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Review Essay
The Fine 'Science' of Entrepreneurial Decision-Making

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Books reviewed in this essay:

Veronica Gustafsson, *Entrepreneurial Decision-Making: Individuals, Tasks and Cognitions* (Northampton, MA and Cheltenham: Edward Elgar, 2006), 155 pages

Saras Sarasvathy, *Effectuation: Elements of Entrepreneurial Expertise* (Northampton, MA and Cheltenham: Edward Elgar, 2008), 360 pages

Entrepreneurship is recognized as being a key driver of economic growth, competitiveness and job creation as well as being central to the functioning of market economies (OECD, 1998). Despite this recognition, there remains much to be understood about the entrepreneurial process. Even a clear definition of the entrepreneur and entrepreneurship has eluded researchers until more recently. There is growing consensus among entrepreneurship scholars that entrepreneurship is 'a field of business that seeks to understand how opportunities to create something new (e.g., new products or services, new markets, new production processes or raw materials, new ways of organizing existing technologies) arise and are discovered or created by specific persons, who then use various means to exploit or develop them, this producing a wide range of effects' (Shane and Venkataraman, 2000, p. 218). Following this view, addressing the questions of why, when and how certain individuals identify and exploit these opportunities has become the focus for recent entrepreneurship research.

This view of entrepreneurship puts human agency, and therefore the individual entrepreneur, at the centre stage of entrepreneurship research. A focus on the individual in entrepreneurship research is not new. The individual was very much the core of entrepreneurship research in the 1970s and more so in the 1980s, when we saw the development of a critical mass in the entrepreneurship field. A considerable body of work

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in this era sought to identify a set of common traits associated with (successful) entrepreneurs that could distinguish them from the rest of the population. If such traits could be identified, especially those associated with successful entrepreneurs; wouldn't it make life so much easier? Policy-makers and investors could target their resources to those individuals possessing the right traits. Budding entrepreneurs looking to form an entrepreneurial team could look for individuals who possessed the right traits. Established companies wishing to foster an entrepreneurial spirit in their organizations would be able to employ individuals with entrepreneurial traits. But it wasn't meant to be. Unsurprisingly, studies failed to identify a consistent set of traits that explained who became an entrepreneur and who would become successful.

In his critique of the trait approach, Gartner (1988, p. 21) states: 'A startling number of traits and characteristics have been attributed to the entrepreneur . . . a "psychological profile" of the entrepreneur assembled from these studies would portray someone larger than life, full of contradictions, and conversely, someone so full of traits that (s)he would have to be a sort of generic "Everyman" '. The inability of the trait approach to adequately explain entrepreneurship, coupled with heavy critique from the likes of Gartner, rightly or wrongly led to a move away from attempts to understand the nature of the entrepreneur. At the heart of the trait approach is a psychological paradigm. With the departure of the trait approach, entrepreneurship research also turned way from the psychological paradigm and its preoccupation with the individual entrepreneur. Underpinned by economic and sociological theories, along came a greater emphasis upon the venture and the external environment in which entrepreneurship took place.

There has, however, been a resurrection of the psychological paradigm and the individual within the field of entrepreneurship. Even personality/trait research is making a comeback (see Rauch and Frese, 2007). Central to the resurgence of the psychological approach and the role of the individual have been the influential works of Venkataraman, Shane, Baron, Gaglio and Katz, among others (e.g. Baron, 1998, 2004; Gaglio and Katz, 2001; Shane and Venkataraman, 2000). These scholars have re-emphasized the role of the individual but with an added focus on opportunity identification. A distinctive strand of some of the more recent work is that which draws upon cognitive theories whereby individual differences are attributed to variations in cognitive profiles. Further, instead of trying to explain who the entrepreneur *is*, this more recent approach seeks to explain what the entrepreneur *does* and *how*. Cognitive approaches have been heralded as a robust and effective means of accounting for the role of the individual in the entrepreneurial process (Baron, 2004; Mitchell et al., 2007). In fact, the term 'entrepreneurial cognition' has emerged to highlight the distinctive way in which individuals identify, evaluate and exploit opportunities. To date, these approaches have proved reasonably effective in delineating entrepreneurs from non-entrepreneurs. For example, entrepreneurs' greater reliance on certain cognitive techniques, such as heuristics and biases, may explain why they are able to detect and exploit opportunities (e.g. Baron, 1998; Busenitz and Barney, 1997; Simon et al., 2000).

Despite recent developments, there is still much to be understood about the individual decision-making *processes* underlying opportunity identification, and entrepreneurship more generally. There is a concern that by identifying cognitive features that distinguish entrepreneurs from other groups, we are merely identifying another group of trait-like

characteristics associated with the entrepreneur. While it is not unrealistic to expect that entrepreneurs may possess unique but relatively stable cognitive properties and that they, therefore, select into entrepreneurship, it is also possible that the entrepreneurial environment calls for the adoption of certain cognitive processes (Baron, 2004). Moreover, human cognition is generally viewed as being more malleable than personality traits. Another concern about the recent trend in entrepreneurial cognition research relates to the comparison of entrepreneurs as one group with non-entrepreneurs as another. While distinguishing the cognition of entrepreneurs from non-entrepreneurs has proved useful, there is scope for understanding the heterogeneity that exists within each of these groups. The two books I have selected for this review essay speak directly to these two issues in a timely manner.

