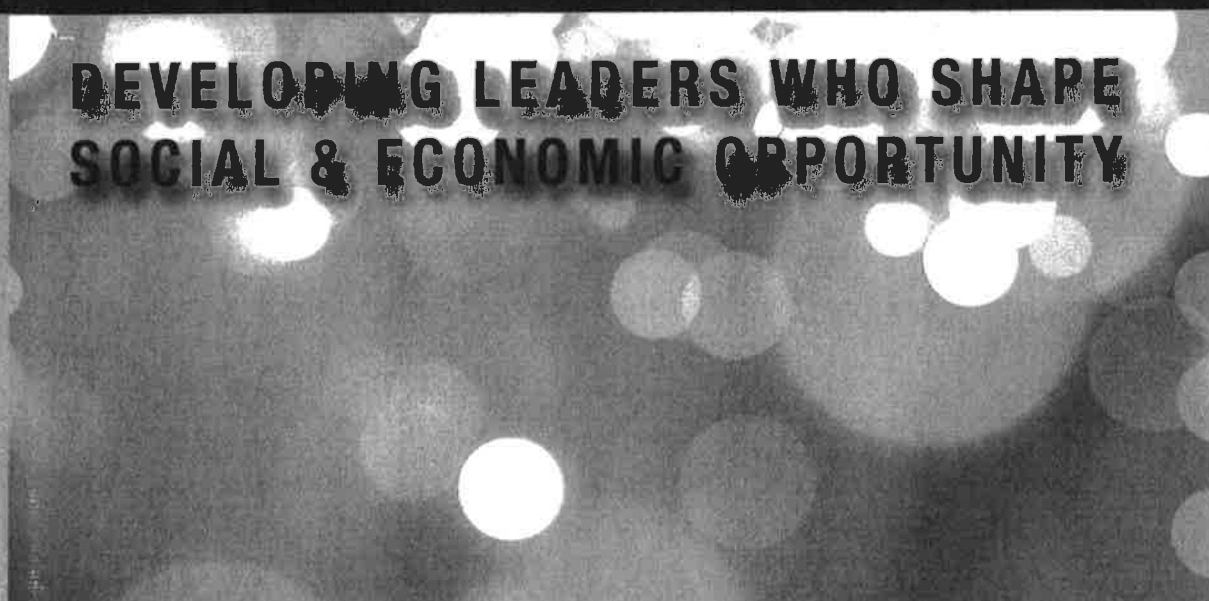
The New Entrepreneurial Leader



DEVELOPING LEADERS WHO SHAPE SOCIAL & ECONOMIC OPPORTUNITY

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CHAPTER 2

Creation Logic in Innovation: From Action Learning to Expertise

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> Most people view product as the one aspect of a business over which they have absolute control—unlike capital, say, or employees. But most products I have seen develop a life of their own, beyond anyone's power to control. Just look at this innocent little snack called Smartfood, which has managed to reroute the lives of everyone drawn into its orbit (Kahn 1988).

SMARTFOOD, A SNACK FOOD MADE FROM PREMIUM-QUALITY WHITE popcorn sprinkled with aged white cheddar cheese, was first introduced to the New England market in 1985 and quickly became America's leading snack food, with sales going from $500,000 in 1985 to $18 million in 1988. What is most interesting about this product innovation is that in many ways it was a by-product of the innovation the entrepreneurial leaders were seeking.

Ken Meyer and Andrew Martin were working on the Tug-N-Tie resealable bag. At the time they were looking to create a resealable bag for the snack food industry that was cheap to produce and easily adaptable to the current technology. They had spent two years developing the Tug-N-Tie bag only to find that snack food companies weren't interested in buying it. They decided to make Smartfood to show the industry that the bag worked. The irony is that when Smartfood was launched in 1984, it was never sold in the Tug-N-Tie bag (Kahn 1988).

Innovation is one of the critical quests of many entrepreneurial leaders. While every generation claims that in its own time business competition reached unprecedented levels, today's entrepreneurial leaders face a unique set of challenges to predictably innovate and compete. The perfect storm has been created by globalization, economic and technological changes, and an increased emphasis on environmental and social impact. In almost all markets, this storm has caused product variety to dramatically increase, most product life cycles to shorten, and the number of competitors to substantially increase. As a consequence any competitive advantage that an organization might have today is short-lived and will likely need to be continually re-created. As such, an organization's ability to repeatedly and reliably generate new products and services is essential. To innovate is the best choice, and perhaps the only one, to ensure the growth of new organizations and the long-term survival of existing ones.

