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Effectuation 10 Year Waypoint

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Abstract. As a concept, effectuation celebrated its tenth birthday in 2011. We use the milestone to look back at the work done to date and to look forward to new questions and issues. What we see is an idea that has added shape to the conversation regarding entrepreneurship. By offering a clear theoretical and testable perspective, effectuation has enabled both a foundation for supporting work as well as criticism. The resulting dialog has advanced our level of understanding regarding the phenomenon of entrepreneurship, and in the process it has opened exciting specific questions and entirely new directions. By inventorying as much current work and as many future questions as we could identify, we seek to encourage the interaction, and look forward to what will be created by effectuation's twentieth birthday.

Keywords: effectuation; entrepreneurship; uncertainty; theory; review; venture.

1. Introduction

Effectuation describes a set of expert entrepreneurial heuristics and an overarching logic based on control. The concept has been the foundation of, or referred to in more than 100 peer-reviewed academic papers published over the last 10 years. Our main purpose in this work is not to try to capture all the richness and nuance already developed around the topic nor is it to focus on one specific area (i.e. empirical research on effectuation (Perry, Chandler and Markova 2012)), but to provide something of a roadmap through the extant body of effectuation work, actively looking for promising off-ramps, intersections and possible next destinations. The effectuation journey is one that formally started with an Academy of Management Review article entitled "Causation and Effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency" (Sarasvathy, 2001). Combining the messiness of entrepreneurial practice and thinking with strong and relevant theoretical connections to existing foundational work, Sarasvathy's seminal work opened a broad avenue of academic enquiry.

This paper is organized simply. In sections 2 and 3, we describe the theoretical foundations of effectuation and the body of knowledge cumulated on the topic to date. In section 4, we open the larger inventory of things we do not know, working to articulate specific questions and where those questions might

fit into the effectuation conversation and the dialog on entrepreneurship. In section 5, we step back and examine some broader implications suggested by effectuation that may extend the idea outside the boundaries of entrepreneurship. Throughout, we seek to increase the accessibility and relevance of the idea to scholars with a variety of perspectives, both complementary to and critical of effectuation, in order to build dialog and ultimately an understanding of how new things are created in the world.

2. Foundation

From the start, the effectuation journey has taken parallel routes. The empirical route brought the Venturing scenario – a business problem about how to bring a fictitious game of entrepreneurship to market – to a panel of 27 expert entrepreneurs. Protocol analysis (Ericsson and Simon, 1980, 1993) of the transcripts of their think-aloud solutions to Venturing identified a series of heuristics employed in expert entrepreneurs' problem-solving which inverted much of what is still commonly taught in business education. The resulting set of heuristics, which compose the logic of effectuation, are presented in Table 1 and contrasted with "causal" heuristics that rely on prediction or historical data.

Table 1: Principles of Effectuation, Contrasted with Causation

Issue	**Effectuation**	**Causation**
Where to Start	Means. The basis for decisions and new opportunities (Who I am, What I know, Whom I know).	Goals. Given (based on predictions).
Risk, Return and Resources	Affordable Loss. Calculate downside potential and risk no more than you can afford to lose.	Expected Return. Calculate upside potential and pursue the (risk adjusted) best opportunity.
Attitude Toward Others	Partnership. Build your "future" together with customers, suppliers and even prospective competitors.	Competition. Set up transactional relationships with customers and suppliers.
Surprise	Leverage Surprises. Surprises can present new opportunities.	Avoid Surprises.
Underlying Logic & What to Do	Co-Create. To the extent we can control the future, we don't need to predict it.	Plan. To the extent we can predict the future, we can control it.

The theoretical route identified core thinking that would form the intellectual foundation for effectuation. Knight (1921) described the uncertainty of the

environment where the entrepreneur operates. In his articulation of enactment, Weick (1979) relaxed the assumption that the environment exerts the sole influence over outcomes or even the rules of the game, opening an opportunity for the agency of the entrepreneur. And March (1982) offered a new starting point for the process, in connecting environmental assumptions from Knight and Weick with a situation where decision-makers are unsure of their own preferences or goals. The net result is a perspective inherently creationist in nature that seeks to account for the proactivity of individual agents in the shaping and outcomes of the environment.

This thinking constitutes the theoretical cornerstone of the problem space for effectuation, a problem space that limits the explanatory power of models based on causal rationality. And it is exactly under the uncertainty that is described by Knight that predictive logic (to the extent we can predict the future, we can control it) may not be useful and that effectual logic (to the extent we can control the future, we do not need to predict it) emerges. Hence, by focusing on the controllable aspects of an unpredictable future, effectual logic is able to overcome the problems of prediction when the future is truly unpredictable.

3. What We Know

As with just about all scientific and academic endeavors, what we do not know exceeds what we do know. Intuitively – this seems obvious – because any single piece of new knowledge brings with it a series of new questions. But we mention it explicitly to explain why this section will necessarily be shorter than the next, and in many ways, an introduction to the next.

3.1. Empirical

The findings from the Venturing experiment encouraged empirical work in many directions. The Venturing study was replicated with a sample of novice managers (Dew, Read, Sarasvathy and Wiltbank, 2009), and the results supported the uniqueness of the expert entrepreneurs' effectual heuristics. The marketing related questions from Venturing were analyzed separately in a study that also included a sample of executives in order to provide another control group that might further isolate the uniqueness of effectual heuristics (Read, Sarasvathy, Song, Dew and Wiltbank, 2009). The qualitative differences between all three groups, along the lines of the marketing questions, are summarized in Table 2.

Table 2: Venturing Findings from Groups of Expert Entrepreneurs, Executives and Novice Managers (Read, Sarasvathy, Song, Dew and Wiltbank, 2009)

Decision or Issue	**Summary of Findings on the Differences between Expert Entrepreneurs, Executives and Novice Managers**
Market Research	Expert entrepreneurs are less likely to believe and accept market research than novice managers or executives.
Prior Experience	Expert entrepreneurs are more likely to draw on experience in uncertainty than novice managers or executives.
Affordable Loss	Expert entrepreneurs worry more about project affordability than novice managers – executives are between the two.
Decision Framing	Expert entrepreneurs are more likely than novice managers to think holistically about the business – executives are between the two.
Decision Framing: Time	Expert entrepreneurs are more likely than novice managers to consider the long term with executives between them.
Market and Product	Expert entrepreneurs identify or create more new markets than novice managers with executives between them.
Price Strategy and Quantitative Price	Expert entrepreneurs and executives are more likely to price high (skim) to maximize cash; novice managers are more likely to price low (penetration) to drive adoption.
Channel: All Direct Sales	No difference in sales channel between expert entrepreneurs and novice managers; executives are more likely to choose direct.
Channel: Direct Sales	Expert entrepreneurs and executives are more likely to choose direct sales than novice managers, who are more likely to do it themselves.
Channel: Partnerships	Compared with novice managers, expert entrepreneurs co-create with distribution partners with executives between them.
Channel: Number of Segments	Expert entrepreneurs are less likely to pursue more unique segments than novice managers or executives.

