front of a large crowd, he demonstrated that his *laufmaschine* (running machine) could go 7km (4.3 miles) in an hour. Ironically, this was considered too fast, causing this first incarnation of the bicycle to be outlawed in several cities for creating a hazard to pedestrians.

Karl von Drais was not an engineer or a mechanic, but he was an avid inventor. He demonstrated that *anyone can innovate with impact*. We tend to think that innovation is the preserve of a special few introverted geniuses, driven by “Eureka!” moments and instantly resulting in brilliant new products. In our long experience and research, innovation is not confined to a subset of preternaturally gifted people. By describing some

simple tools, traits and methods, this book will help everyone in business – across every function and level – to improve how they, their teams and their organisations can make a difference through innovation.

The bicycle was a significant innovation, as was the car, the jet engine, the mobile phone and the laptop. Yet an innovation need not be a life-changing product or service. It simply represents something new or a new way of making or using something. For us, the definition of innovation is much more straightforward: *innovation creates customer value by solving customer problems.*

Another everyday item – the mirror in a lift – illustrates how this is so. Originally invented by Archimedes, the man-powered lift used ropes and winches in ancient Rome to hoist gladiators and animals into the Colosseum. Its modern incarnation was introduced in 1885 to support an innovation – steel-framed high-rise buildings – that offered an efficient way to develop residential units in crowded city centres. But one problem undermined the appeal of high-rise buildings: the residents hated the lifts. They found them too slow. At peak hours, waiting for and then using the lift became a frustrating experience. The time spent idly standing in the lobby and then inside the lift seemed interminable.

A faster lift was not the solution. In 1885, riding a cage lift that moved fast was not for the faint-hearted. Installing more lifts was too costly and would address only the waiting time, not the riding time. Ingenious developers finally recognised that residents would accept waiting for and riding in lifts if they had something interesting to look at. And the image that people found most fascinating was ... themselves. So they installed

mirrors inside the lifts and in the lobby where people waited. To this day, most lifts have mirrors (or more recently, television screens) inside and out to keep passengers distracted. The mirror wasn't new but using it to make lifts more palatable was. The use of mirrors in a lift solved a customer problem.

There are many other materials that could have been applied to the inside of the lift that would have been novel. I have never seen sandpaper or blinding lights inside a lift. Although new, those would not have addressed the customer need. They would have been inventive but not innovative.

The example of the lift also demonstrates that *everything can be used more innovatively*.

Innovation can be applied to every aspect of a product or service. Consider cars. BMW manufactures and sells cars; Avis rents cars; Uber helps people rent out their own time to drive their car for passengers; and Waymo makes self-driving cars. All four companies offer personal transportation centred around cars. Yet they deliver the value of transportation to the customer in radically different ways, showing us that *every part of a service can be innovated*.

Innovation can be as simple as putting two wheels and an extendable handle on a suitcase or as complex as transforming a suitcase into a smart device with built-in wireless technology, fingerprint locking and self-driving wheels. However, not all innovations rely on more features or higher quality. Sometimes innovations deliver inferior quality, but in a way that is significantly faster, more convenient or less expensive than a product with more features. These innovations can be more valuable to customers than existing products or services. The *laufmaschine* was not as good as a horse, because the riders

had to push it with their own legs. Yet it was convenient and inexpensive at a time when horses had become scarce and unaffordable.

Innovation pyramid

Profitable innovation rarely arrives in the innovator's mind by epiphany. The trope of some tortured, Eureka-yelling entrepreneur sitting bolt upright in bed in the middle of the night and then jotting down the precise sketch of a billion-pound idea is entertaining but mythical. Innovation is not an extraordinary event, but the outcome of a deliberate process.

We think of innovation as a pyramid, as seen in Figure 1.

It must rest on solid foundations of culture and individual mindset. Company – and even national – characteristics of openness, agility and ambidexterity provide a cultural context that promotes innovation. Personal traits like curiosity, objectivity, flexibility, adaptability and grit all enhance innovativeness. People who embrace the right attitudes are not guaranteed to be successful in innovation, but people who show none of these characteristics are probably doomed to an uninnovative future. These foundations are empirically more likely to lead to the adoption of a process for innovation, which is then more likely to generate an innovative idea. We discuss this foundation in Part 1 of this book.

