

# Creative Discovery

## Reconsidering the Relationship Between Entrepreneurship and Innovation

The severe recession of 2008–09 has brought to the fore deep concerns regarding the U.S. economy’s ability to continue to grow, let alone to keep pace with emerging nations such as India and China. The scale of job losses and the woes of sectors that are emblematic of the recession—particularly finance and automakers—have left many worrying about a bleak American economic future. Even those who expect a return to growth worry about the United States’ capacity to supply two essential ingredients: innovation and entrepreneurship. Such concerns have spurred increasing investment in broadband Internet connections, additional funding for research and development (R&D), and the largest-ever federal investment in public education—all steps meant to help build a new foundation for economic growth.

Public-sector efforts of this type are nothing new in U.S. history. They date back at least to the Morrill and Hatch acts in the late 1800s and continue through the massive expansion of federal investment in R&D after World War II.<sup>1</sup> Such actions are generally credited with helping to ignite bursts of innovation and maintain steady rates of economic growth. In its renewed efforts today, the United States joins Singapore, the European Union, and others in forming deliberate strategies to provide what are considered semipublic goods: the knowledge and the people necessary for productive firms to innovate, create jobs, and boost economic growth.<sup>2</sup> It’s far from clear, however, whether the phenomena of innovation and entrepreneurship are adequately understood for these entities to be making such large commitments.

Over the past several years, the work of the Kauffman Foundation has focused on understanding these phenomena and thereby seeking to create more successful entrepreneurs in the United States. During that time, the Foundation has conducted extensive research and developed mechanisms, such as the iBridge Network, to increase the pace of entrepreneurship.<sup>3</sup> Now, with lingering questions about the U.S. economy’s capacity to grow, concerns over the one to two billion people who remain in poverty around the world, and increasing interest in different types of entrepreneurship and innovation, the Foundation has embarked on a newly ambi-

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tious path. This effort, Kauffman Labs for Enterprise Creation, takes deliberate public strategies down to the very core of economic advance: high-growth firms. How do they come into being?

The usual default answer, via venture capital, offers little of practical value, since that industry has steadily moved to the later stages of financing for entrepreneurial enterprises. Angel investing has filled some of the resulting void, but in both cases the organizations invested in have already reached a point to which many nascent entrepreneurs don't progress. Millions of people with innovative ideas and what might be called proto-organizations either do not get to this financing phase or, once there, fail. Amazingly, notwithstanding intensive study and interest, the start-up process remains largely mysterious. The popular business literature (entrepreneurship in seven steps!) offers no help, and academic work confines itself to research of attenuated empirical substance and of little relevance to prospective entrepreneurs. Entrepreneurship education programs in universities, moreover, usually default to teaching business plans or inviting in successful entrepreneurs to tell their stories; few can claim to have imparted real knowledge about the start-up experience.<sup>4</sup>

For individuals and governments interested in economic growth, such half-baked knowledge of entrepreneurship and innovation presents a serious problem. How can they dedicate massive resources to a phenomenon that is not fully understood? The process of thinking through and forming Kauffman Labs has directly engaged those involved with these very issues. This essay, a product of that effort, seeks to parse the meaning of innovation and entrepreneurship, their relationship to economic growth, and the implications for future research and growth strategies.

## INNOVATION AND ENTREPRENEURSHIP

The importance of innovation and entrepreneurship will not be foreign to anyone who drives a car, shops at Wal-Mart, uses a computer, carries an iPod, talks on a telephone, or boards an airplane. The rise in the American standard of living over the past two centuries can be attributed nearly totally to innovation and entrepreneurship. But what do these actions mean, exactly? Do they denote more or less the same thing, separated only for rhetorical purposes? If innovation and entrepreneurship are distinct, what is the relationship between them?

Everyone can likely name someone who falls into the standard archetypes: the lone inventor in the garage; the person toiling away in the bowels of a giant corporation; the desperate person who gambles everything on one idea; the yin-yang pair that, working in harmony, embarks on a start-up adventure. A random passerby asked to name an entrepreneur or innovator would probably name people like Bill Gates, Sam Walton, and Henry Ford. These three fit what most people see as the ideal type: they developed a breakthrough product and made a fortune from it. They are, in the best sense, romantic icons of American democratic capitalism.

But are they innovators or entrepreneurs?

The most frequent theoretical touchstones for this question are Joseph Schumpeter and Peter Drucker. Unlike many of his contemporaries, Schumpeter saw clearly the critical role of entrepreneurs in driving economic change and growth and identified innovation as their defining attribute: “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.”<sup>5</sup>

Thankfully, Schumpeter was not as mathematical as his economic descendants, although this also meant he was not always systematic in his analyses. In the tradition of the German romantics, Schumpeter often equated entrepreneurs with leaders—they took on the tasks of organizing, coordinating, and inspiring others. This meant they may not have been, and frequently were not, the originators of whatever innovation they effectuated. Schumpeter even stated explicitly, “This [entrepreneurial] function does not essentially consist in either inventing anything or otherwise creating the conditions which the enterprise exploits. It consists in getting things done.”<sup>6</sup>

Exploring the same ideas some years after Schumpeter, Drucker wrote, “Entrepreneurs innovate. Innovation is the specific instrument of entrepreneurship. It is the act that endows resources with a new capacity to create wealth. Innovation, indeed, creates a resource. There is no such thing as a ‘resource’ until man finds a use for something in nature and thus endows it with economic value.”<sup>7</sup> Fossil fuels, for example, did not fall from the sky in the nineteenth century—their use as a source of energy was made possible by innovative people and companies. Drucker noted that many of the growth companies in the United States in the 1970s and 1980s were not necessarily in the high-technology fields, but they were nonetheless innovative in what he called entrepreneurial management.<sup>8</sup>

In their writings, Schumpeter and Drucker both refined and expanded the idea of entrepreneurship. It consists of organizing, leading, managing, and of exploiting a core technology. In many cases, in fact, organizing *is* the innovation. The technology can be high-tech or decidedly low-tech; the shipping container—“the box”—was one of the most consequential wealth-creating innovations of the twentieth century but, as its moniker implies, it was, well, a box, a standardized, rectangular container.<sup>9</sup> Geometrically symmetrical containers existed—the concept of their uniform use in shipping was the innovation. (Boxes seem to be a renewable innovation: mass-produced cardboard boxes helped transform the production and distribution of Americans goods in the late 1800s.<sup>10</sup>)

As entrepreneurship has grown in stature and frequency over the past three decades, other scholars have focused their analytical lens upon it. Israel Kirzner of the Austrian school of economics, for example, argued that entrepreneurs basically act as price arbitrageurs, noticing and then eliminating price discrepancies in the market. In a world of disequilibrium, Kirzner maintained that alert entrepreneurs discover opportunities, thus ironing out the disequilibria.<sup>11</sup> Mark Casson, an

English economist and leading theorist of entrepreneurship, has sought to synthesize the views of Schumpeter and Kirzner in the concept of judgment; that is, the capacity to make decisions in the face of uncertainty or unknowability. To Casson, entrepreneurs “are specialists who use judgment to deal with novel and complex problems.”<sup>12</sup>

What seems to emerge from the entrepreneurship literature is something of a spectrum: an invention or commodity becomes an innovation when applied commercially. A person or company earns the entrepreneur label by taking it and, through superior organization and management, making a profit. A box became an innovation when used for transport; it was used by entrepreneurs to slim down supply chains and reduce consumer costs. The successes of Gates, Walton, and Ford clearly involved innovations: software, low-cost retailing, and automobiles, respectively. None of these men, however, was responsible for the principal technology around which they built their companies. Gates did not invent the personal computer or software or even the idea of an operating system. Walton certainly did not invent retailing, not even discount retailing. And Ford was far from the inventor of the car—it wasn’t even invented in Detroit, which is now used as a synonym for the auto industry!

