Effectual Networks:
A pre-commitment approach to bridging the gap between opportunism and trust

Saras Sarasvathy
University of Maryland

Nicholas Dew
University of Virginia

January 5, 2003

We would like to thank the Batten Center for supporting this research. We would also like to thank the following on specific contributions to our thesis: Anil Menon for his relentless insistence on more precise formulations of effectual reasoning and suggesting the importance of "grue;" Jim March for his conversation and for inspiring us to dig into Type I and Type II errors; Rob Wiltbank for firming up the section on opportunity costs; and Stuart Read for helping us clarify our writing.

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Abstract

One of the theoretical puzzles concerning how organizations and markets come to be has to do with our fundamental behavioral assumptions. While economic theories are built on assumptions of opportunism, organizational and sociological theories either look for existing structures of trust as ways to overcome opportunism, or emphasize the role of a third-party arbiter. In this paper, we bring together two existing concepts in previous literature, namely, docility and effectuation, to construct a pre-commitment approach to the creation of new networks that proceeds in the face of motivational uncertainty – i.e. *irrespective of assumptions of opportunism or trust*. We develop our synthesis within the context of new market creation in entrepreneurship.

Instead of strong behavioral assumptions based on opportunism or trust, we begin with the far weaker assumption of docility – i.e. the fact that human beings are, to varying degrees, *persuadable*. Furthermore, in the context of extremely nascent or non-existent markets, actors may not only be uncertain about each others' motivations, but may be unsure of their own future preferences and goals. Under such circumstances of combined motivational and environmental uncertainty, non-predictive strategies such as effectuation are called for in creating and managing new networks. The effectual pre-commitment approach we develop in this setting is analogous to other pre-commitment approaches developed in areas such as finance, jurisprudence, and economic psychology. A pre-commitment is defined as a self-imposed non-negotiable constraint that stacks the deck in favor of or against specific future choices.

On November 8, 1767, Josiah Wedgwood, a short, stocky Staffordshire potter with a pock-marked face and a limp, wrote a letter to persuade Thomas Bentley, a "gentleman" philosopher from the English upper crust, to join him in a venture that created a highly valuable brand that survives and generates economic profits to this day. In his letter, Wedgwood listed one by one Bentley's objections to beginning their partnership and ways to overcome them:

"I have read your letter many times over, and find several of the objections to our near approach may be surmounted…

The first is, "Your total ignorance of the business"; that I deny, as friend Tristram said to St. Paul. You have taste, the best foundation for our intended concern…"

He went on to solve each of Bentley's objections until he came to the most difficult one, the one that "staggers my hopes more than everything else put together" – namely, "Can you give up the rational and elevated enjoyment of your Philosophical Club for the puerile *tete-a-tete* of a Country fireside?" It is here that we find Josiah at his persuasive best:

".. and if you think you could fall in love with, and make a Mistress of this new business, as I have done mine, I should have little doubt of our success, for if we consider the great variety of colours in our raw Materials – the infinite ductility of Clay, and that we have universal beauty to copy after, we have certainly the fairest prospect of enlarging this branch of Manufacture to our wishes, and as Genius will not be wanting, I am firmly persuaded that our *proffits* will be in proportion to our *application*, and I am confident that it would be beyond comparison more congenial, and delightful, to every particle of matter, sense and spirit in your composition, to be the Creator as it were of beauty, rather than merely the vehicle or medium to convey it from one hand to another, if other circumstances can but be rendered tolerable." (E.18432-25)

At a completely different place and time, in early 1994, Bill Foss loaded Mosaic (the world's first web browser created by Marc Andreesen) onto his computer and watched as Jim Clark clicked his way through the internet. As Reid (1997) describes it, "It was Clark's first glimpse of the Web. Before he was done, he E-mailed Marc. `You may not know me, but I'm the founder of Silicon Graphics,` his message began." Reid goes on to explain that the first few meetings between the two men did not go very well: *Foss remembers Marc as "this kind of ungainly twenty-two-or twenty-three-year-old kid [who] doesn't quite know what to make of this corporate culture, so he's put a* tie *on" (ties were passenger-pigeon rarities in the corridors of the company Clark had founded)… But.. Marc "kind of built up his comfort level with Jim" over the subsequent weeks, Foss recalls.*

The history of entrepreneurial new market creation is full of unusual partnerships leading to the emergence of new networks that eventually ripened into new markets and organizations. When we examine the antecedents of these relationships and the subsequent development of the networks they engendered, it is rather difficult to get our hands around this phenomenon under our existing theoretical lenses, which either begin with an existing profit opportunity and the need to overcome opportunism or explain opportunities as a direct result of existing and well-defined social networks. Instead of arising naturally as a consequence of existing social networks, several of these seminal relationships began as intentional or co-incidental garbage

cans (Cohen, March, & Olsen, 1972), such as the one in which Clark and Andreesen found themselves. Josiah Wedgwood, too, was introduced to Bentley through his physician while he was laid up in bed in Liverpool for many weeks from a knee injury. As Koehn (1997) describes it, "This meeting was a fortuitous one for both men. It inaugurated a long friendship of great depth and intimacy, as well as one of the most important business partnerships of the eighteenth century."

The focus of this paper is to analyze how such relationships that do not have the luxury of drawing upon existing networks of trust (i.e. in the face of *motivational* uncertainty) and/or clear specifications of profit opportunities (i.e. in the face of *environmental* uncertainty) get started and grow into networks of value creation in the economy. In this task, we draw upon two key conceptualizations by earlier scholars. With regard to motivational uncertainty, we use Simon's (1993) notion of *docility* and combine it with Sarasvathy's (2001) exposition of *effectuation* for dealing with environmental uncertainty. Together the two get synthesized into a "pre-commitment" approach to network creation that is analogous to other pre-commitment approaches developed in areas such as finance, jurisprudence, and economic psychology. As we will elaborate in detail later, a *pre-commitment* is a self-imposed non-negotiable constraint that stacks the deck in favor of or against specific future choices.

Although no credible scholar in the social sciences truly contends that either unvarnished opportunism or naïve altruism is the primary empirical fact, many of us do unhesitatingly accept one or the other as the predominant assumption for our *theorizing.* We will begin by establishing this claim through a concise literature review. We will then argue for a more parsimonious set of behavioral assumptions consisting only of bounded rationality and *docility*, defined as the tendency to be persuaded by others. Next we will construct a pre-commitment approach to

network formation in the particular context of entrepreneurship, defined *a la* Shane & Venkataraman (2000), as the creation of future goods and services in the absence of current markets for them. The crux of the approach is that it works *irrespective* of motivational assumptions – i.e. the approach does not depend on whether we assume opportunism or trust or both or neither. Finally we will trace out a hypothetical development of this effectual network and delineate observable differences in the temporal architecture of such networks.

