

# Entrepreneurial logics for a technology of foolishness

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## Abstract

Several years ago Professor March pointed out that rational choice involves two guesses, a guess about uncertain future consequences and a guess about uncertain future preferences, and called for the development of a technology of foolishness to complement the technologies of intelligence that have been developed to improve the first guess. In this essay we use empirical data from two separate studies of entrepreneurial expertise, one involving the creation of new ventures and the other the birth of a new industry to identify three logics that constitute working elements of a technology of foolishness: (1) the logic of identity, as opposed to the logic of preferences; (2) the logic of action, as opposed to the logic of belief; and (3) the logic of commitment, as opposed to the logic of transaction.

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Uncertainty about future consequences and human limitations in dealing with them are relatively easily seen as intrinsic in the decision situation and nature of the human organism. It is much harder to see in what way ambiguous preferences are a necessary property of human behavior. It seems meaningful in ordinary terms to assert that human decisionmakers are driven to techniques of limited rationality by the exigencies of the situation in which they find themselves. But what drives them to ambiguous and changing goals? Part of the answer is directly analogous to the formulations of limited rationality. Limitations of memory organization and

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retrieval and of information capacity affect information processing about preferences just as they affect information processing about consequences (March & Simon, 1958; Cyert & March, 1963; Simon, 1973; March & Romelaer, 1976). Human beings have unstable inconsistent, incompletely evoked, and imprecise goals at least in part because human abilities limit preference orderliness. If it were possible to be different at reasonable cost, we probably would want to be.

But viewing ambiguity as a necessary cost imposed by the information processing attributes of individuals fails to capture the extent to which similar styles in preferences would be sensible, even if the human organism were a more powerful computational system. We probably need to ask the more general question: Why might a person or institution intelligently choose to have ambiguous tastes? The answer, I believe, lies in several things, some related to ideas of bounded rationality, others more familiar to human understanding as it is portrayed in literature and philosophy than to our theories of choice (March, 1978, p. 598).

## 1. Introduction

This essay is directly inspired by Professor March's written work and conversations with him. It is also empirically grounded in two separate studies of entrepreneurial expertise, one involving the creation of new ventures (Sarasvathy, 1998) and the other the birth of a new market (Dew, 2003). Entrepreneurs emerge as Simonian decisionmakers (i.e., they are boundedly rational and docile) who living in a Marchian world of goal ambiguity where predictive knowledge and even learning are usually *not* harbingers of positive outcomes. In such a universe, choices are engineered through a technology of foolishness to produce valuable surprises embodied in novel organizations and new markets.

In his paper "Bounded rationality, ambiguity, and the engineering of choice" March wrote: *Rational choice involves two guesses, a guess about uncertain future consequences and a guess about uncertain future preferences* (1978, p. 587). He then pointed out that while the former had been studied extensively and resulted in the development of a technology of intelligence, the latter might require the development of a technology of foolishness, a task not yet undertaken seriously by scholars of human decision-making. We are not quite sure why this is so, but we suspect one reason could be that most decisionmakers are studied in settings such as corporations, where they have a strong incentive *not* to use technologies of foolishness, or at least to *appear* to be using well-worn tools of intelligence. As scholars of entrepreneurship, however, we were more fortunate. Entrepreneurial expertise offers us, as the Galapagos Archipelago did for Darwin, an exceptional setting for understanding how human beings act in the face of mounting uncertainties and lurking ambiguities. Our aim in this paper is to put some legs under March's evocative conceptualization of the technology of foolishness, and maybe even to bring to the table a whiff of its relationship to literature and philosophy.

Our empirical investigations of entrepreneurial expertise in the creation of new firms and markets suggest that entrepreneurs are as likely to be drawn from, and driven by, poets and philosophers as any other group of human beings. Be it a potter partnering with a philosopher in the 18th century to create one of the longest enduring brands (Wedgwood Pottery), or a group of yuppies inspired by Moby Dick founding one of the most successful brands of the twentieth century (Starbucks), entrepreneurs routinely straddle economic

and so-called “non-economic” spheres in creating new products and services, and new markets for them. Generally speaking it could be argued that before there are *products*, there is human imagination; and before there is a *market*, there are human aspirations. Successful entrepreneurs have long been creating firms, industries and even economies by matching up the offspring of human imagination with human aspirations.

Yet, a detailed look at the way entrepreneurs actually arrive at these new products and markets shows that they often act without clear goals and without assumptions of unambiguous preferences in the stakeholders they interact with. In fact, we will argue that the existence of ambiguous and even conflicting preferences is necessary for the successful creation of entrepreneurial novelty. And the entrepreneurial process often embodies a technology for dealing with this second guess of rational choice, demystifying it and making it more tractable in the spirit of engineering so favored by March (1978, p. 602):

Choice theorists have often discussed complications in the usual abstract representation of tastes. But those concerns have had little impact on ideas about the engineering of choice, perhaps because they pose the problems at a level of philosophic complexity that is remote from decision engineering. Thus, although I think the challenges that ambiguity makes to our models of choice are rather fundamental, my engineering instincts are to sacrifice purity to secure tractability. I suspect we should ask the engineers of choice not initially to reconstruct a philosophy of tastes but to reexamine, within a familiar framework, some presumptions of our craft, and to try to make the use of ambiguity somewhat less of a mystery, somewhat more of a technology.

In particular, our data shows that a technology of foolishness operates through at least three logics employed by entrepreneurs in the production of new value. The three logics are: (1) the logic of identity, as opposed to the logic of preferences; (2) the logic of action, as opposed to the logic of belief; and (3) the logic of commitment (focusing on stakeholders and value-creation), as opposed to the logic of transaction (focusing on resources and value-distribution). Each logic suggests complementary decision criteria that use identity (who you are), knowledge (what you know), and networks (whom you know) in unusual ways, providing *alternatives* to strong predictions of, or strong preferences for, particular consequences. In the following pages, we will describe these three logics that we have labeled *effectual*, and contrast them with more familiar *causal* logics that have served us well as decision criteria in fabricating technologies of intelligence. We hope to show that when these alternative logics drive actions in an entrepreneurial setting, there is no need to “reconstruct a philosophy of tastes” (see the quotation above) nor, indeed, to take them as mysterious exogenous *given* in our theorizing. What emerges is a process of partial construction of preferences that is *embodied* in the very origins of economic artifacts.