Sarasvathy's book *Effectuation: Elements of Entrepreneurial Expertise* is described by the author as a 'reconstruction of her journey to understand entrepreneurship as a form of expertise' (p. 3). She takes issue with traditional approaches to entrepreneurship that have viewed entrepreneurial performance to be the result of the entrepreneur possessing certain personality traits or the result of a set of characteristics and/or circumstances associated with the venture and its environment. Sarasvathy approaches the subject from a different angle, that being entrepreneurial expertise. Expertise is seen to be comprised of tacit as well as learnable and teachable aspects of experience that are related to high performance in specific domains. The author seeks to identify commonalities in decision-making processes adopted by experts in a single domain, with high levels of performance being a given. She argues that one of the appealing features of this expertise approach is that elements of expertise can be identified and organized into a set of domain-specific principles, which can subsequently be used as testable and teachable decision-making and problem-solving techniques.

The book comprises four parts. The first part presents the empirical work which was inductively used to develop the concept of effectuation. The second part develops the concept by putting theoretical flesh on the empirical bones, producing a theoretical logic[1] as opposed to a particular theory. The third part examines the relationship between this effectual logic and a number of issues in the economics of business and entrepreneurship areas. The final part discusses the implications of effectual logic and its application to practice, pedagogy, policy and academic research. Space constraints prevent me from providing an in-depth review of each chapter. Some chapters assume a reasonably high level of knowledge of economics, philosophy and/or cognitive science. I do not believe I could do justice to each of these chapters by reviewing them briefly and without discussing the conceptual building blocks on which they are based. It is with regret, therefore, that my review of this book is somewhat selective. I must emphasize, however, that each chapter provides considerable food for thought and is well worth reading. In the review that follows I seek to focus on aspects of the book that develop and clarify the concept of effectuation.

The book commences with two research questions:

1. What commonalities and differences exist in the decision making processes of a group of expert entrepreneurs who start with the same idea for a new venture and face exactly the same set of decisions in building it?

2. In the face of non-existent or not-yet-existent markets, what underlying beliefs about the predictability of the future influence the decisions expert entrepreneurs make as they build a new venture?

I would like to draw attention to two interesting aspects of these questions. Most studies in entrepreneurship examine the venture ideas of each individual entrepreneur, thereby examining multiple venture ideas in a single study. In contrast, as implied in the first research question, Sarasvathy explores how entrepreneurs respond to a single given venture idea. This allows us to disentangle the role of the entrepreneur from the opportunity. Second, Sarasvathy examines the context of non-existent and not-yet-existent markets. This also deviates from most studies in the area. Most approaches to entrepreneurship implicitly assume that the future is predictable to a greater or lesser degree; that the environment is mostly exogenous to the individuals' actions; and that decision makers know what they want. While each of these assumptions has been challenged in various domains, Sarasvathy explores decision-making in spaces where none of these assumptions hold. She introduces a new concept – 'effectuation' – to depict this kind of decision making. This concept emerges inductively from her interviews with expert entrepreneurs.

She adopts Rudolf Carnap's view of research design. This involves a process that commences with direct observation in an attempt to identify empirical regularities followed by the development and testing of appreciative theory (Nelson and Winter, 1982). That is, a bottom-up, inductive approach. The author's means of data collection is through think-aloud verbal protocols. While this approach is widely used in the area of psychology and, in particular, the study of expertise, its adoption in the area of business and management is not widespread (with a few exceptions in the domains of accounting, management consulting and software cost estimation). The method involves giving the subjects a set of tasks or problems from their domain of expertise and then asking them to think aloud continuously as they solve the problems. In this way, this approach gets around the common problem of retrospective bias. Further, there is considerably more behaviour that can be observed when a subject is performing a task while thinking aloud than when the subject operating in silence (Ericsson and Simon, 1993).

The method required that (a) a sample of expert entrepreneurs had to be identified and selected and (b) a set of tasks/problems suitable to the domain of entrepreneurship be developed. In the study, experts entrepreneurs are defined as individuals who, either alone or as part of a team, have founded one or more companies; remained a full-time founder/entrepreneur for ten years or more; and participated in taking at least one company public. To identify entrepreneurs that fit the bill, Sarasvathy used the list of the national winners of the (US) Entrepreneur of the Year awards, compiled by Ernest &Young. In addition, the list compiled by the venture capitalist David Silver of the one hundred most successful US entrepreneurs between 1960 and 1985 was used. From an original list of 245 entrepreneurs, 45 entrepreneurs agreed to participate in the study. A total of 27 protocols were deemed appropriate for the analysis.

For the tasks, Sarasvathy had to identify an idea that would cut across multiple industries since the subjects were from such disparate backgrounds. The common

element across all subjects was entrepreneurship. Therefore, she created (in consultation with local entrepreneurs) a set of ten tasks involving an imaginary product, a game of entrepreneurship, called *Venturing*. The subjects were asked to imagine themselves in a start-up situation of a company, *Entrepreneurship, Inc*., that has created a computer game of entrepreneurship. This game could be used as a teaching tool for entrepreneurship. The subjects were then asked to solve ten entrepreneurial decision problems, ranging from identifying the market, defining the market, financing, leadership, product redevelopment, and growing the company to issues surrounding the exit decision.