Each of these men took something that already existed and endowed it with a wholly new idea of what it could be. Gates, who envisioned personal computers, operating systems, and applications joined together, was one of the first to develop a true business model around something intangible. Walton combined retailing with sophisticated inventory and supply-chain management to reshape the global economy. And Ford developed an entirely new conception of the car as a means of transportation for the masses; at that time in Europe, the birthplace of the car, no one saw it as more than a luxury item for the wealthy. To realize his vision, Ford needed to develop a new production method—and *voilà*, mass production via assembly lines.<sup>13</sup>

These examples represent various types of innovation: new products, new services, new ways of doing business, new ways of structuring an organization, new types of distribution. Any of these qualifies as an innovation, even if they occur at different points along a spectrum of activities. But there is still non-equivalence between innovation and entrepreneurship. If part of what defines entrepreneurship is innovation, then it can be said, as Drucker did, that all entrepreneurs innovate. But the obverse is not true—not all innovators are entrepreneurs. This can be portrayed using concentric circles, with a circle of entrepreneurship enclosed within a larger circle of innovation.

That seems straightforward enough. It does not, however, appear to be the typical treatment of innovation and entrepreneurship in popular and scholarly discourse. Today, the most common idiom used in considering innovation and entrepreneurship is “opportunity recognition and discovery.”<sup>14</sup> According to this idea, any attempt to create more entrepreneurs, as Kauffman Labs is doing, must either teach people how to recognize opportunities, shepherd them through a procrustean business plan process if they’ve already discovered one, or point them to

opportunities already discovered. The key assumption is that opportunities already exist and are simply waiting for someone to see them and turn them into money. Is this what entrepreneurs do? Sure, there was clearly an opportunity for Ford to turn the car into an item of mass consumption and an opportunity for Walton to expand discount retailing. Were they the only ones to recognize these opportunities? It has already been noted that they certainly weren't the first to manufacture cars or operate discount stores. Of all the people building cars in the United States and Europe, was Henry Ford the only person to recognize the existing opportunity for mass appeal and production?

Knowing what these men accomplished, it's easy to say in hindsight that yes, there clearly were opportunities waiting to be recognized. Just look at all the cars on American roads! And look at how successful Wal-Mart has been and how many other stores have emulated its model. These opportunities existed in the abstract, in the same way that Plato's ideal form of the chair exists in another realm. The idiom of opportunity recognition and discovery thus presents two major and, unfortunately, contradictory problems.

First, how can there be any hope of

teaching people opportunity recognition if in fact only one person in the entire world could recognize the opportunity presented by the automobile? That idea would surely cause all entrepreneurship education programs to shut their doors. To overcome this absurdity, approaches to entrepreneurship that are centered on the individual resort to a Zen koan approach, hoping to push people out of their normal routines so they approach problems in a new way. Accordingly, the opportunity-recognition perspective directs attention at an individual's neurobiological computational capacity—known by the layperson as the thought process.

So there are books instructing people to be iconoclastic or to train themselves to think like Leonardo da Vinci.<sup>15</sup> There is no shortage of brain-enhancing tricks and techniques a person can use to shape their brain into that of an entrepreneur. These tricks and techniques are cousins of the psychological theories that wax and wane in popularity, if not validity; a recent offering purported to diagnose entrepreneurs (alive or dead, a remarkable feat) with hypomania.<sup>16</sup> And what is to be made of evidence that dyslexia has a higher prevalence among entrepreneurs—that it in fact is said to help explain their success?<sup>17</sup> Anyone who thinks they can become an entrepreneur by remolding their brain or temperament according to what researchers say is entrepreneurial . . . well, good luck.

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The starting presumption here matters. If the objective is to train people to recognize opportunities, the default approach is often to teach them to “think like an entrepreneur”—or at least what an entrepreneur is thought to think like. Perhaps this is why so many programs bring in successful entrepreneurs to talk to students about their experiences.

The second problem with treating opportunity recognition as the keystone of entrepreneurship is that it suggests a structuralist interpretation of the world, something that should never go beyond the walls of English and history departments. In other words, if it is thought that opportunities are floating out there waiting to be recognized, then the implicit belief is that it doesn’t matter who comes along and recognizes them, that someone will because they are there and their discovery is inevitable in the grand march of Time and Progress. The individual seems to be diminished in this interpretation, which would certainly be out of place in any exploration of entrepreneurship.

This version has been semi-formalized in the academic literature as the “innovative milieu,” which supposes that creativity only flourishes when the conditions are just right: not too hot, not too cold, not too rigid, not too loose.<sup>18</sup> This theory, such as it is, can be disproved in a number of ways. My favorite proof is the Renaissance, perhaps the most intensely creative period in human history. One might expect that the cities of the Renaissance were placidly peaceful places of decorous manners, pleasant conduct, and free-floating opportunities. The truth, of course, is that Italy’s Renaissance cities were cauldrons of conflict, with competing families, political instability, and violence.<sup>19</sup> (After all, Machiavelli drew on real-life source material.) This isn’t a conundrum: such instability was precisely the font of artistic and commercial creativity.

The attempt to reconcile these two interpretations of opportunity recognition—the individual-opportunity nexus—is unsatisfying. Considering the idea that “only individuals with appropriate qualities will perceive” the preexisting opportunities, I can’t help but recall the early Christian sect of Gnosticism and its existential belief that only those with special knowledge (*gnosis*) could really get in touch with the divine.<sup>20</sup>

In the realm of likelihood and human possibility, the idea of opportunity creation might be a more appealing construct—the defining characteristic of an entrepreneur being that he uses an innovation to create a heretofore unknown opportunity. This, in fact, is the idea toward which we first gravitated in working through Kauffman Labs—people would approach us with innovations, however inchoate, and we would help them create an opportunity from it. Yet opportunity creation tends to have an air of inevitability around it, at least as developed by some of the literature.<sup>21</sup> This construction may also invest the individual, however persistent and creative, with a tad too much Nietzschean power. An entrepreneurial firm arises out of the interaction between individuals and their environment, and while it might be possible to identify certain “but for” hinge points, it is frequently difficult to parse out precise reconstructions of the process and degrees of contributing factors. Who, for example, created the opportunity for commercial

aviation? Donald Douglas, Juan Trippe, the military, the U.S. Post Office, the general public? It's not possible to say for sure, nor can one resort to the Hegelian view that the opportunity was, somehow, "just there."

