An Effectual Analysis of Markets and States

Saras D. Sarasvathy

Abstract Entrepreneurial expertise consists in nonpredictive heuristics grouped under the rubric of effectuation. The principles and process of effectuation specify ways to tackle multiple uncertainties, allowing the cocreation of innovative upsides even without large, upfront investments. In focusing attention on the differences between risk and uncertainty, effectuation compels us to rethink the familiar relationships between risk and reward. Entrepreneurs and their stakeholders self-select into the effectual process not only to build products and ventures but also to reshape their environments, including markets and states. An effectual perspective, therefore, offers new frameworks to analyze the role of markets and states in innovation, especially in shaping and choosing goals worth pursuing in the face of complex interacting uncertainties. Additionally, it suggests that the question, "What are we willing to live with if we get it wrong?" has to become a larger part of the public discourse than it is today.

Keywords Effectuation · Market design · Uncertainty

1 Introduction

We know from over two decades of research that entrepreneurial expertise consists in heuristics of nonpredictive control, grouped under the rubric of effectuation (Sarasvathy, 2009). The principles of effectuation allow entrepreneurs to act under multiple uncertainties. Moreover, the effectual process logically implies a high probability of innovation, while keeping losses within the control of entrepreneurs and their stakeholders. This vitiates the taken-for-granted relationship between high risk and high reward.

Conventional wisdom about entrepreneurs being risk-takers is not accurate. In fact, the familiar relationship between risk and reward speaks to investor behavior

S. D. Sarasvathy (✉)
Darden School of Business, University of Virginia, Charlottesville, VA, USA

Indian Institute of Management, Bangalore, Bengaluru, India
e-mail: saras@virginia.edu

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rather than how entrepreneurs act and the lessons they learn. This does not mean that risk-taking is unimportant to entrepreneurship. Instead, it means we need to pay attention to differences between risk-taking and uncertainty-bearing. All individuals, risk loving, risk neutral, and risk averse can learn to tackle uncertainty through effectual approaches. In analyzing markets and states from an effectual perspective, it is therefore important not to confound investor behavior with entrepreneurial behavior.

As explained in the brief overview below, effectuation explicitly tackles the three dimensions of the entrepreneurial problem space consisting of Knightian uncertainty, goal ambiguity, and isotropy. These three dimensions also occur in the context of the central question this essay aims to tackle: What are the implications from the theory of effectuation for the design of governance mechanisms, particularly the roles of markets and states in fostering innovation?

I undertake a careful analysis below to show that states, through their representatives, elected or otherwise, tend to act more like causal investors who try to predict the future to justify risky bets than effectual entrepreneurs who eschew or at least minimize the use of predictive information. This may seem counterintuitive, since one would expect states to lead the way under uncertainty. Yet both historical evidence and the analysis below will show why effectual entrepreneurs are necessary in tackling uncertainty, even in cases usually argued for in the purview of public, nonprofit, or governmental action.

I begin the analysis with a quick overview of effectuation.

1.1 Overview of Effectuation

Briefly, effectuation consists in the following principles:

- Bird-in-hand principle: Be means-driven rather than goal-driven. In other words, begin with things already within your control, instead of chasing means you do not have to achieve some predetermined goal. The canonical example here is cooking based on a recipe for a preselected dish (causal) vs. cooking based on what is available in the kitchen and garden, even if that means having to substitute ingredients or cook up something for which there exists no recipe at all (effectual).
- Affordable loss principle: Instead of placing large bets in pursuit of high expected returns (causal), invest only what you can afford to lose (effectual). This does two things—it keeps the downside within your control and removes irrational exuberance about predicted upsides.
- Crazy quilt principle: Allow stakeholder self-selection. Instead of predicting and targeting particular stakeholders who can help achieve predetermined goals (causal), effectuators are open to working with anyone and everyone who self-selects into the venture by making actual commitments for the opportunity to shape the goals of the venture (effectual). In other words, those who come on

board have a say in where the venture is headed, rather than the goals of the venture determining whom to invite on board.
- Lemonade principle: Leverage (effectual), rather than avoid (causal) contingencies. Even when things outside your control inject positive or negative surprises into the process, consider ways to incorporate these into the effectual process. An obvious interpretation of this principle is, when life throws lemons at you, make lemonade. A more nuanced view argues for a radical revision of attitudes toward failures and successes. For example, separating the performances of entrepreneurs from the performances of their ventures.
- Pilot in the plane: Futures are cocreated through human action, and environments are endogenous to the effectual process. This principle emphasizes the role of human beings (effectual) and dampens the idea of trends or inevitable trajectories (causal). It rejects the idea that history runs on autopilot.

As mentioned earlier, effectuation explicitly tackles the entrepreneurial problem space consisting of Knightian uncertainty, goal ambiguity, and isotropy.

2 Three Dimensions of the Effectual Problem Space

As I explicate each of the three dimensions below, it will be useful to keep in mind that these can interact and combine. Even though they can occur independently of each other, they are not always mutually exclusive.