Literature Review: Thesis and Antithesis

Opportunism, defined as self-interest seeking with guile (Williamson, 1975), is a fact about human behavior. As is trust, defined as affect-based belief in moral character (Wicks, Berman & Jones, 1998). Yet, taking one or the other as more fundamental and prior in our set of behavioral assumptions has led to a deep rift in our theorizing. On the one hand, management researchers often observe the role trust plays in business relationships, both inside and outside the firm (Adler, 2000). Trust is observed as an important lubricant in inter and intra-organizational life. On the other hand, economists have built models with powerful explanatory value based on assumptions of opportunism, diametrically opposed to trust (Williamson, 1985).

So, while organizational literature provides evidence for the presence of trust and group identification, it has to deal with the existence of opportunism and has to come to grips with transaction costs. TCE in turn has been criticized (Donaldson & Preston, 1995, Moschandreas, 1997, Moran & Ghoshal, 1996) as an anti-managerial theory – treating all individuals as crooks. In other words, the opportunism assumption does not fit well with many managers' actual experience of life in firms.

Sociologists have tried to leap across this theoretical divide by positing a *tertiary gaudens* of one kind or another, who through the good fortune of his/her position in a social network acts

as an arbiter of trust and legitimacy between two opportunistic parties. James Coleman, for example, identifies three different kinds of intermediaries in trust, one of which is the entrepreneur: *The entrepreneurial function is one in which the intermediary induces the trust of several trustors and combines these resources, ordinarily placing them in the hands of one or more other actors who are expected to realize gains for the original investors* (1990: 181). He has no explanations, however, for *how* the entrepreneur induces such trust. And finally, there are those who trust in the government, as the *tertiary gaudens* of ultimate resort (Olson, 1986).

Each of the three streams of theorizing, namely, TCE, trust and social networks, are rather vast. So our review below necessarily has to be incomplete. But the key claim we wish to establish through the review is that both opportunism and trust/altruism are empirically valid and theoretically compelling descriptions of human behavior. Furthermore, both strong ties (signaling a role for trust-based networks) and weak ties (signaling a role for transaction cost based networks) appear essential to the formation and evolution of networks that create economic value.

We can trace back the theoretical rift in our behavioral assumptions to a partial reading of Adam Smith. Economists often cite and build upon *The Wealth of Nations,* (Smith, 1776), in which Smith developed his ideas about the spontaneous benefits of selfishness, an idea he got from Mandeville (1714). The oft quoted but mostly misunderstood passage from that book concerning the butcher and baker (Baumol, 2002) forms the basis for economists' generalization of the fundamental behavioral assumption about human self-interest. But his (arguably) most important work, *Theory of Moral Sentiments* (Smith, 1759) needs to be consulted if we are to have a complete picture of his position on the matter (Werhane, 1991; Sen 1985). By ignoring this latter work, economists have set the stage for a continuing debate between their own

normative theorizing and the observed empirical experience of human transactions, both within and outside organizations.

The notion of opportunism, defined as "self-interest seeking with guile" however, is more recent and can be found in Williamson (1975). It is important to note here that Williamson is not saying that opportunism is always at work; he is only saying that contracts should be made on the assumption that it *could be* at work. In other words, contracts should be made with an eye to the opportunistic potential they offer.

The work of Douglas North (1978) in economic history illustrates well both the potential for and limits to economic analysis built on assumptions of opportunism. In using opportunism driven transaction costs as prime movers in economic history, North had to provide an explanation for the observed evidence of successful collective action such as the voting paradox, the absence of free riding in various human organizations, the pervasiveness of charity and so on. In seeking to explain these manifest phenomena, North introduces the notion of "ideology" as the missing factor in economic analyses. However, North does not have an underlying explanation why people should buy into "ideology." Similarly, scholars who argue in a stricter neoclassical vein, such as Stigler & Becker (1977) and Becker (1996) and Gauthier (1984) all have the problem of not being able to account for why rational actors would acquire beliefs and behaviors that are not in their narrow self interest. While North's conclusions also cohere with Arrow (1974) and Sen (1985), others have posited other exogenous factors such as the Protestant ethic (Weber 1905).

Yet others have solved the problem by arguing for the necessity (and in some cases the sufficiency) of a tertiary gaudens, either a third party or an institution that serves as a guarantor or arbiter of good behavior. Olson's "logic" of collective action, for example, builds on the logic

of the tragedy of the commons to suggest selective incentives promulgated by a *market-augmenting* government. At the most general level, all these economic arguments together present one approach to the quintessential issue of social order: an *institutional* solution that imposes or incentivizes collective action. Hobbes needed the Leviathan to impose order. Similarly, modern institutional theory relies on the law as the keeper of last resort, providing a structure for contractual relations that help overcome the inherent conflict classically captured in the prisoner's dilemma.

Organizational scholars provide a different solution to the social order problem, namely, that order is enabled by relationships of trust that exist between actors. This literature denies that the prisoner's dilemma situation can only be ordered by meta-contract – i.e., law – and instead relies on trust, a dispersed, local lubricant for deals, bubbling up from beneath. Adler (2000), for example, argues that there are 3 ideal types of organization, Besides the standard Williamsonian market/price and hierarchy/authority, Adler adds a third type, based on community/trust. In this s/he echoes Ouchi's categories of markets, bureaucracies and clans (Ouchi, 1980).

In recent years, both theoretical and empirical work on trust by management scholars has proliferated. But almost all of this work starts with and continues to tie itself around the notion of opportunism in one way or another. For example, the organizers of the 1998 AMR special issue on trust point out in their introductory essay how scholars from a variety of fields cohere on the meaning of trust (Rousseau et al, 1998):

> *To answer our initial question, scholars do appear to agree on the fundamental meaning of trust. Trust, as the willingness to be vulnerable under conditions of risk and interdependence, is a psychological state that researchers in various disciplines interpret in terms of "perceived probabilities," (Bhattacharya et. al. this issue) "confidence," and "positive expectations" (e.g. Jones & George; Hagen & Choe; Das & Teng, all this issue) – all variations on the same theme.*

In a similar vein, sociologists too contribute to the strength of this key role for trust in our theorizing -- sometimes by locating it in tertiary arbiters (Coleman, quoted earlier) and at other times in socially embedded properties of relationships among people (Granovetter, 1985) or institutions (Zucker, 1986). Granovetter, for example, argues strongly that social embeddedness is essential for economic networks to work. In sum, in almost all of the literature on trust and legitimation (Perrow 1970; Dowling & Pfeffer, 1975; Parsons 1960; Ashforth & Gibbs, 1990), opportunism is still the fundamental and prior assumption about human behavior. Trust and legitimacy derive their importance primarily from the necessity to overcome the risk of opportunism and the onerous infractions of inter-dependence on the pursuit of self-interest.