As we moved along with Kauffman Labs, we kept encountering obstacles both pragmatic and conceptual: stubborn empirical realities from which some academic research is blissfully liberated. One is the basic question of when, prospectively or retrospectively, to confer upon someone the title of entrepreneur. Does success matter to the definition? A second recurring issue is the somewhat irritating fact that many high-growth entrepreneurs in advanced technology sectors are in their forties—not the buccaneering youth of popular mythology.<sup>22</sup> College students and people in their twenties undoubtedly have lots of ideas, but by the time a person is forty or fifty, they have had the time and experience to learn how to turn those ideas into something meaningful. Maybe this also helps explain why the average age of firms on the *Inc.* 500 lists tends to be six to eight years; it takes time to turn the innovation into something viable that has value.<sup>23</sup> A third challenge is the historical pattern of numerous people pursuing the same opportunity. Henry Ford was late to enter the automobile game; Cyrus McCormick was not the only one peddling a mechanical reaper; Andrew Carnegie had plenty of competitors.

Theorists of the opportunity recognition-discovery framework elide this problem somewhat by pointing out that entrepreneurship "is concerned with the *discovery* and *exploitation of profitable* opportunities."<sup>24</sup> The first of the requisite elements—discovery—has already been addressed, and the importance of exploitation can perhaps be acknowledged (the essay will touch on this again later). But the notion that entrepreneurs exploit "profitable" opportunities raises the same question as above: does success matter to the definition? Moreover, can a profitable opportunity be known in advance? Reaching back in the annals of economic research to the great Frank Knight reveals the commonsense idea that profit exists because of uncertainty and of entrepreneurs' exploitation of that uncertainty.<sup>25</sup> *Ex ante* profitable opportunities thus become circular: an entrepreneur creates profit by doing something profitable. This seems to require an elaborate set of structural preconditions that, while not invalid, resemble Rudyard Kipling's Just-So Stories. Standing at the back end of the entrepreneurial process, the focus is necessarily on the particular path taken by Bill Gates and his success is ineluctably explained in terms of "information asymmetry" and "opportunity sets." This is all relevant and makes sense, but it confuses the actual process of entrepreneurship in real-world settings and adds little to efforts to generate more entrepreneurs.

After wading through the popular and academic literature, then, it is not yet clear what concepts of entrepreneurship and innovation would be helpful to deliberate attempts to generate more entrepreneurs. Anyone studying the example of a successful entrepreneur is inevitably biased by their success and unable to reliably draw lessons for others. But if the outcome is ignored and the focus put on the person, the tendency is to invest him or her with superhuman talents. Let's step back for a moment and turn the map around, as the Marines say, to consider these concepts from a different perspective.

## Social Entrepreneurship

Anyone remotely interested in entrepreneurship cannot fail to have noticed the rise in the past decade of “social entrepreneurship.”<sup>26</sup> The seminal paper on the term lays down five definitive traits of a social entrepreneur:

- Adopts a mission to create and sustain social, not private, value.
- Recognizes and pursues new opportunities.
- Engages in continuous innovation and adaptation.
- Acts boldly, not limited by current resources.
- Remains accountable “to the constituencies served and for the outcomes created.”<sup>27</sup>

Since four of these five traits could apply to “regular” entrepreneurs, the distinguishing characteristic is a mission to create “social value” (not just private value). Examples frequently include Habitat for Humanity, Teach For America, America’s Second Harvest, and Grameen Bank. The “social” difference, then, appears to fall along the traditional for-profit/nonprofit line, but laying claim to an entirely new discipline based on this feels unsatisfactory.

Alternatively, social entrepreneurs are said to have distinct personal motivations,<sup>28</sup> yet even altruism is an evolved human trait, not unique to nonprofits, and it’s not unusual to find business entrepreneurs motivated by non-pecuniary convictions.<sup>29</sup> Profit can be a source of less than savory behavior, but few spurs to human creativity are as potent as profit.<sup>30</sup> In any case, categorization difficulties quickly arise. According to the most widely accepted definition of social entrepreneurship, the nonprofit Aravind Eye Care System in India (a clear case of entrepreneurship whatever the modifier) might not be included because it charges a fee to roughly half of its customers and uses it to subsidize non-paying customers.<sup>31</sup>

Clearly, some organizations are entrepreneurial yet not so easily placed alongside Henry Ford.<sup>32</sup> Do technical differences justify a morally freighted social versus non-social distinction?<sup>33</sup> The social entrepreneurship literature, moreover, often evinces a subtle hostility toward entrepreneurs who found businesses. This would seem to deny the clear social benefits to be had from the work of firms such as Senior Whole Health (Medicare management for the impoverished elderly, the number-one firm on the 2008 *Inc.* 500 list), Bridgepoint Education (for-profit higher education), Signature Genomic Laboratories (diagnoses pediatric chromosome abnormalities), and others. Even Henry Ford was among many “creative democratizers” who brought a previously luxury item into the grasp of the masses, clearly something that had a revolutionary social impact on people’s everyday lives.<sup>34</sup> If our interest pertains to outcomes and results, any social/non-social distinction matters little, if at all.<sup>35</sup>

Yet getting into a debate about who does and does not provide social benefits, and in what manner, profits nobody. The popularity of social entrepreneurship partly stems from the positive connotations around the term “entrepre-

neur” in American society, the rising interest in participatory democracy over the last 40 years, and, most significantly, the decreasing confidence in government’s ability to solve problems.<sup>36</sup> Social entrepreneurship, then, might be seen as one route to government retrenchment, a role highlighted by its biggest advocates.<sup>37</sup> The confluence of a deep recession and impending deficit implosions around Social Security and Medicare would seem to be an ideal situation for social entrepreneurs to find ways to reinvent the American government’s orientation toward its citizens’ social and economic activity.

Many of the foregoing distinctions may not matter much in the context of the changing nature of the economy. On one level, there is “a blurring of the traditional categories of public, private, for-profit, and nonprofit,”<sup>38</sup> visible in the efforts of foundations to expand the boundaries of philanthropy and charity in areas such as program-related investments.

On another level, changes in the structure of the U.S. and global economies may obviate any distinction between “social” and other entrepreneurs. The older economic vocabulary of manufacturing included “goods” and “products”; management meant breaking down production into discrete tasks. Producers acted upon consumers, penetrating the market, stimulating demand, etc. There were obvious technological innovations (the province of inventors), obvious organizational innovations (the realm of managers), and an entrepreneur was someone who owned and capitalized a business.<sup>39</sup>

The extraordinary evolution of the service sector—the proliferation of ever-newer services, the growing innovativeness in what was once considered the low end of the economy—has upended these formerly clear-cut categories. What do Charles Schwab and Google and Target “produce”? Beyond language, the manner in which service firms form and interact has increasingly blurred not only company boundaries but also the line dividing innovation and entrepreneurship. In some cases, notions of entrepreneurship, innovation, the organization, and their benefits appear to have melded together into one indivisible concept.<sup>40</sup> In many service sectors there is no distinction between a technological and an organizational innovation.<sup>41</sup>

These changes may make the “social” modifier meaningless. What should we make of new types of banking or of websites such as Bankrate.com?<sup>42</sup> More radically, the rapidly expanding evolution of social networking technologies raises profound conceptual questions. Websites such as guru.com and Elance.com, as well as the cutting-edge work of places such as the Berkman Center for Internet & Society at Harvard University, are only the beginning of a wave that calls into question the meaning of “social” and “economic.” The value of a service is subjective by nature, often defined as “the process of using competences to benefit another.”<sup>43</sup> Does this mean modifiers like “social” are unnecessary? Who knows? But it certainly makes (artificial) lines of demarcation less clear and, perhaps, less relevant.

