

Chapter 2

Defining the Entrepreneurial Mindset

Author Reflection

At the beginning of the semester, I often ask my students to share their thoughts on what an entrepreneur is. Student responses commonly fall into one of three categories. The first has to do with someone being a “business owner.” After some discussion, this is usually further refined to “small business owner,” with the caveat that the owner must be actively involved in the day-to-day operations of the business. Indeed, most of us know someone who owns his or her own business. The second category of responses typically defines an entrepreneur as someone who is “starting up their own business.” Thus, the focus shifts from ownership to the start-up process. The last category of responses commonly associates entrepreneurs with “new, high-tech firms” that grow quickly, obtain venture capital funding and redefine industries. Examples might include Uber or Facebook. While these answers may be, in some cases, true, they do not get at the essence of what being entrepreneurial really means.

The purpose of this chapter is to provide an introduction and definition of the entrepreneurial mindset, taking into consideration literature and research from the discipline of entrepreneurship.

2.1 What is a Mindset?

What is the entrepreneurial mindset? To arrive at a definition, we must first dig into the meaning of the words “entrepreneurial” and “mindset” separately. We start by examining the definition of mindset, which serves as our foundation, and then move on to what it means to be entrepreneurial.

A mindset is defined by Merriam-Webster as a “mental attitude or inclination.” As further elaborated upon by Thum (2012):

Your mindset is the sum of your knowledge, including beliefs and thoughts about the world and yourself in it. It is your filter for information you get in and put out. So it determines how you receive and react to information. **Mindset: Mental attitude or inclination**

In her book entitled Mindset, Carol Dweck (2006) acknowledges that a mindset can be fixed or growth oriented. While a fixed mindset assumes your talents and abilities are set, the growth mindset believes your talents and abilities can be developed. Yet, Dweck is quick to point out that a mindset can change. Much of this occurs through developing a greater awareness of your current mindset, and taking steps to purposely start thinking and reacting in new ways.

Mindset: Mental attitude or inclination

From an academic standpoint, the mindset concept comes out of the cognitive psychology and organization theory fields. Gupta and Govindrarajam (2002: 116–117) summarize the findings from this literature as they pertain to individuals:

1. **As human beings, we are limited in our ability to absorb and process information.** Thus, we are constantly challenged by the complexity, ambiguity, and dynamism of the information environment around us.
2. **We address this challenge through a process of filtration.** We are selective in what we absorb and biased in how we interpret it. The term mindset refers to these cognitive filters.
3. **Our mindsets are a product of our histories and evolve through an interactive process.** Our current mindset guides the collection and interpretation of new information. To the extent that this new information is consistent with the current mindset, it reinforces that mindset. From time to time, however, new information appears that is truly novel and inconsistent with the existing mindset. When this happens, we either reject the new information or change our mindset. The likelihood that our mindsets will undergo a change depends largely on how explicitly self-conscious we are of our current mindsets: the more the hidden and subconscious our cognitive filters, the greater the likelihood of rigidity.

Thus, while our mindsets can be shaped by an intentional awareness, they are also largely driven by our experiences and what we are (intentionally or unintentionally) exposed to.

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What does this mean for engineering educators? For starters, we have a direct way of influencing the mindset of the students through the experiences we provide them with in our classes. Yet, as mindsets evolve through an interactive process, it is not simply a “one and done” effort. Rather, it must be reinforced and practiced. **In this sense, a mindset is a habit that requires practice.**

2.2 What Does it Mean to be Entrepreneurial?

The word “entrepreneur” originates from the French word *entreprendre*, which means “undertaker” as in the sense of someone undertaking a major project. The French economist most well-known for coining this term around 1800 is Jean Baptiste Say, who emphasized “the entrepreneur shifts resources out of an area of lower and into an area of high productivity and greater yield” (Drucker 1985a: 23). Thus, the creation of value is of the very essence of entrepreneurship. Yet, the definition has continued to evolve from here, as illustrated in Table 2.1.

Joseph Schumpeter is perhaps best known for coining the term “creative destruction” in 1942, which emphasizes the “new” element of entrepreneurship in that new innovations replace existing products, processes, and services. According to Schumpeter (1942), “the function of entrepreneurs is to reform or revolutionize the pattern of production ... by exploiting an invention or, more generally, an untried technological possibility for producing a new commodity or producing an old one in a new way, by opening up a new source of supply of materials or a new outlet for products, by reorganizing an industry and so on.” This hereby suggests that entrepreneurship can take many different forms or combinations. For example, Henry Ford installed the first assembly line for automobiles, creating a more efficient and cost-effective process. The discovery of digital cameras disrupted the photography field. With the help of software engineers, eBay brought the auction process online.

