

**OF IMMORTAL FIRMS AND MORTAL MARKETS:
DISSOLVING THE INNOVATOR'S DILEMMA**

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Revised: October 12, 2001

Presented At: The Second Annual Technology Entrepreneurship Research Policy Conference,
December, 2001, Robert H. Smith School of Business, University of Maryland.

Paradoxes, dilemmas, and dichotomies are the stuff of intellectual adventure; and we, as scholars, scientists, and philosophers love them. Not only do they serve to challenge received theories, but they usually also indicate the existence of missing or erroneous assumptions, provoking us to break out of our familiar frames of reference into new conceptual realities. In other words, empirical anomalies that cross our paths are harbingers of possible paradigm-shifts in our theorizing. Zeno's paradox, for example, signaled the curious relationships between the universe of the discrete and the continuous, eventually leading to the theory of limits and the development of modern algebras. Similarly, the inexplicable and erratic twists in Mars' orbit boded doom to Kepler's elegant circular orbit theory and paved the way for the laws of planetary motion based on elliptical orbits.

In this essay we examine the assumptions called into question by one such dilemma in business, namely the Innovator's Dilemma (Christensen, 1997). The two assumptions challenged by the Innovator's Dilemma are: (1) Predictive rationality in decision making within the firm; and, (2) Pre-existent markets in the firm's environment. We will replace these two assumptions with (1) effectuation (i.e. a plural notion of rationality) in the firm's internal decision making, and (2) an environment consisting of mortal markets (existing markets competing with markets yet-to-be), respectively. The new conceptual reality thus ushered in will define a new theoretical role for firms in our economic models. Inside such a re-conceptualization, the creation of new technologies and new markets is a matter of course in the lives of firms, rather than being possible disruptions in their daily existence.

THE INNOVATOR'S DILEMMA

During their landmark investigation of the disk-drive industry with a view to understanding why leading firms fail in the face of some types of technological change,

Christensen and Bower (1996) encountered the curious phenomenon that has come to be known now in the strategic management literature as “The Innovators’ Dilemma.” The dilemma consists in the fact that by doing the ‘right’ thing, i.e., by listening to their customers, well-established and well-run companies such as IBM can end up losing those customers to relative new-comers – upstart firms that bring to market new technologies for which “no customers as yet exist” (Christensen and Bower, 1996: 197).

The beauty of Christensen's formulation of the dilemma is that it draws together a practical management perspective and several well-rehearsed themes in management literature into a seamless whole. It locates itself within a long and convincing history of the trials and tribulations of corporate venturing, a history strewn with evidence of leading firms floundering and even dying in the face of new technologies commercialized by unknown startups. The dilemma is positioned against the background of theoretical insights in the areas of strategy (Cooper and Schendel, 1976; Foster, 1986), resource dependency (Pfeffer and Salancik, 1978), resource allocation (Bower, 1970; Burgelman, 1983), agency (Jensen and Meckling, 1976), technological change (Dosi, 1982; Utterback, 1994) and changing organizational environments (Tushman and Anderson, 1986).

The crux of the story that Christensen tells is that firms wishing to innovate face an irresolvable dilemma: their existing customers will encourage them to focus resources on building a better widget, while somewhere else another company is building a gadget, either for new sub-segments of the market, or for an altogether new market. The technological trajectory of the gadget, however, will lead it to eventually either usurp the position of widgets in the whole marketplace, or end up destroying the widget market altogether. Therefore widget companies that listen closely to their existing customers and perfect their technology will one day inevitably

face a situation where their technology has been made redundant by the next-best-thing - the gadget. Those feckless existing customers will then defect to gadgets, leaving widget producers high and dry. In an interview with Business Week (1999) Christensen put the dilemma this way:

The dilemma is that the criteria that managers use to make the decisions that keep their present businesses healthy make it impossible for them to do the right thing for their future. What's best for your current business could ruin you for the long-term. They've been trained to listen closely to customers and do things that improve their margins. Those things are mandatory to keep your present business healthy and stock price high.