Three studies have looked directly at the performance consequences of effectual heuristics. In a meta-analysis of proxies to effectual constructs extracted from prior literature, Read, Song and Smit (2009) draw positive correlations for the constructs of Means, Partnership and Contingency (Affordable Loss results were insignificant, though with data from only four studies) with new venture performance. In the context of angel investing, and using a scenario/survey instrument, Wiltbank, Read, Dew and Sarasvathy (2009) found effectual strategies were associated with a reduction in investment failures compared with causal strategies, and yet without any penalty in terms of success or positive returns for those angel investors employing effectuation. And using a survey instrument created expressly for the task, effectuation was also shown to have a positive connection with R&D project success in large organizations (Brettel, Mauer, Engelen and Küpper, 2011). Work has been undertaken specifically to

develop a measurement scale for effectuation (Chandler, DeTienne, McKelvie and Mumford, 2010), and several studies looking at new venture performance have interpreted findings relating opportunity discovery to effectuation (Corbett, 2007) and the use of affordable loss strategies to explain that founders may shy away from growth strategies because the risk is unacceptable (Steffens, Davidsson and Fitzsimmons, 2009). Recent empirical work has also begun to investigate the inner workings of effectuation. Fischer and Reuber (2011) used qualitative data combined with data collected from Twitter feeds to analyze the effect of social media on effectual interaction and generated new propositions about community and norms in interaction in the process of effectuation. And using a qualitative case study approach, Harmeling and Sarasvathy (2011) isolated the use of contingency in the narratives of six different entrepreneurs that each served a pubic need in areas from education to politics, showing in each case what alternative heroic and adaptive strategies might have looked like.

These various studies and their findings embody the effectual idea that self-selected stakeholders, each bringing together their own unique means and values, can combine them to construct an artifact that could not be predicted at the outset. They also indicate the enormous variety of open empirical questions and possibilities for future contributions, as outlined in section 4.

3.2. Theoretical

If the balance of existing empirical to theoretical work relating to effectuation is any indicator, the field of entrepreneurship is hungry for theoretical foundations upon which to develop and expand new theoretical understanding of new venture creation. Starting with the initial work that builds on Knightian uncertainty (Sarasvathy, 2001), the theoretical ties between effectuation and uncertainty have since been theoretically strengthened (examples: York and Venkatramen, 2010; Webb, Tihanyi, Ireland and Sirmon, 2009) as well as connections to ambiguity (Brinckman et al., 2010). On that base, theoretical development associated with effectuation can be mapped into at least five broad directions.

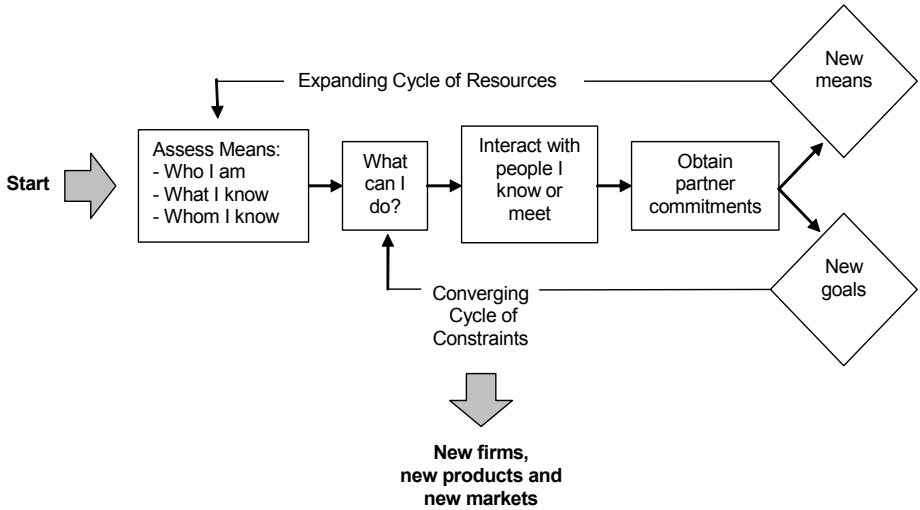
Action. The heuristics associated with effectuation are inherently action-oriented – centered around proactively interacting with and shaping the environment where the entrepreneur operates. That perspective has been developed and even articulates effectuation as a specific logic for entrepreneurial action (Dimov, 2011). The initial connections made to enactment (Weick, 1979) have also subsequently been strengthened (Dimov, 2007; Lichtenstein et al., 2006), laying the groundwork for theoretical development around environmental and opportunity creation, a topic we take up in a separate section. As it relates directly to action, however, effectuation has been cited as an explanation for why entrepreneurs pursue opportunities (McMullen and Shepherd, 2006) and as a basis for entrepreneurial goal emergence (McVea, 2009). Viewing action

economically, as a function of incentives, Pacheco Dean and Payne (2010) discuss how effectuation overcomes suboptimal incentives, posing effectuation as the basis of a supra-incentive to the entrepreneur to take action against new, competitive and sustainable opportunities.

Thinking/Cognition. But effectuation is not just about doing. It also represents a philosophy (Mitchell, Friga and Mitchell, 2005), a way of thinking (Bradley et al., 2011) about opportunities, that not only results in the observable implementation of the heuristics outlined in Table 1, but also changes the way entrepreneurs handle cognitive issues such as trust (Sarasvathy and Dew, 2008) and how they make sense of their environment (Nicolaou and Birley, 2003). As effectuation has been theorized to be a function of the development of expertise within the domain of entrepreneurship (Read and Sarasvathy, 2005), it is logical to make the connection with metacognition (Haynie and Shepherd, 2009; Haynie et al., 2010) because expertise has been shown (Ericsson, 2006) to fundamentally change the way that people store information and match patterns of existing problems with patterns from previously encountered problems to more quickly and successfully generate solutions. Returning to the foundation of Simon (1996), Mitchell, Busenitz, Lant, McDougall, Morse and Smith (2004), there are open questions about whether effectuation can be brought to bear to better describe the symbolic processing (SP) and or semantic processing (SC) in the cognition of entrepreneurs.