## 2. Brief description of empirical findings

The three logics we present below draw upon empirical findings from two separate investigations into the entrepreneurial process. The first (Sarasvathy, 1998) consists of a protocol analysis of expert entrepreneurs that resulted in a cognitive model for transforming an idea into a new firm in a new market. The second (Dew, 2003) brings together historical data with contemporary interviews of key players in the emergence of a new market in the radio frequency identity (RFID) industry. We provide brief descriptions

of each study below and outline key findings that we will later use to develop the alternative logics underpinning a technology of foolishness.

### 2.1. *Sarasvathy (1998): effectuation, a baseline model of entrepreneurial expertise*

In line with classic studies of expert cognition, this first study used think-aloud verbal protocols (Ericsson & Simon, 1993) to extract a baseline model of entrepreneurial expertise. The 27 subjects in the study consisted of founders of companies ranging in size from \$200 million to \$6.5 billion from a variety of industries ranging from retail and services to information and bio-technologies. All 27 continuously thought aloud as they worked their way through exactly the same 17-page problem set consisting of 10 typical decisions required to transform an idea into a new firm in a new market. Protocol analyses of the transcriptions converged into a model of decision-making that is now called *effectuation*, signifying the inverse of causation. While causal models begin with pre-determined goals to be attained or effects to be created, and seek to generate and select between alternatives to achieve those ends, effectual models are primarily means-driven (i.e. only loosely tethered to goals) and seek to generate new effects to be created and to select between them.

In terms of creating a new firm in a new market, Fig. 1 contrasts the processes of causation and effectuation and Table 1 delineates the two in terms of decision criteria. Effectuation focuses on what *can* be done, given existing means rather than what *ought* to be done, given existing goals. In this sense, it is inherently dynamic, interactive, and pluralistic. And in the final analysis, effectual reasoning emphasizes non-teleological, non-predictive, and non-adaptive decision criteria. For example, effectuators use the affordable loss principle rather than expected return in making financial choices; they prefer partnerships and pre-commitments from stakeholders to competitive analyses; and they open themselves to surprises rather than seek to avoid them. See Sarasvathy (2001a, b) for more detailed expositions of the theory of effectuation.

### 2.2. *Dew (2003): dynamics of effectuation and the creation of new markets*

This study illustrated how networks have a temporal architecture, in this case emerging from an initial garbage can (Cohen, March, & Olsen, 1972) of actors and growing through a series of stakeholder commitments (see Fig. 2). It looked into the dynamics of the effectual process and demonstrated how a small group of effectuators wove together a new stakeholder network that propelled the origin and evolution of a new organization and new market. Fig. 2 graphically depicts this process and will be discussed in greater detail later in the present paper. The study traced back through historical analysis four threads of technological and demand-side innovations that began in 1945 and culminated in the birth of the RFID industry.

RFID tags are wireless barcodes. One of the seminal pieces of the technology was invented by David Brock, a roboticist who imagined every object being embedded with an RFID tag carrying a unique identification number. Just as we browse the Internet by clicking on hypertext links, Brock imagined robots “browsing” a room full of objects by using their RFID reader to “click” on tagged objects, and going to a webpage to “see” information about the object, i.e., what it is, how to pick it up, etc. From this idea, an infrastructure for objects to communicate with other objects developed into a new market

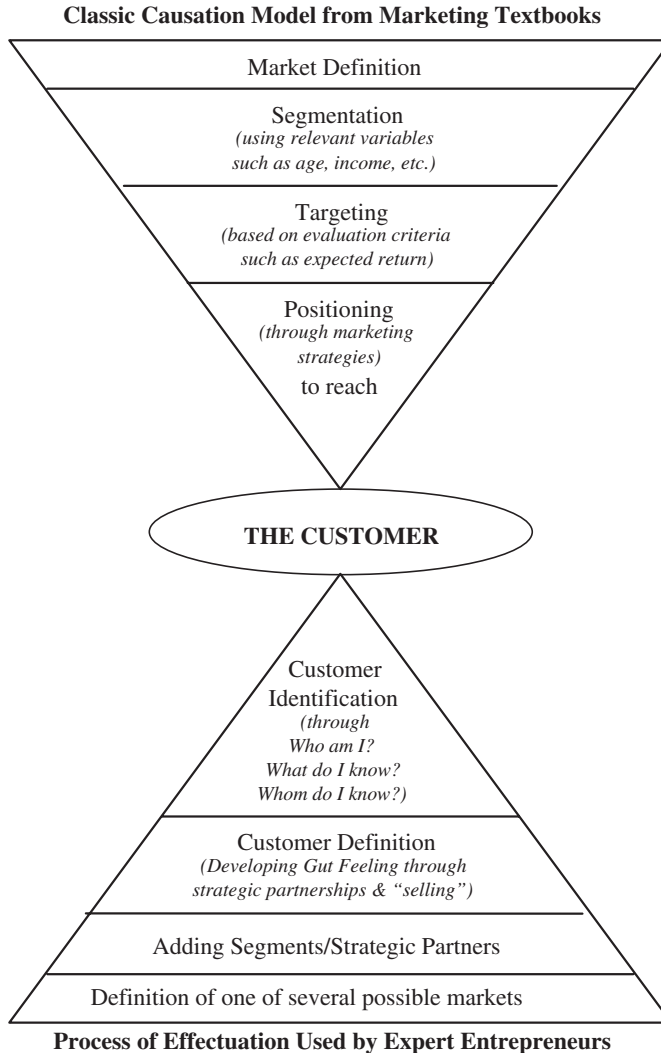


Fig. 1. Contrasting causation with effectuation in the creation of a new market.

in the RFID industry, something that the protagonists began to refer to as *The Internet of Things*.