At the next level of the innovation pyramid are processes, tools and methods that intentionally promote new opportunities. These encourage new ideas, identify sources of authentic value, refine existing products and services, or develop new ones that can deliver value. Such processes and techniques transform ideation from a freak event into a serious

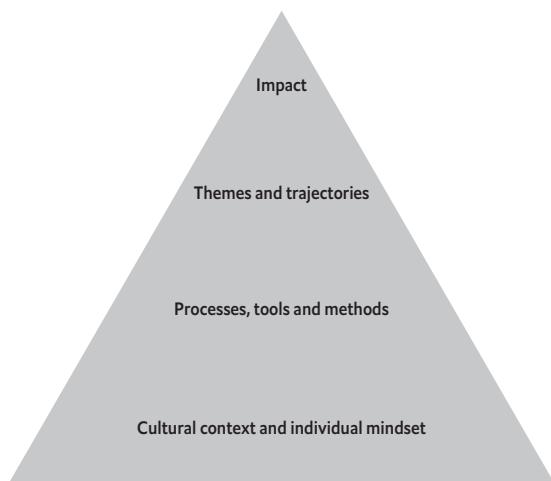


Figure 1. The innovation pyramid

game of probabilities. Resources of people and money are then made available to move ideas to prototypes and then to actual products or services. Part 2 of this book examines what is needed at this level of the pyramid.

Many contemporary efforts to innovate converge towards some common themes and trajectories that we have been cataloguing. In recent years, companies have found huge success by creating multi-sided platforms, by experimenting with novel pricing that descends all the way to “free”, by collecting and analysing large data sets with artificial intelligence, and by recognised innovations that benefit not just company profits but also communities and societies. These examples can provide inspirational cases for other innovators to amend and adapt to new markets. We cover this in Part 3.

At the summit of the pyramid sits *impact*, the ultimate

purpose of successful innovation. The thread of impact runs through each part of this book, but we give it special attention in the concluding section. Although we want to demystify innovation, we don't want to give the impression that innovation is trite or inconsequential. Quite the opposite. We are deeply passionate about the potential of innovation to improve the world and we hope many will find this book an inspiration to innovate with a purpose that contributes to better humankind.

Innovating with Impact describes each of the layers of this pyramid with examples across a range of industries and geographies. Each chapter is self-contained: readers can jump around the book for the insights that matter most to accelerating innovations within their own organisations.

Humans have been innovating for 200,000 years. It is baked into our genes, quite fortunately. We innovate for the love of innovating. No one working on an innovation knows where it will end up, what contribution to humanity it might make, or what further evolution it might go through. We are sure Karl von Drais never imagined how his simple running board with two wheels would one day morph through countless innovations into the amazingly sophisticated carbon fibre 21-gear bike, the 35-mile per hour electric bike, or the internationally popular Harley Davidson motorcycle. But it isn't necessary to be clairvoyant to innovate.

We want this book to show how everyone can use the traits and techniques we discuss to support innovation both for business success and to contribute to making life on this planet easier, more productive and more enjoyable.

PART 1

The context and mindset for innovation



In times of rapid change, people and organisations must innovate ever more rapidly just to keep up. In such times, innovation is no longer a nice to have. It becomes an essential capability to remain effective and a key ingredient for continued success. This is not a challenge. It is an opportunity.

The good news is that anyone can innovate. Yet not everyone does. Innovation can happen anywhere, but it doesn't happen everywhere.

While daring innovators and innovative organisations surely have something unique about them, they are not blessed with some mystical magic ingredient. The mindsets and the conditions that make them successful at innovating are well known, they can be recognised and measured and – most importantly – they can be nurtured and improved by anyone.

The first part of this book covers the foundations of innovation. The individual traits that make individual

innovators stand out are covered in Chapter 1. Chapter 2 highlights aspects of organisations that make the strategic decisions and create the cultural conditions that empower their employees to innovate.

With this, we want to invite you to explore how to become a better innovator and help others become better innovators at work and beyond.