Specific Principles. Each of the individual heuristics laid out in Table 1 has also seen devoted theoretical development and connections. Working from the start of the process and the top of the list, the heuristic of beginning with means has been described to pragmatically "reflect simply what [entrepreneurs] can do at a particular point in time, given their knowledge and resources" (Dimov, 2011). A focus on means has been theoretically linked to new-firm survival (Wiklund et al., 2010) and to explaining how entrepreneurs deal with the environmental constraints associated with limited resources (Leung et al., 2006). Recent discussions around entrepreneurial risk (Endres and Woods, 2010; Cronin and Weingart, 2007) have adopted the possibility of an affordable loss heuristic. The affordable loss idea was theoretically developed in the context of the plunge decision (Dew, Sarasvathy, Read and Wiltbank, 2009) as one of many alternative heuristics that prospective entrepreneurs might utilize when considering entry into entrepreneurship. Specific to the effectual principle of partnerships, Chiasson and Saunders (2005) equate effectuation with relational views in their thought experiment around alternative decision-making paths available to Andy Groves at Intel Corporation. And contingency has been theoretically identified as a potential resource, or means (Harmeling and Sarasvathy, 2011), effectively describing work pertaining to each element of the effectual process diagrammed in Figure 1.

Figure 1: The Effectual Process (Sarasvathy and Dew 2005)



Academic Areas. Entrepreneurship is a cross-functional activity. Whether this is desirable in establishing entrepreneurship as a distinctive field of academic study (Shane and Venkataramen, 2000) is debatable, but the fact remains that in order to successfully create and operate a new venture, entrepreneurs must deal with finance, marketing, operations, strategy, organization and many other activities that are theoretically confined to the domains of individual academic departments.

We explicitly do not claim that effectuation can rationalize issues across business functions, and even more so across academic departments, but significant efforts have been made to explore the relevance of effectuation in many of the domains touched by the entrepreneur. In a detailed theory review paper, Wiltbank, Dew, Sarasvathy and Read (2006) positioned effectuation within the broad strategy literature, connecting effectuation with environments where predictability is low, but controllability is high. The empirical investigation of angel investing practices (Wiltbank, Read, Dew and Sarasvathy, 2009) connects effectuation with a branch of the entrepreneurial finance literature. Effectuation and innovation are closely tied, as both speak to the creation of new artifacts in the world, and initial links have been made to disruptive innovations (Dew, Sarasvathy, Read and Wiltbank, 2008) as well as the specific transformations of means employed by entrepreneurs using effectual heuristics (Dew, Sarasvathy, Read and Wiltbank, 2011). The empirical investigation of marketing under uncertainty (Read, Sarasvathy, Song, Dew and Wiltbank, 2009) also made strong theoretical connections to service dominant logic (Vargo and Lusch, 2004), a contemporary and highly co-creative view of marketing. Entrepreneurship has been termed "economics with imagination" by

Sarasvathy (2002) and the links to economics are developed in the presentation of the effectual process (Sarasvathy and Dew, 2005). Drawing on Cyert and March (1963), an effectual parallel to the behavioral theory of the firm has been articulated (Dew, Read, Sarasvathy and Wiltbank, 2008). Relating the organization to its environment, Pacheco, York, Dean, and Sarasvathy (2012) link effectuation with institutional entrepreneurship and bring innovation together with stakeholder issues. Dew and Sarasvathy (2007) also introduce effectuation to the ethical issues in entrepreneurship. More specifically, the effectual principle of contingency is introduced to the ethical discussion around stakeholders and values (Harmeling, Sarasvathy and Freeman, 2009). One idea specifically derived from the intersection of effectuation and socially oriented entrepreneurship is Sarasvathy's (2008) concept of markets in human hope – the idea that it should be possible to invest in, build businesses from and possibly even profit from social problems ranging from malnutrition to global warming.

Creation (Made vs. Found). In parallel to the work relating to effectuation already described in this section, another stream of research on the nature of opportunities has also blossomed. To the existing work on entrepreneurial opportunity alertness, search and discovery, Alvarez and Barney (2007) summarized a radical alternative – opportunities might also be created through the agency of the entrepreneur. This view is consistent with theoretical development in effectuation (Sarasvathy, Dew, Read and Wiltbank, 2008) regarding the process by which entrepreneurs design the environment. Since then, effectuation has been consistently connected with the opportunity creation perspective (Rindova, Barry and Ketchen, 2009; Song et al., 2010), describing effectuation as a subjectivist, agentic approach (Sarason et al., 2010) to the structuration of both the opportunity and the entrepreneur. Much of this thinking is summarized and advanced in a full-length book entitled, Made, as Well as Found: Researching Entrepreneurship as a Science of the Artificial (Sarasvathy, Venkataraman and Dew, 2012) which, among many other tasks, offers effectuation as one potential logic for "worldmaking."

3.3. Not

Much of the thinking outlined in the theoretical section remains open to empirical operationalization and testing, a process likely to generate more connections as well as questions. In addition to the questions which the current body of literature has generated, which are outlined in the next section, we have learned something else about effectuation as a result of reviewing the journey to date. We have learned some things that effectuation is not (Dew, Read, Sarasvathy & Wiltbank, 2011).

Table 3: Twelve Things Effectuation is Not (Dew, Read, Sarasvathy and Wiltbank, 2011)

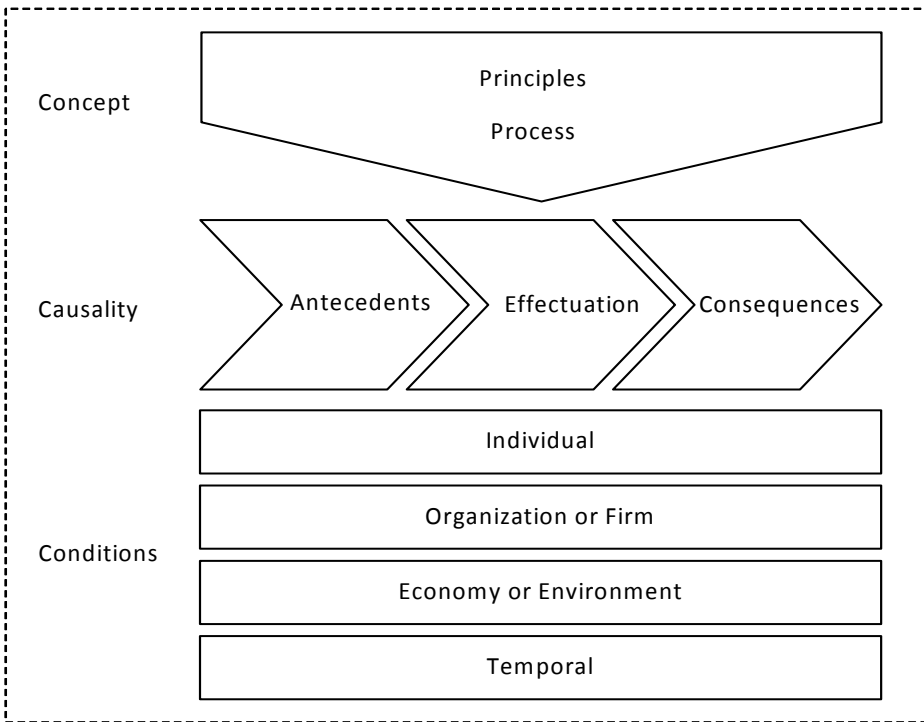
Effectuation is not…	**Explanation**
... irrational.	In decision-making under uncertainty, effectuation is both internally consistent and externally effective, making it a specific kind of procedural rationality (Simon, 1978).
... trial and error.	Intersubjectivity, constraints and commitment form the basis of proactive effectual action.
... adaptation.	The agency of the entrepreneur matters – she both responds to ***and*** creates the environment where she operates.
... not planning.	Business plans are pragmatic tools, employed by effectuators when useful to any aspect of venture creation.
... all or nothing.	Sarasvathy (2001) found 63% of her expert entrepreneur subjects used effectuation more than 75% of the time. But the remainder of the decisions were made using alternative logics, including causal (based on prediction or historical data) or Bayesian (based on trial-and-error).
... a contradiction with respect to control.	Stakeholder self-selection and commitment are amplifications and enhancements of control.
... just for small, start-up firms.	Brettel et al. (2011), Bleckman (2011) and Liedtka et al. (2010) empirically show effectuation to be effective in large organizations.
... a personality trait.	Effectuation may be correlated with certain traits, but it is primarily an artifact of the accumulation of expertise (Ericsson, 2006).
... a reflective construct.	Effectuation is a temporal-process cycle (Sarasvathy and Dew, 2005) where different principles are employed at different points in the cycle (see Figure 1).
... opportunity search.	The agency of the effectual entrepreneur is capable of creating opportunities (Alvarez and Barney, 2007) that hitherto did not exist.
... exploration.	
... about all entrepreneurs/ heuristics.	There are surely more expert entrepreneur heuristics that have not yet been accounted for, and more contingencies about the application of those heuristics. Work to be done.