While innovation may be important, it is also very difficult. Recent surveys demonstrate that many executives rate their current innovation efforts as unsatisfactory. For example, a recent McKinsey study shows that more than 70 percent of participating executives indicate that innovation is among the top three drivers of their companies' growth, but only one-third of the executives are confident in their ability to actually stimulate innovation (Barsh, Capozzi, and Davidson 2008). Similarly, another recent study shows that only 55 percent of the surveyed company leaders are satisfied with their companies' financial returns on their innovation investments (Andrew et al. 2010).

The lack of innovation that these executives point to may connect to how we currently conceptualize innovation. In popular myth innovation is often portrayed as an idea occurring to a genius in a flash; as something that happens only to individuals with exceptional skills, genes, or luck; or as a product of circumstances that border on

the mystical. In contrast to this myth, we believe that innovation is a method that can be learned, practiced, and improved; that involves multiple people; and that is predicated on passion and hard work.

Furthermore, as innovation work is done in an unknowable environment, it demands that an entrepreneurial leader engage a cognitively ambidextrous mindset in which one cycles between a creation approach of acting and a prediction approach of learning from the data that are created during the action. Innovation occurs as entrepreneurial leaders start small with the resources at hand and rapidly create prototypes to generate new data and new ideas. They are able to minimize risk by failing fast and cheaply, learning quickly, and rapidly changing directions when reality does not match assumptions. Using their cognitively ambidextrous mindset, entrepreneurial leaders experiment, succeed, fail, and learn.

The challenge is how to teach future entrepreneurial leaders to be cognitively ambidextrous in their method of innovation. Stemming from the aforementioned myths of innovation, some people suggest that individuals can't be taught to be innovative. By highlighting superstar innovators such as Steve Jobs of Apple, Bill Gates of Microsoft, and Mark Zuckerberg of Facebook—all of whom have incomplete formal educations—it is sometimes implied that formal education may be detrimental to developing innovative capacities. Not surprisingly, we don't follow this argument. Instead the challenge may be that too many formal education approaches teach students in traditional ways that rely on lecturing about the innovation process rather than *experiencing* it.

To develop entrepreneurial leaders, we as educators need to create learning experiences that are based on a context and enable leaders to practice the innovation method of the real world. We need to consider moving away from a pedagogy focused on lecturing about a prediction approach and pursue a pedagogy that enables students to *experience* both the prediction and creation approaches embedded in all innovation.

In this chapter we describe courses we have developed to teach entrepreneurial leaders to be cognitively ambidextrous in their approach to innovation. We provide examples from diverse contexts so that the reader can explore how these ideas can be taught to undergraduates or to experienced managers who are trying to build a culture of innovation and entrepreneurial leadership. Although these examples come from different realms of management education, they are similar in that they rely on an experientially based pedagogy to develop cognitive ambidexterity.

Defining Key Innovation Activities

Moset experts agree that despite differences in labeling, innovation projects tend to involve three broad sets of nonsequential activities:

- Recognizing an opportunity
- Creating alternative options
- Selecting and refining options

By focusing on these activities, one can recraft the teaching of innovation to apply the principles of both creation and prediction logics. In so doing entrepreneurial leaders are able to develop a more accurate frame of cognitive ambidexterity that is needed to test and shape innovative opportunities.

Recognizing an opportunity requires a serious effort to fully understand the problem for which a solution is sought, including the problem's context and the stakeholders' interests. It is important to note that the focus of this activity is on understanding the problem and not on creating the solution. The design community labels this approach as developing deep empathy for the user and other relevant stakeholders (Leonard and Rayport 1997).

Entrepreneurial leaders will need to rely on their passion and their discipline to explore the experience of users with an open mind, as they will likely travel down many winding paths to develop deep empathy.

As the Smartfood example shows, Meyer and Martin's passion propelled them to create their Tug-N-Tie bag; at the same time, their passion and open minds enabled them to be open to pursuing the Smartfood opportunity. In addition, developing this deep empathy requires individuals to engage in a co-creation process as the relevant stakeholders share their perspectives. Because empathy goes beyond factual knowledge, the best—and perhaps only—path to its successful development requires entrepreneurial leaders to directly encounter and try out the experiences of their customers. In the Smartfood case, Meyer and Martin used their networks to consider diverse stakeholders' interests. It was out of one of these conversations that the ideas materialized to focus on the popcorn and not the bag. Through this co-creation process, entrepreneurial leaders learn to understand the problem from multiple perspectives, a key issue that is discussed in more detail later in this book.