1

Innovative people

The start-up Confinity began in Silicon Valley as a simple idea. Just as people can hand a physical dollar bill from one person to another, they should be able to “beam” a dollar from one smartphone to another. In 1998, three people in Silicon Valley invented a piece of software that could send money from one PalmPilot to another.

The devices from Palm were precursors to the contemporary smartphone. In the 1990s, however, they did not have the capability for an internet connection. To beam money from one device to the another, the people needed to be about two feet apart. This was an interesting and elegant technical solution, but it lacked a fundamental element in its business model: a person holding a Palm device would probably have a wallet full of dollars. Exchanging physical dollars was easier, faster and safer than using this software.

The innovators continued to search for potential sources of growth. They even approached one of the authors of this book (Ted), who at that time was an employee at Palm tasked with helping the software developers to create new innovations for the PalmPilot. Ted concluded that the idea would never find traction.

With hindsight, Ted and the entire world now know that

his prediction was short-sighted and less than visionary. A year later, the founders of Confinity – Max Levchin, Peter Thiel and Luke Nosek – launched a working electronic payments system and shortly thereafter sold the company to X.com, founded by Elon Musk. Thiel soon replaced Musk as CEO, renamed the company PayPal in 2000 and in 2002 took the company public, garnering \$61m through its initial public offering. Only months later, Thiel sold PayPal to eBay for \$1.5bn. PayPal is now one of the largest digital payment platforms in the world.

Clearly, innovation does not happen by itself. Someone, an imperfect human being, must be searching for novel ways to create customer value. What traits within the founders of Confinity propelled them to persist and to evolve their idea? What makes some innovators more likely to find success than others?

The most successful innovators have an “innovator’s mindset”. It may be that some people are born with this mindset, but the elements of it are complex enough to lead us to believe that it is a set of cognitive and emotional characteristics that can be developed over time by anyone. Research into entrepreneurship reveals that this mindset has three key elements: orientation, self-efficacy and objectivity. Here’s a look at each of them.

Entrepreneurial orientation

Entrepreneurial orientation (EO) emerged from academic research in the early 1990s as a powerful predictor of venture success. People who showed this complex trait were more likely to start and grow new companies. EO is not a single

characteristic. One of the seminal articles in this field was written in 1996 by G.T. Lumpkin at Northeastern State University and Gregory Dess at the University of Texas.¹ Over the past 30 years, scholars have determined that EO encompasses a set of five traits that successful innovators have in greater amounts than people who rarely innovate. Innovators always have at least some degree of these traits, though the amount of each trait and the combination can vary. Read the descriptions here and then take the self-test that follows to assess your own EO.

- *Innovativeness* refers to the ability to generate new ideas, be they products, processes or technologies. This quality has long been a durable trait in entrepreneurial research, harking back to economist Joseph Schumpeter who, in 1942, introduced the concept of “creative destruction”, by which he noted how entrepreneurial innovation periodically overtakes the status quo in business, replacing current products and processes with new technologies. Schumpeter believed that a definite entrepreneurial spirit (*unternehmergeist*) was necessary to innovate and that people working in companies that invest in innovation ultimately drive the economy forward.
- *Autonomy* relates to an innovator’s sense of independence to take a strategic initiative, disengaged from any surrounding bureaucracy, to explore a new venture. For those who work in hierarchical command-and-control companies, the innovator might be considered a “maverick” who refuses to adhere to the rules and conventions of the company’s policies and processes. Once involved in an innovation start-up venture, the person may continue to exhibit this same strong autonomy and

may even be seen as autocratic, imposing their vision on others in the new venture.

- *Risk-taking* captures the trait that entrepreneurs need to have to take action in the face of uncertainty. Risk-taking may involve making financial and other resource commitments with no guarantee of payback or profit. This characteristic does not mean that innovators do not assess risks or consider them in their decision-making; they do. Innovators determine that such risks are worth taking because they can envision success.
- *Proactivity* reflects the entrepreneur's desire and drive to seize any first-mover advantage possible to shape a new market. This quality affects the innovator's sense of speed in wanting to get things done as quickly as possible and their sense of time to be in the marketplace before anyone else.
- *Aggressiveness* refers to an innovator's sense of intensity and posturing during head-to-head competition with any other product, service or technology that is deemed a rival. It is simply the quality of being a competitive personality, unwilling to let anyone else win. Aggressiveness differs from proactivity in that proactivity looks at unoccupied market space, whereas aggressiveness assumes existing competition.