FORWARD TO GROWTH

The very term “economic growth” is a slightly unfortunate one, conveying as it does a steady and uniform increase in wealth and welfare, akin to “yeast,” as Arnold Harberger has playfully chided economists.<sup>44</sup> Schumpeter titled his first major work *The Theory of Economic Development*, not growth, because what he (and others) described was a much more desultory and messy process—development—than the smooth route of “growth” imagined by some.<sup>45</sup>

The genealogy of automobiles encapsulates this and can be seen as a line of descent traced back from Henry Ford to Samuel Colt. Innovations in the manufacture of guns in the mid-1800s helped give rise to an entire industry devoted simply to machine tools; when the sewing machine was invented and made viable, some armament makers and machine tool firms transferred their knowledge to sewing machines, accelerating the process of innovation. A metallurgy innovation made possible an improved machine, which made possible faster production, which in turn called forth yet another metallurgical advance, etc. When the bicycle came along, its makers drew directly on the expertise and skills of armories and sewing machine companies and, in many cases, these manufacturers simply switched to bicycles. Next, when people around the world and in the United States attempted to make automobiles viable, some of the first companies to venture into it were bicycle manufacturers.<sup>46</sup> In the most basic sense, one thing led to another.<sup>47</sup>

Economic development, then, can be thought of in terms of biological evolution.<sup>48</sup> To many people, Darwinian evolution resembles a hierarchical ladder: amoebas evolved into sponges, which begat jellyfish, which begat flatworms, which evolved into fish, and so on up to monkeys, which evolved into humans. But this is the wrong way to think about evolution, according to Steven Pinker: “Evolution did not make a ladder; it made a bush. We did not evolve from chimpanzees. We and chimpanzees evolved from a common ancestor, now extinct. . . . The organisms we see around us are distant cousins, not great-grandparents; they are a few scattered twig-tips of an enormous tree whose branches and trunk are no longer with us.”<sup>49</sup> This is precisely what economic development looks and feels like—the automobile is related to the bicycle, to the sewing machine, to the Colt .45.<sup>50</sup> The bushy tree analogy also answers the question of how to get to new forms of industry from old ones: “Although natural selection involves incremental steps that enhance functioning, the enhancements do not have to be an existing module. They can slowly build a module out of some previously nondescript stretch of anatomy, or out of the nooks and crannies between existing modules.”<sup>51</sup> This echoes a recurrent economic theme: established companies in established industries are often ignorant. RCA saw little potential in FM radio; IBM missed personal computing; Microsoft overlooked the Internet, etc. Entrepreneurs build out the nooks and crannies into completely new industries and systems that provide a platform for the next generation.<sup>52</sup>

In hindsight, it’s more or less possible to connect the developmental dots—guns to sewing machines to bicycles to cars—in a rough and roundabout way. But

nearly everything about economic development, as it happens in real time, is uncertain—the definition of an innovation is a change, the consequences of which cannot be known in advance.<sup>53</sup> The uncertainty of an innovation is only resolved through actual doing or building. In this way, the economic future is a vast space of darkness—development consists of the continuous carving out of new branches of light within this space.<sup>54</sup> Entrepreneurs are a particularly fertile source for the growth of new economic branches.

It is not right to pretend, however, that entrepreneurs are like scientists who discover objective reality. Scientific discovery unquestionably demands a great deal of discipline and creativity, yet Kepler did not create the laws of planetary motion, Fleming did not create penicillin (nor was he the first to observe mold), Schönbein did not create ozone. To my knowledge, there was no independent objective reality of personal computing before Jobs and Gates, no fixed law of automobile production that was happened upon by Ford. Some of these, of course, are based on scientific laws, but who's to say the path Bill Gates took was the only conceivable one for operating systems? Efforts to encourage entrepreneurship don't enjoy the luxury of knowing whether a given person will succeed. The fundamental question has little bearing on whether a nascent entrepreneur is "hypomaniac" or whether or not an opportunity exists to be discovered.<sup>55</sup>

In much of the literature, the entrepreneur is discussed in terms of his or her consequences. So, the entrepreneur disrupts equilibrium (Schumpeter), returns a distorted economy to equilibrium (Kirzner), exploits profitable opportunities (Shane), bears uncertainty (Knight), makes judgments (Casson). To be sure, each of these could be an accurate characterization of entrepreneurial consequences in varying situations. And for economists and policymakers, the consequences are what matter. But for actual attempts to generate more entrepreneurial firms, such observations of consequences are of little value because they don't tell us much about what an entrepreneur does to create consequences—namely, what it feels like to *be* an entrepreneur. (It's unlikely, too, that entrepreneurs conceive of themselves in such terms.)

Tales of entrepreneurial exploits contain healthy doses of words like "vision" and "certainty" (along with "ruthlessness" and "shrewdness"). But from the time-bound perspective of individuals and teams building an organization, much is uncertain, unforeseeable, and perhaps unknowable. In a real but figurative way, the entrepreneur moves forward blindly; the eventual path they follow, moreover, is frequently not the one they anticipated.<sup>56</sup> Entrepreneurs are found at the frontiers of knowledge and innovation and growth not because these frontiers are there simply waiting to be discovered, but because the frontiers give "scope for originality in men and institutions."<sup>57</sup> It is precisely the indeterminate future the frontier signifies that permits (and encourages) people to create new branches of ideas and institutions. How does this lack of foreknowledge translate into the entrepreneurial experience?

COMBINING AND BUILDING

In a Pentagon news briefing in early 2002, then secretary of defense Donald Rumsfeld uttered lines that immediately subjected him to widespread ridicule: “There are known knowns; there are things we know we know. We also know there are known unknowns; that is to say, we know there are some things we do not know. But there are also unknown unknowns, the ones we don’t know we don’t know.”<sup>58</sup>

Established firms excel in handling “known knowns,” things they can control, like refining existing technology or creating new versions of old products. They can even handle “known unknowns” fairly well, although the lesson of studies such as Clayton Christensen’s *The Innovator’s Dilemma* is that entrant firms are generally better with “known unknowns”—the technology in question is a known quantity, but its potential is quite unknown and therefore not worth an established firm’s attention.<sup>59</sup> But it is the “unknown unknowns” (new technologies, new markets, new applications; little knowledge, little predictability, little awareness) at which entrepreneurs excel—this partly captures the uncertainties they face in real time and the success they might enjoy. In itself, this might seem unremarkable—after all, a common theme in the literature is that entrepreneurs handle radical, not incremental, innovations.