The second key set of innovative activities is *creating alternative options.* This involves the iterative application of creation and prediction logics to arrive at a large number of potential solutions to increase the probability of finding a good one (Terwiesch and Ulrich 2009). Each idea generated is essentially an action that provides access to new ideas and new information that may have not been considered before. By learning from each idea, entrepreneurial leaders drive an iterative process that reveals new options. As this description suggests, innovative opportunities seldom arise through a prediction approach alone in which entrepreneurial leaders weigh the costs and the benefits of each option to select an optimal solution. Rather entrepreneurial leaders take action, learn from the action, and use this knowledge to guide the next choice. By cycling between creation logic and prediction logic, entrepreneurial leaders generate alternative solutions to a problem.

Meyer and Martin certainly used this approach as they developed the Smartfood product. After deciding to focus on Smartfood, they encountered numerous problems related to manufacturing and distribution. For example, an early manufacturing problem arose when the coating of each popcorn kernel with oil and cheese was inconsistent, which affected the taste (Kahn 1988). To solve this problem, these entrepreneurial leaders experimented with the manufacturing process. With each change they made, they learned from their action until they eventually arrived at a new, improved manufacturing process that yielded a more consistent cheese coating and taste. While technology played a supporting role, learning from experience was central to the solution (Kahn 1988).

The final set of activities of innovation involves *selecting and refining options.* This begins with generating information about the options. Prototyping—the early and rough testing of ideas and their feasibility—is a preferred way to generate this information. The goal of prototyping in early-stage development is not confirmation but exploration. In other words ideas are tested until they break so that one can learn about the ideas' potential and limits. Prototyping is essentially creating experiments, taking action, and learning from the action to guide future action. The results from early prototypes provide new information about both the problem itself and the various options in the associated solution space. Similar to empathy development, this learning is best fostered through active experimentation. Prototyping is the vehicle with which to test and assess the opportunities that the creation logic helped generate.

The three sets of activities that underlie innovation parallel the central elements of the creation approach of cognitive ambidexterity. As we've designed courses in innovation, we have strengthened

our pedagogy for teaching entrepreneurial leaders to apply a creation approach to innovation. In the following section, we provide examples from both undergraduate and executive education courses to highlight how we help entrepreneurial leaders develop their capacity to engage in a creation approach to innovation.

Teaching a Creation Approach to Innovation

We have found that experiential learning, and the active engagement of the student in the learning experience, is the most-effective method for enabling students to connect creation logic and innovation. There are two major dimensions to consider in building experiential learning in innovation. First, the *team* assigned to any innovation learning activity is critical. Many modern technologies require participants with different multidisciplinary competencies. In addition to skill diversity, trust and psychological safety are essential if team members are to embrace open experimentation, including the possibility of failure (Edmondson and Nembhard 2009). Second, the choices of type, scope, and context of the learning project are important. The innovation *project* should stretch the team to explore unconsidered possibilities, but at the same time it should not represent an impossible goal. In line with an appropriate project scope choice, the project context should support the project and the team but not remove all constraints—which are sometimes the source of innovative ideas.

The following discussion highlights how we manage these aspects of experiential learning in our innovation courses.

Creation Logic in Undergraduate Product Design and Development Course

One of the novel ways that we introduce a creation orientation to innovation is in an interdisciplinary undergraduate course in Product

Design and Development. This one-semester course combines students and faculty across three different disciplines and three separate schools: business (Babson College), engineering (Olin College of Engineering), and industrial design (Rhode Island School of Design). Working in interdisciplinary teams, students experience the process of product development, from opportunity recognition to prototype construction to economic and environmental analyses of the proposed solution.

With action and experience as major learning modes of the course, teams work on semester-long projects, learning about users and markets, creating novel ideas, and developing and refining prototypes. The course unfolds as the faculty introduce tools and methods in brief lectures, in-class exercises and discussions, and studio-style work. Throughout the course, testing, experimentation, and learning from failure are experienced as key pieces of the product development cycle. Using $500 maximum seed money, past student project teams have developed a wide variety of innovative products, including new public water fountains, intelligent energy-saving power extension cords, innovative travel luggage, and solutions to prevent road accidents involving pedestrians and automobiles.