The story thus told may be captured in the following relationship: The better aligned management incentives are to serving the existing customer base by improving the current technology of the firm, the more likely the firm is to be blindsided by fresh new technology that initially appeals only to customer segments that do not appeal to the firm, but goes on to capture the firm's core customer base over time. Ergo, a well-meaning management team just cannot win by doing the right thing.

In his study of the disk-drive industry, Christensen found an even more astonishing addendum to this vexing conundrum. Many of the new (disruptive) technologies that eventually took away the firm's customer base were actually invented by the firm itself and rejected for possible commercialization due to lack of interest from key customers. Christensen writes, "New companies, usually including members of the frustrated engineering teams from established firms, were formed to exploit the disruptive product architecture." (Christensen and Bower, 1996: 209).

The innovator's dilemma, therefore, has all the earmarks of a classic paradox. And in an attempt to overcome it, we need to look not only for new empirical models and modified prescriptions for practice, as Christensen has done in a highly commendable manner (Christensen, 1995 and 1997), but also for deeper ramifications for our fundamental theoretical

assumptions about technologies, firms and markets. It is in this latter task that we hope to take Christensen's work further, by linking it to recent findings in the area of entrepreneurial expertise. In all the relevant examples of leading firms failing on the horns of the innovator's dilemma, it was entrepreneurial startups that upset their lead by commercializing disruptive technologies that ended up eroding the incumbent firms' leads in their own markets. Therefore, it is in the literature on entrepreneurial expertise that we must look for developing a new conceptual foundation for our understanding of novelty in business, whether this novelty involves the creation of new technologies or new firms or new markets or all of the above.

ASSUMPTIONS CALLED INTO QUESTION BY THE INNOVATOR'S DILEMMA:

ASSUMPTION #1 -- PREDICTIVE RATIONALITY

In trying to explain the reasons for the phenomenon exposed by their findings in the analysis of the disk-drive industry, Christensen and Bower (1996) decided to dig deeper and excavate a process model for resource allocation within established firms faced with disruptive change (1996: 207-211). This process model brought to surface the fact that many of the new and disruptive technologies were either developed within established firms or were easily accessible to them, but were not pursued due to estimates of high market risk and low revenue and profit projections. While individuals within the established firms saw great potential in the new technologies, the firm's *processes* were set up to allocate resources based on "rational" assessments of data about returns and risks. "Projects targeted at the known needs of big customers in established markets consistently won the rational debates over resource allocation. Sophisticated systems for planning and compensation ensured that this would be the case. The contrast between the innovative behavior of some *individuals* in the firm, vs. the manner in

which the firm’s *processes* allocated resources across competing projects, is an important feature of this model.”

It is within this contrast that we will begin to look for faulty fundamentals in our current theories. WHY was there a divergence between the expectations of those few “pioneering” individuals and those of the firm as a whole? One could argue, as Christensen and Bower do, that somehow while the firm’s processes were “rational”, the innovative engineers in the firm “intuitively perceived opportunities for a very different disk drive.” (1996: 211). But recent research into the decision-making processes of expert entrepreneurs (founders of companies ranging in size from \$200 M to \$6.5 B) suggests a theoretically richer alternative explanation than the much-beaten old horse of “intuition” (Sarasvathy, 2001a)

This alternative explanation has to do with the inversion of predictive rationality and is called “effectuation.” In the following section, we will provide a brief outline of the theory of effectuation and a summary glimpse into the evidence supporting it. The theory of effectuation not only provides an alternative to causal rationality, but also suggests ways to make effective decisions in the face of non-existent or not-yet-existent markets – precisely the situation faced by the leading firms foundering helplessly on the horns of the innovator’s dilemma.