In some ways, this is an unnecessarily binary distinction—radical versus incremental—and it not only confuses the issue of knowledge (“radical” can usually only be judged after the fact) but also glosses over the central nexus of innovation and entrepreneurship, the combining and recombining of ideas.<sup>60</sup> Entrepreneurs, as a colleague puts it, take a  $2 + 3$  equation and generate results of 6 or 108. Such combinatorial dynamics, the source of newly grown economic branches, can readily be seen within the idea of “unknown unknowns” yet have the singular quality that the result is almost universally taken as “obvious” in hindsight.

It is often pointed out that many entrepreneurs did not invent the technology they worked with or were not even close to the first ones to enter an industry. Cyrus McCormick developed one of the most successful mechanical reapers, a landmark innovation in the nineteenth century, but what made him an entrepreneur was the company he built, the McCormick Harvesting Machinery Company. This company was built not upon the single innovation of the reaper (plenty of other firms were competing with him on this), but around the systems of marketing and financing that McCormick developed. Recognizing the difficulty farmers had in paying the entire cost up front, he pioneered financing that allowed the farmer to put the reaper to use immediately and to pay the cost over time.<sup>61</sup>

In a similar way, Adolph Zukor and Marcus Loew were major forces in basically creating the film industry in the first quarter of the twentieth century. Thomas Edison invented the first viable motion picture machine and even commercialized it as the “kinetoscope,” helping to produce some of the first films (e.g., *The Great Train Robbery*).<sup>62</sup> And yet, Edison actually worked to stymie the film industry. He helped form the Motion Picture Patents Company (the Trust), the imperious

actions of which pushed many incipient film producers and distributors out of New York City to southern California. The entrepreneurs of the film industry—those who broke out and created new economic branches through their organizations—were men like Zukor and Loew and Louis Mayer, who sought new ways of producing, distributing, and exhibiting films, building in the process, respectively, Paramount Pictures, Loew's, and MGM.<sup>63</sup> They, far more than Edison and the Trust, gave the innovation of film a completely new horizon of commercial and artistic possibility.<sup>64</sup>

An even starker example can be found with John Wanamaker, one of the great department store entrepreneurs who, in the late 1800s and early 1900s, helped build the mass market of American

consumption. Wanamaker was not the first into men's clothing (his original line of merchandise) or department stores or advertising or financing, but he built a hugely successful company by using these elements to bring, for the first time, goods that had once been considered luxuries into reach for millions of Americans.<sup>65</sup> Despite few claims to originality, Wanamaker is clearly considered an entrepreneur.

Before 1850, there really was no U.S. clothing industry such as exists today. Clothes were either homemade (sewn by hand) or specially fitted by a tailor, the latter method reserved mostly for the rich. The sewing machine radically changed this. However, it wasn't just the invention itself but the innovations of Isaac Singer and, just as important, the entrepreneurial efforts of Edward Clark that altered the production of clothing—that in essence created the clothing industry. New production methods also required new methods of distribution, sales, and advertising, and these new economic branches made possible new branches, which is where Wanamaker stepped in and created a new way of shopping—in fact, a new way of living.<sup>66</sup>

Andrew Carnegie represents even more precisely what is considered the consummate entrepreneur: from humble beginnings, he built the U.S. steel industry. He was also a pioneer in American philanthropy, establishing numerous institutions (e.g., the Carnegie Institution of Washington, the Carnegie Foundation for the Advancement of Teaching) before setting up one of the first general-purpose foundations in the country, the Carnegie Corporation. His most famous bequest was to fund the building of libraries in thousands of cities and towns across the United States; yet here, Carnegie was an innovator, not an entrepreneur.

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It is the “unknown unknowns”  
(new technologies, new  
markets, new applications; little  
knowledge, little predictability,  
little awareness) at which  
entrepreneurs excel.

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A blanket grant for libraries was clearly innovative: no one had done anything like it, and Carnegie was not responding to a specific demand. His intention was for everyone to have access to these libraries, but he especially had children in mind, as he considered his own early exposure to literature a springboard for his later success. Nothing like today's children's libraries existed at the time. A few places had special sections for children's books and there were incipient moves to create them, but the very idea of a children's library didn't exist. Carnegie himself did not envision something so specific; in fact, many of the libraries built with his money would not admit children.

Yet upon Carnegie's innovation was built the children's library, complete with child-size furniture, child-appropriate interiors, and, of course, children's books. The entrepreneur who created this new institution around Carnegie's innovation was Anne Carroll Moore. First in Boston, then more famously at the New York Public Library, Moore offered storytelling hours, lists of appropriate books, and, for the first time, borrowing privileges for children, thus building something completely new in the United States.<sup>67</sup>

What McCormick, Wanamaker, and Moore, and Zukor and Loew, and Gates, Walton, and Ford did, then, was not simply to build something physical. In a very general but nonetheless real sense, these entrepreneurs took an innovation and endowed it with new possibilities. Entrepreneurs innovate, but they innovate in terms of the possibilities they see and the ways they make those possibilities manifest. As these men and women have clearly demonstrated, endowing something with new possibilities—whether in retailing (eBay and Amazon), personal computers (Apple), or financing new firms (Michael Milken)—does not require foreknowledge, Gnostic insight, passivity, or uniquely inherited intelligence.

## CONCLUSION

Entrepreneurs, of course, do not wait for academic understanding. Schumpeter long ago lamented that economic theory left the entrepreneur out in the cold, "like *Hamlet* without the Danish prince."<sup>68</sup> Yet such exclusion had little bearing on the American economy, which enjoyed a rebirth of expansion and entrepreneurial capitalism in the last third of the twentieth century.<sup>69</sup> The expectation is that if the processes of innovation, the formation of firms, firms' growth, and economic expansion can be better understood, it will be possible to design more facilitative public policies and private institutions. Federal investment in technological infrastructure and education rests on the premise that the investments will help provide people with the tools and skills they need to start and grow businesses. This premise is not necessarily wrong and it is based in part on historical experience, but it also creeps into those two areas of murky understanding, innovation and entrepreneurship. The work of Kauffman Labs represents an effort not only to enhance understanding but also to apply it to the process of forming firms.

On one level, the analysis in this essay brightens the prospect that public and private strategies can accelerate economic growth. If efforts to create more inputs

for firms and generate greater numbers of new firms continue, eventually something will stick and the economy will expand. Yet it is entirely possible that heavy-handed efforts to generate entrepreneurship could, like measuring Heisenberg's uncertain particles, stifle the very target at which they aim. The process by which people combine ideas to produce innovations, for example, is not fully understood. The very nature of knowledge is such that no one can simply decree that such combinations be made in a display of interdisciplinary magic.<sup>70</sup>

Deliberate strategies must include a broad scope to allow for variation and experimentation, which likely are not the first terms that jump to mind during a period of wrenching economic adjustment. This is the challenge. Established organizations and ways of operating in many sectors will be disrupted as upstarts arise, increasing pressure to protect the disappearing past. But, as history reveals, human welfare only expands when people are given room to carve new economic branches into the uncertain future. The only way to move forward is through that uncertainty.