2.1 Problem Dimension One: Knightian Uncertainty

Effectuation has been studied relatively well in the context of Knightian uncertainty, a term originating from Frank Knight's taxonomy of uncertainty in his 1921 thesis, *Risk, Uncertainty, and Profit*. In lay terms, Knightian uncertainty refers to situations in which the future is not only unknown but also fundamentally unknowable. An iconic example from decision theory can help clarify Knight's taxonomy. Imagine you are playing a game in which you draw balls from an urn containing 50 green balls and 50 red balls. You will win if you draw a green ball. Although you do not know which ball you will draw, you can still calculate the odds as 50–50 since you know the distribution of balls in the urn. This captures the idea of "risk"—namely, a known set of possibilities but an unknown draw.

Another concept of interest is the notion of "uncertainty" in which you know neither the distribution nor the draw. This would be like an urn containing many different colored balls, but you do not know how many of each color or even the total. The game, however, is the same: You win if you draw a green ball. It is easy to see that this game is much more difficult to play than the game of risk. Many organizational, economic, and socio-political problems are conceptualized as

problems of uncertainty that can only be tackled through sophisticated techniques for prediction ranging from systematic hypothesis-testing to scenario analysis and other approaches based on simulation and big data.

In both the above thought experiments, we knew something about the urn's contents. In situations in which Knightian uncertainty is involved, even this information is unavailable. The urn may contain things that defy classification or even recognition, making it impossible to classify them into a distribution on which predictive techniques can work. It is as though the urn could contain umbrellas, snakes, bars of gold, disease, anything and everything that can and may exist. You get something different every time you draw—not just balls. In other words, Knightian uncertainty refers to the impossibility of imagining, let alone specifying a distribution, on the basis of which you can make predictions. In dealing with Knightian uncertainty, you need to come up with techniques that either minimize or completely avoid prediction altogether. The lessons that expert entrepreneurs learn consist in nonpredictive techniques that we call effectuation or effectual logic, contrasted with predictive or causal logic.

Effectuators develop an awareness of and even a preference for Knightian uncertainty. Hence, in addition to cocreating futures with self-selected stakeholders, effectual approaches emphasize possible errors as decision criteria rather than predicted upsides (e.g., the affordable loss principle). This is a powerful tool to help bring downsides within one's control, without constraining upsides. Therefore, one starting point for an effectual analysis of markets and states is to ask: In any given governance choice, what are we willing to live with if we get it wrong?

2.2 Problem Dimension Two: Goal Ambiguity

The literature on effectuation also highlights problems of goal ambiguity and isotropy, both of which are also relevant to an analysis of markets and states, especially in terms of their roles in innovation. At the level of analysis of individuals, goal ambiguity refers either to not knowing what one's preferences are or not knowing how to translate high-level goals into actionable subgoals. The latter applies at the levels of organizations and institutions as well. Especially when faced with complex problems such as climate change, goal-setting is fraught with ambiguities. For example, it is not clear if certain species are more crucial for conservation, bees for example, and therefore need to be protected more than others, say mosquitoes. What about frogs? Or crickets? The *foundation species* literature argues that there are species that are foundational, but there is little agreement on how to decide which ones at any given point in time. Also consider the famous Julian Simon wager against Paul Ehrlich on peak oil and futures in commodity prices (Simon, 1982). In 1980, Ehrlich chose five metals he predicted would increase in scarcity within 10 years and hence in price, but Simon won the bet in the other direction. Prices of most commodities, including oil, have not hit peak 30 years

since. Even with increasing consensus on the reality of climate change, goal ambiguities continue to plague this problem. Effectual action is surely called for here.

Organizations as Fabricators of Artificial Predictability and Goal Clarity. Interestingly, organizations (including states) are a way for us to reduce Knightian uncertainty and goal ambiguity. Hence their ubiquity in human affairs, as argued by Joseph Schumpeter, Herbert Simon, and others. Unlike markets that enable open-ended interactions, organizations are for the most part hierarchical in structure (Williamson, 1973). Note that in the ensuing discussion, I will use the word *organization* to include a variety of hierarchical structures ranging from familiar for-profit firms to normative institutions such as regulations and customs. At the extreme end of this spectrum are states, which are organizations endowed with the right to use coercive force.

By constraining what members can and cannot do through contractual obligations, organizations create artificial predictability amidst pervasive uncertainty. Traffic lights offer a simple example. By simply agreeing to stop when traffic lights turn red, we create predictability and hence safety for both pedestrians and drivers. However, simple agreement is not sufficient. Some amount of effective enforcement against transgressors is also necessary. Particular combinations of voluntary compliance and enforcement differ across different socio-political contexts (just compare busy streets in Mumbai with those in Frankfurt). In the case of designing traffic systems, contextual elements involve different types and speeds of vehicles, numbers of pedestrians, widths and types of streets, as well as historical and cultural antecedents to behavior. When designed well, *organization* can provide reasonable predictability in a wide variety of contexts.

On the face of it, it seems easier to see how market interactions (such as interpersonal negotiations) can be more efficacious in the case of organizations such as small businesses than in the case of larger societal institutions such as traffic lights. It seems absurd to think about negotiating with traffic lights. Yet there is more of a role for market interactions in the case of traffic lights, just as, on the flip side, there can be enforcement within organizations, even completely voluntary organizations. For example, communities do negotiate and vote on a variety of institutions around traffic lights, including speed limits on roads, placement of lights, and widths and numbers of lanes. It is unfamiliar, however, to consider any of these as *market* activities. In such cases, the missing link is provided by institutional entrepreneurs, people acting effectually to build these institutions. As we develop the ensuing analysis of markets and states from an effectual perspective, we will use a more general view of entrepreneurship than a narrow focus on the building of for-profit firms. This generalization is common to the works of noted economists such as Williamson, Ostrom, and North, as well as most entrepreneurship scholars today.