Testing your entrepreneurial orientation

You can assess your EO using the following self-test. For each question in Part 1, indicate your agreement on a scale of 1 to 5, where 1 reflects strong disagreement and 5 reflects strong agreement.

Part 1	Disagree	—————>			Agree
I like high-risk projects with the potential of very high returns (Risk)	1	2	3	4	5
I enjoy exploring new ideas (Risk)	1	2	3	4	5
I actively improve and innovate in my professional career (Innovativeness)	1	2	3	4	5
I am creative (Innovativeness)	1	2	3	4	5
I seek new ways to do things (Innovativeness)	1	2	3	4	5
I try to speak and act first when working with others (Proactivity)	1	2	3	4	5
I excel at identifying new opportunities (Proactivity)	1	2	3	4	5
I initiate actions to which other people respond (Proactivity)	1	2	3	4	5
I am proactive (Proactivity)	1	2	3	4	5
I am intensely competitive (Aggressiveness)	1	2	3	4	5
I am bold and aggressive (Aggressiveness)	1	2	3	4	5
I aim to outmanoeuvre and “undo the competition” in my business ventures (Aggressiveness)	1	2	3	4	5
I embrace bold, wide-ranging acts to achieve my objectives (Aggressiveness)	1	2	3	4	5
I prefer to act and think without interference (Autonomy)	1	2	3	4	5
I work independently (Autonomy)	1	2	3	4	5
I do not like authority (Autonomy)	1	2	3	4	5
Total of Part 1					

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For Part 2, the scale is reversed. Strong agreement merits a 1 and strong disagreement merits a 5.

Part 2	Agree	—————>			Disagree
I prefer low-risk projects (RiskR)	1	2	3	4	5
I am cautious (RiskR)	1	2	3	4	5
I respond to actions from competitors (ProactivityR)	1	2	3	4	5
I look to others for new ideas (ProactivityR)	1	2	3	4	5
I emphasise solutions that have already been tried and have been proven successful (InnovativenessR)	1	2	3	4	5
Total of Part 2					

Scoring your EO

When you have scored these statements, add the totals from Part 1 and Part 2. Then divide by 21 to calculate an average score, which should be between 1 and 5. This is your EO score.

Note that the five dimensions of entrepreneurial orientation are not cumulative. Some of them overlap and reflect the same underlying trait. For example, people who like to take risks also typically like personal autonomy. Thus, an individual's entrepreneurial orientation can be evaluated using the five dimensions, but is often summarised and interpreted as a single trait based on the average of your responses to all the questions.

In an academic paper in 2018, Ted, along with fellow Hult professors Joanne Lawrence and Patricia Hind, analysed 1,859 students and found that the average across all five characteristics of entrepreneurial orientation was 3.80 on the scale of 1 to 5.² Those with a higher score were more likely to start new businesses and more likely to succeed with those new ventures.

It is important to note that entrepreneurial orientation is not a conclusive measure by which to predict your potential success as an innovator. EO scores vary greatly across age, gender, cultures and region of origin. In some national cultures and corporate environments, being a risk-taker or an autonomous thinker is severely frowned upon and even discouraged. Being proactive or competitive is perceived as anti-social behaviour. Thus, depending on where you are from, your gender or age, getting a score of 2.0 does not doom you to failure as an innovator. Indeed, this score might be high in some populations that culturally do not foster or appreciate entrepreneurial behaviour. Even more importantly, your score for entrepreneurial orientation can increase as you gain wisdom, skills and experience.

Now that you understand the concept of EO and have your own EO score, how does this help you innovate? If you have a relatively high EO score, your existing innate characteristics already give you a foundation for generating impactful innovations. You are ready to move to the next step. If you have a relatively low EO score, you have two options. The first is to select areas of innovation that lie within your own scope. For example, if you are aggressive but not proactive, this suggests that you are reactive. Reactive innovators search for flaws in existing products such that a customer's problems are not entirely addressed. Moreover, a reactive innovator might only find motivation for innovation when solving a problem that they personally encounter. The innovator is finding a solution in order to be the first beneficiary.