One of the earliest protagonists in the RFID drama was Kevin Ashton, a brand manager at Procter and Gamble who wanted to find a way of ensuring the availability of lipsticks in retail stores that kept up with real-time changes in demand. Through a mere contingency (a friend could not make it to the seminar because of a double-booked schedule and Ashton happened to have some free time on his hands), Ashton met one of Brock's colleagues. And so a strange network of lipsticks salesmen and roboticists began. The network provided a means for agents to lick their partially formed preferences into shape, as they engaged in a joint exploration of how RFID technology might be developed and

Table 1  
 Contrasting effectual against causal reasoning

Issue	Causal position	Effectual position
View of the future	<i>Prediction.</i> The future is a continuation of the past; can be acceptably predicted	<i>Design.</i> The future is contingent on actions by willful agents
<i>Constructs pertaining to individual decisions</i>		
Givens	<i>Goals</i> are given	<i>Means</i> (Who I am, what I know, and whom I know) are given
Decision agenda	<i>Resources.</i> What resources ought I to accumulate to achieve these goals?	<i>Effects.</i> What effects can I create with the means I have?
Basis for taking action	<i>Desired worlds.</i> Vision of a desired world determines goals; goals determine sub-goals, commitments, and actions	<i>Possible worlds.</i> Means and stakeholder commitments determine possible sub-goals—goals emerge through aggregation of sub-goals
Basis for commitment	<i>Should.</i> Do what you ought to do—based on analysis and maximization	<i>Can.</i> Do what you are able to do—based on imagination and satisficing
Stakeholder acquisition	<i>Instrumental view of stakeholders.</i> Project objectives determine who comes on board	<i>Instrumental view of objectives.</i> Who comes on board determines project objectives
<i>Constructs in terms of responses to the environment</i>		
Predisposition toward risk	<i>Expected return.</i> Calculate upside potential and pursue (risk adjusted) best opportunity	<i>Affordable loss.</i> Calculate downside potential and risk no more than you can afford to lose
Predisposition toward contingencies	<i>Avoid.</i> Surprises may be unpleasant. So invest in techniques to avoid or neutralize them.	<i>Leverage.</i> Surprises can be positive. So invest in techniques that are open to them and leverage them into new opportunities.
Attitude toward success/failure	<i>Outcomes.</i> Success and failure are discrete outcomes to be sought after or avoided, respectively	<i>Process.</i> Successes and failures are inputs into a process that needs to be managed such that failures are outlived and successes are accumulated
Attitude toward probability estimates	<i>Update beliefs.</i> Estimates are used in a Bayesian fashion—to update ones beliefs about the future.	<i>Manipulate conditionals.</i> Estimates signal which conditionals may be reified or falsified so the future can be skewed through action.
Attitude toward others	<i>Competition.</i> Constrain task relationships with customers and suppliers to what is necessary	<i>Partnership.</i> Build YOUR market together with customers, suppliers and even prospective competitors
Underlying logic	To the extent we can predict the future, we can control it	To the extent we can control the future, we do not need to predict it

commercially applied; the network also became the engine driving the collective mobilization of resources in what has become known as the EPC (electronic product code) movement. Both historical data and interviews with key players in the creation of this industry show that ambiguity played a different role than the one traditionally portrayed in economic theory. Instead of being a problem to be overcome in order to produce a market, ambiguity allowed a variety of stakeholders to come together in a variety of ways. Had these entrepreneurs been surer of their goals or clearer about their preferences for particular products and services, they would have found it much more

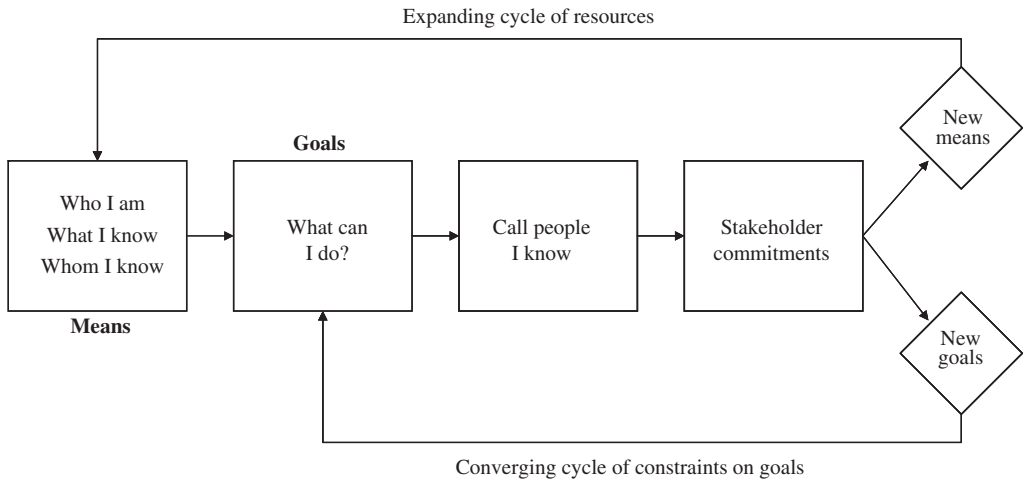


Fig. 2. Dynamic Process of effectual interactions that result in the creation of a new market. Both new means and new goals are changed in constraints.

difficult to find common ground in making specific commitments that fueled the market opportunity for RFID. Such entrepreneurial situations reveal that trade-offs, or a balance of uncertainties, can be conducive to the production of valuable technological and social artifacts.

In sum, the two studies together suggest that entrepreneurs do use decision criteria and principles that often *invert* not only those embraced by formal models of rational choice, but those suggested by adaptive or evolutionary approaches to choice. It is in light of this evidence that we believe an exploration of entrepreneurial logics through March's conception of a technology of foolishness may be useful and important.

### 3. Key elements of a technology of foolishness

What is a technology of foolishness? It is, as we noted above, a way to grapple with the second guess of rational choice—i.e. the guess about uncertain preferences. A technology of foolishness therefore has to consist of strategies to make decisions in the presence of goal ambiguity. It seems appropriate here to go to the source and to quote March (1982, p. 75) in his own words:

Perhaps we should explore a somewhat different approach to the normative question of how we ought to behave when our value premises are not yet (and never will be) fully determined. Suppose we treat action as a way of creating interesting goals at the same time as we treat goals as a way of justifying action. It is an intuitively plausible and simple idea, but one that is not immediately within the domain of standard normative theories of intelligent choice.

Interesting people and interesting organizations construct complicated theories of themselves. In order to do this, they need to supplement the technology of reason with a technology of foolishness. Individuals and organizations need ways of doing

things for which they have no good reason. Not always. Not usually. But sometimes. They need to act before they think.

In beginning to specify key elements of a technology that lets us act before we think, however, March argues against setting up a notion of “supergoals” in terms of which alternative goals are evaluated. Instead he takes up the more challenging, if almost nonsensical, idea of making decisions *now* in terms of goals that will only be knowable later—an idea evocative of the old Aristotelian problem of teleology. March seems to acknowledge the immensity of the challenge that he is suggesting we should undertake and says, “I do not know in detail what is required, but I think it will be substantial. As we challenge the dogma of pre-existent goals, we will be forced to reexamine some of our most precious prejudices” (March, 1982, p. 75).