Once formed and functioning well, organizations can also resolve goal ambiguity at the individual level by creating and enforcing norms around particular missions, often defined in behavioral, technological, and strategic terms. Jim March's "garbage can" model shows how organizations do these through simple mechanisms such as deadlines (Cohen, March, and Olsen, 1972). In market-based societies, individuals can select in and out of particular organizations for a variety of reasons,

including alignment with the stated and actual missions embodied in norms practiced within organizations. Whereas individuals with high levels of goal ambiguity might still vacillate in their choices, most will strive to align themselves with the goals of organizations they sign on to.

Similarly, organizations strive to both select in individuals with some degree of mission coherence and then invest in processes and incentives that seek to realign individual and organizational goals as needed and feasible over time. To the extent that they succeed at this function, organizations also create oases of predictability and goal clarity, both for individuals and communities, at least for reasonable periods of time, so that reasonably positive outcomes for both can be fabricated.

This method of reducing uncertainty already involves a move from goal ambiguity to goal alignment. Returning to the example of traffic lights, trade-offs between speed and safety can be efficiently managed by solving the problem of behavioral (human beings), contextual (types of streets), and technological unpredictability (types of vehicles), through a combination of voluntary commitment and enforcement of compliance with that commitment. Voluntary commitments, for example, a community's determination of an acceptable speed limit, resolve goal ambiguity. Once the limit is determined, anyone ambiguous about it still has to comply with the limit. Or exit. Move to Montana or Manila.

In other words, one way to remove goal ambiguity is through organizations' efforts to align the goals of its members, through voluntary commitments during formation, and thereafter through incentives and enforcement. Furthermore, multiple goals embodying differing tastes, preferences, and values can be leveraged and achieved through organizations aligned with these. For unaligned individuals, the choice then becomes unwilling compliance or exit. This works in the case of organizations and markets. But it can be problematic or even impossible in the case of states.

2.3 Problem Dimension Three: Isotropy

The third dimension of the effectual problem space, isotropy, differs from Knightian uncertainty and goal ambiguity. Isotropy refers to the problem of relevant vs. irrelevant information. In contexts of reasonable predictability, it is relatively easy to evaluate the relevance of any given piece of information. But contexts of innovation are contexts of unpredictability. And in these, even when goals are clear, the isotropy problem is rampant. In fact, the more innovation called for, the more this problem might become salient to all kinds of endeavors, including the enterprise of policymaking. Decisions and actions for the fabrication of organizations involve isotropy. Even more so the making of markets and the shaping of states. And most importantly, isotropy pervades choices between markets and hierarchies. In order to clarify the concept of isotropy a bit more extensively, let us consider a standard problem that budding entrepreneurs face.

Suppose you have come up with the idea for a green widget. Most standard textbooks and courses in entrepreneurship would suggest you go talk to potential customers and ask for their input in making marketing and production decisions. This advice is based on conventional wisdom that makes a series of assumptions, each of which is usually not only unjustified, but has the potential to misguide entrepreneurial action:

- There exists a market for the product.
- You know who your potential customers are likely to be.
- Your potential customers know what they want.
- They will actually do what they say—buy what they say they will buy, not buy things they say they will not buy, etc. Note that these two are not the same, nor are they symmetrical.
- You have the time and resources to talk to enough potential customers to figure out what they want and do not want.
- Your potential customers will not want completely contradictory features.
- There are no customers you do not know about.

You can combine the above into the most important and fatal assumption of all: Markets are out there, in an objective sense, and they can give you reliable, actionable answers. This implies that markets are not themselves artifacts of what you and others do. In other words, markets are mostly exogenous to human action, not endogenously created through it.

Not only entrepreneurs, but large established companies who can afford the best market research techniques and talents available, routinely make two bad bets based on these assumptions:

1. They make decisions assuming markets are more predictable than they are.
2. They miss out on making markets that could be made without resorting to prediction.

Effectual entrepreneurs choose to make the opposite set of bets, choosing to make the opposite error on predictability. They treat markets as artifacts and approach them as less predictable than they might be. Let us now consider how that enables them to overcome the isotropy problem.

How the Crazy Quilt Principle Helps Overcome Isotropy. If you approach markets as exogenous, but predictable, and you ask for information, advice, and feedback from *potential* customers, one of the interesting problems that arises is not that you do not get enough information, but that you get too much information. *Too much* in the sense that the information confuses, rather than clarifies, your understanding of the situation. If you now take seriously the idea that there may be other customer segments out there that you may not have predicted and widen the circle for your research, the isotropy problem of too much and too varied information without clear criteria to distinguish relevance only increases in quantity and intensity. No brainer as it may be, seeking more information does not usually reduce isotropy.