The empirical evidence on trust, legitimacy and the pursuit of self-interest provide somewhat less of a basis for assuming such a fundamental and prior position for opportunism in our theorizing. More importantly, the evidence suggests that neither opportunism nor trust can possibly form clear bases for predictions about human behavior. Both are confounded not only by heterogeneity in behavioral traits and choices, but are situated and change over time. Dawes and Thaler (1988) capture this in an eloquent passage:

> In the rural areas around Ithaca it is common for farmers to put some fresh produce on the table by the road. There is a cash box on the table, and customers are expected to put money in the box in return for the vegetables they take. The box has just a small slit, so money can only be put in, not taken out. Also, the box is attached to the table, so no one can (easily?) make off with the money. We think that the farmers have just about the right model of human nature. They feel that enough people will volunteer to pay for the fresh corn to make it worthwhile to put it out there. The farmers also know that if it were easy enough to take the money, someone would do so.

In fact, what we know about self-interest based on empirical evidence, both in the lab (See Rabin, 1998 for a comprehensive review) and in the field suggests the following:

1. People are not solely or even massively self-interested; nor are they entirely altruistic.
2. The same person may be altruistic at certain times and opportunistic at others. (Ex: Robber barons such as Andrew Carnegie)

3. People who are predominantly opportunistic in one domain may be concurrently altruistic in others (Ex: The Godfather)

This level of variance both in situated and dynamic terms is further attested to by scholars who have examined the strength of ties that lead to the formation and evolution of networks that play a large part in economic value creation. For example, while Granovetter (1973) and Burt (1992) have argued for and gathered evidence on the importance of weak ties in the creation and sustenance of competitive advantages for firms, Larson (1992) and Uzzi (1997) have attested to the role for the opposite. Finally, Hite has argued for the differential advantages of each depending on the stage in the life cycle of the firm.

In sum, both the volume of theorizing and the weight of the evidence suggest that it might be fruitful to move away from strong behavioral assumptions of either opportunism or trust-based ties toward a more realistic starting point – namely, that in most cases at the beginning of the formation of a network, actors simply cannot predict the motives of those they interact with nor can they always predict their *own* motivations. Therefore, if we start with the idea that new networks form in a context of motivational as well as the more familiar environmental uncertainty, we need to ground our theories in a more parsimonious and pragmatic set of behavioral assumptions rooted in our biological evolution rather than in economic philosophy. Simon (1991) suggested such an assumption called "docility."

Toward a new synthesis – Docility

Simon defined "docility" as: *The tendency to depend on suggestions, recommendation, persuasion, and information obtained through social channels as a major basis of choice.* (1993: 156) Docility follows directly from the limitations of human cognition – i.e. that as a species, we are at best, boundedly rational. Simon developed a notion of "intelligent" altruism based on this

notion of docility to argue that bounded rationality not only limits our ability to undertake the computational demands of highly opportunistic behavior, but also selects such behavior out (in an evolutionary sense) and selects in those who are willing and able to depend on others and help sustain others in a group. More recently, Knudsen (2002) has argued for the role of docility in the emergence of altruism in biological populations. The case for the evolutionary dominance of intelligent altruists is also well-argued from perspectives other than those resting on docility. Hill (1990) for example shows that under the normal assumptions of neo-classical economics, the invisible hand of the market will tend to weed out persistently opportunistic behavior. Also, without resorting to evolutionary arguments, Adam Smith himself had made the case for the fundamental behavioral assumption of persuasion in all economic exchanges:

> *"Different genius is not the foundation of this disposition to barter which is the cause of the division of labour. The real foundation of it is that principle to perswade which so much prevails in human nature… We ought then to mainly cultivate the power to perswasion, and indeed we do so without intending it. Since the whole life is spent in the exercise of it, a ready method of bargaining with each other must undoubtedly be attained."* (Smith, 1978: 493-494)

It is extremely important to note that for our purposes in this paper, the minimal set of behavioral assumptions consisting of bounded rationality and docility is *sufficient*. The implications that Simon derives for intelligent altruism are relevant only to the extent that Thompson (1998: 305) suggests:

> *Because selection has sometimes favored individualistic and at other times collectivist behavior, the human species has evolved not only the capacity for both kinds of action but probably also a complex cognitive device for figuring out in a given situation which kind of action, collective or individualistic, is likely to produce the best genetic outcome.*

Simon's central argument implies that by restricting our behavioral assumptions to bounded rationality and docility, we can theorize in a space of unknown human motivation and even explain and empirically test the emergence of particular motives and goals. *How* we can go from docility and a space of unknown motivations to the actual cohesion of ordered pools of

preferences embedded within matched up demand and supply schedules in a market is the subject of our synthesis.

The synthesis: Effectual Networks

To summarize the discussion thus far, today our theoretical picture about economic behavior is dichotomous, with both extremes anchored solely on the motive of economic gain. At one extreme we have the idea that motivations based on economic gain induce us to form networks of loyalty through structured incentives and in/complete contracts. At the other, we are urged that existing networks of trust and loyalty are necessary to achieve economic gain. If we are to move away from this dichotomy, it might be useful to start with a relatively unknown distribution of plural motives (economic and otherwise) and endowments that cannot always be known a priori (both one's own and those of others) and then model a boundedly rational and docile process of discovery/formation of common motives based upon and leading to elements of group identification – that in turn spark the transformation of combined endowments into new economic value -- in short, the notion of "effectual" networks.

"Effectual" here refers to the type of reasoning that has been shown (Sarasvathy, 2001b) to work in a relatively non-predictive (Knight, 1921), sometimes non-adaptive (Weick, 1979), overall non-teleological (March, 1982) problem space. In modeling a boundedly rational and docile process that moves us from motivational uncertainty to new markets as we observe them in the world, we draw upon Sarasvathy (2001a) to provide the principles and logic that underlie decision making under environmental uncertainty. The overall logic of effectuation is based on the primacy of non-predictive control over predictive strategies. In a nutshell this logic boils down to the following statement: *To the extent you can control the future, you do not need to*

predict it. According to Sarasvathy (2001a) this logic of non-predictive control is operationalized in three effectual principles as follows:

- Affordable loss rather than expected return
- Partnerships rather than competitive analyses
- Leveraging of contingencies rather than avoiding them

We will develop our central thesis about effectual networks as follows. First, we will describe how networks in general come to be and identify what makes a network effectual. The key idea here is the concept of a *pre-commitment* with regard to the shaping of an as yet unborn future. Then we will carve out the temporal architecture of an effectual network as it moves from and reshapes an environment of true uncertainty to one that is for the most part predictable and manageable along certain dimensions. Instead of starting with opportunism and searching for ways to overcome it, as most extant literature does, we will start with uncertainty where the free rider problem is irrelevant since the wagon is not yet in existence, and trace both the fabrication of the wagon and the tracks on which it rolls so free riders are able to climb on board down the road. See Figure 1 for a graphical representation of this idea.