One of the major ways he suggests to begin this reexamination involves introducing some playfulness into reasoning processes, both in theory and practice (March, 1982, pp. 76–81). In particular, he outlines five possible elements as a beginning in this direction;

1. We can treat goals as hypotheses.
2. We can treat intuition as real.
3. We can treat hypocrisy as a transition.
4. We can treat memory as an enemy.
5. We can treat experience as a theory.

Entrepreneurs in the two empirical studies presented above appear to use all these elements in their decision-making. They are only very loosely tethered to goals and do make frequent references to relying on their “gut feeling.” Particularly in dealing with failures, they treat their own and their key peoples’ mistakes as transitions. In fact, the experts even view them as important inputs into success. Furthermore, they have no problem re-interpreting their own histories in light of experience, or tackling new projects with renewed naiveté, so that they may open themselves to productive failures and valuable surprises. For the purposes of this essay, we will focus only on the first one—the tentative nature of entrepreneurial goals and the alternative logics embedded in the means-driven processes that they use to generate new goals.

Before we explicate these logics pertaining to the three categories of means—i.e., who you are, what you know, and whom you know—we would like to note that the categories are by no means mutually exclusive.

#### **4. Who you are: the logic of identity versus the logic of preferences**

I was not afraid to take risks. I knew my identity was not in my work. It’s just... real important, cause you’re going... going to take some risks. Especially if you’re going to take philosophical risks about... that are different, you know..., to take the... the position that shareholders are not the owners of the company, and that...that you are... that all... there’s a lot more owners and... and they’re all to be treated with respect and equality. There’s no hierarchy among... the stakeholders, it’s very radical, so you better... and you... and you... you’re fired for thinking that way, especially if you act on those thoughts. And I’ve almost been fired several times. But... it... it’s okay, because... I’m not... my identity is not in... being CEO of this company. Uhm...it would be hard... it would be painful to leave it, not so much



because my identity is not here because... but because I love this. I love this. I love this place and the people, and I'm doing what I'm doing, you know (Subject E5<sup>1</sup> in Sarasvathy, 1998).

The story actually begins not with me but with a fellow called David Brock... a crazy researcher...in the Robotics Lab...David had...some of the key ideas...[He] was running around with those ideas, and he entered my office one day and said, "Look at robotics and look at perception." (In fact I sometimes suspect he is a robot...[He] tends to kind of putter around and walk into people's offices and tell them things and vanish...). "You should look at RFID because that's the way to overcome this whole perception problem." He said, "Isn't it crazy that we don't include information about objects. In fact, just writing on the forehead of the object: "I am X. Here is my website. This is how you pick me up." So that's kind of the way it all started... (Professor Sanjay Sarma,<sup>2</sup> Director, MIT's Auto-ID Center, 2002—in Dew, 2003).

A number of studies, both academic and popular, have shown that in cases where goals are ambiguous, entrepreneurs often explain their actions and decisions in terms of their identities rather than their preferences. Sometimes the identity has to do with being an *entrepreneur*, however idiosyncratically interpreted; at other times, it comes from other areas of their lives—such as religious faith, political affiliations, childhood traumas, aesthetic pursuits, or even loyalties to favorite sports teams.

It can be argued that like any other decision criteria, identity-based decision criteria are nothing but a certain type of preference ordering. And, of course, both identity-based criteria and preferences can co-exist or even overlap in entrepreneurial settings. The difference lies in the relationship between preferences for particular outcomes and preferences for particular courses of action. When the preference for a particular outcome is clearly connected with the preference for a particular course of action that leads to that outcome, then the preferences may suffice to make the decision. But reasoning from identity works even when there is no causal link between action and outcome, when a yawning chasm seems to stretch between choice and consequence, or when an entrepreneur feels passionately about a particular course of action while having no idea whether it will lead to desirable outcomes. Professor March refers to Don Quixote and shows how knowing what a knight would do in any circumstance makes Quixote very decisive even possible consequences are extremely uncertain. As March puts it,

Quixote reminds us  
That if we trust only when  
Trust is warranted, love only  
When love is returned, learn  
Only when learning is valuable,  
We abandon an essential feature of our humanness.

Quixote's decision criteria are deeply rooted in his sense of identity: *Jo se quien soi*. And more generally, using identity-based decision criteria frees entrepreneurs from having to order their preferences for specific consequences of their choice, and allows them to take

<sup>1</sup>Note: In using actual quotes from the verbal protocols in Sarasvathy (1998), we have numbered the subjects of the study as E1, E2, etc.

<sup>2</sup>The sources for the quotes from Dew (2003) are interviews with key founders of the RFID industry. See Table 2 for a cast of characters and Table 3 for the part each played in founding the industry.

Table 2  
Cast of characters in the creation of a new market in the RFID industry

Character	Role	Contribution
Kevin Ashton	Product manager for Oil of Olay lipsticks at P&G, and manager of P&G's embedded technology development.	Ashton's role was making network connections between Brock, Sarma, Haberman and P&G; had a clearly defined understanding of the application possibilities for RFID in retailing; became the Executive Director of the Auto ID Center.
David Brock	MIT professor, "roboticist" and computer scientist.	Came up with the idea of using RFID, EPCs and the Internet to network computers and objects; a key researcher in the Auto ID Center's efforts to create the technology for the Internet of Things.
Steve David	In 1999, Chairman of the UCC and Director of P&G (Proctor and Gamble, Inc.).	Approved P&G's commitment to back the creation of the Auto ID Center with the UCC and MIT; launched the center at the 25th anniversary celebrations of the barcode at the Smithsonian Museum.
Alan Haberman	Honorary Director of UCC (Uniform Code Council, the organization that administers barcodes); chairman of the committee that chose the barcode system in the 1970s.	Led the UCC's search for a program to discover what might come after the barcode; envisioned how to organize the Auto ID Center; persuaded UCC to back the center; first chairman of the Auto ID Center.
Tom Pounds	VP Market Development, Alien Technology Inc.	Pounds led the spin-out of an RFID start-up from one of the government national labs; sold the company to Alien Technology, which had a manufacturing process for cheap RFID tags; and led Alien's market development efforts.
Sanjay Sarma	MIT associate professor in Dept of Mechanical Engineering.	Sarma initially teamed-up with Brock to do some RFID research; later he researched how it might be possible to manufacture disposable RFID tags; in 2000 became the research director of the Auto ID Center.

decisive action even in the face of Knightian uncertainty (Knight, 1921; Langlois & Cosgel, 1993). That is because the notion of *identity* stands in the same relationship to *preferences* as procedural rationality does to substantive rationality (Simon, 1978). For example, when faced with identical circumstances, a macho identity may lead one to revenge, whereas a Christian identity may seek to forgive (Cosgel & Minkler, 2004). In other words, identity consists of preferences for particular processes or ways of living and deciding, rather than for any particular consequences that the preferred processes may lead to. Identity may be fictive or real, freely chosen or socio-culturally constructed, good or evil.