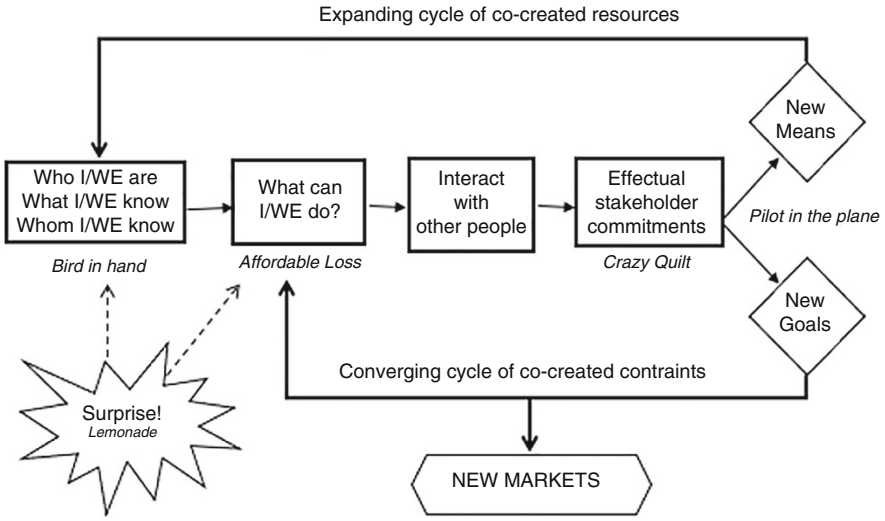

Fig. 1 The Effectual Process. Note: *Author's creation*

The only way to overcome isotropy is to ask for actual commitments, not merely information, advice, or feedback. In other words, market mechanisms such as deal terms, real investments of financial and nonfinancial resources, preselling, etc., are examples of ways to overcome isotropy. When someone says they will or will not buy something at a price, that is predictive information of little or no value to effectual entrepreneurs. But if someone underwrites the next step in the venture, by actually producing a prototype for you, or by introducing you to someone who can do a trial run without charging you up front, or signs a preorder that allows you to set up favorable terms with vendors, etc., then the next step is not a speculative bet. Instead it is an actionable task you can accomplish for affordable loss.

By stitching together a series of such actual commitments (See Fig. 1 for a graphic illustration of this process), effectuators end up cocreating a market that neither entrepreneurs nor anyone else might have predicted. Hence markets themselves become an artifact of the effectual process. In this sense, as Schumpeter argued, entrepreneurship is more about cocreating new markets than innovative products and ventures within extant markets.

Relevant information in the effectual process therefore gets its relevance from individuals and/or organizational actors who, for idiosyncratic reasons of their own, enable you to accomplish key venture-building actions for affordable loss. These individuals or organizational actors self-select into the process—an act characteristic of markets, not states. Yet the deal terms of each effectual commitment entail elements of governance, constraints on future actions, and future interactions with future self-selected stakeholders that become the building blocks of the hierarchy that comes to be as well. In other words, the effectual process offers the quintessential microprocess of mixing and matching market-like and state-like elements that

add up to actual new markets and new organizations that come to populate economies and societies. Ergo, it is worthwhile to take a bottom-up view of markets and states through an effectual lens.

3 Markets in Effectuation

It is worth explicitly acknowledging that I am assuming a world in which individuals are relatively free to act effectually, as in modern democracies in which there exist reasonable avenues for entry and exit into labor markets, different types of private and public organizations, and even some movement in and out of states. At least a minimal level of property rights and contract enforcement are also the norm in this analysis. Of course, this is not readily true for a large portion of humanity. But for the purposes of this analysis, I assume a minimal level of existing norms and institutions of individual freedom.

Is the existence of relatively free markets necessary for effectuation? Yes and no. Without belaboring the point, remember that effectuation is a method of shaping and cocreating institutions and environments, including institutions of freedom. However, an analysis of how effectuation can work under varying degrees of tyranny or coercive oppression is beyond the scope of this essay.

The Hayekian notion of variation in and across individuals, whether in the form of preferences and values, or experiences and situations that disperse knowledge and ignorance in totally unpredictable ways throughout society makes effectuation more efficacious. This is not surprising since effectual action is the micro-foundational prior to market transactions. The effectual process coheres well with the idea of markets as games without goods (Buchanan and Vanberg, 1991). The role of markets, from an effectual perspective, is not to optimize resource allocation, but to allow productive innovation to happen. In this sense, effectuation endorses a view of markets as (co)creative processes rather than allocative or discovery processes.

But the effectual process, as depicted in Fig. 1, also provides the microfoundations for the cocreation of organizations and institutions, not only products and markets. In other words, every effectual commitment from two or more entities, entrepreneurs and their stakeholders, results in shaping governance mechanisms related to the commitment. Each commitment also makes particular futures more predictable, as goals converge toward clarity while reducing isotropy. In other words, as the effectual process fabricates longer standing relationships and governance mechanisms, a more causal/predictive approach becomes feasible and even necessary in some cases. This implies that you can design, create, and set up governance mechanisms effectually, but once set up, it is far more difficult for them to operate effectually. This is a case of effectuation leveraging market processes to shape and cocreate hierarchies all the way from transactions to firms to polycentric governance systems and even states.

In sum, the effectual process can cocreate both markets and hierarchies, reshaping socio-political environments and states. In designing markets, effectuation can result

in new goals worth pursuing. At the same time, in designing hierarchies, effectuation may result in goal alignment of the kind that may hinder innovation. To the extent that effectuators seek to avoid quick goal coagulation and strive to keep both entry and exit of stakeholders open even as they build stable organizational structures, they can nurture markets as well as enduring ventures.