A simple typology of how networks come to be

We start with a simple typology of how new networks may be initiated:

- Networks may form through random chance (Ex: Two or more people bump into each other at the mall or happen to sit next to each other on an airplane)
- Networks may form in some path dependent fashion (Ex: Through garbage cans). These can be intentional or unintentional
- Networks may form through the deliberate activation of an existing network – again either with regard to achieving a pre-determined goal (causal initiation) or by imagining ways to exploit an extant network (effectual initiation)

Irrespective of how a network is initiated, what makes an emerging network *effectual* is the *pre-commitment* to an effectual principle.

The pre-commitment approach in general

The notion of pre-commitment is not a new one. In financial economics, the pre-commitment approach is used to create incentive-compatible regulation that would enable regulators to ensure that riskier banks maintain higher capital holdings. The outline of the problem under consideration in this literature is as follows: The central bank (say, the Federal Reserve in the US) requires each ordinary bank in the economy to hold minimum capital reserves to cover possible losses in its trading account for the ensuing time period. For the protection of investors as well as for the efficacy of its own monetary policies, the central bank needs to set this amount equal to or more than the maximum value of expected loss in the trading account for each individual bank – i.e. commensurate with the risk associated with each individual bank. But how is the central bank to predict how each individual bank will behave in any given period?

Under the pre-commitment approach to solving this problem, the central bank does not try to predict the maximum value of expected loss for each bank for each period. Instead it merely requires that each bank *pre-commit* at the beginning of the trading period to its own chosen levels of expected loss, subject to penalties if the actual loss at the end of the period exceeds the announced value (Kydland & Prescott, 1977). The logic of this approach is that the regulator needs no information ex ante with regard to the riskiness or opportunistic potential of each bank (that is, the regulator can extract private information ex post by observing how much capital each bank chooses to hold after setting the unique penalty rate).

The notion of pre-commitment has wider uses than the one in financial theory. Sumner (1987), for example, provides a Utilitarian justification of rights based on a strategy of pre-commitment. His use of the notion amounts somewhat to the following: *When we anticipate the*

making of a decision at some future time, "pre- commitment" is something like "stacking the deck" in the present for or against one of the choices which we might make on a future occasion (www.lawrence.edu/fac/boardmaw/RIGHTS_PRE-COMMT.HTML).

The principle of "presumption of innocence" in the US justice system is an example of a pre-commitment. This principle requires that while a judgment "beyond reasonable doubt" is required to convict someone of a crime, this standard need not be met in order to acquit. The point of this asymmetric "pre-commitment" is that if mistakes are made, they are more likely to be in acquitting the guilty than in convicting the innocent. This particular pre-commitment embodies both (a) a *value* that it is worse to place an innocent person in jeopardy than to free a guilty person; and (b) a *judgment* that it will in general be more difficult to prove innocence, even when the defendant is innocent, than to prove the guilt of a guilty defendant. Therefore, by making a pre-commitment to the presumption of innocence, the deck is "stacked" against conviction in the way the process is defined.

As individuals and organizational actors, we use pre-commitments all the time. In his Ely lecture, Schelling (1984) lays out the problems and practices of effective self-command and provides a wide variety of examples where individuals make pre-commitments against changes in their own future preferences. This type of pre-commitment is incorporated into techniques for overcoming addiction. For example, when going on a diet, the dieter might assign the task of grocery shopping to a trustworthy (from the point of view of nutrition) spouse, thereby pre-committing to the spouse's choices and eliminating or reducing the possibility of having high-fat items in the refrigerator.

Pre-commitments create self-imposed *non-negotiable* constraints on our future choices[1]. In doing this, they help skew the distribution of future outcomes in at least three ways:

- They create a trade-off between Type I and Type II errors in the face of uncertainty and thereby "stack the deck" with regard to the shape of the future distribution in favor of either *one* of Type I or Type II errors. The presumption of innocence, discussed above, is an example of this effect.
- They help free the decision maker from the opportunistic behavior of participants to a process along certain specific parameters. In the case of capital reserve requirements imposed by a central bank for example, by allowing individual banks to choose their own levels of pre-commitment to reserve levels with advance knowledge of penalties for non-performance, the central bank skews the outcome in favor of its own goals irrespective of the (opportunistic or altruistic) motivations of each individual bank.
- And in problems involving self-command, pre-commitments align our own future preferences (that may be swayed either by moments of weak resolve or by changes in our circumstances that lead us into temptation) with our current preferences forged in a moment of high resolve or when cooler judgments prevail.

In each example where the pre-commitment approach has been effectively utilized, it has served to reduce uncertainties about the future without having to rely on *predictions* about what the future will be, in the sense of an exogenous "state-of-nature." Instead, the pre-commitment approach serves as a mechanism of *non-predictive control* (at least partially) *irrespective* of what exogenous factors might constitute the state-of-nature that actually comes to be. In other words, the pre-commitment approach rests on our ability to partition future states into things outside our control and those within, allowing us to *act upon* those pieces of the distribution that are a direct result of human action.

The pre-commitment approach to building effectual networks: A thought experiment

We now turn to the construction of a pre-commitment approach to the creation of new networks. In this effort we will, for the scope of this paper, restrict ourselves to a network that

[1] In this, pre-commitments act as the inverse of incomplete contracts and real options.

creates a new market for a new product, say widget *X*. To clarify key elements of our theoretical development, we use a thought experiment (Folger, 1999) as follows:

Let us assume Entrepreneur *E* has invented widget *X* (or come up with the idea for *X*) and goes to Customer *C* to make a sale. For the moment, it does not matter whether we assume that *E* is proceeding causally (i.e. has found *C* through market research) or effectually (i.e has found *C* through her existing social network or some kind of a garbage can).

Let us further assume that she wants to sell 1,000 units of *X* to *C* at $100 a piece. Let us now imagine that *C* says the following:

"I will gladly buy *X* if only it were blue instead of green."