Effectuation: An Alternative To Predictive Rationality

A central aspect of The Innovator’s Dilemma is the genesis of new economic artifacts: innovations in products, firms and markets. Any resolution of the dilemma therefore depends upon understanding how these new economic artifacts come to exist, ex nihilo. A large amount of empirical evidence points to the fact that entrepreneurs do create new products, firms and markets all the time, and it is reasonable to conjecture that some empirical regularities potentially exist in the entrepreneurial process. A recent study (Sarasvathy, 2001b) of 27 entrepreneurs who

built firms ranging in size from \$200M to \$6.5B demonstrates that entrepreneurs predominantly utilize a decision process that is based on effectual reasoning rather than causal, or predictive, reasoning. The difference between the two processes is summarized in the observation that causation processes focus on generating and selecting means to create an effect that is taken as a given goal, whereas effectuation processes take means as given and focus on selecting between the possible effects that can be created with those means, in the absence of pre-existent goals. While causation emphasizes the *ought* question – what *ought* I to do given a clear goal and possible means, effectuation urges the much more open-ended *can* question of what *can* I do, given who I am, what I know, and whom I know.

Of these two types of decision rationality, predictive rationality is the most familiar both to economists and management theorists. The anatomy of a decision based on predictive rationality maybe be summarized as follows (Sarasvathy, 2001a: 249):

- a given goal to be achieved (usually well structured and specific);
- a set of alternative means or causes (which can be generated through the decision process);
- constraints on possible means (usually imposed by the environment);
- criteria for selecting between the means (conventionally the maximization of expected returns).

The decision process described here summarizes the essential features of rational choice, conventionally understood. The model not only represents the foundation of decision theory as it is taught in formal educational environments, but is also reinforced through social interaction, particularly in the institutionalized environment of organizations (March, 1982).

The logic of predictive decision rationality underlies most management theory, including much overtly prescriptive theory. A good example is the classic Harvard Business School definition of entrepreneurship as the pursuit of goals “without regard to resources currently controlled” (Stevenson, 1988). This definition assumes that the goals of the entrepreneur are

clear – that the entrepreneur has a vision - and that entrepreneurship rests essentially not on the novelty of those goals but on the novelty with which the entrepreneur acquires and selects means to achieve the desired ends. An alternate example is the segmentation-targeting-positioning (STP) theory taught and widely applied in marketing management (for an example, see Kotler 1994). Under analysis the STP model illustrates the importance placed upon having a clear target (based on an evaluation of possible segments) and the arraignment and selection of means to achieve the desired positioning, a selection conventionally made considering constraints on the basis of maximizing expected returns.

At a managerial level, predictive decision rationality pre-supposes well-structured goals, which is psychologically very soothing because it generates the sensation that the situation is adequately under control. As Joseph Conrad once said, “To have his path made clear for him is the aspiration of every human being in our beclouded and tempestuous existence.” For example, in contrasting the decisions made by innovating individuals within leading firms in the disk-drive industry with the decisions made by the firms’ processes of resource allocation, Christensen and Bower (1996: 211) state: “Information provided by innovating engineers was at best hypothetical: without existing customers, they could only guess at the size of the market, the profitability of products, and required product performance. In contrast, current customers could articulate features, performance, and quantities they would purchase with *much* less ambiguity.”

The sense of control brought by clear goals is especially important in management where issues of organizational coordination loom large. Organizations that utilize the logic of prediction - and almost all well-established organizations predominately utilize this logic - are able to maintain a strong internal locus-of-control at an organizational level. This, it is suggested, is the root appeal of this very pervasive decision logic. This *perception* of control,

however illusory in fact, is important to the organization, so important in fact that organizational actors openly accept their predictions may be very wrong (for example, the relevant organizational goals may be changing or the "plan" numbers already very wrong). And yet organizational actors accept that this is a price worth paying for the benefits yielded by the decision logic.

Effectual decision rationality is an alternative to predictive decision. In essence, a decision involving effectuation consists of (Sarasvathy 2001a: 249):

- a given set of means (usually consisting of the relatively unalterable circumstances and characteristics of the decision-maker i.e. a function of who they are, their social network and their specialized and generalizable knowledge);
- a set of possible effects (based on the given set of means and usually some vague and very general goals);
- constraints on possible effects (usually imposed both by the limited means as well as the environment and its contingencies);
- criteria for selecting between effects (usually a pre-determined level of affordable loss or acceptable risk).