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1. The Morrill Act, signed by President Abraham Lincoln in 1862, established the system of land-grant universities in the United States and their focus on agriculture and engineering. The Hatch Act, passed in 1887, consolidated the effects of the Morrill Act by establishing agricultural experiment stations at the land-grant schools. By promoting applied research, these pieces of legislation helped put the tight relationship between higher education and industrial innovation at the heart of the economy. See, e.g., Frederick Rudolph, *The American College & University: A History* 261 (1962); John R. Thelen, *A History of American Higher Education* 135 (2004).
  2. For a fascinating study of Singapore, see Charles Hampden-Turner, *Innovation and Entrepreneurship Can be Taught: Building on the Singapore Experiment* (Cambridge University Press, forthcoming). The European Union made entrepreneurship a central part of its 2000 Lisbon Agenda. See, e.g., "Action Plan for Entrepreneurship," at <http://europa.eu/scadplus/leg/en/lvb/n26043.htm>; "Entrepreneurship and Innovation Programme," at [http://ec.europa.eu/cip/eip\\_en.htm](http://ec.europa.eu/cip/eip_en.htm).
  3. For information on iBridge, see <http://www.ibridgenetwork.org/>.
  4. One exception to the above criticisms is the handful of accelerators that can lay claim to astounding success, by different methods, in building firms that either grow to scale or get acquired by an existing company. This includes Y Combinator, PureTech, and The Foundry. In our work on Kauffman Labs, we have considered ourselves students of their approaches, though we have found that the various accelerator models are often so narrow (e.g., medical devices) or directed toward a specific outcome (i.e., acquisition), that we must necessarily expand our learning purview.
  5. Joseph A. Schumpeter, *Capitalism, Socialism and Democracy* 132 (1942) (4th ed. 1976).
  6. *Ibid.*
  7. Peter Drucker, *Innovation and Entrepreneurship*, 30 (1985).
  8. *Ibid.* at 11.
  9. See, e.g., Marc Levinson, *The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger* (2006).
  10. See, e.g., Evan Osnos, "The Wastepaper Queen," *The New Yorker*, March 30, 2009, at 46; Daniel Boorstin, *The Americans: The Democratic Experience* (1973).
  11. See Israel M. Kirzner, "Competition, Regulation and the Market Process: An 'Austrian' Perspective," Cato Institute Policy Analysis No. 18, September 30, 1982, available at <http://www.cato.org/pubs/pas/pa018.html>; Kirzner, *How Markets Work: Disequilibrium, Entrepreneurship and Discovery* (1997).
  12. Mark Casson, "Entrepreneurship," in *The Concise Encyclopedia of Economics*, at

- <http://www.econlib.org/library/Enc1/Entrepreneurship.html>. See also Mark Casson et al., "Introduction," in Mark Casson, Bernard Yeung, Anuradha Basu, & Nigel Wadeson (eds.), *The Oxford Handbook of Entrepreneurship* 1, 3-4 (2006).
13. Strictly speaking, assembly line manufacture was not an innovation of Ford's either; Eli Whitney and Samuel Colt had made important advances long before Ford. "What Ford did was to conduct mass production at a tempo and on a scale never seen before." Jonathan Hughes, *The Vital Few: The Entrepreneur and American Economic Progress* 323 (2nd ed. 1986).
  14. See, e.g., Scott Shane & S. Venkataraman, *The Promise of Entrepreneurship as a Field of Research*, 25 *Acad. Mgmt. Rev.* 217 (Jan. 2000); Scott Shane, *Prior Knowledge and the Discovery of Entrepreneurial Opportunities*, 11 *Org. Sci.* 448 (Jul.-Aug. 2000); Mark Casson, *The Individual—Opportunity Nexus: A Review of Scott Shane: A General Theory of Entrepreneurship*, 24 *Small Bus. Econ.* 423 (2005); Mark Casson & Nigel Wadeson, *The Discovery of Opportunities: Extending the Economic Theory of the Entrepreneur*, 28 *Small Bus. Econ.* 285 (2007); Roger L. Martin & Sally Osberg, *Social Entrepreneurship: The Case for Definition*, *Stanford Social Innovation Review*, Spring 2007, at 29.
  15. See, e.g., Gregory Berns, *Iconoclast: A Neuroscientist Reveals How to Think Differently* (2008); Michael J. Gelb, *How to Think Like Leonardo da Vinci: Seven Steps to Genius Every Day* (2000).
  16. See John D. Gartner, *The Hypomanic Edge: The Link Between (A Little) Crazy and (A Lot of) Success in America* (2005).
  17. See, e.g., Malcolm Gladwell, "The Uses of Adversity," *The New Yorker*, November 10, 2008, at 36.
  18. See, e.g., Philippe Aydalot & David Keeble (eds.), *High Technology Industry and Innovative Environments: The European Experience* (1988); Olivier Crevoisier, "The Innovative Milieus Approach: Toward a Territorialized Understanding of the Economy?" 80 *Econ. Geog.* 367 (2004).
  19. See, e.g., Lauro Martines, *Power and Imagination: City-States in Renaissance Italy* (1979).
  20. Mark Casson, "The Individual—Opportunity Nexus: A Review of Scott Shane: A General Theory of Entrepreneurship," 24 *Small Bus. Econ.* 423 (2005).
  21. See, e.g., Ayse Guclu, J. Gregory Dees, & Beth Battle Anderson, "The Process of Social Entrepreneurship: Creating Opportunities Worthy of Serious Pursuit," Center for the Advancement of Social Entrepreneurship, Fuqua School of Business, Duke University, November 2002, available at <http://www.caseatduke.org/documents/seprocess.pdf>.
  22. See Vivek Wadhwa, Richard Freeman, & Ben Rissing, "Education and Tech Entrepreneurship," Ewing Marion Kauffman Foundation, May 2008, available at [http://www.kauffman.org/uploadedfiles/Education\\_Tech\\_Ent\\_061108.pdf](http://www.kauffman.org/uploadedfiles/Education_Tech_Ent_061108.pdf).
  23. Aside, of course, from the magazine's eligibility requirement of sustained revenue growth for three to four years.
  24. Scott Shane & S. Venkataraman, "The Promise of Entrepreneurship as a Field of Research," 25 *Acad. Mgmt. Rev.* 217 (Jan. 2000) (emphasis added).
  25. See Frank H. Knight, *Risk, Uncertainty and Profit* (1921).
  26. See, e.g., Philip Auerswald, "Creating Social Value," *Stanford Social Innovation Review*, Spring 2009; David Bornstein, *How to Change the World: Social Entrepreneurs and the Power of New Ideas* (2004); Leslie R. Crutchfield & Heather McLeod Grant, *Forces for Good: The Six Practices of High-Impact Nonprofits* (2008). Former President George W. Bush more than once mentioned "social entrepreneurs" in speeches, and President Barack Obama has established an Office of Social Innovation. See David E. Pozen, "We Are All Entrepreneurs Now," 43 *Wake Forest L. Rev.* 283, 299 n.67 (2008) (quoting Bush); Executive Office of the President, at <http://www.whitehouse.gov/administration/eop/> (last visited May 28, 2009).
  27. J. Gregory Dees, "The Meaning of Social Entrepreneurship," Center for the Advancement of Social Entrepreneurship, Fuqua School of Business, Duke University, May 30, 2001, at [http://www.caseatduke.org/documents/dees\\_sedef.pdf](http://www.caseatduke.org/documents/dees_sedef.pdf).
  28. See, e.g., Roger L. Martin & Sally Osberg, *Social Entrepreneurship: The Case for Definition*, *Stanford Social Innovation Review*, Spring 2007, at 29. (Martin and Osberg also appear to draw a strange and untenable distinction between societies, to which social entrepreneurs contribute, and economies, to which business entrepreneurs contribute.) The uproar over Compartamos, a Mexican microfinance bank that became for-profit, has exposed the deep emotional veins that