Now *E* has a decision to make. Should she go ahead and invest in making the widget blue (cost $10 K, say)? There are several criteria she may consider in making this decision. First, she may or may not have the $10 K needed to make the modification. Second, if she does make the modification, *C* may or may not buy. Third, there may or may not be other possible customers (say, *D*) who may be willing to pay >$100 (say, $120) per unit for a green *X* – i.e. for the widget as is, without any modification.

Assuming that *E* has the money to make the modification, *E* needs a mechanism that will decide whether *C* is indeed a customer (T) or is actually a non-customer (F) who will not buy the modified blue *X*. This mechanism, like any other mechanism we can devise will of course be prone to two types of errors. It may either classify *C* as (F) when *C* is indeed a customer (Type I error); or, it might classify *C* as (T) when *C* is actually not a customer (Type II error).

Again, assuming *E* has the money to make the modification, there are 3 possible solutions to this problem:

Solution 1: *E* goes in search of other possible customers *D* first. If no *D* exists, then *E* gets *C* to sign a contract that penalizes *C* if he decides not to buy the modified widget. This is psychologically highly unlikely unless *E* and *C* have an ongoing relationship of trust. In the case of an emerging new network, *C* faces two types of uncertainties leading to contractual hazards here. (a) *E* may not be able to deliver the modified widget as per contracted specifications (unknown competence); or (b) it might not be possible to specify very clearly in advance what exactly *C* wants modified and *C* could find himself in trouble by signing an incomplete contract.

Solution 2: *E* invests (or goes out and raises) $10 K in expectation of the net profit due to the order from *C*. Without an enforceable contract, this expectation is unreliable at best as a decision criterion. But *E* could also do this effectually, using the affordable loss principle – i.e. not with the expectation of any net profit from a potential transaction with *C*, but merely as an investment that she could afford to undertake (and lose) with imagined possibilities of other uses for the blue widget in case *C* chooses not to buy. In this weakly effectual case too, this investment is not a reliable one for market creation except in its potential for effectual exaptation (Dew et al, 2002).

Solution 3: The final solution to the problem is the strongly effectual one consisting of any mechanism that reduces Type II errors at the cost of incurring Type I errors. In other words, an effectual pre-commitment embodies any rule that *always* favors the error of letting possible customers go as opposed to letting non-customers drive the decision process. In our current thought experiment, the effectual pre-commitment takes the form of the following counter-offer to *C:*

"It will cost me $10 K to make the modification you suggest. I will make the modification if you will put up the $10 K up front. In fact, if you will pay for the modification, I will even supply you the modified widget at $80 per unit, so ultimately you will end up saving money on this purchase."

[Note that this solution does not require *E* to search for all possible *D*'s before making the counter-offer. We will examine the logic for this in a separate section below]

Now it is *C*'s turn to decide if he wants to commit $10 K for making green *X* into blue. Again, (1) *C* may or may not have the $10 K; (2) *E* may or may not deliver the modified widget; and, (3) *C* may

be able to find someone else to make the blue *X* for < $80 a piece. Assuming that *C* has the money, while in the causal case it is obvious that he will invest it with *E* only of there is no one who can supply blue *X* at < $80, the effectual pre-commitment suggests he make a counter-offer to E as follows:

"I will invest $10 K to transform your green widget into blue *X*. But, instead of a discount on the price, I would like to take equity in the product and share future returns on it at *p* percent."

The two effectual counter-offers together transform the relationship into a partnership that pre-commits both to a blue widget world. Furthermore, under this partnership, both C and *E* need to specify blue *X* only to the extent possible at this time, leaving it up for re-negotiation as they together develop the product. As in the central bank case, *E'*s contractual commitment to undertake the modification signals her private estimation of her own competence, and *C'*s investment of $10 K identifies him as an actual customer (T).

In this thought experiment we have used standard TCE assumptions – i.e. the negotiation deals contractual hazards and terms are finalized with an eye to the opportunistic potential in *C* and *E*. Also, we have assumed that *C* knows he is indeed a customer and *E* knows herself to be a supplier. But the effectual pre-commitment would work even if we reversed these two assumptions – i.e. if we assumed that *C* and *E* are completely trustworthy (and know each other to be so ex ante), but that *C* was not quite sure that he himself was indeed a customer and *E* was not quite sure that she was indeed a supplier in the case of widget *X* (green or blue or otherwise) – i.e. if neither knew whether there was a market or even a latent market for *X*.

In fact, it is the latter scenario that is actually interesting in the domain of entrepreneurship – i.e, the discovery/creation of new markets. When the market for a product does not yet exist, there is by definition nothing to be opportunistic about. We will examine this claim in greater detail in a later section. Here, we will merely illustrate it anecdotally and proceed with the thought experiment. For example, the internet existed for over a decade before the invention of web browsers such as Mosaic showed it had a potential for economic gain. In *actually* transforming Mosaic into a market for web browsers, Netscape created the potential for opportunism. The transformation process itself, however, had to overcome the prior (and larger?) problem of a non-existent market than the secondary problem of opportunism.

In our thought experiment, this transformation process happens as follows: By actually investing in *E, C* became a customer *de facto.* And by walking into *C'*s office and making the counter-offer based on the effectual pre-commitment, *E* became a supplier *de facto.* To the extent that each was not 100% certain about their own potential as the two sides of this transaction, the actual signing of the contract (either in a formal or figurative sense) is what forged the effectual network. And the "worth" if any of widget *X*, is at this point only what *C* and *E* are willing to commit to its creation. To the extent that widget *X* is unformed and negotiable, this market is not a phenomenon of discovery, but of action-based creation. And the market for *X* is a residual of the interaction between *C* and *E.*

Another way to look at this is through the lens of "Exit, Voice, and Loyalty." Through a strange and interesting symmetry, the framework that Hirschman (1970) devised for explaining the behavior of organizations in decay is also useful in understanding the behavior of members in an effectual entrepreneurial network. In the weakly effectual case that we discussed earlier, a market transaction offers only one of two choices to potential members of the network – i.e. exit or loyalty. In our thought experiment, this case may be described as *E* going to the street corner (or to *C'*s office) with a basket full of green widgets and all *C* can do is take it or leave it, and in case he decides to take it, he can at best *bargain* for a lower price. In the strongly effectual case, however, the entire transaction is driven by "voice" – they now prospectively *negotiate* the very existence and shape of X^2. The content of the negotiation is not so much concerned with the opportunistic potential embodied in the green vs. blue widget (for neither party knows what this *X* may or may not be worth down the road), but with what each would like *X* to look like and what each is willing to "commit" to *make* it look like what s/he wants it to be. Thus, the set of

[2] In this sense, in an effectual world, all widgets are "grue" (Goodman, 1983).

pre-commitments that define an effectual network consist in agreements to participate in the creation of a new market, rather than in agreements to appropriate future payoffs arising out of it.