Guided by the two broad research questions listed above, the data collected from the protocols were subjected to both quantitative and qualitative analysis in an iterative, inductive manner. Preliminary analysis of the qualitative data resulted in the emergence of a number of themes which were then analysed further in light of the literature surrounding these themes. For example, one theme to emerge from the data was expert entrepreneurs' distrust of market research. It appeared that the expert entrepreneurs tended not to rely on data from surveys, focus groups, and other systematic attempts to predict potential demand. In general, they did not believe in the validity of attempts to predict the future. How, then, did expert entrepreneurs make decisions without trying to predict the future? At this juncture Sarasvathy delves into the literature on decision making under uncertainty (Knight, 1921). The literature suggests two key decision making models which depend on the nature of uncertainty. If decision makers believe that they are dealing with a relatively predictable future, they will adopt an approach involving systematic information gathering and analysis of that information that allows them to make predictions about the future. In contrast, decision makers believing that the future is relatively unpredictable are likely to gather information through experimental and iterative learning techniques as posited by the Bayesian estimation approach. As such, with learning and experience, decision-makers may be able to refine their predictions. However, both these approaches are likely to be ineffective when dealing with a future that is unknown but also unknowable even in principle.

Sarasvathy's book is concerned with this third type of Knightian uncertainty. How can entrepreneurs make decisions when operating under these conditions? Sarasvathy creates a catch-all third approach which includes everything that does not fit into the first two approaches (i.e. analysis and estimation). This approach involves controlling and shaping the future rather than trying to predict it. She coins this third approach *effectuation* (the cognitive inverse of causation). Causal approaches (i.e. analysis and Bayesian estimation) are based on the premise that: 'To the extent that we can predict the future, we can control it' (p. 91). Effectuation, on the other hand, is guided by the following logic: 'To the extent that we can control the future, we do not need to predict it' (p. 91). Sarasvathy's quantitative analysis of the expert protocols reveals that the vast majority of subjects rely on effectuation when making decisions under uncertainty. The remainder of her book defines, describes and elaborates upon this concept.

Having established that experts rarely rely on predictive analysis (i.e. analysis or estimation approaches) when making decisions, Sarasvathy subjects her expert protocols to qualitative analysis to reveal the underlying elements of effectuation. She identifies six

elements of effectual logic. The first element involves decision makers starting off with a set of given means, rather than a predetermined goal. For example, the selection of initial customers for the product was based on who they (the subjects) were, what they knew and whom they knew. Accordingly, the initial customer base varied for each entrepreneur depending on their 'means' rather than assuming the existence of a predetermined market. Later in the book, Sarasvathy calls this the 'bird-in-hand principle'.

The second element relates to the principle of affordable loss. Rather than trying to predict an ideal return for their projects, 'effectuators' focused on what they could afford to lose. In fact, several subjects did not want to spend any money at all but instead used resources garnered from others. Therefore, effectuators did not waste time trying to estimate future sales and possible risks, and then raise enough money to make the venture happen. Instead, they started off with an assessment of their own financial situation and psychological commitment to the venture. The attitude towards customers relates to the third element of effectual logic. Effectuators often viewed customers like partners from whom they could learn. One way in which this is achieved is by directly selling to the customers/partners at a very early stage.

The fourth element of effectuation relates to effectuators' attitude towards competition. Effectuators tended to prefer creating the initial market segment prior to competitive analysis. This does not mean that they viewed competition as unimportant. Rather, they prioritized the successful development of a target segment and then considered their response to competition. As one subject put it: 'Your competition is a secondary factor I think, you are putting the cart before the horse'.

The fifth element of effectuation involves fabricating rather than finding a market. Effectuators appeared to start off with initial products or market segments and then added segments through the development of new products or stakeholder partnerships. As such, they tended to develop, shape and define the market themselves (often in collaboration with stakeholder partners). An effectual approach ensures that self-selected stakeholders will have a genuine voice in shaping the new ventures they are involved in and indeed the markets that come to be. Closely related to the fifth element, the final element of effectuation identified relates to the presence of unanticipated ends as opposed to a pre-selected goal. Starting off with the same imaginary product, the 27 subjects created 18 different market definitions. This can be explained by differences in the means available to each subject as well as differences in possibilities for partnerships with various stakeholders. This final element is closely related to the 'lemonade principle' which Sarasvathy introduces later on in the book. The principle is based on the well-known expression 'when life gives you lemons, make lemonade'. Sarasvathy argues that causal reasoning seeks to avoid the unexpected or achieve predetermined goals in spite of contingencies. In contrast, effectual logic seeks to exploit the unexpected. The author sees the effectuator's ability to turn the unexpected into valuable opportunities as being at the heart of entrepreneurial expertise.

Put together, these elements produce a decision making model which is quite different to (in fact the inverse of) causal decision making in which one attempts to develop the means to achieve a particular end. In the effectual model, the decision maker does not start off with a predetermined goal, end or market. Rather, the decision maker identifies his/her given set of means (e.g. who and what they know) and proceeds to take advantage

of opportunities as they appear as well as fabricating new ones. Sarasvathy uses the contrasting metaphors of making a patchwork quilt and solving a jigsaw puzzle to illustrate the difference between effectual and causal logic. On the one hand, the entrepreneur can be viewed as someone who solves the complex jigsaw puzzle of a profitable opportunity. In this metaphor the opportunity, represented by the jigsaw, already exists. The job of the entrepreneur is to discover the jigsaw and put it together. This approach is analogous to causal decision making. On the other hand, the entrepreneur may be more similar to a patchwork quilt-maker. When solving a jigsaw puzzle, one has little discretion in putting the pieces of the puzzle together if the aim is to solve the puzzle (which has a single solution). In contrast, the quilt-maker has greater latitude. (S)he may have a set number of patches (similar to the pieces of the jigsaw puzzle), but (s)he can put the pieces together in a number of ways that produces different quilts that can be equally desirable. Further, the patchwork quilt-maker has more opportunities for collaboration than the puzzle solver. The quilter may work with others who bring along different patches that can contribute to the quilt. The puzzle solver can also collaborate with others but only with those who have the pieces to the same puzzle. Further, there can only be one meaningful outcome from the collaboration.