When outcomes are predictable, it makes sense to use preference orderings for particular outcomes as our decision criteria. But when outcomes are unpredictable, or our preferences are ambiguous, it serves us well to have a strong sense of identity (who we are rather than what we want) and of process (how to make decisions rather than what

Table 3  
Event history plot of the creation of a new market the RFID industry

History of machine-readable identification technology	History of RFID	History of integrated circuits	History of the internet
1932 Wallace Flint: idea of the standard product ID			
1952 the barcode invented	1948 RFID invented	1947 Shockley: birth of transistor	
1970 barcode commercialization 1974 pack of Wrigley's gum is the first barcoded product scanned	1980 commercialization of RFID starts	1959 invention of integrated circuit	1969 ARPANET created: precursor of the Internet
	1993–1999 DARPA-funded R&D on RFID at PNL (Pacific Northwest National Lab) yields over 50 patents and dozens of DOD applications.		1992 Tim Burners-Lee invents hypertext and the world wide web.
Mar-1999 Kevin Ashton meets Brock and Sarma at MIT; then meets Haberman and initiates a network looking at RFID.		1994 Steve Smith invents Fluidic Self Assembly, a process suitable for manufacturing very small ICs	David Brock invents RFID numberplate tags like hypertext tied to websites: later to become the EPC (electronic product code).

Table 3 (continued)

History of machine-readable identification technology	History of RFID	History of integrated circuits	History of the internet
<p>Oct-1999 Steve David launches the Auto ID Center to “discover what will follow the barcode”; chaired by Haberman, directed by Ashton, Brock and Sarma as researchers.</p> <p>1999–2003 over 100 blue chip companies have joined the Auto ID Center network, including Wal*Mart and the DOD.</p>	<p>2000 Tom Pounds leads spin-out of start-up Wave ID from PNL with 50 RFID-related patents.</p>	<p>2001 Alien Technology starts commercializing FSA; acquires Wave ID; becomes a key member of the Auto ID Center</p>	<p>2002 Auto ID Center envisions the <i>Internet of Things</i>. Ashton says that: “I sometimes joke that this was what the Internet was invented for.”</p>
<p>Sep-2003 EPC officially launched in Chicago.</p>		<p>Gillette orders 500 million RFID tags from Alien; this is more tags than exist in the world at the time. A new mass market is born.</p>	

decisions to make). The use of such alternative criteria, however, often means transforming existing preferences and even fabricating new ones, allowing decision-making to occur without taking preferences as either pre-determined or well-ordered. As Paul Slovic (1995, p. 364) put it in his address to the American Psychological Association,

One of the main themes that has emerged from behavioral decision research during the past 2 decades is the view that people's preferences are often constructed in the process of elicitation. This concept is derived in part from studies demonstrating that normatively equivalent methods of elicitation often give rise to systematically different responses. These preference 'reversals' violate the principle of procedure invariance that is fundamental to theories of rational choice and raise difficult questions about the nature of human values.

This is reminiscent of March's argument that rational choice based on preferences assumes that tastes are absolute, relevant, stable, consistent, precise, and exogenous, some or all of which may be empirically invalid in most human decisions.

Expert entrepreneurs in general appear to realize the value of creating and sustaining strong identities that substitute for consequence-based decision criteria, especially in the face of unprecedented circumstances. For them, goals such as making profits, increasing sales or maximizing shareholder values may each be, at best, one of several constraints on decisionmakers, rather than the objective function in organizational choices. Such entrepreneurs may be foolish if they only pay lip service to the logic of identity. But an intelligent implementation requires them to reify the logic in a variety of routines, decision processes, recruitment procedures and strategic choices that permeate the organizations they found. In this case, the persistent problems of reasoning based on preferences that have been identified in the vast literature on the subject are overcome by the logic of identity: Identity allows us to construct our preferences when preferences do not exist; it allows us to experiment—to “try things on for size”—when preferences are not known; identity also allows us to manage our preferences so that changes in preferences are not arbitrary; it also allows us to play conflicting preferences strategically against each other—and guides our strategies in doing us; and when our preferences are “bad” for us, identity tells us which pre-commitments to use to increase our self-command.

## 5. What you know: the logic of action versus the logic of belief

Somebody once told me the only thing you need is a customer and I think I'd start by just... going... instead of asking all the questions I'd go and say... try and make some sale. I'd make some... just judgments about where I was going—get me and my buddies—or I would go out and start selling. I'd learn a lot you know... which people... what were the obstacles... what were the questions... which prices work better and just DO it. Just try to take it out and sell it. Even before I have the machine. I'd just go try to sell it. Even before I started production. So my market research would actually be hands on actual selling. Hard work, but I think much better than trying to do market research (E1 in Sarasvathy, 1998).

As my friend and colleague Prof Sanjay Sarma is fond of saying, the “rules” about silicon that everybody knows were made at places like MIT, Berkeley and Stanford... And if we don't like the rules, we can change them.” In a conference speech, he crystallized his view that action could overcome entrenched beliefs: “The

solution is to build new roads: to change the rules. Making chips too expensive? Make it cheaper. Handling is impossible? Make it possible. Testing too costly? Find another way to test. These ‘rules’ are not laws of physics or God. They are just technology boundaries—boundaries that until recently hadn’t been explored because there was no call for smaller, cheaper, simpler silicon chips... (Kevin Ashton in Dew, 2003).

It worked because a user industry got together and made it happen. Nowadays 1.3 million companies worldwide use barcodes and they say there are 5 to 8 billion barcodes scanned a day in the supply chain alone—don’t trust that number as I know where they got it from [i.e. me]. And we did it with users very involved because we needed to know that we were in the world of reality. Of course, a lot of people said we were crazy. There were no margins at the time in retailing for technology spending, so technology companies went elsewhere to do business (Alan Haberman in Dew, 2003).