It is important to note that our enumeration of the things that effectuation is not is neither complete nor is it a criticism of any existing work (except perhaps our own for not articulating ideas sufficiently clearly in the first place). Instead, it is intended to provide a dialectic that brings sharpness to the idea and encourages the most productive directions for future work. Well beyond the bounds of effectuation, or even entrepreneurship research, we encourage the application of the technique of describing what an idea is "not" to any active stream of research as the insights gained from asking what something is not can be as illuminating as those gained from asking what it is.

4. What We Need to Know

In imagining a roadmap to guide our effectuation journey, we anticipate encountering a number of bumps along the way. Consistent with effectuation, we regard these bumps as opportunities to improve our understanding of the idea. And rather than being discouraged by them, we let these bumps be the basis of new routes. Figure 2 serves as a signpost, indicating potential directions that would enhance our fundamental understanding of effectuation. Below we give examples of very specific researchable questions that would be useful to answer, and although spatial restrictions limit the number of examples we are able to give, we hope these will provide good fuel for the expedition.

Figure 2: Signposts for a Roadmap Ahead



4.1. Concept

The concept of effectuation has been studied at several different levels, with a large proportion of research conducted at the principle and at the process level. The fact that effectuation can be studied at different levels provides the opportunity to explore questions with respect to the nature of the concept of effectuation. One of the questions that come to mind is, at which unit of analysis

do we (generally) define or measure the concept of effectuation. Depending on the unit of analysis, future research might address how to quantify effectuation in terms of principles and process. For example: How many principles do we need to observe to ascertain one is following effectual logic? Should the measure be comparative to some other logic such as causation, or absolute, i.e. simply in terms of effectuation? More precisely: Is there an exact order of principles or number of iterations one has to undertake before we can speak of an effectual process? These questions highlight the need for a more specific and fine-grained description of what constitutes effectuation. Refining the concept of effectuation is an important part of the journey, since an unambiguous articulation will provide a solid basis on which future research can build. Upon this general question, we advance into specific questions around effectuation principles and the effectuation process.

Principles. At the principle level, we need to know more about what makes the individual principles unique to effectuation and how best to capture those unique qualities. In addition, looking closely at each of the individual principles, we see research opportunities abound. We highlight means and partnership here to provide examples of questions that could easily be translated toward affordable loss and contingency.

With respect to the first principle of starting with means (who I am, what I know, whom I know), there are several obvious directions that derive from the resource emphasis in the strategy literature (e.g. Wernerfelt, 1984). Is there anything that distinguishes a means from a resource? Given the heterogeneous nature of resources, how does an effectual entrepreneur decide between different uses of existing means, assuming that those in the consideration set already meet the affordable loss criteria? How do goals, even at a high level of specificity, influence the perceived value or use of an entrepreneur's means?

Moreover, a number of effectuation studies have used characteristics of causation to demonstrate the difference in logic with respect to the use and value of predictive skills. Can we view market information and predictive skills as means, even though both are squarely the result of causal thinking? And if so, what are the consequences for the concept of effectuation? The principle of partnership and the idea of the self-selected stakeholder commitment also offer opportunities for future research. Just understanding the interactive and intersubjective process of reaching an effectual partnership commitment is a research program (as opposed to a specific question) on its own. To provide an idea of the kinds of questions such a program might address, we start with: What makes partnership commitment effectual? This question leads us to the nature of obtaining partnership commitment, which depends on the decision-making logic of the entrepreneur as well as the partner(s) in question. How does the decision-making logic of a potential partner influence the outcome of the process? Once an individual obtains partnership commitments we can no longer view the effectual process from the individual point of view. In this respect, how do partner

means relate to the degree of constraints a partner can impose or the degree of control over the process?

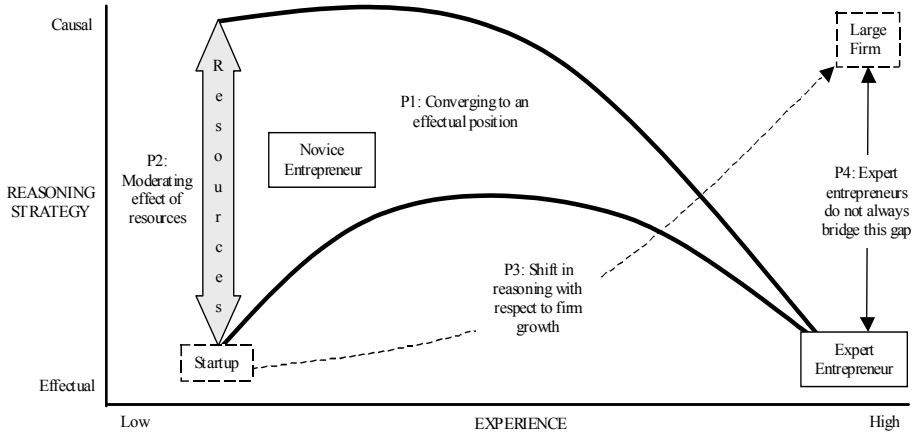
Process. The effectuation process (Figure 1) suggests a temporal ordering of the effectuation principles with feedback loops representing the iterative nature of the process. The expanding cycle of resources indicates how partner commitments expand the means available to the entrepreneur and shift the focus to starting with the new set of means. The converging cycle of constraints assumes that partners also exert a certain amount of control leading to converging constraints. These cycles give rise to questions with respect to the iterative nature of the process and the outcome. First, under what conditions would the process not result in a new product, firm or market? Could an expanding cycle of resources lead entrepreneurs to keep cycling by continuously reassessing means? Second, can a converging cycle of constraints create path dependencies that undermine the entrepreneur's ability to lever contingencies? And must the cycle always function in the theoretical order? What if it does not?