Table 2.1 Definitions of Entrepreneur(ship)

Definition	Emphasis	Origin
The entrepreneur shifts economic resources out of an area of lower and into an area of higher productivity and greater yield	Creates value	Jean Baptiste Say (1800s)
The function of entrepreneurs is to reform or revolutionize the pattern of production ... by exploiting an invention or, more generally, an untried technological possibility for producing a new commodity or producing an old one in a new way, by opening up a new source of supply of materials or a new outlet for products, by reorganizing an industry and so on	Change agent/creative destruction	Joseph Schumpeter (1942)
The pursuit of opportunity without regard to resources currently controlled	Resourcefulness and uncertainty	Howard Stevenson (1983)
The entrepreneur always searches for change, responds to it, and exploits it as an opportunity	Opportunity	Drucker (1985a, b)
The discovery, evaluation, and exploitation of opportunities	Entrepreneurship as a process	Shane and Venkataraman (2000)
Entrepreneurial thinking differs from managerial or strategic thinking	Effectuation	Saras Sarasvathy (2005)

Stevenson (1983: 3) builds on the above definitions with a focus on resourcefulness, and defined entrepreneurship as “the pursuit of opportunity without regard to resources currently controlled.” Entrepreneurs typically start with a constrained set of resources and need to either operate with less or find a way to mobilize external resources. This is where risk comes into play. As a new idea is not yet proven, there is an element of risk when allocating resources. This risk and uncertainty might be related to assumptions about customer desirability and demand, technological feasibility in being able to make the product or service, and/or business viability as it relates to execution, finances, etc. This is where risk management comes in.

Peter Drucker was influential in pointing out that not every small business was entrepreneurial. He also contends that the goal of entrepreneurship is not always profit—and exemplifies this notion within the public sector. Specifically, Drucker (1985b: 5–6) notes “Today, much confusion exists about the proper definition of entrepreneurship. Some observers use the term to refer to all small businesses; others, to all new businesses. In practice, however, a great many well-established businesses engage in highly successful entrepreneurship. The term, then, refers not to an enterprise’s size or age but to a certain kind of activity. At the heart of that activity is innovation: the effort to create purposeful, focused change in an enterprise’s economic or social potential.” Indeed, this helps lay the foundation for the realization that entrepreneurship is not context specific. Drucker further emphasizes, “this defines entrepreneur and entrepreneurship—the entrepreneur always searches for change, responds to it, and exploits it as an opportunity.”

In the year 2000, as an effort to help substantiate the academic field of entrepreneurship, Shane and Venkataraman posited that entrepreneurship seeks to understand the sources of *opportunities*; the *processes* of discovery, evaluation, and exploitation of opportunities; and the set of *individuals* who discover, evaluate, and exploit them. The “discovery, evaluation and exploitation of opportunities” is the most widely accepted definition of entrepreneurship yet today, and the definition that we adopt in this book. The authors again emphasize that entrepreneurship can include, but does not require, the creation of a new organization. Entrepreneurial opportunities are defined as new means–ends relationships. Thus, they must create value. In addition, given that these relationships are newly discovered, there is a level of uncertainty surrounding the relationships early on.

Entrepreneurship: The discovery, evaluation, and exploitation of opportunities

In order to better understand the way entrepreneurs think, Saras Sarasvathy interviewed 42 expert entrepreneurs as part of her dissertation. Her research concluded that entrepreneurs are distinguished not by their common traits, but rather by their common logic, or thinking process, used to solve entrepreneurial problems under conditions of uncertainty. In this way, entrepreneurial thinking is argued to differ from managerial or strategic thinking. Thus, effectuation theory was introduced. As noted by Sarasvathy (2005: 9), “Entrepreneurs are entrepreneurial, as differentiated from managerial or strategic, because they think effectually; they

believe in a yet-to-be-made future that can substantially be shaped by human action; and they realize that to the extent that this human action can control the future, they need not expend energies trying to predict it.”