Expert entrepreneurs, like most human beings, have at best a very uneasy relationship with predictive information in general and probabilities in particular. But while many cognitive biases attributed to human beings have been shown to be the result of problem representation—for example, Hertwig and Gigerenzer (1999) and Fiedler (1988) demonstrated that the conjunction fallacy can be drastically reduced and even made to disappear when the probability format is replaced by a frequency format—expert entrepreneurs also tend to *ignore* probability estimates as a predictive tool in their analyses of opportunities. This disregard has theoretically been explained at various times as overconfidence bias—i.e., the tendency to ignore a high probability of failure (Busenitz & Barney, 1997), or high-risk propensity—i.e., the penchant for enjoying the low probability of success (Begley & Boyd, 1987). But the existing evidence on risk propensities among entrepreneurs is mixed at best. Witness, for example, two recent meta-analytic studies each of which found substantial evidence for and against risk aversion in entrepreneurs (Miner & Raju, 2004; Stewart & Roth, 2001). One reason for this could be the salience of the moderating effect of control, *irrespective* of any psychologically based propensities for taking risks (Sarasvathy, Simon, & Lave, 1998). Furthermore, *expert* entrepreneurs appear to reject the very notion of risk as a type of probability estimate (Sarasvathy, 1998).

As exemplified in some of the quotations above, expert entrepreneurs prefer as far as possible to eschew predictive information and instead to rely on direct action upon the world. In particular, they emphasize the positive side of unpredictability—the fact that surprises can be pleasant; or that contingencies can offer unanticipated opportunities. In the words of E14 in Sarasvathy (1998):

I’ve always tended to be very skeptical about market research studies. I always live by the motto of “Ready–fire–aim.” I think if you spend too much time doing ready–aim–aim–aim–aim, you’re never gonna see all the good things that would happen if you actually start doing it and then aim. And find out where your target is.

In general, an expert entrepreneur rejects the wisdom of relying on probability estimates and challenges several of the assumptions that underpin predictive reasoning on the following grounds:

1. I do not belong to the population of actors based on whose actions the event space was calculated.

2. The event space is not independent of my actions.
3. Belief does not necessarily determine or even precede action.

The first of these is connected with the logic of identity. Faced with a probability estimate such as the one-in-ten success rate for venture-capital-backed companies, an expert entrepreneur might argue that the estimate is inapplicable to their particular venture, since they bootstrap their ventures and do not rely on business-plan-based funding of the kind offered by venture capitalists. Or they may point to their ability to outlive failures and to accumulate successes, thereby succeeding through quixotic persistence where others might quit after the failure of their first venture. Examples like Milton Hershey and Henry Heinz, who survived several bankruptcies before building an enduring success, are favorite sources of entrepreneurial identities. Inspiring examples of this kind provide grounds for expert entrepreneurs' arguments that they are drawn from a different population, one that pulls the rug out from under the probability estimates derived from "random" samples that statisticians might favor. This last argument may have more substance than existing studies might lead us to believe. In particular, the expert entrepreneur draws attention to the fact that the success/failure rates of *firms* are not the same as those of *entrepreneurs* (Sarasvathy & Menon, 2002). Thus, since hardly any studies have estimated the rates for entrepreneurs, extrapolating firm failure rates to entrepreneurs at the present time may well be misinformed and unjustified at best.

The paucity of the evidence described above is further exacerbated by the second argument against the updating of beliefs on the basis of probability estimates. To examine the event space for calculating the rates of firm-successes and failures, we need to contend with at least two sources of endogeneity in relation to entrepreneurial action. First, probability estimates even at the aggregate level can change over time, and they often do so due to human action. Consider for example the hazard rates for infant mortality due to small pox. As a result of human efforts to eradicate the disease, i.e., through causal interventions in the event space, this probability has changed. Implicitly or explicitly, entrepreneurs assume the power of human action at all levels and in all domains to intervene in and transform event spaces. In other words, instead of using Bayesian reasoning as an inference engine for updating beliefs, they prefer to use it as a control engine for manipulating conditioning assumptions with a view to reifying or falsifying predictions based on these. Such intervention in the event space then leads entrepreneurs to tap the second source of endogeneity—i.e., the fact that the "market" as they conceive it often consists of human actions and choices. Consequently, by directly influencing and controlling human actions and choices to create and reformulate new markets, these entrepreneurs seek to increase the probability of success for their particular ventures. This logic leads them to adopt quite different decision criteria and manifestly different strategies than those chosen when the market is taken as exogenously given. Note that the argument is not that *outcomes* are endogenous to entrepreneurial action, but that *the event space* itself is.

Finally, the third challenge posed by expert entrepreneurs is to the received wisdom that belief necessarily precedes action. Almost all of normative decision theory assumes—explicitly or implicitly—that belief has to precede choice and action. Arguing for the priority of belief, this stream of thinking asks, "How do I act without knowing what to do? How do I get anywhere without learning where to go?" to which expert entrepreneurs, like the poet Roethke answer, "I learn by going where I have to go" (Gensler, 1987, p. 279). Or

else they counter-question, “How can I know what I think until I see what I say?” (Weick, 1979, p. 207). Another basis for the logic of action as opposed to a logic of “belief preceding action” is provided by philosophers such as Joas (1996) who urge us to see entrepreneurship as occurring, like every other realm of human action, in the ongoing theater of ordinary life. In the course of being born, growing through childhood to adulthood, and seeking to construct one’s identity, meaning, and purpose in the world, some human beings become entrepreneurs. Entrepreneurship is thus an instrument for making human meaning and solving human problems through economic means. In such a world, where the causal priority of belief about particular outcomes is not a necessary condition for action, Starbucks can be the unanticipated side effect of a romantic adventure chasing the perfect cup of coffee, evocative of Captain Ahab’s pursuit of Moby Dick; and one man’s effort to manage a Website without having to give up mountain-biking weekends can lead to eBay.

Taken together, these three challenges to the use of probability estimates as engines of belief suggest an alternate logic that draws upon the creative potential of *all* human action, one that recognizes that both firms and markets are more like *artifacts* than akin to forces of nature, economic terminology notwithstanding. In this world, meaningful action trumps pre-meditated choice in several important ways, thus constituting an intrinsic part of a technology of foolishness. Whether the logic of action actually leads to a higher probability of success for the entrepreneur we simply do not know—for the data on success rates for entrepreneurs (as distinct from firms) has not been collected; and evidence has certainly not been presented for success among entrepreneurs who actually practice technologies of foolishness.