The second option if you have a low EO score is to find or build the right context for you to innovate. You might assemble

a team of people who, together, might encompass many of the crucial traits of EO. An individual who is inherently innovative but not autonomous should find a business partner who seeks and thrives with independence from an overarching organisation. Or you might move to an organisation that recognises and rewards risk-taking.

Just by knowing that the concept of entrepreneurial orientation exists will help you see the set of traits in yourself and in others. This observation might even by itself provoke a change in your own beliefs and behaviours. In other words, understanding EO might create EO.

Self-efficacy

The second element of the innovator's mindset is self-efficacy, which is broadly similar to self-confidence but with an important distinction. Whereas self-confidence is often used to reflect a person's overall aura, self-efficacy is much more specific. It describes a person's confidence in their ability to achieve a specific goal by taking a specific action in a specific circumstance.

For example, after years of teaching innovation to business school students, we have a high degree of self-efficacy in our ability to empower students with skills in innovation that they will use effectively after graduation to bring new, impactful ideas into the marketplace. But that doesn't mean that we are confident about all aspects of business. The intricacies of double-entry accounting still baffle us. Nor are we confident about our ability to generate innovations in medicine or architecture were we to work with students in those disciplines. Our self-efficacy is narrowing, contained within a specific domain with a specific set of outcomes.

Self-efficacy is not the same as competence. Self-efficacy is a subjective perception. Competence is an objective assessment. Self-efficacy without competence is arrogance. Using our example again, it is possible for professors to have a high personal degree of self-efficacy for student outcomes that does not match their skill in teaching.

However, self-efficacy often generates competence. A person with confidence in an activity is more likely to practise that behaviour continually, typically leading to an improvement in the result. Professors with self-efficacy in teaching innovation will continue to teach, collect evidence on their impact, and make improvements in their content and technique. Through practice, they will almost certainly improve their impact.

Over the last 15 years, management scholars involved in studying innovation have examined the role of self-efficacy in greater detail. They find that specific actions can bolster self-efficacy and lead to successful entrepreneurial activity. Jeffrey McGee, a professor at the University of Texas, found a specific type of self-efficacy that he labelled “entrepreneurial self-efficacy for searching”, which refers to the confidence that a person has in their own ability to find a new idea that will blossom into an innovative, impactful product or company.

Why does this matter? Because an innovator’s mindset makes impactful innovation more likely. Building one’s own self-efficacy for searching contributes to that mindset. In Ted’s 2018 paper (mentioned above), there were significant variations in the degree of self-efficacy according to age, gender and national origin. Nonetheless, the links between a student’s sense of self-efficacy and their ability to search for a new business idea were strong.

Self-efficacy self-test

Here are questions to ask yourself to determine your score for self-efficacy as it relates to the two steps of searching and marshalling.

How much confidence do you have in yourself to:		Not much	→	A lot		
Searching	come up with a new idea or service?	1	2	3	4	5
	identify the need for a new product or service?	1	2	3	4	5
	design a product or service that will satisfy customer needs and wants?	1	2	3	4	5
Marshalling	get others to identify with and believe in your vision and plans for the future?	1	2	3	4	5
	network, i.e. make contact and exchange information with others?	1	2	3	4	5
	clearly and concisely explain your business idea in everyday terms (verbally or in writing)?	1	2	3	4	5
Total your scores						
Divide by 6 to find your average score						

The average score among the sample of almost 1,700 students was 4.2 out of 5. Like many cognitive traits, self-efficacy is mutable and mercurial. It can be affected by slow-moving influences like one's culture, but also by transient influences such as mood and recent experience in innovation. It is even more influenced by experience than the traits of entrepreneurial orientation discussed earlier. Serial entrepreneurs might see only small movements around their appetite for risk, for example. Yet a few initial successful innovations will produce a dramatic increase in entrepreneurial self-efficacy. A few initial failures will have the opposite impact.