The discussion so far suggests that effectuators identify and respond to opportunities and also create new opportunities and even markets. Chapter 5 of the book seeks to explore the somewhat philosophical question of whether new markets exist (and are discovered) or whether they emerge. The discussion builds on Nelson Goodman's (1983) reformulation of the problem of induction, originally presented by David Hume. In *Fact, Fiction and Forecast*, Goodman explores why some regularities establish habits or law-like statements (e.g. all emeralds are green) while others do not. Goodman introduces the colour 'grue', which applies to all things examined before a certain time *t* that were observed to be green but also to other things just in case they are blue and not examined before time *t*.

Sarasvathy argues that markets can also possess 'grue-like' properties. She gives the example of the Internet which was initially used predominantly by researchers and academics. With the launch of Netscape in 1994, the Internet transformed to become an indispensable part of the commercial world. The Internet evolved into something very different after 1994. Further, since the Internet can be transformed yet again, it continues to possess grue-like properties. So where does effectual logic fit into this discussion? Sarasvathy argues that effectuation can be used to explain how one can act under the assumption of 'grue markets'. Following the principles outlined earlier (e.g. starting off from the means available to the individual, forming partnerships and obtaining stakeholder commitments) effectuators can shape and transform existing markets into new ones.

The role of effectuators in exploiting opportunities and creating or shaping new markets is explored from a somewhat different angle later on in the book. In Chapter 7, Sarasvathy describes effectual entrepreneurship as a science of the artificial (Simon, 1981), where the word 'artificial' is seen as being synonymous with 'man-made'. The sciences of the artificial are seen to encompass objects and phenomena in which both human purpose and natural law are embodied (Simon, 1981). Although natural laws may constrain, they do not dictate the fabrication of these human artefacts. An artefact

is viewed as an interface between an inner environment and an outer one. The artefacts in entrepreneurship are entrepreneurs and their firms. The entrepreneur represents an interface between an inner (mental) and outer environment (the rest of the world). For the firm, the inner environment is comprised of its employees and owners. Sarasvathy argues that the study of entrepreneurship (and effectuation in particular) as an artificial science involves asking design-oriented questions such as *how* new goals come to be; and *how* particular strategies shape environments (inner and outer), reformulate individual preferences and reorganize firm structures. Her central message is captured in the following passage taken from Chapter 7 (p. 168):

> The point I am trying to bring home is simple but stark. Designers of organizations design the environments we live in; and in the process they re-build the very coordinates of our existence – who we are and who we can become; what we know and what we can learn; whom we interact with and whom we can find no time for. The fallacy of an environment impervious to the designer or a world unperturbed by artefacts is often bolstered by the comforting myth of the 'market' that is 'out there' – capable of widely sorting out wheat from chaff from the outputs of seemingly 'intentional' but actually 'random' or 'structured' human endeavours.

Having outlined the elements and nature of effectuation, Sarasvathy explores the relationship between effectuation and performance (in Chapter 6). Sarasvathy takes issue with the fact that most studies in entrepreneurship, even those in the area of personal traits and entrepreneurial cognition, focus on the performance of the firms that entrepreneurs create. She calls for the distinction between firm performance and entrepreneurial performance, arguing that while the two may operate in tandem, they may also operate in opposition to each other. In fact, she states that extrapolating firm failure rates to entrepreneurs may be premature, misinformed and unjustified. To illustrate this point, she gives the example of an expert entrepreneur who may have founded one or more firms that failed; and the novice entrepreneur who may achieve supra-normal profits in her very first venture. She argues that the entrepreneurial expertise view she adopts turns the spotlight on the performance of the entrepreneur. She notes that many of the expert entrepreneurs stated that failure was not an option. The key issue, however, is that expert entrepreneurs appear to be able to delineate between business failure and entrepreneur failure. As one expert entrepreneur put it, 'we fail all the time. The key is to know that success is a process and not an outcome. And failures are essential inputs into that process'. It appears that expert entrepreneurs (and effectuators) are just as likely to experience business failure as novices and/or those who do not rely on effectuation. However, a key difference between those who rely on effectuation and those who do not, relates to the cost of failure. Should failure occur, Sarasvathy predicts that effectuators will lose less largely due to the adoption of the affordable loss principle – they invest only that which they can afford to lose. On the downside, the effectuator may not make adequate investments in time to exploit a potentially lucrative opportunity, thereby missing out on its upside potential.