## 6. Whom you know: the logic of commitments versus the logic of transactions

Traditional market research says, you do very broad based information gathering, possibly using mailings. I wouldn’t do that. I would literally, target, as I said initially, key companies who I would call flagship, do a frontal lobotomy on them... . The challenge then is really to pick your partners, and package yourself early on before you have to put a lot of capital out (E26 in Sarasvathy, 1998).

Well, I stumbled into the first part of the MIT crowd, which helped in the end because they were here. And got very much involved with the logistics group over there. And then got involved with the media lab. And then met a young man by the name of Kevin Ashton, and son of a bitch, we had the same goddam vision. And he said, “here are some guys that you’ve got to meet that I’ve stumbled on.” And that’s how we met Sanjay Sarma and David Brock and Sunny Su and the group that were thinking about the universe of things, okay, things talking to things.

Well, that’s when it began to take shape. I recognized that my job was to redo what we had done before, which was to make it an industry driven initiative, and an industry funded initiative. And so, designed, with their help and with Kevin, we designed the center, and its governance situation. And the first thing we did was Kevin persuaded Proctor and Gamble to join the UCC in the effort, because we were the funding, and we set pretty high hurdles (Alan Haberman in Dew, 2003).

Two reasons. One, seemed like a good team with an interesting opportunity to take forward... [inaudible] a good team to develop products. And my sense was that the business plan we went out with wasn’t necessarily the business plan that was going to



make the company go. But I was quite confident in the people—that is Curt and Ron and these guys, who have basically come from a commercial background—have come out of commercial companies. They'd spent 3–4 years at the lab doing R&D in interesting related technologies and they preferred to go back out to the market. And I basically had decided that we can do something interesting, and it might take us an iteration or two to figure out what that was, but I felt we had a good concept. So one reason was the strength of the team. And the chemistry of the team—they are a good bunch (Tom Pounds in Dew, 2003).

Identity and meaningful action are both intertwined with interactions with other human beings in the construction of a productive life. According to current studies of economic organization, the firm's bottom line guides the choice of who comes on board, and any conflict regarding what people (the agents) want (i.e., their preferences and utility functions) is reconciled through incentives to bring them in line with the goals of the organization (the principals). An entrepreneurial technology of foolishness inverts this dictum and seeks to fashion meaningful and useful purposes based on who comes on board and on what they are willing to commit toward shaping those purposes. Note, for example, what Subject E4 in Sarasvathy (1998) has to say:

Where the company goes is really very uh...sort of influenced by the interests and aspirations of people who build the company, and you cannot separate it from it. Pure...making money is not always desired by people. One would want to make money, sort of, along the side of actually making some contribution.

Existing economic theories see the “transaction” or the “contract” as the primary unit of inter-subjective interaction (Williamson, 1985). Contracts may be complete or incomplete, depending on the level of uncertainties in outcomes (Grossman & Hart, 1983). But like all the causal logics discussed so far, both transaction cost economics and contract theories usually assume preferences as given and well-ordered. Moreover, unless there are explicit mechanisms to enforce reciprocal altruism, such as the existence of a *tertius gaudens* in embedded networks of trust (Burt, 1992; Coleman, 1990; Granovetter, 1985), current accounts of transactional relationships prescribe that contracts be written with an eye to potential opportunistic behavior on the part of both parties to the transaction.

Expert entrepreneurial behavior appears to run counter to this transactional view of human interaction on at least four counts:

1. Docility, rather than opportunism, as the fundamental behavioral assumption.
2. Motivational uncertainty extended to oneself as well as to others.
3. A focus on stakeholders rather than on resources.
4. Particular commitments seek to determine *what the artifact can be*, instead of predicted outcomes based on pre-determined opportunities determining *what the investment should be*.

A technology of foolishness begins with goal ambiguity as the norm, so participants in a relationship not only do not know each other's motives; they are not quite sure of their own future preferences either. In an entrepreneurial setting where the environment is characterized by Knightian uncertainty, potential stakeholders not only require investment

criteria other than those based on predicted outcomes; they also have to decide who else comes on board without quite knowing what the project may turn out to be. At first glance, this task might appear to go beyond the improbable and the uncertain and into the realm of the utterly impossible, especially if we assume that human behavior is fundamentally opportunistic. In other words, if I were a risk-averse opportunist with a clear preference for enhancing my financial bottom line and with little else to guide my decisions, Why would I ever invest in anything other than a diversified portfolio of investments with reliable historical betas? And most of the entrepreneurship that we actually observe in the world would be theoretically impossible.

Fortunately, there is growing evidence that more often than not, human beings are as Simon (1993) argued, fundamentally *docile*, i.e., they seek and impart advice (Schotter, 2003); they also are both persuadable (Cialdini, 2001) and persuasive (Gardner, 1995) to a varying degree on a variety of matters. In fact, what we know about self-interest based on empirical evidence from the lab (see Rabin, 1998, for a comprehensive review) and from the field, suggests the following:

- People are not solely self-interested; nor are they entirely altruistic.
- The same person may be altruistic at certain times and opportunistic at others.
- People who are opportunistic in one domain may be concurrently altruistic in others.

In a world where docility (in the technical sense of the term as defined above and not in the colloquial sense of meekness or naïve malleability) is the fundamental type of behavior, it is at least as likely that opportunities for entrepreneurial action will be shaped by a variety of relationships arising from every aspect, aspiration and accident of human life, as it is that visions of particular projects and their predicted gains will induce participants to enter contractual relationships in order to harvest the expected returns. To illustrate how this process might actually work in a generalized model of entrepreneurial interaction, we have combined the data from the two empirical studies described earlier—namely, the cognitive processes used by expert entrepreneurs and the event history of the emergence of a new market—into a dynamic model depicted in Fig. 2 (Sarasvathy and Dew, 2005). Essentially, this model embraces the Marchian quest for “making decisions *now* in terms of goals that will only be knowable later,” not in the realm of individual or organizational decision-making but in an iterative process of inter-subjective decision-making that results in a new organization or a new market.