4.2. Causality

As with most phenomena under scientific investigation, antecedents and consequences provide promising directions for extending existing research.

Antecedents. The fact that the effectuation principles emerged from studying expert entrepreneurs does not necessarily mean that effectual principles are unique to expert entrepreneurs or that all expert entrepreneurs use effectuation. Indeed, Sarasvathy's (2001) exposition reported that over 63% of the expert entrepreneur subjects used effectuation more than 75% of the time. But what happens the rest of the time? Future research might address the questions of who uses effectual logic, when and why. Given that effectuation emerged from expert entrepreneurs, what is the role of the type of entrepreneurial experience (success or failure) in developing a preference for using effectual logic? Further, are there reasons why (expert) entrepreneurs would choose not to use effectuation? What are the conditions under which effectuation emerges or remains absent? Read and Sarasvathy (2005) developed a basic model to describe reasoning strategy with respect to the trajectories of accumulated experience and firm growth. This initial theoretical development offered a small number of propositions in this area (Figure 3) that six years later remain largely untested.

Figure 3: Propositions around Expertise, Resources and Effectuation (Read and Sarasvathy, 2005)



Specifically, the model presented in Figure 3 indicates novice entrepreneurs vary in their use of causal and effectual reasoning. Access to additional resources may encourage novices to select more causal strategies (P2), while in the case of expert entrepreneurs, resource availability will be less likely to discourage their use of effectual action. And while novices may differ in their use of causal and effectual action, their preferences for effectuation in the early stages of new ventures will increase, as they become experts (P1). Moreover, novices learn to balance causal and effectual approaches during the growth phase of new ventures, before developing a preference for effectual strategies as their expertise grows (P1). Successful firms are likely to stem from effectual startups that transitioned to a large corporation, indicating entrepreneurs need to shift to more causal reasoning as they grow their firm (P3); however, not all expert entrepreneurs make the transition (P4).

In addition, existing research suggests that effectuation could be present outside the area of entrepreneurship or business. This raises the questions when, where, why and how does effectual logic emerge outside the area of entrepreneurship. Investigating the emergence of effectuation outside an entrepreneurship or business context may well provide new insights to help establish what drives the differential presence of effectual logic among expert entrepreneurs.

Consequences. A range of important destinations are embodied in the various consequences of effectuation. In addition to new venture performance (initially addressed by Read, Song and Smit, 2009), the performance implications of effectuation might be isolated to specific principles. Consider affordable loss. Sarasvathy (2008) posits that, should entrepreneurial failure occur, the effectuator is likely to lose less in terms of investment than the entrepreneur who invests using causal logic, and this is supported in the case of angel investors (Wiltbank, Read, Dew and Sarasvathy, 2009). Thus logically, the effectual entrepreneur

survives to create more and more various opportunities. But is this empirically borne out? What does this mean for entrepreneur's decision to return to the driver's seat of the entrepreneurship vehicle after a failure? Although we acknowledge that studying entrepreneurial-firm failure comes with its own challenges, recent trends in panel datasets on entrepreneurial efforts provide opportunities to engage in such investigation. When interpreting performance implications in the context of effectuation, it is important to keep in mind that although the effectuator may lose less in the case of failure, she may not make adequate investments in time to exploit a really large or extremely fast-growing opportunity and, therefore, may lose out on some of the upside (Sarasvathy, 2008; Dew, Sarasvathy, Read and Wiltbank, 2009). In addition, the performance implications of effectuation are conditional on the environment and the actual state of the world, which we will discuss in more detail in the next section.

4.3. Conditions

Individual. Since the concept of effectuation involves individual decision-making, future research might consider the role of individual characteristics in explaining the use of effectuation. Are there motivational differences or individual conditions under which one deliberately chooses to follow an effectual logic or is forced to let the principles of effectuation guide one's decisions? How do individual characteristics, like the degree of risk-aversion or docility, relate to the use and effectiveness of effectual logic? Moreover, since individuals use effectuation and causation together, how do individual factors relate to choosing between the two?

Organization or Firm. Moving up one unit of analysis, we start with the obvious question of whether there is such thing as an effectual firm (and if so, what might it look like). Moving away from binary distinctions, it is likely the effectuator has to work with more causal minded people within the context of an organization, which raises the question: How can an effectual entrepreneur work with or in a causal environment? And if an effectuator works in a team, how can effectuation influence team dynamics? And could a team employ an optimal mix of causal and effectual logic? Moreover, if effectuation would be applied in a large or highly institutionalized organization, what factors might drive or hinder the use of effectuation?

Economy or Environment. The antecedents and consequences of effectuation depend on the environmental conditions under which the effectuator operates. Hence, the specific environmental context has implications for the effectiveness of effectuation; and exploring effectuation under different environmental conditions offers a vast number of research opportunities. Important aspects are both the realities and the perception of the exogenous uncertainty (Knight, 1921) in the environment as well as the endogenous shapeability of the environment.

Although research indicates effectuation is most efficient in uncertain environments, important questions remain: What are the consequences of using effectuation in relatively certain environments? And under what circumstances could an effectual approach be a bad idea or even create uncertainty? In addition, the direct environment in which the entrepreneur operates influences the effectiveness of effectuation. This raises questions like: How does environmental munificence – the amount of resources in the environment – influence the use and effectiveness of effectuation?

Temporal. Research has shown that at the individual level, entrepreneurs alternate between effectual and other logics when making decisions. Moreover, at the venture level, the reliance on effectual decision-making shifts with the growth of the venture and might make a place for more causal decision-making as the venture matures (Read and Sarasvathy, 2005) (see also proposition 3 and 4 in Figure 3). Hence, investigating the temporal dynamics of effectuation could make a promising avenue for future research. Questions of interest concern why and when entrepreneurs decide to switch between logics. When during the life cycle of a venture should the use of effectuation transition into a more causal approach? And considering the value of gathering information in a causal approach, what are the consequences of transitioning to a causal approach after having started with an effectual approach? Finally, future empirical research needs to account for time. How long should an entrepreneur effectuate? Does effectuation bring opportunities to market more quickly or more slowly than predictive approaches? And what happens to the trajectories of effectually created firms or markets over time?