In other words, *C* and *E* are negotiating for what *X* "will" be – not in a predictive sense (although prediction may or may not be part of the reasons for negotiating between green and blue), and not in a social construction sense (although the world may or may not actually come to consist of blue widgets ex post), but merely in the sense that both actually invest in a blue widget world and actually make blue widgets. Even more importantly, their negotiations may end in neither green nor blue widgets, but a whole new (grue??) widget that neither had imagined till their interaction at the negotiating table. Also, by membership in this newly forming effectual network, *C* and *E* have together created an "us" that has the potential to create a "them" – i.e. a competitive market down the road.

Generalizing the thought experiment

We can now generalize the thought experiment into a wide variety of new market contexts and iterate it over time to trace the transformation of the effectual network into a new "market". For example, we can replace the widget *X* with an idea and *C* and *E* can be angel and entrepreneur. Or, they can be two random entities (individuals or organizations) with problem components and/or solution components that match, resulting in a strategic partnership that then leads to the creation of a new market based on the combined solution they forge. And so on. In general, *X* is any component of a market including product, channel, physical and regulatory infrastructure, and institutions such as standards bodies. In this general conceptualization of *X,* each new membership in the effectual network negotiates a tiny piece of the future market – a pleasing (meaningful?) juxtaposition of two or more fabric patches, as it were – and the market

that comes to be eventually is like a quilt stitched together through the effectual network as it grows and gradually transforms itself into the familiar artifact of the market.

Each membership into the effectual network is determined by what the potential member "commits" (not is willing to commit or promises to commit, but actually commits) and the change in shape of the future market that s/he is able to negotiate in return for this commitment. Note that what makes the network effectual is the fact that they are negotiating *not* for the size of their piece of the pie[3] but for the shape, content and flavor of the pie even as it is being cooked into existence. In essence, then, each new member in the network not only brings certain "contributions" or resources, but also a set of constraints on the choice set available from then on. It is this shared pool of constraints that eventually coalesces into the "goal" of the network, and firms up the demand and supply schedules that embody the new market.

So if the shape of the market is as yet unclear, what determines contribution? The actual contribution by each member and the resultant shape of the future market negotiated at the table is driven by (a) the boundedly rational and docile judgment of each member, and (b) the qualitative and quantitative *content* of the uncertainty that the network needs to overcome through its collective imagination. The effectual pre-commitment allows the members of the network to proceed as though the universe at any given point in time consists entirely of only the people who are at the table – as though the external world is relevant only to the extent it is embodied in the aspirations and abilities of the people at the table. In other words, the particulars of who they are, what they know, and whom they know matter and drive the creation of the pie or whatever the network ends up cooking up. It is only when the dish is done and the aroma begins to waft out of the room that both the issue of opportunism (who gets what piece of

[3] Although that might be a part of the negotiation, for our analysis it is secondary to the negotiation about the nature of the pie itself

the pie) and choice-influenced opportunity costs (what other pies may be "out there") become more relevant.

Let us now turn to the role of opportunity costs and opportunism in the pre-commitment approach to the creation of new markets.

On the irrelevance of opportunity costs

The key to the effectual pre-commitment – i.e. the pre-commitment to the reduction of Type II errors even at the cost of Type I errors – is that it does not *predict* but actually *sorts* prospects into customers and non-customers, or more specifically, into partners and non-partners. Each partner comes on board the network by actually committing to and investing in particular local shapes and features of the emerging new market, subject to the constraints of everyone else already on board. In other words, every new member who actually comes on board either re-shapes the market to the extent they can persuade others to change their views or re-shapes their own preferences to the extent they are docile toward the views of the others. Notice that we are not suggesting a new "charisma" theory of entrepreneurship, although some members of the network may indeed be more charismatic than others. Instead, we rest our claims upon the fact that *all* human beings, leader and member alike, are (to varying degrees) docile -- i.e., persuadable.

Membership in the effectual network is not determined on the basis of who "should" come on board, but is rather determined by who "can" come on board subject to both the global constraint of the pre-commitment and the pool of local constraints that have been negotiated thus far. Some of these constraints are lumpier than others. For example, any non-reversible investments such as those involved in R&D, reduce the fluidity of the pool and lower its ability to blend in the contributions and constraints of potential new members. Such a pool coalesces

into a stable local structure with its own specific ends and means interacting in predictable ways. This stable structure is very much akin to the *conception of control* that Fligstein (2002) argues so convincingly forms the skeletal structure underlying the "architecture of markets." New members now have to negotiate with this stable structure as a single unit and new pools of contributions and constraints have to evolve *around* this structure, forming hierarchies of stable structures in the growing network.

Through each of these stable structures, within the constraints outlined, the effectual network seeks to control the shape of the future to the extent it is controllable through human action. In other words, the effectual network, especially in the initial stages, does not have any global criteria with which to evaluate the worthiness or otherwise of any particular prospective member. New membership is merely contingent on actual local constraints negotiated with and within current membership. Therefore, the notion of any objective opportunity costs to membership selection is largely irrelevant from the point of view of the effectual network.

From the point of view of each member of the network, of course, opportunity costs may be relevant in two ways. First, each member decides to participate in the effectual network as opposed to other things they may be doing with their lives – i.e. they incur actual opportunity costs. Second, each member decides to participate in this particular effectual network as opposed to other possible networks for the same purpose – i.e. they incur expected opportunity costs. In both cases, as Buchanan (1999) points out, choice-influencing opportunity costs are purely subjective and evaporate after the moment of choice. They are not only unmeasurable ex ante, but are also impossible to evaluate ex post. Therefore, why *E* chooses to make green *X* in the first place (instead of everything else she could be doing) or why *C* wants blue *X* (instead of

red *Y*s for example) are choice-influencing opportunity costs that are not only subjective and ephemeral in the sense of Buchanan, but also completely outside the scope of our analysis here.

What needs explanation, therefore, is only the question of why *C* and *E* might choose to ignore possible *D*'s. The decision to ignore *D* is entirely a function of the uncertainty associated with the market for *X*. If *D* exists and is known with reasonable certainty to be a customer or supplier for *X*, then it would not make sense for *C* and *E* to proceed as though *D* does not exist. But in most new markets, there is considerable uncertainty with regard to the existence of *D*. This is where the *effectual* logic underlying the network becomes manifest and relevant. Given that *E* is already involved in the creation of green *X* and *C* is already interested in blue *X* (for reasons outside the scope of our analysis), we can consider two cases:

- Either *C* and *E* can proceed causally – i.e., as though there exists a market consisting of *D* for *X* (green and/or blue) largely independent of their particular decisions, in which case, they will have to be careful to align their choices with what this market consists of. Ergo, they need to invest in search processes for finding *D* -- i.e., the best possible sources for customers of green *X* and suppliers of blue *X*.
- Or, they can proceed effectually – i.e. as though the market is a *result* of particular actions they take, subject to the possibility of exogenous shocks, and the necessity to modify their own selections as the market comes into existence. In this case, they can proceed to make the commitments they negotiated with each other knowing that they may have to renegotiate the shape of *X* if *D* exists and is willing to commit whatever is necessary to come on board later.