It is interesting to ask whether the above analysis can go in the opposite direction, namely, can states effectuate?

4 States in Effectuation

Experienced effectuators, including those who have built and are running large companies, will tell you that it gets harder and harder to effectuate as organizations grow. The very success and endurance of organizations develops a stiffening of the arteries through a creeping bias toward a belief in the predictability of the future, as well as an exaggerated estimate of one's own ability to predict. Even isotropy, inevitable in areas such as new product development, begins to be tackled through pretensions of predictability rather than with an explicit acknowledgment of the pervasive persistence of uncertainty and the various forms it can take. As illusions of predictability grow, nonpredictive techniques and processes that foster them get neglected and wither away due to disuse. Instead, leaders begin to tout strategies such as the need to see around the corner and *skating to where the puck will be* as the ideal path to innovation.

This clogging of arteries can take on an aspect of rigor mortis when it comes to states. It is not easy for states to act without clearly stated goals, budgets, and targeted stakeholders. Here the analogy of venture capitalists is much more appropriate to states than any allusions to entrepreneurs. People routinely confound investing, especially private equity investment involving other people's money (OPM), with entrepreneurial behavior. Yet it is easy to see why venture capitalists almost always are totally ineffectual, or rather, causal.

In actual fact, investors face multiple uncertainties, just as entrepreneurs do. Yet they embrace complex predictive approaches, confounding risk-taking with uncertainty-bearing. One reason for this misapplication of prediction to circumstances of Knightian uncertainty could be due to the fact that they invest OPM. This sets up high expectations of return from their (institutional) investors, who may be persuaded by their apparent predictive prowess in selecting high-potential ventures. Additionally, the need to design winning term sheets with predetermined milestones makes it even more difficult for them to not hinder, let alone facilitate, effectual approaches. As a result, they may come to believe in the illusion of predictability with regard to their own investments and in turn set up obstacles in the way of entrepreneurs trying to build ventures effectually.

In general, private equity investors' approaches, mimicked by so-called entrepreneurial states, consist in one or more of the following three strategies:

- Place a bet (net present value calculations).
- Place many bets (portfolio diversification).
- Place staged bets (real options).

The effectual process, in contrast, is about not placing a bet. As explained in detail elsewhere, bets involve taking event spaces as given and outside one's control. All one can do then is to calculate or estimate the event space to the best extent possible. The non-bet alternative is to focus on the conditioning assumptions that can be reified or falsified through effectual action so as to reshape the event space itself. For example, entrepreneurs are often taught to carry out market research to *find out* what potential customers want. In contrast, expert entrepreneurs discount market research because both presumptions of who *potential* customers are as well as any information they provide as to what they will or will not want can be inaccurate and unreliable. Instead, effectual entrepreneurs choose to cocreate product and market through precommitments, even before building prototypes, from actual customers. Actual sales, they learn, is the best form of market research. This further has the advantage that no major financial outlay is called for in starting new ventures.

This is precisely why it is important not to confound predictive investing and investors, especially those investing OPM with effectuating entrepreneurs. Discussions of entrepreneurial states or public entrepreneurs often confound the two, attributing entrepreneurial mindsets to investors and funding activities. This is not to say that investors cannot act or invest effectually. It is just that most investors, unless they are investing their own money, for example, angel investors, either do not or cannot act effectually. Just as states cannot or do not.

Only those investing their own money, with a willingness to lose what they invest for reasons or preferences of their own, can self-select into uncertain, isotropic projects. This is because reasons other than predicted upsides are called for in the effectual process. Variations in preferences and values and the infinitely splendored glass of textured lived experiences drive the effectual process. Unlike in the case of investing OPM, accountability is limited to delivering on particular commitments made and not to any overall promised upside outside the control of effectuators or a prespecified goal.

In order to justify their own fundraising as well as to keep up some semblance of accountability, investors of OPM turn to predictive approaches even when aware that these may not be reliable. Interestingly, we found in our empirical work that the more experienced a venture capitalist, the more effectual their approach. This could simply be a side effect of working with expert entrepreneurs and having deal flows heavier in effectual ventures as a consequence. Also, in the case of angel investors investing their own money, we found that the more effectual the approach, the higher their overall hit rate without reducing the number of home runs, again attesting to the fact that effectuation is not about placing large bets (Wiltbank et al., 2009).

Since states, and their representatives, elected or otherwise, almost always invest OPM (monarchies and oligarchies may pretend otherwise), they are much more likely to act like causal investors rather than effectual entrepreneurs.

5 Two Frameworks for Tackling Isotropy and Fostering Innovation

In general, individuals can exhibit and leverage idiosyncratic variation in ways and to extents that become unjustifiable in the case of larger fiduciary organizations, especially states. Justification typically takes shape in stated goals and/or predictive information argued to lead to the achievement of those goals. Once goals are set, they become difficult to change, especially as they begin to generate payoffs. These payoffs become predictable opportunity costs that are then weighed against isotropic innovative possibilities. Since the latter are unpredictable, it becomes harder and harder to make a case for them and easier to dismiss them as infeasible. Consider how both large firms such as the automobile giants in Detroit as well as various states around the world acted or failed to act in the face of carbon emissions exacerbating climate change. On the one hand are predictable opportunity costs such as jobs lost. On the other are a variety of isotropic innovative possibilities, each of which may or may not succeed in technical, financial, and political terms.