The decision process described here summarizes the essential features of effectual reasoning. It is a model that is not taught in formal educational environments, but is widely used in daily decision-making and, in studies, shown to be favored by entrepreneurs at least three fourths of the time (Sarasvathy, 2001b). To cite just one tiny example from the 1500 pages of data that that study is based on: "*I always live by the motto of "Ready-fire-aim." I think if you spend too much time doing ready-aim-aim-aim-aim, you're never gonna see all the good things that would happen if you actually start doing it and then aim. And find out where your target is.*" [E14]

The logic of effectual decision rationality as contrasted with the logic of prediction is perhaps most easily understood by reference to some familiar real life experiences such as: making dinner using a pre-selected menu and then shopping for ingredients and cooking the meal (causal) versus looking into cupboards for available ingredients and creating a possible meal

based on them (effectual); or being commissioned to paint a portrait of a specific person (causal) versus being given a canvas and paints and asked to paint whatever one pleases (effectual).

A well-documented real world example from business consists in the creation of RealNetworks, the audio-streaming pioneer on the internet. The early history of this company illustrates the entire effectuation process, including the use of its three key principles and the overall logic on which they are based. In early 1994, while trying to start an interactive TV channel dedicated to progressive content, an ex-Microsoft executive named Rob Glaser had an epiphanic encounter with Mosaic, the original Web browser (created by Marc Andreessen, later co-founder of Netscape). This led him to take on the task of giving voice to the mute Web, i.e., to create real time streaming audio on the internet. Glaser did this not by carrying out detailed market research and estimating expected return, but by plunging in using his own funds (and those of close friends) to quickly (in less than a year) bring to market RealAudio 1.0 [This is an example of the affordable loss principle at work]. Although initial reactions from the market were not favorable, (the sound was too tinny, for example), by continually weaving an ever-expanding network of strategic partnerships to provide content [Strategic partnerships principle], and by continually improving the quality and range of products in a contingent fashion over time, taking advantage of new technical possibilities that opened up [Leveraging contingencies principle], he managed to become a leader in the newly created streaming media industry in the new economy. For a detailed exposition of the use of effectuation in the creation of this firm, see Sarasvathy and Kotha (2001).

The above example illustrates not only the important principles of effectual decision-making, but notably demonstrates that effectual rationality rests on *the logic of control*. This logic is viscerally different from the logic underlying causal processes. Causal rationality rests

on the logic of prediction, which states: *To the extent you can predict the future, you can control it.* The logic of control, on the other hand, goes as follows: *To the extent that you can control the future, you do not need to predict it.*

Decision-making without clear goals is a psychologically uncomfortable activity (which explains why management teams in organizations avoid it where possible, instead favoring predictive rationality where activities are directed at well-understood goals). The popular myth is that it takes an entrepreneurial mindset to act in highly uncertain environments where goals are unclear or shifting. That mindset is typically described as a high tolerance for ambiguity and high risk-taking propensity, such as the one ascribed to the innovating engineers within the established firms that Christensen and Bower studied. However, recent empirical research on differences in risk-taking propensity between entrepreneurs and managers (Palich and Bagby, 1992; Sarasvathy, Simon and Lave, 1998) together with research into effectuation paints a very different picture of entrepreneurs. Instead of ambiguity-loving risk-takers, the entrepreneurial mindset rests on the logic of control. Expert entrepreneurs explicitly eschew prediction and choose instead to control and even create the future, most often through an expanding network of strategic partnerships and the imaginative leveraging of unexpected contingencies into unforeseen opportunities, all subject of course to a variety of constraints including resource constraints. For example, Richard Brandt quotes Rob Glaser in *Upside*,

When we launched, we didn't just launch a piece of software and say, "Try it." We launched with news content from National Public Radio, from ABC. We'd lined up about 20 to 30 indigenous Internet people, like HotWired and Adam Curry, the [former] MTV video jockey, [who had] one of the first audio Web sites.