In the next chapter, Sarasvathy relates effectuation to two themes in current strategy and entrepreneurship research: competitive advantage and entrepreneurial opportuni-

ties, respectively. She describes sustained competitive advantage as the Holy Grail for management scholars but questions the philosophical necessity for the concept, noting: 'Instead of chasing immortality, an effectual strategic management will focus on vitality and creativity tied together with voluntary exit. Products, business units, firms, and markets will not only be seen as mortal, but that mortality itself will be seen as an effective way to build economic development and prosperity. Suicide and euthanasia would be part of a healthy portfolio of effectual strategies' (p. 173). Within this arena of mortal markets lies a crucial role for entrepreneurial opportunities. Entrepreneurial opportunities have taken centre stage in current entrepreneurship research (although much of the discussion on entrepreneurial opportunities dates back to the works of Schumpeter (1934) and Kirzner (1973)). While there appears to be some consensus that developing our understanding of entrepreneurial opportunities is central to entrepreneurship research, considerable debates have ensued about what they are as well as their very nature. In particular, scholars disagree on the subjective versus objective nature of opportunities. While some argue that opportunities are subjective and enacted by the entrepreneurs (e.g. Gartner et al., 2001), others see opportunities as objective phenomena that are waiting to be discovered (Shane, 2003). Sarasvathy argues that opportunities are *made* as well as found: 'They are perhaps as much the outcomes of what entrepreneurs do as the data on which entrepreneurs base their actions' (p. 177). Sarasvathy puts *action* at the core of entrepreneurial opportunities, arguing that they are largely the result of people acting in entrepreneurial ways, which includes acting upon perceived opportunities. While opportunities may exist, they may also be created. On the supply side, technologies have to be invented, fabricated, constructed or *made*. Similarly, on the demand side, opportunities and markets have to be invented, fabricated, constructed or *made*. Sarasvathy sees effectual logic as guiding and fuelling these entrepreneurial actions.

Chapters 9 and 10 represent two of the boldest chapters in the book. In Chapter 9, Sarasvathy makes a first attempt to develop a new branch of economics – effectual economics – by building on the micro-foundations of effectual logic. She explores candidates that may form the philosophical basis for such an endeavour, such as utilitarianism and pragmatism. She concludes that pragmatist philosophy is likely to be best suited for the task. Sarasvathy also attempts to sketch out an appropriate methodology for effectual economics and takes her cue from Friedman's work on positive economics. Chapter 10 deals with an intriguing possibility – one which could have very serious societal implications – the creation of markets in human hope. She commences this chapter by presenting a conundrum. The commercial investment opportunities and tools available to us are prolific. The reverse seems to be the case if one wishes to invest in the 'eradication of human misery' or 'human potential' (e.g. by eradicating poverty and illiteracy). Her basic premise is that '*all* markets are ultimately markets in human hope and that the idea of separating some products for the for-profit sector and others for the non-profit or social sector is both unnecessary and inane' (p. 205). The chapter explores how effectual logic may be applied to non-profit ventures, while also questioning the need to separate the for-profit and non-profit sectors. Indeed, a large proportion of Sarasvathy's arguments are based on examples where effectual logic has been used to create to create an opportunity for investing in human hope and potential. Arguably, of greatest significance is the story of Mohammed Yunus, the founder of Grameen Bank.

Yunus' strategy went against virtually every principle of conventional banking practice, but in doing so he also followed many of the principles of effectual logic. What is striking about Yunus' approach is that he sought to invest in human potential, rather than seeking to eradicate human misery through charitable fund raising. Building on this example, and others, Sarasvathy calls for market mechanisms which 'are useful and powerful instruments for organizing human efforts in value creation' to be tailored and used to facilitate value creation in social ventures. Doing so would provide opportunities for those wishing to invest in human potential.

The final part of the book examines the implications of effectuation for teaching and future research. In Chapter 11 experiences teaching effectuation are shared. Sarasvathy teaches effectuation to both undergraduate and graduate students. She does not teach effectuation as the only method for entrepreneurial decision making. Rather, effectual logic is presented as one of two toolboxes at the potential entrepreneur's disposal – the other one being causal logic. The chapter provides a discussion of some of the methods adopted as well as the challenges confronted when teaching effectuation. In particular, Sarasvathy reviews some of the common misconceptions students have about effectuation which crop up in the classroom, such as effectuation being viewed as irrational and intuitive; the easy way out; charismatic leadership; a bunch of traits; and a recipe for success. Finally, Sarasvathy explores a number of research possibilities that emerge from teaching effectuation, demonstrating the potential for a valuable relationship between teaching and research.

Chapter 12 is somewhat unusual in that it is devoted to the work of others with whom Sarasvathy has been collaborating. The chapter includes three contributions from her co-authors. The first contribution relates to the work of Nicolas Dew. Dew explores the issue of how markets come to be. He also demonstrates how an effectual approach may produce very different results to those stemming from a casual approach. Dew eloquently uses the case of the RFID (Radio Frequency Identification) industry to demonstrate how the following of effectual principles can explain the creation and evolution of a new market. The second contribution is by Stuart Read. Read examines the relationship between effectuation and the performance of new ventures. He conducts a meta-analysis on 24 studies that have sought to explain new venture performance. Although many of these studies analysed did not examine effectuation directly, Read identifies explanatory variables that are consistent with the elements of effectuation. For example, the studies included in Read's meta-analysis included variables that mirror the 'means' component of effectual logic such as years of entrepreneurial experience; availability of start-up capital and patents; and number of contacts. The results of the meta-analysis provide initial support for a positive relationship between effectuation and new venture performance. Acknowledging some of the limitations of the study, Read presents a number of carefully considered suggestions to guide future research on the relationship between effectuation and performance. The final contribution in the chapter by Robert Wiltbank, explores the consequences of effectuation. The unique feature of Wiltbank's work is that he applies effectuation to the domain of early-stage equity investors, in particular, 'angel investors' (i.e. informal venture capitalists). He develops and tests a number of hypotheses regarding the relationship between effectual strategies and the extent and magnitude of investment successes (and failures). The main finding of the study is that angel investors

who emphasized effectual as opposed to predictive strategies for dealing with uncertainty, experienced significantly fewer failures and when they did they experienced smaller losses. Unfortunately, explaining success proved to be more challenging.