4.4. Specifics of Empirical Test

In advancing our understanding of effectuation, as with all theoretical work in entrepreneurship, establishing a body of empirical work is essential in creating a coherent body of research to build on (Brush, Manolova and Edelman, 2008; Perry, Chandler and Markova 2012). With the large number of academic papers on effectuation (or referring to it) have come a wide variety of settings in which the term has been used. The introduction of expressions like effectual logic, -thinking, -decision making, -behavior, -action, -process, -approach, -strategy and -entrepreneurship, is a reflection of its widespread impact and the many opportunities to extend research on the topic. But it is also a reflection of the limited restrictions on its use. The above expressions are not univocal but involve different (situational and temporal) constructs; while this enables researching effectuation in many different settings, it does not facilitate the integration of existing findings. Without implying that one should confine the investigation of effectuation, we encourage researchers to apply more discipline by consistently adhering to an appropriate unit of analysis when researching or referring to

effectuation. We map out some of the specific variables in Table 4 in order to provide examples, knowing that the collection is nowhere near exhaustive.

Table 4: Inventory of Variables Relevant to Empirical Tests of Effectuation

	Unit of Analysis		
Variable	**Individual**	**Organization or Firm**	**Economy or Environment**
Control	Risk seeking Creativity Personality traits	Size Public/private Board composition	Necessity vs. Opportunity Incubator funds Infrastructure
Antecedent	Formal education Motivation	Technology Expertise Competition Entrepreneur CEO Age Location (culture) Family generation Industry Public/private	Per capita income GINI index Education level Health care Corruption
Effectuation	Means Can/should Contingency Control Affordable Loss Partnerships	Market based Autonomy Rewards Psych safety Hierarchy Business model change	Regulation Free cash (-) Stock markets (-) Freedom to create new ends Failure attitude Hofsteade
Consequences	Self-satisfaction Repeat ventures Freedom Self-efficacy Heuristics Dignity	Performance Survival Sales growth Employees Innovation/ness Stakeholders New products Invested capital Hit rates Failures ROA, ROI, …	Social impact Starts New businesses New markets Economic growth Variety Attractiveness

In addition, to enhance our understanding of effectuation, more needs to be developed regarding what exists beyond effectuation (for example, when considering decision-making logics, effectuation and causation do anything but exhaust the total set) and what drives the differential use and what are the differential consequences of effectuation. Extending effectuation research by including what exists beyond effectuation (or what effectuation is not, as described earlier) rebalances the empirical investigation with respect to only

direct testing of effectuation. By means of indirect testing or building more complete models, we can improve our understanding of the concept, improve current operationalizations and attribute performance implications more directly to effectuation. Moreover, indirect testing allows research on effectuation to move to a higher (scientific) level by attempting to position it within a larger framework capable of accounting for the differential use of effectuation.

5. Implications

Looking toward possible horizons of this journey, we push onward in the two directions of practical understanding of entrepreneurship and strong and relevant theoretical development.

From a practical perspective, we have yet to discuss the teaching and the learning of effectuation. From that starting point, the question of whether effectuation can be taught is still empirically open. Even if we do assume that it can be taught and learned, the next question to ask would be: What are the mechanisms by which (aspiring) entrepreneurs can most effectively learn effectual logic other than gaining it by entrepreneurial expertise? Are traditional teaching approaches, including a textbook (Read, Sarasvathy, Dew, Wiltbank, and Ohlsson, 2011), appropriate for a model that places such a premium on action? And given the current emphasis on prediction-oriented management education, if effectual logic can be taught, how would this interact with already established knowledge and practices around, for example, the business plan? Given the importance of using more predictive approaches under certain circumstances (depending on, for example, the nature of uncertainty in the environment or the development stage of the venture), how can (aspiring) entrepreneurs learn to decide on which approach to use? These questions open broad possibilities to reconceptualize aspects of entrepreneurship education around the actual doing of entrepreneurship. Many small early voyages in this direction have already been undertaken, with instructors challenging aspiring entrepreneurs to create revenue from nothing in a brief fixed period of time, see what can be bartered with the starting point of a common object such as a pen, and even managing an existing investment fund and portfolio that actively searches for firms that are run effectually. Again, these initiatives are as unique as the instructors that lead them, but at some point, these effectual approaches to teaching effectuation will likely be measured and reproduced into more causal teaching plans and replicated, shadowing the effectual and causal trajectories of new firms, products and markets.

The issue of market creation and trajectories directs our closing theoretical implication. Kenneth Arrow (1974) offered the idea that markets may perform more functions than clearing supply and demand at a given price equilibria by suggesting that “although we are not usually explicit about it, we really postulate

that when a market could be created, it would be." Expanding on that idea, Olson and Kahkonen (2000) add that "The fourth primitive of economic thought – and of most lay thinking on economics – is so elemental and natural that it is usually not even stated explicitly or introduced as an axiom in formal theorizing. It is the half-conscious assumption that markets are natural entities that emerge spontaneously, not artificial contrivances or creatures of governments." But Olson and Kahkonen (2000) point out that the distinction is not binary. In their view, markets do not result strictly from demand or supply, but rather from an organic exchange initiated by either side. Buchanan and Vanberg (1991) elaborate on this concept, arguing for the usefulness of a perceptual construct of the market as a creative process is an important direction also on a theoretical vein. Conceptualizing a market in a view consistent with effectuation, as a mechanism that a) can do more than deliver supply to existing demand, and b) can be intersubjectively created by agentic stakeholders, offers the possibility that individuals create market artifacts to drive everything from social change to new academic research. This theoretical direction offers a novel theoretical route to economists, entrepreneurship researchers, instructors, policymakers and entrepreneurs, encouraging them to use what they have to make their own indelible and unpredictable marks on the map.

6. Conclusion

At the start of this paper, we promised a roadmap through the extant body of effectuation (related) work as well as suggestions for future directions. We touched on some key theoretical and empirical landmarks in effectuation research and their implications for our practical understanding of entrepreneurship and theoretical development.

In addition, we have done our best to identify gaps in the literature and point to opportunities for future work related to effectuation. As a starting point of future journeys, we provided a signpost for a roadmap ahead, indicating potential directions that would add to our fundamental understanding of effectuation. Nonetheless, we hope that our directions will not constrain but rather encourage the creation of future maps that we have yet to imagine, recognizing that the best maps are those that one will draw oneself. Maps that may conceive of entrepreneurship more generally – as a vehicle for creating new things in the world. Some of those new things may bestow fabulous wealth. Others may give their creators freedom, personal security and a life with dignity. Still others may enable their creators to enact the changes they wanted to see in the world around them. But likely, those maps will be derived from their own means, from interactions that they have with self-selected stakeholders, maps that meet their own personal risk profile, and that contain an element of surprise.

References:

Alvarez, S. and Barney, J. 2007. Discovery and creation: alternative theories of entrepreneurial action. *Strategic Entrepreneurship Journal*, 1: 11–26.

Arrow, K.J. 1974. "Limited Knowledge and Economic Analysis." *The American Economic Review*, 64(1), 1-10.