Also, in a critical evaluation of 5 companies in the real-time streaming industry in April 1996, Peter Jasco of *Information Today* provides independent validation of this as follows:

In mid-March, RealAudio 2.0 was by far the most popular streamer and server, and that's what defined the choice of the end user. Even if the compression factor of RealAudio is not stellar, it has

such giant broadcasting companies as ABC, CBC, NPR, and PBS behind it, not to mention many smaller ones such as Internet News Radio and Internet Radio Hawaii. Music stores and music labels also prefer RealAudio, which is used by World Wide Music, 1-800-Music-Now, Polygram Records, and Warner Brothers.

Furthermore, there are numerous pieces of incontrovertible evidence that RealNetworks continued to introduce innovations as they became possible, often without regard to detailed predictions about market size and growth rates, instead to proceed in an evangelizing fashion to allow consumers to discover new and often unanticipated uses for the technologies that the firm thrust into their hands. For example, Kim Nash of *Computerworld* reports,

But Progressive will have to overcome information systems (IS) managers' doubts about whether audio is too bandwidth-hungry to work well and whether there is even a need to add voice to internal applications. ...

... Some IS managers said the flash of multimedia just isn't necessary in telephone directories or human resources information applications for which most intranets are used today. But Progressive¹ disagrees. "If there were a simple way to add audio to programs, IS would find new uses for it," said Rob Glaser, president and CEO of the 2-year-old company. For example, users could put executive speeches online or add audio to computer-based training courses, he said.

In sum, entrepreneurial firms use three mechanisms to reinstate control in their decision-making that correspond to three ways of mitigating uncertainty:

1. Affordable loss – makes uncertainty irrelevant by focusing on controlling downside scenarios and acquiring financial resources from stakeholders. This only sometimes means financiers, because new firms probably acquire the bulk of their financial resources from customers and suppliers. In extreme cases entrepreneurs control uncertainty by using a zero-assets-to-market model, which makes uncertainty completely irrelevant to the entrepreneur by laying off the entire financial risk of the venture onto other stakeholders. The start up of U-Haul is one famous example of a large firm made operational on virtually no financial resources. The pattern of acquisition of resources leaves an important stakeholder footprint on the firm,

representing an important external influence on the kind of markets the firm eventually converges upon.

2. Pre-commitments from key stakeholders – destroy uncertainty by contracting along certain dimensions for the future – the future that comes to be begins to look very much like the contracts agreed upon. Through pre-commitments entrepreneurs focus on creating the future in their chosen image, rather than attempting to guess a future crafted in another's image. Control is about choice in the acquisition of stakeholder relationships that influence the network position and development trajectory of the firm.

3. Contingent knowledge – The decision-maker leverages uncertainty by treating the arrival of contingencies as opportunity to exercise control of the emerging situation. This rule might be looked upon as a meta-rule of “swimming with the tides”. The relationship between planning, contingencies and uncertainty is therefore a relationship that is radically rearranged in effectual decision-making. Because effectual decision-making often begins with only a very loose notion of goals, decision-makers can make-up their plan in an incremental fashion, utilizing uncertainty and contingent information as resources for their goals (Lindblom, 1959) rather than relying on goals as determining factors of resource acquisition and choice. Decision-makers therefore accumulate and take advantage of path dependencies in the effects they choose. Uncertainty is a resource and a process rather than a disadvantageous state.

The logic of control is precisely what makes effectual decision-making something more than an adaptive process, although it *is* adaptive. The effectual decision-maker manages the tension between goal-driven decision-making and contingency-driven decision-making by observing the logic of control, and this is what shapes emergence in the decision process. These

¹ RealNetworks was originally named Progressive Networks – the name was changed to RealNetworks only in 1997, just before the company was taken public.

aspects of control make effectuation a psychologically viable strategy in situations characterized by high uncertainty where prediction is psychologically unviable, such as the situation Clayton Christensen describes in *The Innovator's Dilemma* (1997).