One of the ways we highlight a creation orientation to innovation is by teaching students to work within the team and with other stakeholders. The complexity of today's unknowable problems requires a multidisciplinary perspective. The impact on learning from working in multidisciplinary teams can be significant (Hey et al. 2007). At the same time, collaboration across disciplines can be difficult, as each participant has developed his or her own language, values, and incentives. The socialization of professional occupations is remarkably strong, even for students in institutions of higher learning (Ettlie 2002, 2007). Thus having students from different disciplines (such as business, engineering, and industrial design) working together on a project introduces them to the challenges of co-creating with stakeholders

who have differing perspectives. The type of team composition is similar to the real-world innovation teams that students will experience when they graduate.

One of the interesting ways in which students experience the dynamics of collaboration when using a creation approach arises from how the teams assign tasks to different individuals. Some teams decide early on that team members will work on problems best suited to their skill sets. Other teams choose the opposite approach, where team members volunteer for tasks to develop a new skill. In the latter cases, students tend to teach and share their specialized knowledge, and overall these teams approach their projects more holistically. Although our data set is small, it appears that the latter approach leads to better project outcomes and higher levels of satisfaction among the team members. Students from teams in which peer-to-peer teaching was largely absent tended to voice disappointment in debriefing sessions about the unwillingness of some of their teammates to share their knowledge.

Such interdisciplinary teams enable students to learn about a number of elements of collaborative creation. First, course participants are alerted to the different approach to selecting team members when engaging a creation orientation to innovation. Rather than selecting team members for specific roles, members are chosen based on their knowledge and skill set; and if smart choices are made, roles will emerge out of these skill sets. By not committing individuals to particular roles, teams achieve greater knowledge cross-pollination, which supports a creation approach. Second, students come to understand the importance of treating all individuals as co-creators rather than as competitors, which is consistent with a creation orientation in innovation. Through this collaborative approach to creation, entrepreneurial leaders are able to more widely leverage others' knowledge and skills to guide action.

Encouraging collaborative creation and mutual teaching within teams is one of the major elements we are developing. We emphasize the importance of trust in building relationships. For example, the very first assignment we introduce is an exercise that has nothing to do with the project directly: students on the same team are assigned to learn about one another. We have found that this approach not only highlights the importance of interpersonal trust on teams but actually begins to build it. In addition, we have integrated a brief lecture and an associated exercise on team dynamics early in the course. We find it important to provide ongoing coaching to monitor the team's internal dynamics and to build students' understanding of partnerships. While this approach is resource intensive, it is worthwhile because it improves participants' learning of this central element of the creation approach.

With regard to project and team formation, a core theme is that passion helps inform the creation approach, although passion can emerge in different ways. For example, in our first year of teaching this course, we had each student submit 10 ideas to the teaching team and describe his or her best idea to the class in a one-minute presentation. We then used student preferences as the main factor to simultaneously select projects and assign students into teams. We were following the rationale that intrinsic motivation is a key element for effort, creativity, and ultimately high performance (Amabile 1997). In addition, we wanted students to feel some passion for their innovation so that we could explore the importance of passion to the creation approach.

We found, however, that students' preference patterns tended to differ by school association. To create multidisciplinary teams, fewer students got their preferred project choice. The constraint of creating multidisciplinary teams superseded our ability to connect each student with his or her passion. The following year we flipped the sequence of problem presentation and team formation; that is, we first created interdisciplinary teams and then had students identify and develop opportunities. Most teams developed substantial passion for their own project. With this method we were able to demonstrate how one student's passion, like most positive emotions, is contagious and can get others more engaged with a project. In addition, we can demonstrate to students how different levels of passion can affect the action taken. As such we too have learned from our action.

For the semester project, we engage participants in three sets of innovation activities—recognizing an opportunity, creating alternative options, and selecting and refining options—and ask them to practice prediction and creation logics throughout, thus developing their cognitive ambidexterity.

For example, in introducing the activities associated with recognizing an opportunity, we both enable students to learn from action and instruct them in the tools and the techniques they need to successfully navigate the product design and development process. The faculty might introduce user-oriented techniques such as ethnography, and the teams then redefine their paths based on what they find during their ethnographic research. Through the application of both creation and prediction logics, a team takes action, planning and generating its next steps. For instance, one team followed this process as they focused on water fountain construction. Through discussions with consumers on how they approach alternative water sources such as bottled water, as well as observational research, including video analysis, this team developed insights regarding water fountains. A substantial portion of their learning came through extensive interactions with key stakeholders. These stakeholders co-created the team's definition of the opportunity. As the team developed their deep understanding of how individuals used water fountains, they recognized the opportunities for improvements relative to existing water fountains, in terms of both functionality and appearance.