- the profit-nonprofit distinction carries. See, e.g., Elisabeth Malkin, "Microfinance's Success Sets Off a Debate in Mexico," *N.Y. Times*, April 5, 2008, available at <http://www.nytimes.com/2008/04/05/business/worldbusiness/05micro.html?scp=2&sq=com-partamos&st=nyt#>.
29. Samuel Morse, Theodore Vail, Lewis Tappan, and John Wanamker, *inter alia*, drew on a religious drive to serve others—does this make them "social," or is their social commitment vitiated by their profit-making? See Harold Evans, *They Made America: From the Steam Engine to the Search Engine: Two Centuries of Innovators* (2004).
  30. See, e.g., William B. Gartner, "Who Is an Entrepreneur" Is the Wrong Question," *Am. J. Small Business*, Spring 1988, at 11, 24 ("focusing on the intentionality of the individual in order to determine whether that individual is an entrepreneur is just another variation on the trait theme, and requires us to investigate the psychology of the entrepreneur and establish a psychological profile").
  31. See, e.g., V. Kasturi Rangan & R.D. Thulasiraj, "Making Sight Affordable," *Innovations*, Fall 2007, at 35, 47. Furthermore, where in the social entrepreneurship classifications would we put entrepreneurs who set out to target the "fortune at the bottom of the pyramid"? Would this, irrespective of benefits accruing to the poor, be considered exploitation? See, e.g., C.K. Prahalad, *The Fortune at the Bottom of the Pyramid: Eradicating Poverty through Profits* (2006).
  32. Aravind, the hospice movement, the Akshaya Patra Foundation, Habitat for Humanity, and electrification in Brazil are some examples. See, e.g., <http://www.foodforeducation.org/>; David Bornstein, *How to Change the World: Social Entrepreneurs and the Power of New Ideas* (2004).
  33. Drucker anticipated such questions, pointing out that "we now know that there is little difference between entrepreneurship whatever the sphere. The entrepreneur in education and the entrepreneur in health care . . . do very much the same things, use very much the same tools, and encounter very much the same problems as the entrepreneur in a business or a labor union." Peter Drucker, *Innovation and Entrepreneurship* 27 (1985).
  34. Harold Evans, *They Made America: From the Steam Engine to the Search Engine: Two Centuries of Innovators* 8 (2004).
  35. The question of scale also presents thorny questions—in some areas, such as education and health, scale may be an ideal vehicle for achieving change. In others, however, such as poverty alleviation and some areas of environmental protection, there may be an inverse relationship between scale and achievement. That is, a scaled-up organization focused on poverty alleviation should find its services less and less needed as it meets its goals—otherwise, it risks becoming a social service organization that sustains rather than eliminates a problem.
  36. See, e.g., David E. Pozen, "We Are All Entrepreneurs Now," 43 *Wake Forest L. Rev.* 283 (2008) (looking principally at social, policy, norm, and moral entrepreneurship). The definition of entrepreneurship itself, stretching back to proto-economics, has never been fixed, and the term "policy entrepreneur" was never really needed when the federal and state governments were relatively limited in size and scope. See, e.g., Robert F. Hebert & Albert N. Link, "The Entrepreneur as Innovator," 31 *J. Tech. Transfer* 589 (2006).
  37. See Katherine Fulton & Greg Dees, "The Past, Present, and Future of Social Entrepreneurship: A Conversation with Greg Dees," Center for the Advancement of Social Entrepreneurship, Fuqua School of Business, Duke University, February 2006, at <http://www.caseatduke.org/documents/deesinterview.pdf>. In the second edition of his book *The Vital Few*, Jonathan Hughes included a new section on "bureaucratic entrepreneurs," which he defined as individuals who "change the flow over time of these vast [government] resources . . . within the framework of a popular democracy and its elected representative institutions." Jonathan Hughes, *The Vital Few: The Entrepreneur and American Economic Progress* ix (2nd ed. 1986).
  38. David E. Pozen, "We Are All Entrepreneurs Now," 43 *Wake Forest L. Rev.* 283, 337 (2008).
  39. See, e.g., Louis Galambos & Joseph Pratt, *The Rise of the Corporate Commonwealth: United States Business and Public Policy in the 20th Century* (1988).
  40. See, e.g., Stephen L. Vargo & Robert F. Lusch, "Evolving to a New Dominant Logic for Marketing," 68 *J. Marketing* 1 (Jan. 2004); Bruce S. Tether, "Do Services Innovate (Differently)?"