Effectuation: Implications for The Innovator's Dilemma

We began examining effectuation as an alternative to predictive rationality within the context of the contrast between the decisions made by the innovating engineers in the leading firms of the disk-drive industry and the formal decision processes that drove the firms' strategy with regard to technology commercialization. We now posit that the engineers could not win the “rational debates over resource allocation” primarily because the firm’s formal processes were built exclusively on predictive rationality. By equating predictive rationality with an absolute monolithic notion of “rationality” the firm cuts itself off from other equally (if not more appropriately) *rational* avenues of action and becomes psychologically blind to effective investments in its own future health and prosperity. In other words, in the case of the leading firms in the disk-drive industry, it was not so much that the innovating engineers had special intuitions about future opportunities. Rather it was more so that the firm, through its unwavering allegiance to predictive rationality calcified in its formal processes and incentive systems, had allowed one of its vital sense organs that could alert it to effectual opportunities to atrophy and die. Hence all the arguments of its own innovators not based on a “rational” (meaning *predictive*) approach were automatically discarded as either “irrational”, or as based on unjustifiable notions such as “intuition.”

A word of caution is extremely crucial at this point. We do not mean to argue that effectuation is in some way an absolutely better approach than causal/predictive approaches, or that the firm’s formal decision processes based on predictive rationality should be expunged and

replaced with effectual ones. Rather, our argument is meant to advocate *a plural notion of rationality* that includes both causal and effectual approaches to decision making. But before we can examine the implications of such a plural notion for our research, pedagogy, and practice, we need to investigate another fundamental theoretical assumption that is called into question by the innovator's dilemma.

ASSUMPTIONS CALLED INTO QUESTION BY THE INNOVATOR'S DILEMMA:

ASSUMPTION #2 – PRE-EXISTENT MARKETS

Behavioral assumptions undergird all economic models. As we saw above, the rational choice model rests upon assumptions of predetermined and clearly specified goals in decision making. But if we are to move from a monolithic causal to a plural and effectual universe in which specific goals are not given in advance, we also need to give up our assumption of pre-existent markets in our economic models. This is because markets are temporal and effectual *artifacts* where concrete products and services intersect with our abstract aspirations as individual human beings and as members of a variety of groups, organizations and societies. As Olson and Kahkonen (2000: 1) put it, “The fourth primitive of economic thought – and of most lay thinking on economics – is so elemental and natural that it is usually not even stated explicitly or introduced as an axiom in formal theorizing. It is the half-conscious assumption that markets are natural entities that emerge spontaneously, not artificial contrivances or creatures of governments.”

Demand is not an atemporal and *naturally existing* manifestation of our needs, wants, and desires that is “out there” waiting to be “discovered”. In other words, *De Gustibus* is not *non disputandum* – i.e. preferences (and consequently demand) are not exogenous to the economic

process (Becker and Stigler, 1977). Several scholars and bodies of literature attest to this fact. As early as 1942, Schumpeter pointed out that it was not enough for a manufacturer to invent and supply soap: if there is to be a market for soap, the demand for soap also had to be invented i.e. people have to be educated and induced to wash. Much scholarship in evolutionary economics (Nelson and Winter, 1982) was motivated by similar observations and has sought to build a picture of technological change in the supply of products that is consistent with empirical observations of the origination and evolution of markets over time. A theory of the creation of demand for products and services must be similarly consistent with empirical observations about the origin and evolution of markets and recognize the interdependence between production and preference formation. In other words, demand theory must reflect the new opportunities for consumption that are created by new sources of supply. This interaction between endogenously created supply and endogenously created demand is an important issue in our understanding of the role of new markets and, indeed, the nature of competition itself.