Sarasvathy ends the book by focusing on the implications of her research and that which she has not yet done. One of the particularly interesting sections of the chapter discusses the links between her work and policy. She is cautious in making policy recommendations, arguing that further work is first required. However, she aligns herself with the policy positions of economists such as Mancur Olson and Amartya Sen. For example, Sen (2000), argues that policy initiatives should be directed at improving the freedom of individuals to create and achieve their own ends as well as to acquire the means to achieve more conventionally determined ends, within the constraints of the liberties of others to do the same. Sarasvathy argues that existing policy initiatives are often based on the assumption that opportunities exist and need to be discovered by entrepreneurs. As long as entrepreneurs can be incentivized or guided to find them (e.g. generating regional clusters and incubators), entrepreneurship will take place. However, these initiatives speak to the 'causal' entrepreneur, not necessarily the effectual entrepreneur. Sarasvathy calls for the consideration of additional initiatives that may encourage entrepreneurs to 'make' opportunities. Furthermore, she suggests that policy-makers may consider the role of firm failure and failure management in successful entrepreneurship.

Sarasvathy concludes by presenting an extensive menu of research opportunities, including opportunities for the philosophically minded; the mathematically minded; the linguistically minded; the econometrician; the business ethicist; the logician; the economist; the legal theorist; the organizational theorist; the psychologist; the sociologist; and last but not least, the policy researcher. I find this menu highly representative of Sarasvathy's approach – she does not shy away from exploring ideas/issues from many different perspectives. She may not have in-depth expert knowledge in each of these areas but is courageous enough not to let an interesting idea go by. And this, I believe, is what makes the book such a gem. Readers may not agree with or even understand all aspects of the book, but nobody can deny that the book provides plenty of food for thought and discussion.

The second book I chose to review for this essay is *Entrepreneurial Decision-Making: Individuals, Tasks and Cognitions* by Veronica Gustafsson. Although my review of this book is shorter than the previous book, this should not be taken to imply that it deserves less space. The book is shorter than Sarasvathy's and it is also structured in a more traditional manner. Moreover, there is clearly some commonality and overlap in the content of the two books which permitted me to exclude certain aspects of the second book that were discussed in my review of the first (e.g. the nature of entrepreneurship research and issues pertaining to uncertainty).

Gustafsson's book starts with the usual criticisms levelled at the personality approaches to entrepreneurship. These criticisms are largely based on notions of limited explanatory power and there being insufficient evidence to support an 'entrepreneurial personality'. Rooted still in the psychological paradigm, Gustafsson offers an alternative, arguably more fruitful, approach to understanding entrepreneurship; an approach rooted in cognitive psychology. She argues that cognitive psychology offers explanations for

differences in entrepreneurial behaviour (e.g. opportunity identification) but, more fundamentally, for the underlying decision-making processes which have been largely overlooked.

Gustafsson's book has two main foci: the opportunity identification process and individual variations among entrepreneurs. The first focus is understandable since, as intimated earlier, scholars are increasingly in agreement that opportunity identification represents a central concept in the field of entrepreneurship research. The growing number of theoretical and empirical papers published in entrepreneurship journals, and even whole books being devoted to opportunity identification (e.g. Butler, 2004), are testimony to its significance. Yet, there appears to be less awareness of the task characteristics associated with opportunity identification. Further, what are the decision-making processes that underlie opportunity identification? Why is it that certain individuals identify certain opportunities and not others? A novel approach adopted in Gustafsson's study is to integrate cognitive theory with Sarasvathy et al.'s (2003) typology of opportunity identification based on the level of uncertainty involved. According to this typology, opportunity creation involves high levels of uncertainty, opportunity discovery involves moderate levels of uncertainty and opportunity recognition involves low levels of uncertainty (elaborated below). It is evident that Gustafsson's study is closely related to Sarasvathy's work discussed in this essay. Gustafsson's work, however, is broader in that it looks at entrepreneurial behaviour under conditions of extreme uncertainty (as was the case in Sarasvathy's book) but also under moderate and limited uncertainty. Gustafsson argues that the cognitive processes behind these types of opportunity identification are likely to differ. The second focus of Gustafsson's book relates to individual differences, suggesting level of expertise as a key source of variation among entrepreneurs. Accordingly, Gustafsson's study compares the decision making processes of novices and experts involved in opportunity identification. In this sense, Gustafsson's book is highly complementary to Sarasvathy's, in which experts were examined in the absence of a control group.

The theoretical framework for the study is based on a juxtaposition of cognitive theory and what Gustafsson calls entrepreneurship theory. These two theories are reviewed in Chapters 2 and 3, respectively. Having reviewed a number of cognitive approaches (e.g. analytical decision-making and naturalistic decision-making), Gustafsson focuses on cognitive continuum theory (CTT). CTT introduces the concepts of task continuum and cognitive continuum. Accordingly, a task can vary by the level of uncertainty involved. The level of task uncertainty is likely to be high when one is contending with ill-structured problems (i.e. where there may be multiple solutions); uncertain dynamic information; insufficient or delayed feedback; shifting, ill-defined or competing goals; and the presence of multiple players. Applied to the opportunity identification task, this corresponds with Sarasvathy et al.'s typology discussed below.