Blekman, T. 2011. *Corporate Effectuation: What managers should learn from entrepreneurs*. S. D. U. Uitgeverij, 224 pages.

Bradley, S., Wiklund, J. and Shepherd, D. 2011. "Swinging a Double-Edged Sword: The Effect of Slack on Entrepreneurial Management and Growth." *Journal of Business Venturing*, 26, 537-554.

Brettel, M., Mauer, R., Engelen, A. and Kuepper, D. 2011. "Corporate Effectuation: Entrepreneurial Action and its Impact on R&D Project Performance." *Journal of Business Venturing,* in press.

Brinckmann, J., Grichnik, D. and Kapsa, D. 2010. "Should Entrepreneurs Plan or Just Storm The Castle? A Meta-Analysis on Contextual Factors Impacting the Business Planning–Performance Relationship in Small Firms." *Journal of Business Venturing*, 25, 24-40.

Brush, C., Manolova, T. and Edelman, L. 2008. "Properties of Emerging Organizations: An Empirical Test." *Journal of Business Venturing*, 23, 547-566.

Buchanan, J.M. and Vanberg, V.J. 1991. "The Market as a Creative Process." *Economics and Philosophy*, 7, 167-186.

Chandler, G. N., D. R. DeTienne, A. McKelvie, T.V. Mumford. 2011 Causation and effectuation processes: A validation study. *Journal of Business Venturing*, 26:3, 375-390.

Chiasson, M. and Saunders, C. 2005. "Reconciling Diverse Approaches to Opportunity Research Using the Structuration Theory." *Journal of Business Venturing,* 20, 747-767.

Corbett, A. 2007. "Learning Asymmetries and the Discovery of Entrepreneurial Opportunities." *Journal of Business Venturing*, 22, 97-118.

Cronin, M. and Weingart, L. 2007. "Representational Gaps, Information Processing, and Conflict in Functionally Diverse Teams." *The Academy of Management Review*, 32, 761-773.

Cyert, R.M. and March, J G. 1963. *A Behavioral Theory of the Firm*. Englewood Cliffs, NJ: Prentice-Hall.

Dew, N. and Sarasvathy, S.D. 2007. "Innovations, Stakeholders and Entrepreneurship." *Journal of Business Ethics*, 74(3), 267-283.

Dew, N., Sarasvathy, S.D., Read, S. and Wiltbank, R. 2008. "Immortal Firms in Mortal Markets: An Entrepreneurial Perspective on the Innovator's Dilemma." *European Journal of Innovation Management*, 11(3), 313 (won Emerald Literati Award).

Dew, N., Read, S., Sarasvathy, S.D. and Wiltbank, R. 2008. "Outlines of a Behavioral Theory of the Entrepreneurial Firm." *Journal of Economic Behavior & Organization*, 66(1), 37.

Dew, N., Read, S., Sarasvathy, S.D. and Wiltbank, R. 2009. "Effectual Versus Predictive Logics in Entrepreneurial Decision-Making: Differences between Experts and Novices." *Journal of Business Venturing*, 24(4), 287.

Dew, N., Read, S., Sarasvathy, S.D. and Wiltbank, R. 2011. "What Effectuation is Not." Working paper, accessed from www.effectuation.org.

Dew, N., Sarasvathy, S.D., Read, S. and Wiltbank, R. 2009 "Affordable Loss: Behavioral Economic Aspects of the Plunge Decision." *Strategic Entrepreneurship Journal*, 3(2), 105-126.

Dew, N., Sarasvathy, S.D., Read, S. and Wiltbank, R. 2011. "On the Entrepreneurial Genesis of New Markets: Effectual Transformations versus Causal Search and Selection." *Journal of Evolutionary Economics*, 21(2), 231-253.

Dimov, D. 2007. "Beyond the Single-Person, Single-Insight Attribution in Understanding Entrepreneurial Opportunities." *Entrepreneurship Theory and Practice*, 31, 713-731.

Dimov, D. 2011. "Grappling with the Unbearable Elusiveness of Entrepreneurial Opportunities." *Entrepreneurship Theory and Practice*, Special Issue: Future of Entrepreneurship, 35, 57-81.

Endres, A. and Woods, C. 2010. "Schumpeter's 'Conduct Model of the Dynamic Entrepreneur': Scope and Distinctiveness." *Journal of Evolutionary Economic*, 20(4), 583-607.

Ericsson, K. Anders (2006), "The Influence of Experience and Deliberate Practice on the Development of Superior Expert Performance," in *The Cambridge Handbook of Expertise and*