The key idea here is that while individuals have abstract aspirations, there are diverse and plural ways in which these aspirations can be fulfilled (Lancaster, 1971). And what makes this even more complex is that these aspirations can themselves change over time as the individual learns and interacts with other individuals. Aspirations do not in themselves entail any single or inevitable set of “demands” in the conventional economic sense. Instead, individuals have only a very rough idea of their consumption goals. For example, the fact that people experience hunger does not imply a demand for hamburgers, let alone a “market” for the hamburger supplied by any particular fast food chain or restaurant. The transformation of an abstract aspiration such as hunger into particular market niches for particular foods and their suppliers usually involves effectual processes on the part of both suppliers and consumers. In most cases, since markets for

food in general are very well understood, the manufacturer can induce people to try new food products through several marketing and promotional techniques including free samples. But even in this relatively mundane industry, new markets also get created through more subtle effectual processes. For example, the founders of Starbucks opened their first shop only as an outlet for selling fresh roasted and ground coffee beans from around the world, mostly since they themselves were coffee aficionados. Only requests from walk-in prospects for trying out the coffee in the shop led them to the idea of a coffee shop such as the modern Starbucks Coffee shops. Even armed with the knowledge about existing markets of coffee drinkers, no one could have predicted ex-ante the market for Starbucks. That market had to be created through a transformational process that involved the interaction of tentative sources of supply and demand that over time coagulated into a familiar shape that we all recognize as a “market” for specialty coffees and coffee culture (Vishwanath and Harding, 2000).

To put it in a nutshell, in an effectual universe, Needs, wants and desires ≠ Demand; and, Demand ≠ Supply ≠ Market. The relationships between supply and demand are circular, interactive and contingent rather than linear, unilateral and inevitable (Earl, 1998).

But if markets do not pre-exist and are endogenous to the fundamental economic processes of supply and demand, then of what use would it be for the leading firms in the disk-drive industry (or any other industry for that matter) to listen to existing customers about the potential of new technologies? In a plural and effectual universe where markets are artificial inventions endogenous to the economic process, it is hardly surprising that clear and convincing feedback from existing customers proved misleading and even harmful as guides to the firms' decisions with regard to new technological possibilities.

Mortal Markets

Before we elaborate any further on the implications of rejecting Assumption #2 for the innovator's dilemma, we need to consider not only that markets are *created* artificially (i.e. through human action), but that they are also often *destroyed* through artificial forces – both intentional and contingent. This notion of the artificial mortality of markets goes beyond the life cycle model which tends to induce a notion of “naturalness” and inevitability in the birth and death of products (Lambkin and Day, 1989). The notion of mortality presented here is connected with the residuals of effectual action - new markets - that eventually end up competing with and sometimes even destroying old markets. An effectual competitive struggle includes not only the births and deaths of products, firms and markets, but brings suicides, euthanasia and executions as part of the milieu. New competitors may “pull the plug” on an old market. In an effectual universe, markets don't always die peacefully in their sleep; they may be terminated.

With this metaphorically violent picture we aim to press home the point that markets struggle for existence. Competition occurs not only *within* markets but *between* markets. Therefore not only firms compete, but markets compete, and specifically, they compete across the temporal dimension – i.e., today's markets compete with *markets not yet created*. While firms are busy competing for market shares within markets, markets compete for the time, attention, and aspirations of individuals. And as individuals discover new aspirations or new ways to operationalize their abstract aspirations into demand for specific new products, some existing markets get mutilated, transformed or terminated or destroyed in a variety of ways and other new markets come into existence. Firms that blithely continue to struggle *within* existing markets find themselves blindsided and unwittingly crushed under the weight of the larger struggle that continues *between* markets across time.

Mortal Markets: Implications for the Innovator's Dilemma

Just as the theory of effectuation provided a new explanation as to why some innovating engineers within the leading firms in the disk-drive industry arrived at decisions very different from those of the firms' formal resource allocation processes, the notion of mortal markets brings a new explanation for another key question that Christensen and Bower (1996: 199) ask in their landmark study, namely, "*Why have incumbent firms generally intensified their commitments to conventional technology, while starving efforts to commercialize new technologies – even while the new technology was gaining ground in the market?*"

Our answer to this question is: *Because the incumbent firms were exclusively focused on competing "within" their existing market, and completely blind to the larger temporal struggle "between" markets fraying the edges of that existing market.* If you have unwavering faith in a linear model of the economic process starting with pre-existing markets, you will not see those markets unless they have already come into existence. Unfortunately for the incumbent firms in the disk-drive industry, more often than not, that was already too late and they found themselves locked out of or lagging behind those new markets that impinged upon and eroded away their existing market.