The cognitive continuum relates to the range of cognitive processes used, which can vary from intuition at one extreme through quasi-rationality to analysis at the other extreme). CTT suggests that every task within the task continuum will induce a particular cognitive process along the cognitive continuum in order for the decision to be appropriate. The correspondence-accuracy principle (CAP), viewed by the author as a corollary to CTT, suggests that a decision can be solely regarded as appropriate or

inappropriate depending on whether the cognitive processes employed correspond to the nature of the task for which the decision is made. It follows that each type of opportunity identification will require the use of different cognitive processes. CAP would predict that opportunity creation (high uncertainty) calls for intuitive decisions; opportunity discovery (moderate uncertainty) calls for quasi-rational decisions; and opportunity recognition (low uncertainty) calls for analysis. Gustafsson argues that the expertise of a decision-maker may have an important bearing on the ability to recognize the cognitive requirements of a task and adopt the appropriate cognitive processes. As a result of repeated and long-term experience, experts develop declarative knowledge and organize this in such a way that they are able to make sense of incoming information more efficiently than novices.

Chapter 3 explores how some of the generic cognitive processes and task characteristics reviewed may apply to the domain of entrepreneurship. In particular, Gustafsson elaborates on the opportunity identification typology mentioned earlier. Here, she draws heavily on Sarasvathy et al. (2003, p. 145) to describe the different types of opportunity identification:

1. *Opportunity Recognition*. If both sources of supply and demand exist rather obviously, the opportunity for bringing them together has to be 'recognized' and then the match-up between supply and demand has to be implemented either through an existing firm or a new firm. This notion of opportunity has to do with the exploitation of the existing markets. Examples include arbitrage and franchises.
2. *Opportunity Discovery*. If only one side exists – that is, demand exists, but supply does not, or vice versa – then, the non-existent side has to be 'discovered' before the match-up can be implemented. This notion of opportunity has to do with the exploration of existing and latent markets. Examples include: cures for diseases (demand exists; supply has to be discovered); and application of new technologies (supply exists; demand has to be discovered).
3. *Opportunity Creation*. If neither demand nor supply exists in an obvious manner, one or both have to be 'created' and several economic inventions in marketing, financing etc have to be made, for the opportunity to come into existence. This notion of opportunity has to do with the creation of new markets. Examples include Wedgwood Pottery, Edison's General Electric, U-Haul, AES Corporation, Netscape, Beanie Babies, and MIR space resort.

Having synthesized aspects of the cognitive approach presented in Chapter 2 with recent work in entrepreneurship research (e.g. entrepreneurial cognition and opportunity identification), Chapter 3 concludes with a set of hypotheses. In sum, these hypotheses are suggestive of the extent to which entrepreneurial decision-making is a joint function of the task for which the decision is made and the decision-maker's level of expertise.

Chapter 4 provides details of the method deployed. The method, which is taken from cognitive psychology, relates to an experimental design, an approach which is relatively uncommon in entrepreneurship research. This involved creating tasks which could be placed at the high uncertainty end of the continuum, the low uncertainty end and in the middle of the continuum. In addition, these tasks had to induce an intuitive, analytical or

quasi-rational cognitive process, respectively. Four opportunity identification scenarios were developed which were subsequently validated using Q-techniques. Similar to Sarasvathy, data were collected from subjects using think-aloud protocols. The sampling and categorization of participants as novices and experts is also reported. Novices are defined as aspiring entrepreneurs or starters. These participants included students as well as participants of two workshops devoted to small business start-ups. Experts were defined as habitual portfolio entrepreneurs, with no less than seven to ten years of experience since their first start-up. While the author explicitly states the definitions used, I would have liked to see a clearer justification for the selection criteria. For example, it is not clear why the experts selected were portfolio entrepreneurs (i.e. entrepreneurs who own multiple businesses simultaneously). Habitual (i.e. experienced) entrepreneurs are comprised of both serial and portfolio entrepreneurs. While the former start/own businesses sequentially, the latter start/own businesses concurrently. Recent work suggests that these two types of entrepreneurs are both cognitively and behaviourally different (Ucbasaran et al., 2006a). Finally, the novices in Gustafsson's study included both practising and aspiring entrepreneurs. The differing stages of expertise development (discussed in Chapter 2) would suggest that there may be some heterogeneity within the novice sample. Future research may consider how sensitive the results of this study are to different definitions.

Chapters 5 and 6 report the results and relate these to hypotheses developed in earlier chapters. Nine out of eleven hypotheses were supported. So what were the main findings of the study? As predicted, expert entrepreneurs showed greater awareness of the nature of a decision task (e.g. level of uncertainty involved in opportunity identification) and were able to match their cognitive processes to this. In contrast, novices were more prone to analytical decision-making (most suited for tasks involving low uncertainty) regardless of the nature of the decision task. These findings are consistent with evidence reported from other domains. There was, however, some evidence of adaptability among novices. This was likely to have been driven by the heterogeneity of participants in this group. In particular, students of business administration were more prone to analytical decision-making processes, while students of engineering and other fields were more prone to quasi-rational decision making processes. Nonetheless, the finding that novices can demonstrate adaptability is both intriguing and promising. The author also found that experts used intuition mostly for the rejection of venture ideas, and analysis mostly for their acceptance. This finding provides further support for the view that different cognitive processes are required for different types of tasks.