So while the market in which *D* comes on board and one in which *D* does not come on board would be very different from each other, there is no a priori way to decide which of those two markets would be *better* for *C* and *E* to participate in. Instead it makes sense for them to negotiate with any and all members who actually make the commitments required to come on board. In sum, the *calculable* opportunity costs of *not* partnering with *C* always outweigh the incalculable opportunity costs of not partnering with imagined *D*'s elsewhere. Effectually speaking, the bird in hand is always worth more than imagined birds in mythical bushes.

In always preferring *actual* partners (i.e. those who actually commit, however locally and contingently, to the creation of the market) to *possible* partners who may or may not ultimately commit, the logic of an effectual pre-commitment appears to override *expected* opportunity costs. In actual fact, however, the pre-commitment approach here does not suggest *ignoring* expected opportunity costs, but *denies their very existence*. Expected opportunity costs can exist only in a world of reasonable predictability – i.e. in the case of outcome distributions whose probabilities are enumerable. If the very instances of the future distribution are not countable a priori, the notion of *expected* opportunity cost loses all meaning and become utterly irrelevant to the problem in question.

As argued by Sarasvathy (2001), effectuation is useful in a world of Knightian uncertainty and rests on a philosophical basis different from typical normative economic prescriptions. While most economic theorizing draws upon utilitarian philosophies of one kind or another, the effectual pre-commitment suggests that entrepreneurial behavior may rest on pragmatist (*a la* James, Peirce, and Dewey) rather than a utilitarian world view – i.e., entrepreneurs behave *as though* they live in the world described by James than in the one described by Bentham. Without wading into the mire of a philosophical debate, which would be quite outside the scope of this paper, we would merely like to list a minimal set of principles that this world view entails:

- The predominance of the particular over the general and the abstract. This means that the "law-like" properties of human systems are less significant for explaining phenomena than what particular actors in particular circumstances do. In other words, locality and contingency matter.
- The predominance of the "meaningful" over the "optimal" – meaning being *negotiated* through endogenous human interaction rather than *calculated* to achieve a priori objectives.
- A world in-the-making (where choices entail consequences) as opposed to a universe of all possible worlds (where consequences entail choices).

The market as artifact, or How the effectual network grows into a new market

We can now envisage the growth of the effectual network as a dialectic between members already on board and the external world. As the network grows over time, it tends to become less effectual and the external world at each point in time consists of one of three categories of things: (1) negotiations that become embodied in actual additional commitments; (2) those that do not; and (3) non-negotiable exogenous states of nature.

Category 1: Negotiations that become embodied in actual commitments

We have already seen how the network deals with the first category. Only those members of the outer environment who negotiate their way into the network through actual commitments form the membership of the network. This provides a substantial deterrent to free riders and opportunists. Furthermore, by requiring a large amount of docility (in the form of willingness to change the shape of *X* through negotiation and re-negotiation), the effectual network tends to select out opportunists and select in intelligent altruists including those who persuade others to be altruistic. Finally, opportunists have real opportunity costs in the form of other more predictable markets with low hanging fruit (as opposed to those under construction through effectual networks). Joining and working with an effectual network requires them to forgo those other opportunities that provide more immediate and surer gains. To a great extent, therefore, effectual networks eradicate the need to *overcome* opportunism, by merely making it irrelevant to the creation of new markets.

Note that this does not mean that the very same members of the effectual network who behave in a docile and intelligently altruistic fashion in the beginning will not behave opportunistically as the market coalesces into more predictable outcome distributions. All that the effectual network does is to cue in intelligent altruism at the earlier stages, leaving open the

possibility of opportunistic behavior later in the development of the market. This is very much in keeping with our earlier behavioral conceptualization of altruism and opportunism as the two tails of an unknown distribution of motives that is highly contextual and subject to change over time.

Category 2: Negotiations that do not become embodied in actual commitments

Returning to the dialectic between the effectual network and its outer environment, we next examine negotiations that do not become embodied in actual commitments – i.e. members of the outer environment who decide not to join the network *after* engaging members of the network in negotiation. Note that while members continue to ignore *potential* or hypothetical *D'*s, actual *D'*s who choose not to come on board provide a certain kind of "voice" to the effectual network that impacts the shape of *X*. Each negotiation that does not result in a commitment signals one of two possibilities: (1) They might indicate significant changes yet to be negotiated to bring the market into being, or (2) They could either be existing alternate markets or new effectual networks that may eventually coalesce into alternate markets that compete with and dissolve the nascent market being formed by the effectual network under consideration. In either case, the effectual network we are analyzing can only coalesce into a market when it reaches a critical mass that allows it to function relatively self-sufficiently with regard to the rest of the world – i.e. when the continual effectual churn at its outermost edges tapers off and firm barriers get shored up around its key components.

In essence then, the design of effectual networks is an exercise in the science of the artificial. As all things artificial, the market created by an effectual network too is essentially a dialectic between the inner and outer environments where each comes to resemble the other in important ways – just as shovels are designed to take the shape of the earth they need to scoop up

at one end and the hands that hold them at the other (Simon, 1992). But instead of the predominant reshaping of the inner environment to mesh with the outer as in the case of physical implements, in the case of the effectual network, inner and outer environments of new markets re-shape each other through iterated negotiations. This is because a large part of the outer environments of markets also consist of human actors.

Category 3: Events completely exogenous to the process

This brings us to the final piece of the dialectic between effectual network and outer environment, namely the part that is completely exogenous to the process. This could consist in exogenous shocks such as those in the macroeconomic/regulatory environment or in the technology regime, as well as some kind of internal failure such as the exit of a key member of the network. In case of such contingencies, complete and cascading failure of the effectual network may not be avoidable. But if avoidable, such contingencies will have the same type of "voice" that new members of the network have – i.e., they effectively call for the re-shaping of the artifact in question. To the extent that the collective imagination of the network internalizes these contingencies as input into the shape of *X* the network will continue to grow and coalesce into a stable artifact.