In a recent study by Zappe and colleagues (2013), twenty-six engineering faculty that taught entrepreneurship were asked to rank the characteristics that they felt defined an entrepreneur. The top response was “acts on opportunities,” which seems to suggest an alignment with the definitions provided above. Another survey of 144 engineering faculty and administrators had strong agreement on the top six choices that make up an entrepreneurial engineer (Byers et al. 2013). At the individual level, these included creativity (71%) and risk tolerance (49%). At the market level, these included opportunity recognition (64%), value creation (57%), and market awareness (47%). Within technology, the list included product development (57%). Again, these are all building on different aspects of the above definitions.

In examining the evolution of the definition of entrepreneur, it is important to recognize five key insights as they pertain to engineering education.

Insight #1 “Are you an entrepreneur?” is the wrong question. Rather, it should be “how entrepreneurial are you?”

While we have an inherent tendency to dichotomize and classify individuals as either being an entrepreneur or not—it is not necessarily this simple. As entrepreneurship is the discovery, evaluation, and exploitation of opportunities, individuals can vary as to the extent to which they exhibit these behaviors. Thus, the question shifts from “are you an entrepreneur?” to “how entrepreneurial are you?” The goal as engineering educators is to simply push our students further up the continuum, and to a place where they are more apt to discover, evaluate, and exploit opportunities on a regular basis.

Insight #2: Being entrepreneurial is relevant to more than just start-ups.

While we, again, have an inclination to associate entrepreneurship with business ownership or the high-growth, tech start-up, any reference to context is noticeably absent from the definitions. As the acceleration of change increases, the need for the discovery, evaluation, and exploitation of opportunities also intensifies—regardless of what type of organization it is. While entrepreneurship has become relevant to nonprofits, government, social enterprise, and communities, it has also become significant to existing, large corporations that are working harder than ever to embrace the entrepreneurial values—as it is critical to maintaining competitiveness. This is a particularly relevant point for engineer educators, as it helps justify why entrepreneurship is applicable for all engineering students—and not just the ones that are interested in starting up their own business.

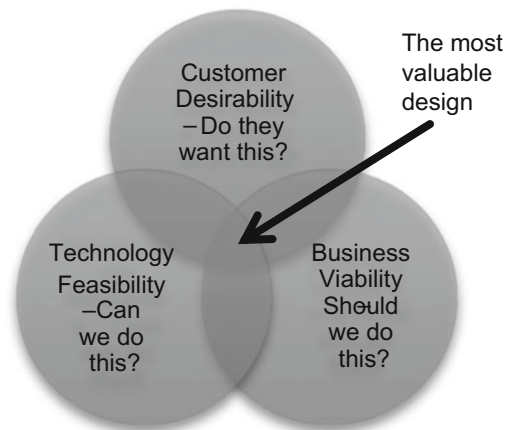
Insight #3: There are many types (and sizes) of entrepreneurial opportunities.

If entrepreneurship is defined as the discovery, evaluation, and exploitation of opportunities, there is often discussion over what constitutes an opportunity. As noted by Schumpeter, innovations can involve any new combination of knowledge,

resources, etc. He provides five general types of innovations, including new goods, new methods of production, new markets, new sources of inputs, and new types of organizing. We can also look at the distinction between radical versus incremental innovations. For entrepreneurial educators, the main takeaway is that entrepreneurial opportunities can take many different shapes and sizes. It can range from developing a completely new product, for example, to refining an existing process to reach a new market.

Insight #4: Being entrepreneurial requires the creation of value.

From the earliest definition of entrepreneurship provided by Jean Baptiste Say in 1800, it was clear that being entrepreneurial involves the creation of value. This value can come in many different forms, whether it is a civil engineer improving the traffic flow at an intersection or a biomedical engineer creating a new diagnostic tool. Yet, as inscribed by design thinking, the most valuable design is when a solution is not only feasible (can we do this?), but also desired by the customer (do they want this?) and viable from a business perspective (should we do this?). As engineers, we are most comfortable—and quite good at—focusing on the feasibility lens. Yet, from an entrepreneurial perspective, we have to couple our inherent maker mentality with a constant awareness of business viability and the desire of the customer. Thus, as engineering educators, we similarly need to bring the business viability and the desire of the customer into our teaching so that we can truly and wholly focus on value creation.



Insight #5: Being entrepreneurial involves embracing uncertainty.