Logically, one would expect states to lead the way in taking on isotropic possibilities in the face of Knightian uncertainty. Yet history shows that it is individual entrepreneurs, using market transactions and/or collective action that lead the way. Not because states are inherently myopic and individual entrepreneurs are clairvoyant. But because it is easier for individuals (and some budget-owners inside organizations) to act based on subjectively calculated affordable loss rather than pseudo-objectively calculated expected return. Larger organizations and states follow as upsides become clearer to predict and envision. Eventually. This is true even in the case of basic science or technologies for defense, in which states make large a priori investments. Take the case of the internet. State investments led to the internet. But in addition to targeted technical developments, a variety of actions and interactions, intended and unintended, as well as effectual entrepreneurship over 15 years, helped reshape it into the universe of endless possibilities that it has become today. This reshaping involved idiosyncratic, even idiotic, transformations such as technologists inventing UNIX to play video games and college kids inventing Facemash to rate females on campus *hot or not* that became Facebook, leading to the fount of fortune and misery that is social media today.

There is something about the lived experiences of conscious human beings that seems to be an important input into all creativity leading to any kind of innovation, even serendipitous or accidental innovations. A purely calculative process leading to innovation seems unlikely, even absurd, especially in innovations in goals themselves, innovations in what is deemed worth pursuing or not. We will get to these in the concluding section of this essay. For now, let us organize the arguments so far into a usable conceptual framework in two parts.

Figure 2a and b depict the analysis above in a simplistic two-part framework that can nonetheless be useful for thinking through the role of markets and states in innovation. Figure 2a considers cases characterized by the need for funding, especially funding using OPM—other people's money. Figure 2b illustrates situations

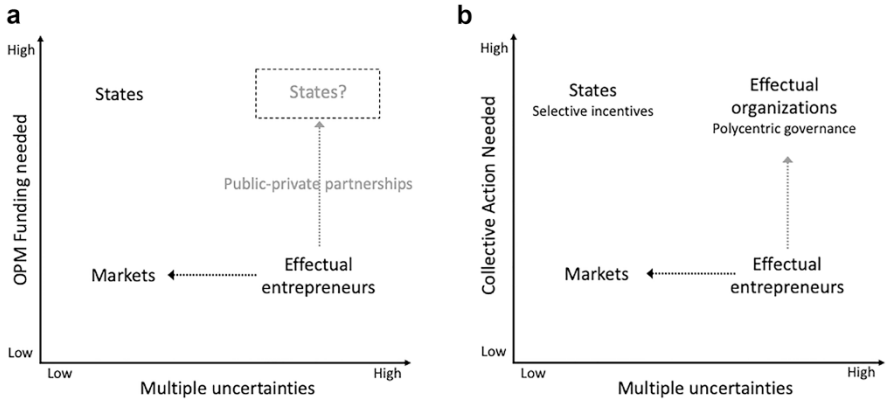

Fig. 2 **a**, **b** The role of markets and states in innovation. Note: *Author's creation*

requiring more than funding, such as those involving collective action even before funding becomes salient. These are usually dubbed situations of market failure. I will, however, eschew that term since it sets up an overly rigid dichotomy between markets and states and completely obscures the role of effectual entrepreneurs in building and reshaping both.

Figure 2a captures the argument that both markets and states will find it difficult to tackle the effectual problem space. Without restricting effectuation to individual actors, it is still easy to see why idiosyncratic individuals may be more likely to kick off the effectual process, even though the process almost immediately moves to more than one cocreative stakeholder, hence not an individual-level phenomenon at all. The point here is not about whether only individuals can effectuate. Rather it is to highlight the idea that something other than prediction-based reasoning is needed and used on the right-hand side of both Fig. 2a and b. In other words, waiting for consensus based on reasons and projections is not a necessary condition for effectual action leading to the cocreation of new markets. Means-driven possibilities within affordable loss are sufficient.

Once kicked off, the effectual process can stitch together several different kinds of partnerships, including public-private partnerships that can eventually lead to a larger role for states in funding isotropic possibilities whose promise might be more easily folded into politically palatable predictive approaches. In sum, when funding requirements are very large, states will have a larger role to play even though they may need to be cajoled into it through effectual action. SpaceX and other companies collaborating with state space agencies are cases in point.

Figure 2b addresses situations requiring collective action, such as those involving common pool resources or persistent inequities often ignored by those with power and privilege. In such cases, effectual entrepreneurship is even more crucial in the face of isotropic possibilities under Knightian uncertainty. In a recent study, we reanalyzed the data Elinor Ostrom had collected on how a variety of different stakeholders came together to cocreate polycentric governance mechanisms for the

administration of the water basins in the Los Angeles area (Sarasvathy and Ramesh, 2019). The reanalysis allowed us to spell out the effectual process that constituted its behavioral microfoundations. Studies have examined effectual action in other settings requiring collective action such as art movements (Callander, 2019; Olive-Tomas and Harmeling, 2020), disaster relief (Nelson and Lima, 2020), and communal well-being in first nations such as the Toquaht (Murphy, Danis, and Mack, 2020).