Fig. 2 delineates how expert entrepreneurs start with who they are, what they know, and whom they know, and proceed through a chain of interactions with *actual* stakeholders that lead to particular commitments to a *potential* project that gets determined only through the very process of garnering those commitments. This chain of effectual interactions sets in motion two cycles—an expanding cycle of mobilized means and resources that each new stakeholder adds to the pool, and another cycle of constraints on the possible objectives and outcomes of the project that *converges* to the goals of the resultant organization. Each new stakeholder has a say in *what* the artifact that comes to be will be, rather than in *whether* it will come to be or how valuable it will be. In other words, commitment decisions seek to shape what the pie will be rather than how to divide it. The choice is not between making X or not making X, or in choosing between alternative price/quantity combinations for X. Rather it consists in helping to shape at any given point in time, what X may eventually turn out to be.

This process does not strategically track down and induct the appropriate people to make a particular goal happen. Nor does it simply leverage existing networks and the trust and legitimacy embedded in them. Instead, it fabricates a new network from existing networks and from ongoing garbage cans, making new and unpredictable artifacts possible through the very processes that such fabrication entails. In doing so, not only does it manufacture new preferences and beliefs, but it also concurrently resolves the problem of aligning these preferences and beliefs with those of diverse stakeholders over time. Thus, within pockets of the economy and for reasonably stable epochs at least, it resolves both the problems that March discussed in arguing for the necessity for a technology of foolishness, namely, the inter-personal comparison of utilities problem and the problem of inter-temporal comparison of preferences.

Fig. 2 can be discovered and evidenced in the early histories of a variety of firms and industries. Simply as an exemplar, and not as evidentiary analysis, we can tell the story of RFID in terms of Fig. 2 as follows:

In the case of the birth of the RFID industry, the curtain opens on Brock asking Sarma to become a research colleague after they co-taught a course at MIT because, “He was a nice guy. We got on well.” In the beginning the pair did what they could working out of a storage closet, hacking up demos and searching for resources from organizations they knew at MIT. When Ashton had a chance meeting with Sarma, the two MIT roboticists became connected into a commercial network that included P&G and Ashton’s personal network. A month afterwards, Ashton had another chance encounter, this time with barcode pioneer and longtime champion of industry standards, Alan Haberman, at a conference in Antwerp, Belgium. Ashton’s two chance meetings created the initial connection between the four individuals that would found a new organization at MIT, called the Auto ID Center. Brock and Sarma made a commitment to set out on a research program to modify Brock’s ideas for industry, while Haberman and Ashton persuaded their organizations to commit to funding the effort by putting up an initial \$300,000 each. These commitments transformed the nascent network into a partnership, thereby creating a tiny piece of the future RFID market.

Under the partnership, the actors initially specified some dimensions of the transformation of Brock’s idea, but left open, as far as possible, many of the details. So, when the Auto ID Center was launched at the Smithsonian museum in Washington D.C. on the 25th Anniversary celebration of the barcode by P&G’s Steve David, it was described as, “[T]he beginning of a new journey: the journey to discover what will follow the barcode.” One answer to “what next?” was “a microchip embedded into every product”, but the exact nature of the system the Auto ID Center would develop was left open, and both subject to the evolution of preferences of existing members and the preferences of new members joining the network. Through their commitments, members gave themselves a voice in “designing a possible future” (Ashton, 2001) and augmented their own set of intentions by committing them to a jointly elaborated future, along certain lines. These commitments caused a significant skewing effect on the space of possible future outcomes in the RFID industry, amounting to a transformation of the industry from a series of specialist niche markets into a mass market of “radar for everyday products” (Fildes, 2002).

Entrepreneurs, as we noted at the beginning of this essay, are boundedly rational and docile (i.e., Simonian) decisionmakers living in a Marchian world of goal ambiguity. Ambiguous preferences are not for them a massive hurdle to be overcome; rather, as we have argued here, ambiguity is a necessary condition which expert entrepreneurs leverage in order to fabricate valuable new economic artifacts. Acquiring entrepreneurial expertise involves the mastery of at least three logics: (1) continually building and sustaining a strong sense of identity; (2) causally intervening in the world to change and thwart probability estimates; and (3) imaginatively patching together stakeholder-commitments to fashion new purposes embodied in new organizations. The sagas of entrepreneurship, contrary to current dominant wisdom, are not heroic epics with satisfactory endings in which good triumphs over evil. They are romantic adventures with surprise endings that leave us a little unsettled about what we believe about the world and its possibilities.

## 7. Conclusion: fact, fiction, and forecast in entrepreneurial action

In his seminal “Fact, Fiction and Forecast,” the philosopher Nelson Goodman (1983, p. 57) concludes, “We have come to think of the actual as one among many possible worlds. We need to repaint that picture. All possible worlds lie within the actual one.”

Fact and forecast continue to dominate the landscape of decision theory in business and economics today. As March (1994) explicates and summarizes it, our current decision logics are overwhelmingly fueled either by “consequences”—i.e., goal-driven formal techniques, or by “appropriateness”—i.e., adaptive reasoning driven by evolutionary techniques, both of which leave very little room for the playful foolishness of fictions that engender new meanings and imagined possibilities. In this paper we set out to explore our data with a view to discovering what some logics fueled by imagined possibilities might look like.

Whether it is expected utility theory based on preferences, or Bayesian inference based on probability estimates, or transaction cost economics, the causal logics underlying the technologies of rational intelligence and evolutionary adaptation are all associated with certain formal calculi. There may or may not be any such calculi associated with effectual logics in a technology of foolishness. Instead it may turn out that what we have identified as alternative logics are actually genres of fiction that complement and counterbalance the causal calculi based on fact and forecast. Our data has convinced us, however, that these genres of fiction will prove crucial to the effective use of fact and forecast. Without fiction, fact cannot help us understand what has already happened. And forecast, contrary to received wisdom, cannot tell us what will happen. At best, it can tell us what may happen if we do not do things differently from the way we have done them in the past.

As human beings our perceptions of who we are, what we know and whom we know are imagined fictions of who we might become, what we might make of our circumstances and what we might make possible or impossible for posterity. To the extent that entrepreneurs act on those fictions and produce particular performances of them in the economic theater, we hope our exposition of the effectual logics they use “...will lead theories of choice to a slightly clearer understanding of the complexities of preference processing and to some modest links with the technologies of ethics, criticism, and aesthetics” (March, 1978, p. 605)—an enterprise close to Professor March’s heart.

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