The final chapter brings the book together by summarizing the findings, discussing their implications, highlighting the limitations of the study and developing an agenda for future research. The implications of this book are far-reaching. It presents experts as role models but recognizes that the development of expertise requires time. A number of practical suggestions for novices are considered. Gustafsson argues that the biases associated with novices' over-reliance on analytical decision making may be reduced by exposing them to a variety of tasks ranging from low uncertainty to high uncertainty (e.g. through the use of simulations); providing them with feedback; and facilitating mentoring from experts. These activities have strong implications for entrepreneurship educators as well as interventionist policy-makers. It is unfortunate that the implications for the latter

are not fully developed in the book. However, many of the tentative suggestions offered by Sarasvathy in her book also seem to apply here. For entrepreneurship researchers, the clear and honest account of the methods represents an exemplar for those considering an experimental design. Further, the book offers a plethora of research opportunities. A particularly interesting extension of Gustafsson's work would be exploration of the implications of adaptability (or otherwise) for subsequent stages of the entrepreneurial process, ranging from opportunity exploitation choices to venture performance. Though not dealt with explicitly in the book, it would be interesting to think about how entrepreneurship researchers may be able to develop the theories they utilize from other disciplines.

In sum, I thoroughly enjoyed reading this book. It is a well-thought through piece of scholarship which will certainly be of interest to those involved in entrepreneurship research, especially in the area of entrepreneurial cognition. It represents an excellent example of how the theoretical and methodological tools from a well-established discipline can be used to aid our understanding of entrepreneurial phenomena.

In my introduction to this review I suggested that we need to develop our understanding of the decision-making processes underlying opportunity identification. I am sure readers will agree that both books reviewed in this essay shed some light on this issue. Sarasvathy suggests that, at least for expert entrepreneurs, effectuation can explain how they identify opportunities. More generally, effectuation might explain how entrepreneurs create or make opportunities under conditions of extreme uncertainty. Taking a wider selection of entrepreneurs, Gustafsson suggests that there are a variety of decision-making techniques at the entrepreneur's disposal such as intuition, quasi-rationality (i.e. heuristics) and analysis. She finds, however, that the availability and choice of technique will depend on the level of expertise as well as the level of uncertainty the entrepreneur is confronted with.

The two books are also illuminating with respect to another area where I highlighted a need to enhance our knowledge, that being the heterogeneity of entrepreneurs. Taken together, these books question the suitability and relevance of conducting studies that compare entrepreneurs with non-entrepreneurs. As heterogeneous as a group of non-entrepreneurs is, so is a group of entrepreneurs. One source of variation presented in these two books is experience/expertise. Hopefully the identification of one source will spark off the search for others.

Entrepreneurs with high levels of expertise do not to approach problems or situations in the same way as novices. Unfortunately, the 'road to excellence' (Ericsson, 1996) is never straightforward. First, expertise development takes time (approximately 10 years). This is not particularly promising for the impatient novice. Fortunately, Gustafsson suggests a variety of techniques that may encourage and possibly speed up the process of expertise development. One example is increasing the individual's exposure to the maximum variety of entrepreneurial situations through simulations. Sarasvathy's work also implies that the development of expertise may be facilitated. The principles of effectuation used by the experts in Sarasvathy's study can be taught. Sarasvathy offers guidance on how effectual logic can be taught. A second potential hurdle in the development of expertise is that it may involve failures. In fact, Gustafsson suggests that the development of entrepreneurial expertise requires both success and failure. What

appears to be important, however, is the attitude to failure. Many expert entrepreneurs have picked up the pieces, learned from their mistakes and moved on to the next opportunity. Sarasvathy shows how these entrepreneurs view failure as an input into the process of achieving success. However, not all entrepreneurs are able to do this. Failure may be associated with strong emotions such as feelings of grief and trauma (Shepherd, 2003). Where such feelings are present, entrepreneurs' confidence may be dampened, affecting their motivation to identify and exploit subsequent opportunities (Ucbasaran et al., 2006b). Unless they try again, they are unable to put into practice what they have learned. This calls for a need to better understand the impact of and responses to business failure, followed by the development of techniques for what Sarasvathy calls 'failure management'. Shepherd's (2004) work on this issue is promising. Further, teaching entrepreneurs about effectuation may foster a more positive attitude towards failure.

I would like to conclude with a quote from Murray Davis. In 1971, he wrote: 'It has long been thought that a theorist is considered great because his theories are true, but this is false. A theorist is considered great, not because his theories are true, but because they are interesting' (Davis, 1971, p. 303). If interesting means 'engaging the attention' (as Davis puts it) then I congratulate both authors on writing an interesting book. I suspect other readers will find this to be the case too. The books reviewed here have far-reaching implications for both entrepreneurship and management scholars. Although the setting for most entrepreneurship research is the new venture, entrepreneurial decision-making takes place and is often called for in a wide variety of settings ranging from teams in established ventures to the board rooms of large international corporations. It would be interesting to see if and to what extent these findings contained in the two books reviewed here would be sensitive to these alternative settings.

NOTE

[1] Logic is defined as an internally consistent set of criteria that forms the basis for action upon the world.

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