Creation logic orientation also occurs as participants create alternative options. In connecting creation logic to activities associated with generating options, we discuss extensively the importance of experimentation and learning from your actions. While we highlight that learning from failure is part of this, we find that true understanding comes only from experience.

For example, a team that focused on preventing road accidents involving pedestrians and automobiles was initially exploring ways to prevent pedestrians from stepping into traffic by installing barriers. Following creation logic, this team met with pedestrians, drivers, city planners, and police to examine the feasibility of their idea. They learned that barriers, even visually attractive ones, are not appropriate for many situations. When the team recognized the problems with their idea, they initially reacted to the experience as a failure. Through discussions and problem reframing, however, we helped the students understand the importance of experimenting and learning from their action. This learning, even about the problems of their initial idea, led to the subsequent design of a device that did not constrain pedestrians' movements but rather increased their awareness of potential danger from approaching vehicles.

In the third set of activities, selecting and refining options, we have found prototyping to be an ideal means of introducing the principles of creation logic. When prototyping, students often need to consider the range of skills and knowledge within their team and identify prototyping options that are feasible given the available skills and resources. This discussion highlights how different options are available based on the combination of individuals on each team.

For example, course participants often need access to workshops to build models and prototypes. Because most university workshops have strict rules limiting the use of the space and the machinery to their own students, and usually only to students who have extra training, different students may have access to different resources. This experience facilitates learning about heterogeneous access to resources, a

common challenge for innovation teams. Course participants learn how to assemble the skills available to the team into something larger than the sum of its parts and to enlist key stakeholders to supplement the team's skills. In this way students learn the function of self- and social awareness—of *who I am* and *whom I know*—when employing creation logic.

Course participants also learn the Smartfood lesson of how action leads to solutions that could not be predicted in a class discussion. For example, during the process of building a functional water fountain prototype that allowed the team to vary water pressure, the team noticed that they could create a water arc that made refilling water bottles significantly easier. By experimenting and learning from their actions and being open to new possibilities, this team solved the more challenging problem of creating water fountains that can be used to refill water bottles as well as to provide sips of water.

In sum we view our Product Design and Development course—an experiential approach to teaching how to innovate—as an innovation project itself. Through this experiential course, participants develop their confidence with engaging creation and prediction logics. From the start (recognizing an opportunity) to the end (prototyping) participants learn about the value of taking action that is rooted in an understanding of who you are, whom you know and have access to, and the general context. Participants learn that action gives them access to new data and new stakeholders and that this information enables further refinement of actions to arrive at an innovative opportunity.

With its focus on developing entrepreneurial leaders' cognitive ambidexterity, this course is itself a prototype that we continue to experiment with to find better solutions to the various challenges. That said, the course has established itself as a successful, interdisciplinary method of developing entrepreneurial leaders' cognitive ambidexterity (Fixson 2009).

A Creation Orientation to Innovation in Executive Education

Today's Fortune 1000 executives and managers are very comfortable with and adept at managing complicated problems with a good deal of uncertainty. Using their business school training as well as their work experience, managers tend to approach the future through traditional strategic planning techniques—such as SWOT (strengths, weaknesses, opportunities, and threats), STEP (social, technological, economic, and political), and value chain analyses—that tap existing knowledge to take action. Executives approach the future by performing environmental scanning and analysis, followed by setting a strategy. Next they put in place a project plan to execute the strategy, using milestones, trend lines, and key performance indicators to allocate budgets. When performance does not meet projections, executives spend money and energy to get performance back to the trend line.

Innovation is often about dealing with "unknown unknowns," however, and existing knowledge can be grossly inadequate in such situations, leading to faulty predictions of the future. In unknowable contexts a firm has to learn through "experience," uncovering the salient variables through creation logic. Such experiential learning can take several forms.

As children we learn by imitating others and by playing and experimenting: *what will happen if I do this?* Most importantly, because children are not afraid to fail, they are able to acquire several skills much faster than adults, such as learning a language. On our way through adolescence, most of us stop playing to avoid embarrassment when failure occurs. In the workplace we instead imitate our leaders, peers, and competitors. Thus to teach entrepreneurial leaders to deal with unknown unknowns, we have to find a good substitute for childhood play. As managers and leaders, we learn when we have an unforgettable experience—a surprise success, an unexpected failure, a provocation, or a jolt to our day-to-day existence.