The literature on collective action argues for the need for selective incentives to induce individuals to contribute to the common good (Olson, 1965). In more predictable situations in which the path to societal goods might be clear even if the problem of selective incentives is large, states can provide those. Incentives provided to those reluctant to get vaccinated for Covid-19 are a case in point. However, when the situation contains isotropic possibilities in the face of Knightian uncertainty, effectual entrepreneurs have to kickstart the collective action process and even carry it forward for long periods of time before the environment gets reshaped enough to engender the political will needed. The years of *Don't ask, don't tell* even when presidents in office were morally supportive of gay rights are a case in point here.

5.1 Applying the Framework to Innovation Policy

A word on applying effectual approaches to innovation policy. While the development of scientific institutions such as universities, peer-reviewed journals, R&D departments, and national innovation funding agencies such as the National Science Foundation (NSF) attest to the importance of both public and private organizations, it is interesting to consider the role of smaller companies and even individuals in this arena. For example, partnerships between new (smaller) ventures and large established firms abound in several industries such as biopharmaceuticals, fintech, and telecommunications. Additionally, multinational firms routinely engage in corporate entrepreneurship of various kinds.

In examining the role of effectual entrepreneurs in this arena, it is important to note that innovation and valuable innovation are two different things. Furthermore, not all innovations, especially valuable innovations, are produced by scientists in R&D, whether within large companies or public sector organizations. Users, suppliers, and other stakeholders in the value chain often produce innovations that prove to be more valuable in terms of actual adoption in the market or even in creating new markets. In fact, innovators often miss markets because they rely on predictions about who the customers will be that later turn out to be incorrect. The CD-ROM, for example, was invented by scientists that auctioned it off just before their patents were about to expire. Using the invention for music was an act of effectual entrepreneurship. Even the internet served only scientists for about 15 years before it was commercialized by entrepreneurs who built more user-friendly interfaces allowing nonscientists to use it for a myriad of purposes.

In other words, while innovation policy has been shown to work in moving forward the frontiers of science, transforming that frontier and ensuing technologies into valuable products and markets seems to leverage the dispersion of knowledge across idiosyncratic individuals argued for by economists such as Hayek (1977) and Buchanan and Vanberg (1991). Such idiosyncrasies are impossible to predict ex ante, making effectual approaches invaluable, a point I will return to later in this chapter. Innovation policymakers need to carefully consider how to invite in effectual entrepreneurs or at least not barricade the system against them. One way to accomplish that could be to institute X-prizes such as the privately funding Ansai X-prize that kickstarted SpaceshipOne and the cocreation of the private space industry in recent times.

6 Markets and States as Outcomes of the Effectual Process

Any analysis of markets and states has to examine their role in human well-being and the societal innovation and productivity that feed into that well-being. As seen above, one organizing principle of markets consists in the role of idiosyncratic preferences. Whether attributed to the Adam Smith of *Moral Sentiments* or *Wealth of Nations*, preferences and values need not be extrinsically dictated and enforced, nor is collective consensus required before transactions happen. In fact, effectuation shows how market transactions can be one way for such consensus to come about and even for new frontiers for moral sentiments to be shaped both at individual and societal levels. Both new goals worth achieving and new governance mechanisms for alignment and enforcement can be forged through chains of intersubjective interactions in the effectual process.

However, market transactions are still deemed to be driven by expectations of the upside, whether economically or social-psychologically speaking. As proponents of markets have argued and social entrepreneurs have shown in practice, a wider range of problems can be tackled through market mechanisms than might have been conceptualized in economics textbooks. Recent examples include microfinance in the alleviation of poverty through entrepreneurship, income-share agreements to fund education, and of course renewable energy, as well as refugee entrepreneurship. Each of these, while not immediately and predictively tied to returns, do offer the possibility of economic upsides in the longer run that can fuel market-based creativity.

Yet, there do exist problems that do not have economic upsides, whether for individuals in their lifetimes or for society in the longer run. Caring for the elderly or the severely mentally ill comes to mind. The upsides in these cases are more difficult to capture in economic terms and even more subject to the three dimensions of the effectual problem space. My aim in bringing these examples to fore is neither to enter a discussion of market nor moral failures. Instead, it is to acknowledge the argument that states may be required for tasks beyond the facilitation or augmentation of markets.

States are insurers of last resort against the multiple uncertainties that characterize the effectual problem space in individual human lives. The invention and practice of taxation in human history is not an arbitrary development. The oft-repeated quote attributed to Benjamin Franklin, "Nothing is certain but death and taxes," uncovers a profound truth under the effectual lens, that has a different meaning than the one usually associated with it. Consider, for example, the fact that as life expectancy increases, taxes become even more important to protect us through the uncertainties that may accidentally debilitate us in physical, emotional, and other ways. Another example consists in the technologies that allow billions of people to survive and thrive, while concurrently threatening to unmoor us from our homes, spatially as well as temporally. It is a plausible hypothesis that immortality is not likely to reduce, let alone eliminate uncertainty. Hence funding for some form of insurer of last resort may be inevitable. Certainly for now, life is more uncertain, without death; and however unpalatable this fact, without taxes.

Political philosophy endorses the fact that at the minimum, the most important task of states is protection. That includes protection from the uncertainties of life. Yet paradoxically, their structure, whether in terms of hierarchy and bureaucracy, as well as their function in terms of investing OPM collected through differing degrees of coercive force, makes it more difficult for them to use effectual techniques. From an effectual perspective, therefore, it is time to rethink states as artifacts of effectual action, not only arenas within which markets and organizations function. History shows us how labor markets and state institutions were reshaped in concurrence with the development of the scientific method. Hence we routinely accept state investments in basic science so long as the investment decisions are overseen by reliable and reputable scientific bodies and made accessible sooner or later to private enterprise as well. I see a similar evolution of new institutions and radical rearrangements of the roles of markets and states driven by the effectual entrepreneurial method.