Expert Performance, Ericsson, K. Anders, Neil Charness, Paul Feltovich and Robert Hoffman (Eds.), 683-703.
Ericsson, K. Anders and Simon, H.A. 1993. *Protocol Analysis: Verbal Reports as Data*. Cambridge, MA: MIT Press.
Ericsson, K. Anders and Simon, H.A. 1980. "Verbal Reports as Data." *Psychological Review*, 87, 215-251.
Fischer, E. and Reuber, A.R. 2011. "Social Interaction via New Social Media: (How) Can Interactions on Twitter Affect Effectual Thinking and Behavior?" *Journal of Business Venturing*, 26(1), 1-18.
Harmeling, S.S. and Sarasvathy, S.D. 2011. "When Contingency is a Resource: Educating Entrepreneurs in the Balkans, the Bronx, and Beyond." *Entrepreneurship Theory and Practice*, In press.
Harmeling, S., Sarasvathy, S.D. and Freeman, R.E. 2009. "Related Debates in Ethics and Entrepreneurship: Values, Opportunities and Contingency." *Journal of Business Ethics*, 84(3), 341-365.
Haynie, J.M., Shepherd, D., Mosakowski, E, and Earley, P.C. 2010. "A Situated Metacognitive Model of the Entrepreneurial Mindset." *Journal of Business Venturing*, 25(2), 217-229.
Haynie, M. and Shepherd, D. 2009. "A Measure of Adaptive Cognition for Entrepreneurship Research." *Entrepreneurship Theory and Practice*, 33, 695-714.
Knight, F. H. (1921), Risk, uncertainty and profit. Boston, New York: Houghton Mifflin Company.
Liedtka, J., Rosen, R. and Wiltbank, R. 2009. *The Catalyst: How You Can Become an Extraordinary Growth Leader*. Crown Business, 272 pages.
Leung, A., Zhang, J., Wong, P. and Foo, M. 2006. "The Use of Networks in Human Resource Acquisition for Entrepreneurial Firms: Multiple 'Fit' Considerations." *Journal of Business Venturing*, 21, 664-686.
Lichtenstein, B., Dooley, K. and Lumpkin, G. 2006. "Measuring Emergence in the Dynamics of New Venture Creation." *Journal of Business Venturing*, 21, 153-175.
March, James G. 1982. "The Technology of Foolishness." In James G. and J.P. Olsen March (Eds.). 1982. *Ambiguity and Choice in Organizations*, Bergen, Norway: Universitetsforlaget.
McMullen, J.S. and Shepherd, D.A. 2006. "Entrepreneurial Action and the Role of Uncertainty in the Theory of the Entrepreneur." *Academy of Management Review*, 31(1), 132-152.
McVea, J. 2009. "A Field Study of Entrepreneurial Decision-Making and Moral Imagination." *Journal of Business Venturing*, 24, 491-504.
Mitchell, J., Friga, P. and Mitchell, R. 2005. "Untangling the Intuition Mess: Intuition as a Construct in Entrepreneurship Research." *Entrepreneurship Theory and Practice*, 29, 653-679.
Mitchell, R.K., Busenitz, L., Lant, T., McDougall, P.P., Morse, E.A. and Smith, J.B. 2004. "The Distinctive and Inclusive Domain of Entrepreneurial Cognition Research." *Entrepreneurship Theory and Practice*, 28(6), 505-518.
Nicolaou, N. and Birley, S. 2003. "Academic Networks in a Trichotomous Categorisation of University Spinouts." *Journal of Business Venturing*, 18, 333-359.
Olson, M. and Kahkonen, S. 2000. *A Not-So-Dismal Science: A Broader View of Economies and Societies*. Oxford; New York: Oxford University Press.
Pacheco, D., Dean, T. and Payne, D. 2010. "Escaping The Green Prison: Entrepreneurship and the Creation of Opportunities for Sustainable Development." *Journal of Business Venturing*, 25, 464-480.
Pacheco, D.F., York, J.G., Dean, T.J. and Sarasvathy, S.D. Forthcoming 2012. "The Co-evolution of Institutional Entrepreneurship: A Tale of Two Theories." *Journal of Management*.
Perry, J. T., Chadler, G. N., and Markova, G. 2012. "Entrepreneurial Effectuation: A Review and Suggestions for Future Research." *Entrepreneurial Theory and Practice*, 36(4), 837-861.
Read, S. and Sarasvathy, S.D. 2005. "Knowing What To Do and Doing What You Know: Entrepreneurship as a Form of Expertise." *The Journal of Private Equity*, 9(1), 45.
Read, S., Song, Michael and Smit, W. 2009. A Meta-analytic Review of Effectuation and Venture Performance." *Journal of Business Venturing*, 24(6), 573.
Read, S., Sarasvathy, S.D., Song, M., Dew, N. and Wiltbank, R. 2009. "Marketing Under Uncertainty: A Knock on the Door." *Journal of Marketing*, 73(3), 1 (lead article).
Read, S., Sarasvathy, S.D., Dew, N., Wiltbank, R. and Ohlsson, A.V. 2011. *Effectual Entrepreneurship*, Abingdon, NY: Routledge.

Rindova, V., Barry, D. and Ketchen, D. 2009. "Introduction to Special Topic Forum Multilevel Theory.*" The Academy of Management Review AMR*, 34, 477-491.

Sarason, Y., Dillard, J. and Dean, T. 2010. "How Can We Know the Dancer from the Dance?: Reply to 'Entrepreneurship as the Structuration of Individual and Opportunity: A Response Using a Critical Realist Perspective.'" *Journal of Business Venturing*, 25, 238-243.

Sarasvathy, S.D. 2001. "Causation and Effectuation: Toward a Theoretical Shift from Economic Inevitability to Entrepreneurial Contingency, Academy of Management Review." 26(2), 243-288.

Sarasvathy, S.D. 2002. "Entrepreneurship as Economics with Imagination." *Business Ethics Quarterly* (The Ruffin Series #3 on Entrepreneurship and Business Ethics), 95-112.

Sarasvathy, S.D. 2008. *Effectuation: Elements of Entrepreneurial Expertise*. Edward Elgar, New Horizons in Entrepreneurship Series.

Sarasvathy, S.D. and Dew N. 2005. "New Market Creation as Transformation." *Journal of Evolutionary Economics* 15(5), 533-565.

Sarasvathy, S.D. and Dew, N. 2008. "Effectuation and Over-Trust: Debating Goel and Karri." *Entrepreneurship Theory and Practice*, 32(4), 727-737.

Sarasvathy, S.D., Dew, N., Read, S. and Wiltbank, R. 2008. Designing Organizations that Design Environments: Lessons from Entrepreneurial Expertise, *Organization Studies*, 29(3), 331.

Sarasvathy, S.D., Venkataraman, S. and Dew, N. Forthcoming 2012. *Made, as Well as Found: Researching Entrepreneurship as a Science of the Artificial.* Yale University Press.

Shane, S. and Venkataraman, S. (2000) The Promise of Entrepreneurship as a Field of Research. *The Academy of Management Review*. 25(1), 217-226.

Simon, H. A. 1978 Rationality as Process and as Product of Thought. *The American Economic Review*, 68(2) Papers and Proceedings of the Ninetieth Annual Meeting of the American Economic Association, 1-16.

Simon, H. A. 1996. The *Sciences of the Artificial.* MIT Press.

Song, M., Wang, T. and Parry, M. 2010. "Do Market Information Processes Improve New Venture Performance?" *Journal of Business Venturing*, 25, 556-568.

Steffens, P., Davidsson, P. and Fitzsimmons, J. 2009. "Performance Configurations over Time: Implications for Growth- and Profit-Oriented Strategies." *Entrepreneurship Theory & Practice*, 33(1) 125-148.

Vargo, S. and Lusch, R. 2004. "Evolving to a New Dominant Logic for Marketing." *Journal of Marketing*, 68(1), 1-17.

Webb, J., Tihanyi, L., Ireland, D. and Sirmon, D. 2009. "You Say Illegal, I Say Legitimate: Entrepreneurship in the Informal Economy." *The Academy of Management Review*, 34, 492-510.

Wernerfelt, B. 1984. A Resource-Based View of the Firm, *Strategic Management Journal*, 5(2) 171-180.

Weick, Karl E. 1979. *The Social Psychology of Organizing* (2nd ed.). Reading, MA: Addison-Wesley.

Wiklund, J. Baker, T. and Shepherd, D. 2010. "The Age-Effect of Financial Indicators as Buffers against the Liability of Newness." *Journal of Business Venturing*, 25, 423-437.

Wiltbank, R., Dew, N., Sarasvathy, S.D. and Read, S. 2006. "What to Do Next? The Case for Non-Predictive Strategy." *Strategic Management Journal*, 27(10), 16.

Wiltbank, R., Read, S., Dew, N. and Sarasvathy, S.D. 2009. "Prediction and Control under Uncertainty: Strategy in Angel Investing." *Journal of Business Venturing*, 24(2), 116.

York, J. and Venkataraman, S. 2010. "The Entrepreneur–Environment Nexus: Uncertainty, Innovation, and Allocation." *Journal of Business Venturing*, 25, 449-463.