In the ultimate analysis then, the effectual network is a network of voice that shapes those parts of the future that are controllable through human action. And in giving shape to the new market, the members of the network have available to them several mechanisms of non-predictive control. These include:

- Affordable loss
- Exaptation
- Pre-commitments
- Voice, including iterative feedback from members through renegotiations
- Leveraging of contingencies (the "voice" of exogenous shocks)
- Docility – satisficing on a pool of constraints

- Persuasion – the flip side of docility – i.e. manipulating other people's constraints
- Nearly-decomposable hierarchical structures

Based on the analysis above, we next develop a set of observable differences in the temporal architecture of economic networks

The temporal architecture of effectual networks

Table 1 summarizes our entire exposition in terms of observable differences between effectual networks and more familiar transactional ones. While we do not claim this to be an exhaustive list, it can still be viewed as a set of testable hypotheses about the emergence and evolution of networks that end up creating firms and markets. The differences laid out in the table can be tested both cross-sectionally by comparing early-stage and well-established firms and markets along the dimensions listed in the table, and/or longitudinally – either using historical case-studies or panel data on particular firms and industries.

Conclusion

The key insight we have attempted to develop in this paper is that while human behavior is fundamentally unpredictable, it is also docile. Docility implies that we are teachable, persuadable, adaptable, and manageable. This suggests that non-predictive strategies that leverage both our own and other people's docility may prove at least as effective under conditions of motivational and environmental uncertainty as those built upon more familiar predictive prescriptions. In fact, we have tried to argue here that such effectual pre-commitments may be crucial in the creation of new markets where a large portion of what comes to be is driven by human choices rather than states-of-nature, conventionally understood.

Figure 1:
Effectual networks: Theoretical context and direction

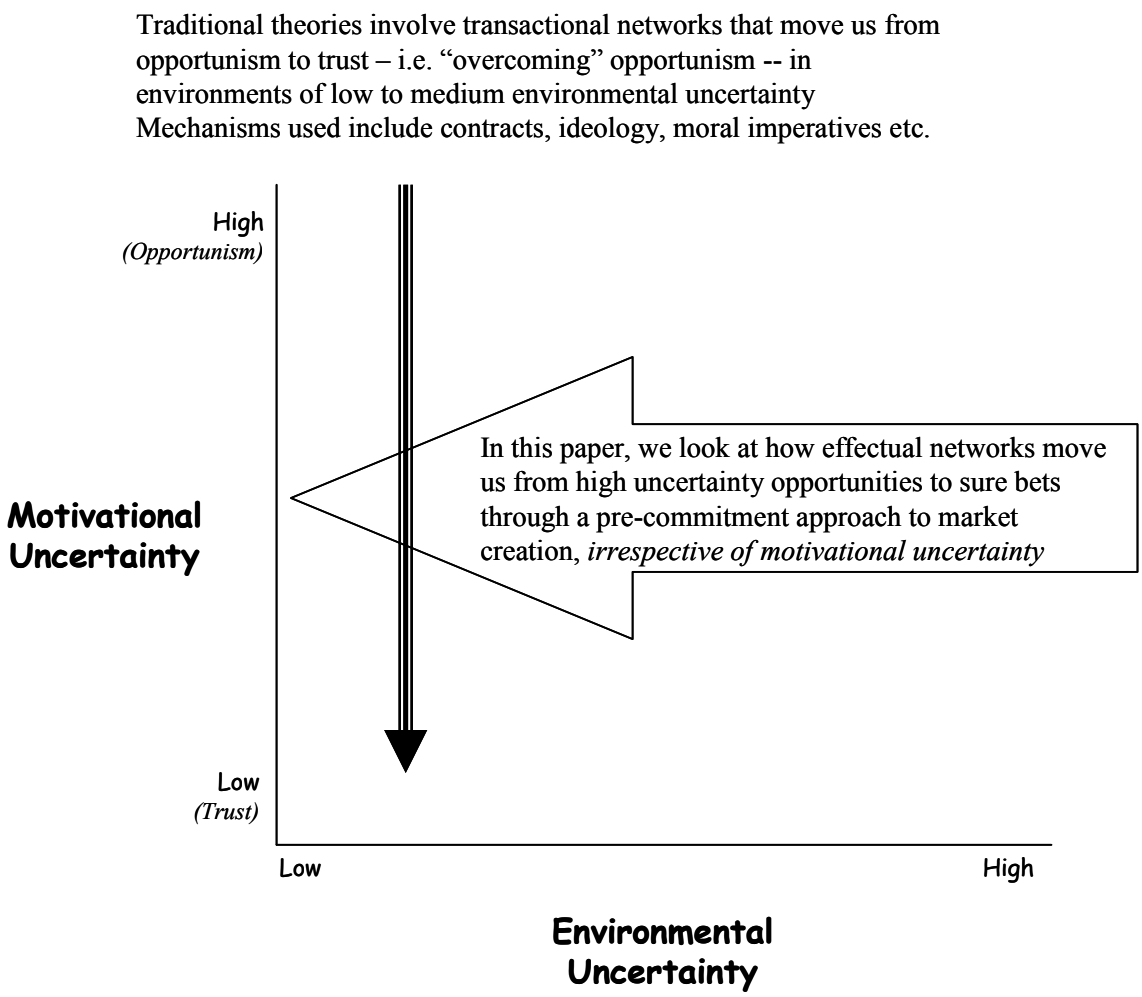

Table 1:
Temporal architecture of networks – From effectual networks to transactional ones

Characteristics of:		**Earlier (Effectual)**	**Later (Transactional)**
Action & interaction	*Behavior of Actors*	Predominance of intelligent altruism	Mix of opportunism and intelligent altruism
	Interactions structured through	The effectual pre-commitment -- Opportunity costs are less relevant	(Bounded or unbounded) optimality of contracts – opportunity costs are significant
	Locality & Contingency	Exploited through inter-dependence	Exploited through independence
Group Membership	*Relationship of actors to goals*	Goal hierarchies forged through who comes on board	Who comes on board determined through goal hierarchies
	Relationship of actors to group identity	Group identity shaped through individual aspirations and persuasive rhetoric	Individuals "incentivized" toward group goals and group identity
	Commonalties among members	Common problems matter	Common solutions matter
Strategies	*Prediction*	Who I am shapes what I want (Elements of member identities are predictable; goals and strategies are not)	What the group wants shapes who is admitted (Goals and strategies are predictable; members come and go)
	Adaptation	Goals are being exapted; exaptations driven by group membership	Goals are adapted to external environments – and in turn reshape group identity
	Teleology	Means are clearer and more difficult to change than goals; goals are flexible	Goals are less flexible; means may change to align with goals

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