Human well-being requires investments in the productive without giving up on the seemingly unproductive. In fact, as already mentioned in the case of UNIX and social media, unproductive situations and experiences produce new goals worth pursuing. In conventional dichotomies of markets and states, market mechanisms are notoriously bad at fostering unproductive activity. Their efficiency is the efficiency of separating wheat from chaff. This may be arguable, but not unreasonably so. Hence, also arguably, only states can step in to take up the slack to take care of those who need care, productive in the longer run or not. But the analysis I offer here from the effectual perspective uncovers a process that sifts and reshapes relationships between markets and states in a dynamic way. Both markets and states become inputs into the effectual process. But they are also refabricated outcomes of the process.

7 The Ultimate Innovation: Goals Worth Pursuing

In *Development as Freedom,* Amartya Sen explained that to thrive, humans need to choose their own ends, not merely get access to resources for achieving externally set developmental goals. In building multiple ventures, including successes and failures, expert entrepreneurs learn the same lesson through the principles and processes of effectuation that help engender goals worth pursuing. Additionally, this process of shaping new goals not only leverages market-like variations in the lived experiences of individual stakeholders, but is also crucial to build viable governance mechanisms that coalesce into enduring ventures and environments that nurture them.

At the extreme, an argument could be made that if we already know with clarity and precision which goals are worth achieving and can predict with reasonable accuracy how to achieve them, we may not need markets or states. Or the effectual process. Or conscious, lived human experiences for that matter. We could program artificial intelligence (AI) to structure societies that offer comfort and efficiency in the achievement of the chosen goals with Bitcoin for currency and Ethereum for enforcing property rights and contracts. However, even with AI and unfettered digital decentralization, it is not clear which goals are worth achieving. Hence, the most important goal might be the freedom to fashion new goals arrived at through the push and pull of variations in lived experiences not subject to static frameworks neatly sifting positive from negative valences in those experiences. Furthermore, new goals can also emerge in the process of achieving old ones. And unsavory unintended consequences can arise from the very acts of prescribing and pursuing preset goals that were deemed worth achieving. All of these get embodied in the effectual problem space.

The effectual problem space brings into stark relief the question I began this essay with: Even as we strive to find best-possible solutions to achieve goals we believe are worth achieving, what are we willing to live with if we get it wrong? We know from behavioral economics that we react differently to losses than to gains. For example, we experience aversive feelings in response to a loss of $5 more acutely than positive feelings when we gain $5. In terms of goal-setting, this shows up in a different asymmetry. It is easier for us to know what we do not want than what we do. It is easier, for example, to teach children what not to do to avoid bad consequences than how to take action to achieve good outcomes. *Avoid talking to strangers* does not usually tell us how to form new friendships and build lasting relationships. Similarly, when it comes to governance, even at the level of states, it is easier to choose from loss aversion, *Avoid job losses* than foster ways to create jobs. Or worse still, create jobs while saving the environment.

As we have seen in the analysis above, the lessons that entrepreneurs learn could be of use here. But that requires us to invert traditional conceptualizations of goals and prediction in good decision-making. Isotropy compels us to confront the fact that we face Type I-Type II errors more often than we would like to believe. Consider this at the meta-decision level. We could erroneously deem the future

more predictable than it may be and goals clearer and more worth achieving when they may not be. Similarly we may also be wrong in seeing the future as less predictable than it actually turns out to be or unnecessarily or frivolously question extant goals.

However, note that the errors in both directions involve unpredictability. Thus the question of which error we are willing to live with if we are wrong lurks around the corner of *all* our decisions. This pervasive, persistent unpredictability looms larger at the state level, where wealth and power can deepen, enlarge, and painfully exacerbate either error. That is why building and shoring up effectual toolboxes and processes in addition to predictive decision-making is important. A new focus on downsides, not as prices to be paid for predicted upsides in the risk-return space, but as skin in the game in attempts to fashion goals worth pursuing even in the face of near-certain failure, has to become a more explicit part of the public discourse.

Without the seemingly solid anchoring of decisions to achieve clearly specified goals through strategies based on good quality predictions, we feel at the mercy of idiosyncratic preferences and the vagaries of power politics. Effectual entrepreneurship offers practical guidance based on cumulated evidence on how idiosyncratic preferences can be transformed step by step into productive and innovative governance mechanisms that in the process, allow us to arrive at new goals worth pursuing. In fact, functioning markets and states that we take for granted rest on underlying microfoundations of effectual action and interaction. Uncovering the movement beneath reveals not chaos, but a set of systematic principles and a learnable logic that propels the process forward.

History shows uses for both markets and states. Both have arguably been important for humans to survive and thrive. Yet history also offers cautionary tales of presumptions about what constitutes thriving. It may be time to realize that we need principles and processes that can design and reshape markets and states without defining a priori which goals lead to thriving and are therefore worth pursuing. The freedom to design purpose itself. Coming full circle, is not that why we invented markets and states in the first place?

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