Entrepreneurial opportunities are, by definition, new and thus involve a high level of uncertainty. This is reinforced by Stevenson's recognized need for resourcefulness. This uncertainty not only relates to finding a way to build the solution (feasibility), but also uncertainty as to how the customer will react (desirability) or whether the solution is viable from a business sense (viability).

Uncertainty requires continuous experimentation, learning, and adapting. In his book, *The Lean Start-up*, Eric Reis refers to this process as the build-measure-learn loop. Indeed, the entrepreneurial process necessitates perseverance in shifting from a state of assumption to knowledge. As engineering educators, our students are already familiar with the scientific method and the engineering design process—which are both the basis of the build-measure-learn loop. Yet, we need to again ensure that this process is being applied not only to the feasibility, but also to the customer desirability and business viability angles. We also need to stress the need to embrace uncertainty and learn to adapt accordingly.

2.3 Putting it Together: The Entrepreneurial Mindset

Given our focus on the entrepreneurial mindset, we are thereby interested in the inclination towards entrepreneurship. In other words, the entrepreneurial mindset is *the inclination to discover, evaluate, and exploit opportunities*.

Entrepreneurial mindset: The inclination to discover, evaluate and exploit opportunities

In their book, entitled *The Entrepreneurial Mindset*, McGrath and MacMillan (2000) suggest that you know you have fully embraced the entrepreneurial mindset when you start to act and think like a *habitual entrepreneur*. As suggested by the name, habitual entrepreneurs are known for making a career out of starting businesses, both within existing organizations and as independent ventures. While you do not need to actually start businesses to embrace the entrepreneurial mindset, the point is that you utilize the entrepreneurial way of thinking so frequently that it has become a habit. McGrath and MacMillan (2000: 2–3) go on to identify five characteristics of the entrepreneurial mindset in common with habitual entrepreneurs:

1. They passionately seek new opportunities.
2. They pursue opportunities with enormous discipline.
3. They pursue only the very best opportunities and avoid exhausting themselves and their organizations by chasing after every option.
4. They focus on execution—specifically, adaptive execution.
5. They engage the energies of everyone in their domain.

If the entrepreneurial mindset involves an inclination to act or think in a certain way, can we, as engineering educators, actually impact how our students act or think? Can we really change their mindset? **Yes, but it requires practice so that it becomes a habit.** And, this practice must be grounded in theory. As outlined by Neck et al. (2014: 9):

...in order to *learn* entrepreneurship, one must *do* entrepreneurship. Our position, however, is that doing entrepreneurship does not exclude theory. On the contrary, effective doing of entrepreneurship requires a set of practices and these practices are firmly grounded in theory.

References

- Byers, T., Seelig, T., Sheppard, S., and Weilerstein, P. 2013. Entrepreneurship: Its role in engineering education. *The Bridge on Undergraduate Engineering Education* 43 (2): 35–40.
- Drucker, P.F. 1985a. The Discipline of innovation. *Harvard Business Review*.
- Drucker, P.F. 1985b. *Innovation and Entrepreneurship Practice and Principles*. New York: Harper & Row.
- Dweck, C.S. 2006. *Mindset: The new psychology of success*. New York: Ballantine Books.
- Gupta, A.K., and V. Govindrarajam. 2002. Cultivating a global mindset. *Academy of Management Executive* 16 (1): 116–126.
- McGrath, R.G. and I. MacMillan. 2000. *The Entrepreneurial Mindset*. Harvard Business School Press.
- Neck, H.M., P.G. Greene, and C.G. Brush. 2014. *Teaching Entrepreneurship: A Practice-based Approach*. Edward Elgar Pub.
- Sarasvathy, Saras. 2005. *What makes entrepreneurs entrepreneurial?* Darden Business Publishing.
- Schumpeter, J.A. 1942. *Capitalism, Socialism and Democracy*. Harpers and Brothers.
- Shane, S., and S. Venkataraman. 2000. The promise of entrepreneurship as a field of research. *Academy of Management Review* 25 (1): 217–226.
- Stevenson, H. 1983. *A perspective on entrepreneurship*. Harvard Business School Publishing. Boston, MA.
- Thum, Myrko. 2012. *The right mindset: Change your mindset in 6 Steps*. Retrieved from: <http://www.myrkothum.com/mindset/>.
- Zappe, S., K. Hochstedt, and E. Kisenwether. 2013. Teaching to innovate: Beliefs and perceptions of instructors who teach entrepreneurship to engineering students. *International Journal of Engineering Education* 29 (1): 45–62.

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