- Insights from the European Innobarometer Survey,” 12 *Industry and Innovation* 153 (June 2005); Stephen L. Vargo, Robert F. Lusch, & Fred W. Morgan, “Historical Perspectives on Service-Dominant Logic,” in Lusch & Vargo (eds.), *The Service-Dominant Logic of Marketing* 32 (2006); Jeremy Howells & Bruce Tether, “Innovation in Services: Issues at Stake and Trends,” ESRC Centre for Research on Innovation and Competition, Institute of Innovation Research, University of Manchester (2004).
41. The same might apply to the radical and incremental distinction. See, e.g., Scott Shane, “Technological Opportunities and New Firm Creation,” 47 *Mgmt. Science* 205 (Feb. 2001).
  42. See I. Miles, “Patterns of innovation in service industries,” 47 *IBM Systems Journal* 115, 122 (2008); Michael P. Gallaher & Jeffrey E. Petrusa, “Innovation in the U.S. Service Sector,” 31 *J. Tech. Transfer* 611 (2006). We won’t dwell on it here, but a provocative discussion awaits the place of check cashing in the social-business classification. See, e.g., Douglas McGray, “Check Cashers, Redeemed,” *New York Times Sunday Magazine*, November 7, 2008, at <http://www.nytimes.com/2008/11/09/magazine/09nix-t.html?scp=1&sq=tom%20nix&st=cse>.
  43. R.F. Lusch, S.L. Vargo, & G. Wessels, “Toward a conceptual foundation for service science: Contributions from service-dominant logic,” 47 *IBM Systems Journal* 5, 6 (2008).
  44. See Arnold C. Harberger, “A Vision of the Growth Process,” 88 *Am. Econ. Rev.* 1 (Mar. 1998).
  45. See, e.g., Allyn A. Young, “Increasing Returns and Economic Progress,” 38 *Econ. J.* 527 (Dec. 1928); Robert Lucas, *Lectures on Economic Growth* (2002); Arnold C. Harberger, “A Vision of the Growth Process,” 88 *Am. Econ. Rev.* 1 (Mar. 1998).
  46. For a detailed history, see Nathan Rosenberg, “Technological Change in the Machine Tool Industry,” 1840-1910, 23 *J. Econ. Hist.* 414 (Dec. 1963).
  47. This developmental process, which generated a huge expansion in wealth and welfare, also illustrates what Amar Bhidé calls “nondestructive creation.” At a conference two years ago, Bhidé held up a pencil and pointed out that the pen, typewriter, and personal computer had not destroyed it; today, they all coexist: “creative destruction is only half the story. Many innovations do not displace existing products and services, because they create and satisfy entirely *new* wants. This non-destructive form of entrepreneurship is as necessary for economic prosperity as creative destruction.” Amar Bhidé, *The Venturesome Economy: How Innovation Sustains Prosperity in a More Connected World* 345 (2008).
  48. See Steven Pinker, *The Language Instinct: How the Mind Creates Language* 352 *et seq* (1994).
  49. Steven Pinker, *The Language Instinct: How the Mind Creates Language* 353 (1994).
  50. The car, of course, did replace the previously predominant mode of transportation, the horse. It did not, however, gradually evolve from the horse and buggy—such things arise “from within the system which so displaces its equilibrium point that the new one cannot be reached from the old one by infinitesimal steps. Add successively as many mail coaches as you please, you will never get a railway thereby.” Joseph A. Schumpeter, *The Theory of Economic Development* 64 n.1 (4th ed. 1965). For a fantastic perspective combining Bhidé, Schumpeter, and the bushy tree analogy, see William Nordhaus, “Do Real-Output and Real-Wage Measures Capture Reality? The History of Lighting Suggests Not,” in Timothy F. Bresnahan & Robert J. Gordon (eds.), *The Economics of New Goods* 29 (1997).
  51. Steven Pinker, *The Language Instinct: How the Mind Creates Language* 359 (1994).
  52. While the terminology might be similar, this does not exactly parallel the idea of niches in organizational sociology. See, e.g., Joel A.C. Baum & Jitendra V. Singh, “Organizational Niches and the Dynamics of Organizational Founding,” 5 *Organization Science* 483 (Nov. 1994).
  53. This resembles Donald Campbell’s blind-variation and selective-retention model of how knowledge increases. See, e.g., Donald T. Campbell, *Variation and Selective Retention in Socio-Cultural Evolution*, in Herbert R. Barringer, George I. Blanksten, & Raymond W. Mack (eds.), *Social Change in Developing Areas* 19-49 (1965).
  54. This analogy, of darkness and light in no way is meant to suggest that economic development is a Manichean struggle. The branches of growth are not revealed in a quasi-prophetic sense—although a casual reader could be forgiven for coming away from the academic literature on entrepreneurship with this impression. In the same way that Amos and Jeremiah had the Almighty’s will revealed to them (and, in a more mundane sense, the same way Columbus hap-

- pened upon North America), the research literature paints entrepreneurs as receiving revelations or stumbling upon the “objective phenomena” of profitable opportunities.
55. See Howard Aldrich, *Organizations Evolving* 79 (1999).
  56. See, e.g., Howard E. Aldrich & Amy L. Kenworthy, “The Accidental Entrepreneur: Campbellian Antinomies and Organizational Foundings,” in Joel A.C. Baum & Bill McKelvey (eds.), *Variations in Organization Science* 19 (1999).
  57. Jonathan Hughes, *The Vital Few: The Entrepreneur and American Economic Progress* 68 (2nd ed. 1986).
  58. See Transcript, Department of Defense News Briefing, United States Department of Defense, February 12, 2002, available at <http://www.defenselink.mil/transcripts/transcript.aspx?transcriptid=2636>. See also Hart Seely, “The Poetry of Donald Rumsfeld,” *Slate*, April 2, 2003, at <http://www.slate.com/id/2081042/>.
  59. See Clayton M. Christensen, *The Innovator’s Dilemma* (1997). Christensen’s stories of innovation and technological change are, on one level, examples of the paradoxes of good management and company failure. On another level, however, the book is a larger story of how development and growth really happen: entrant firms best established firms and in turn become the next generation of established firms bested by new entrants.
  60. Such recombination is a key element in ideas both about economic growth and creative ability. See, e.g., Martin Weitzman, “Recombinant Growth,” 113 *Q.J.Econ.* 331 (May 1998); William W. Lewis, *The Power of Productivity: Wealth, Poverty, and the Threat to Global Stability* (2004); Dean Keith Simonton, *Origins of Genius: Darwinian Perspectives on Creativity* (1999); Jonathan Hughes, *The Vital Few: The Entrepreneur and American Economic Progress* (2nd ed. 1986). Entrepreneurs also exhibit another quality common to creativity: some show an early aptitude for it (e.g. Amadeo Giannini), while others don’t become an entrepreneur until later in life (e.g. Ford). See, e.g. David W. Galenson, *Old Masters and Young Geniuses: The Two Life Cycles of Artistic Creativity* (2006). To get inside this creativity, many entrepreneurship education programs seek to get inside the head of successful entrepreneurs: what were you thinking when you decided to let children borrow books? How did you come up with the idea for installment financing? What happened in that instant of insight? These, of course, are the wrong questions to ask. While the neuroscience of creativity has made tremendous strides in uncovering the biochemical bases of insight, it is probably not possible for someone else to intentionally mimic or recreate the precise production of gamma rhythms in the cerebral cortex.
  61. See, e.g., Robert Sobel, *The Entrepreneurs: Explorations Within the American Business Tradition* 41 (1974); Harold Evans, *They Made America: From the Steam Engine to the Search Engine: Two Centuries of Innovators* 85 et seq. (2004).
  62. See Jonathan Hughes, *The Vital Few: The Entrepreneur and American Economic Progress* 203-204 (2nd ed. 1986) (Hughes says Edison has a claim as the father of the industry).
  63. See Robert Sobel, *The Entrepreneurs: Explorations Within the American Business Tradition* 247 et seq (1974).
  64. Again, we must not imagine that, because film is such a gigantic industry today, its development as such was inevitable. At any number of turns, Zukor and Loew proceeded relatively blindly, their paths blocked by the Trust, adherence to the established ways of operating in vaudeville and nickelodeon, and distrustful politicians.
  65. See, e.g., Robert Sobel, *The Entrepreneurs: Explorations Within the American Business Tradition* 73 (1974); William R. Leach, *Land of Desire: Merchants, Power, and the Rise of a New American Culture* (1994).
  66. See Robert Sobel, *The Entrepreneurs: Explorations Within the American Business Tradition* 81 et seq (1974).
  67. See Jill Lepore, “The Lion and the Mouse,” *The New Yorker*, July 21, 2008, at 66.
  68. Joseph A. Schumpeter, *Capitalism, Socialism and Democracy* 86 (1942) (4th ed. 1976).
  69. See generally Robert D. Atkinson, *The Past and Future of America’s Economy: Long Waves of Innovation that Power Cycles of Growth* (2004); Carl J. Schramm, *The Entrepreneurial Imperative* (2006).
  70. See, e.g., Dominique Foray, *The Economics of Knowledge* (2004).