Now that you understand the importance of self-efficacy, what can you do about it? Albert Bandura at Stanford University, the originator of the concept of self-efficacy, has offered numerous suggestions for developing and improving it.³ First, a person, along with their mentors and peers, can set moderately challenging but attainable goals to experience the challenge – and triumph – of small achievements in innovation. Second, innovators can find and recruit role models and mentors in their specific target domain. Someone hoping to innovate within the realm of hospitality, for example, can find managers and leaders in the industry to emulate. Finally, self-efficacy relies on self-reflection. Someone hoping to improve their confidence about their own impact should document and then refer to the lessons from each success, failure and external observation. Self-efficacy can be built upon evidence of success, which requires that an innovator solicit and internalise such evidence.

Both of us teach innovation to graduate students. Part of the success of our classes is built upon our ability to convince students that, as a result of the class, they have the skills to innovate with impact. In other words, we are not just teaching them the methods. We are also giving them the confidence to employ these methods, which makes them more likely to practise these methods in the real world. By trying the methods, these students can improve them.

We build student self-efficacy for innovating using Bandura's model. We set assignments for the class that push each student to try something slightly out of their comfort zone. When they take even a small step towards innovation, we applaud them loudly and publicly. This is not false or inauthentic praise. They have done something courageous.

We engineer opportunities to congratulate them. Second, we mentor these students through personal relationships that give them individualised attention and support. Third, because both of us have had success as innovators, we offer ourselves as role models to these students. We also bring many guest speakers into our classes. Across all these interactions, most of our students find a person that they can admire and emulate. Finally, we force students to reflect on their actions towards learning to innovate – actions that were successful and those that were not. We do not do this with any judgement about their value as a human being. We do not belittle or harangue.

We assume that a person without self-efficacy for innovation is not doomed to poor innovations. Instead, we assume that such people need a more supportive context to allow them to internalise the methods of innovation into their own confidence that these methods will work.

Objectivity

Entrepreneurial orientation and self-efficacy reflect what people think about themselves. These are purely subjective assessments. Two people with very different beliefs about themselves may still behave in the same way despite their subjective assessments. Subjectivity is unavoidable for assessing traits but it is lethal when assessing capacity for successful innovation. That is why an innovator's mindset needs a third element: objectivity.

Objectivity is the voice of other people's wisdom when going through the steps of innovation. Not every idea is brilliant, valid, usable or even worthy of further pursuit. Being able to recognise when an idea will lead to a dead end or has no chance

of meeting consumer needs can save innovators a lot of time and resources.

Objectivity is the antidote to natural human weaknesses. When contemplating a new idea, many people fall into one or both of twin traps: confirmation bias and selection bias. *Confirmation bias* describes a behaviour where the actor ignores any new information that runs counter to existing beliefs. We literally hear and recognise only information that confirms what we already believe to be true. Later in this book, we will talk about deliberate strategies to reduce the tendency towards confirmation for new ideas. The impact of such strategies depends on one's own comfort in being wrong, being able to listen to and act on information. An innovator's objectivity is necessary to realise that sandpaper on the walls of a lift might be new but not useful; inventive but not innovative.

There are two common avenues to reduce confirmation bias. The first is actively to seek information that would *invalidate* an idea. Instead of attempting to find supporting logic and facts, an objective innovator starts the process with a search for logic and facts that might poke holes in the value of an idea. This practice relates to self-efficacy in searching for an entrepreneurial idea. Someone who is confident that they can eventually find and develop a fruitful innovation has the emotional strength and persistence to put the idea immediately through a pressure cooker of potentially unflattering experiments.

Confirmation bias commonly leads to a second bias, *selection bias*, where someone seeking feedback on an idea chooses to solicit opinions from a group of friends who are predisposed to agree. This audience will incorporate their desire to please the speaker into their opinion about the innovation at issue.

It is not enough to approach strangers for their opinions. An aggressively objective innovation, buoyed by entrepreneurial orientation and self-efficacy in searching for a new idea, might do well to seek out feedback even from people who have well-known alternative interests.

As an illustration, let's talk about parking spaces. Like the cliff swallows returning to Capistrano every March, every year one of our students will declare that they have the perfect business: a service through a smartphone (that is, an app) that will help match people who are looking for a parking spot for their car with a person who owns an empty parking space. Because such a service does not currently exist in their home city and seems logical and valuable at first glance, they are convinced that it will be innovative.