Yet applying creation logic to innovation projects within firms is only now becoming mainstream. In a recent Babson Executive Education survey sample of global executives, 51 percent said that experimentation is now their organization's preferred approach to understanding and acting on potential opportunity (Wilson and Desouza 2010). Although scientists and engineers have been much more comfortable with this logic and practice, most business majors, managers, and executives are either unaware of this approach or apprehensive about it. As discussed, the predominant focus of management training and the prevalence of yearly strategic planning exercises have marginalized creation logic, especially within large enterprises.

At Babson Executive Education, when we deliver innovation programs for firms, we deliberately teach a creation approach through the use of games, experiments, simulations, and action-learning projects. Some of the following innovative experiential pedagogies were developed by our colleagues at Babson:

- **TechMark.** In this simulation, developed by Robert Eng, participants face unexpected internal and market variables that affect the overall performance of an organization. The game is played in several rounds, requiring participants to reflect on their decisions and make changes dynamically.
- **Mount Everest.** This is a game in which participants learn to act with a limited amount of information while also managing new and unexpected variables appearing in the environment.
- **The Spaghetti Game.** Participant teams navigate high levels of uncertainty with either a creation or a prediction approach. Teams that pursue a creation approach, for instance through rapid prototyping, usually win; whereas those that pursue predictive planning for a longer period of time usually fail. The game illustrates how taking action before analysis (rapid

prototyping) can uncover unknown obstacles and opportunities much faster.

- **First Service.** This exercise helps participants test innovation decisions in business environments defined by high levels of service complexity.

These simulations and classroom games do involve some analysis and predictive logic. Yet the predominant focus is on the experiential process and action-based learning. The goals here are threefold:

- To educate the executives about the existence of the creation logic concept
- To expose them to the lingua franca—the concepts of tools—of creation logic and innovation
- To get them to use creation logic in their own firm's innovation projects

A few key elements of these program designs are central to teaching executives how to engage cognitive ambidexterity.

First, executives usually participate in our innovation programs in teams. By design the teams tend to be hierarchy-neutral and skill-neutral, putting all members on a level playing field that may not exist in their regular work environment. Such parity introduces unseen dynamics within the team, including new forms of collaboration and decision-making, especially when teams compete against one another.

Second, by putting teams into unique and novel situations, we force them to break out of their traditional thinking patterns and be exposed to a different set of skills. As a consequence participants find themselves in unfamiliar situations, which jolts them into a state of alertness and openness to learning. In addition these simulations and games involve the task of uncovering hidden variables through experimentation, rapid prototyping, and making mistakes. Thus participants

develop the key skills of being able to reflect on what, why, and how failures occur.

Third, most of the simulations and games are played in several rounds, creating opportunity to pause after each round for reflection on consequences of decisions and actions. Hence participants enter into subsequent rounds with new knowledge and new data to inform future actions.

Well-designed simulations and games—those that have unknown unknowns—help participants practice both creation and prediction logics in alternating fashion and identify and exploit innate and otherwise dormant entrepreneurial traits and leadership skills. The ultimate goal in our approach to executive education is to help entrepreneurial leaders more effectively lead innovation projects within their organizations. Hence we integrate real projects from the organization into our educational programs.

The most effective organizations apply these lessons to start several small projects with the resources they have on hand. They establish proof of concept via quick feedback loops between the voice of demand (customer) and the voice of supply (technology). They minimize risk by failing fast and cheaply and learning quickly. They acquire resources and assets to scale only when some success materializes or a proof of concept is established. This is creation logic in action.

Conclusion

This chapter shows how the opportunity for teaching entrepreneurial leaders to facilitate innovation lies in developing cognitive ambidexterity. Through employing both creation and prediction logics, entrepreneurial leaders have a greater ability to successfully lead the innovations that their organizations need to survive. Creation logic and prediction logic are intertwined approaches that shape opportunity through action that generates data, predictive analysis of the data, and further action.

In introducing cognitive ambidexterity in the context of innovation, faculty must rely on experiential methods in which students have the opportunity to engage in the innovation method. Through these types of exercises, they develop their own skills with using a cognitively ambidextrous approach.

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