Unfortunately, this product is unlikely to deliver the value to customers that these students anticipate. First, there is the enormous cost of making drivers and parking lot owners aware of the app such that they download it to their smartphone and consult it. Second is the “chicken-or-egg” problem that is common to multi-sided platforms: if a driver consults the app and does not find an available parking space, the driver is unlikely to consult the app again. If a person who owns an empty parking space opens the app only to find that there are not currently any drivers actively seeking a spot, they are unlikely to take the effort to sign up for the service and update the status of the parking space. And then we get into the issues of security for the car and security for the parking space. And what happens if the driver refuses to leave? Or if the owner suddenly wants the empty space? In summary, this idea is objectively not likely to provide customer value.

An innovator must be willing to take a risk, think innovatively, act autonomously and proactively. An innovator must have confidence in their ability to create new products and services that will eventually solve customer problems. And yet an innovator must also be open to external evidence to test and determine if a particular idea will in fact be impactful.

The innovator's mindset

These three traits – entrepreneurial orientation, self-efficacy, and objectivity – comprise the innovator's mindset. People with these traits are more likely to consider innovating and are more likely to generate innovations that create significant customer value.

It is difficult to know with certainty the degree to which the most well-known innovators of the past decades had all the traits of the innovator's mindset. Despite hundreds of articles and books covering entrepreneurs like Steve Jobs, Marie Curie, Nicola Tesla or Shirley Jackson, we have yet to find the “perfect” innovator's mindset. Jobs launched numerous technology failures when he was CEO of Apple. Musk's first version of PayPal was voted as one of the worst business ideas of its time. Bezos oversaw the development of Amazon's Fire Phone, a total failure.

The past decades have seen thousands of start-ups founded and headed up by highly intelligent and driven entrepreneurs who appeared to have the right components of the innovator's mindset. Innovation is directly, positively and significantly correlated to this attitude. What is more difficult to observe is the number of people who lacked this mindset who did not even attempt to innovate. For this reason, the innovator's mindset

remains a predictive but not deterministic characteristic of innovation. If you have it, you are more likely to generate impactful innovation. If you do not have it, you can develop it. If you do not have it and do not develop it, you may still be able to innovate, but the odds are against you.

Empowered with an innovator's mindset, an individual can improve the odds of generating a successful innovation by embedding into a group of people who together can foster innovation. Just as there are traits that predict and accelerate innovation in an individual, there are also traits of an organisation that predict and accelerate the innovation from the team. This topic, organisational innovation, is the focus of the next chapter.

The innovator's brain

Until recently, research into the innovator's mindset has been based on observations about how people behave. A few studies have employed functional magnetic resonance imaging (fMRI) machines to look at the regions of the brain to see how innovators' brains might differ from those of non-innovators, but these machines cannot see minuscule blips of neural activity. There were no theories that could explain how the brain creates new ideas.

The "thousand brains" theory of intelligence from Silicon Valley innovator-turned-scientist Jeff Hawkins is the first proposal to describe how the brain functions at the cellular level.⁴ This theory has direct, important and unexpected implications for how people learn to innovate. The first is to expand the number of reference frames that an innovator can call upon. Because the brain starts with available analogies in

order to learn a new object, innovators should cram their minds with new historical examples that include an explanation as to why these examples were successful. This helps the brain on a cellular level apply ideas from one context into another. It's an important path to creating something novel and useful.

The second piece of advice from Hawkins revolves around the role of self-efficacy. When new sensory input arrives, all cells compare this new information to their expectations. If all these cells agree that these sensory inputs match the model of something the brain has already understood, they do not need to create a new model. However, if they do not agree, these cells must decide if this is a new detail for an existing model that is already in the brain, or if it is a new object that deserves its own new model. Self-confidence might be construed as the speed and comfort with which the brain makes this decision: more details for an old model or the first details for a new model.

This book intentionally provides hundreds of contemporary and historical examples to give the reader's brain new models of innovation. As the reader is considering new potential innovations, this expanded library will give these new ideas hundreds more reference frames to which the reader can attach these new ideas. Moreover, innovations can emerge from the recombination of existing ideas. By having more models in the brain, the reader can consider new combinations more efficiently and comfortably.