Again, our arguments do not advocate *not* competing in existing markets – only that firms need to be concurrently conscious of the mortality of markets in general and the effectual nature of the competitive and cooperative struggle that creates and destroys them. To turn this discussion into more specific implications for future research, pedagogy and practice, we will integrate the key arguments made thus far into a comprehensive view of competition that redefines the role of firms and markets in the economic process.

OF IMMORTAL FIRMS IN MORTAL MARKETS

Legally, firms are fictitious persons with limited liability and *perpetual* life. The notion of limited liability shields their founders and managers from crippling downside risk and allows society to benefit from their risk-taking. And the concept of perpetual life allows the organization to function relatively independent of the tenure of its managers, allowing it to make credible commitments to long run strategies. But the limited liability corporation has evolved in ways not dreamed of by its formulators and also has unfortunately come to embody the goal of *economic* immortality. Because they are immortal in a legal sense we have come to believe that firms have to be immortal in an economic sense also. Hence the pride and honor showered upon firms such as GE that have lasted practically the entire life of the stock market.

But this type of immortality is illusory – it is akin to the story of George Washington’s axe. The story goes that an old gardener preserved the legendary axe that George Washington used to chop down the cherry tree. The old man would proudly display the axe to all comers explaining, “This is the very axe that young Master George used to cut down the cherry tree.” And when asked how the axe looked all shiny and new, he would explain, “Oh! The handle has only been replaced three times, and the blade about five.” In what sense is that axe the very axe that Washington used? In the same sense, we believe in which GE seems immortal – the GE that Jack Welch retired from hardly bears any resemblance at all to the firm that Thomas Edison effectuated into being at the turn of the century. Yet immortality in its milder incarnation of sustained competitive advantage continues to be the holy grail of good management and suffuses incentive systems in most large corporations today. Indeed, some scholarship explicitly postulates survival as every firm’s *raison d’être* (Fligstein, 1995).

With regard to our foregoing exposition of the innovator's dilemma and the two fundamental assumptions that it calls into doubt, the key issue for our research, pedagogy, and practice now becomes: *How does one create immortal firms in mortal markets?* Based on alternate assumptions of plural rationality (predictive and effectual) and the artificiality of markets, there are at least two answers to that question.

First, perhaps we need to seriously begin considering a role for firm mortality, i.e. the planned obsolescence of particular firms. While as an empirical fact, entrepreneurs and even top management of larger firms do plan and execute exit strategies that include the sale and/or dissolution of firms, this is often a neglected area in our scholarly research and pedagogy. Except for practitioner developed concepts such as the “cash cow” in the BCG model of corporate strategy, most studies and instruction concerning exit strategies assume firms with positive NPV of future cash flows in perpetuity. Christensen came closest to the idea of planned termination of firms and even then only to consider the termination of business units and not the firm as a whole when he exhorted, “In order that it may live, a corporation must be willing to see business units die.” (Christensen, 1995). While we believe his ideas can and should be considered for the firm as a whole under certain circumstances, it is clear that such a radical notion requires far more deliberation and empirical experimentation before it can become a viable and accepted way out of the innovator’s dilemma.

The second answer to the issue of building immortal firms in mortal markets consists of a two-fold approach: On the one hand (at the micro-economic level), it has to do with pluralizing formal decision processes and activities within firms in terms of their underlying rationality; and on the other (at the macro-economic level), it has to do with redefining the role of the firm within our larger understanding of the economic process as a whole. In this scenario, firms need to put

in place effectual decision making teams or effectual “cells” intertwined concurrently with cells of predictive rationality in the organization. Firms need people who pay attention to what *can* be done as well as what *ought* to be done, both strategically (i.e. in a goal-driven fashion) and effectually (in a means-driven and contingent fashion). This is not as difficult to do or as far-fetched as might appear to be at first glance. That is because every firm that exists today, large or small, was at one time an effectual entrepreneurial firm. For example, IBM, one of the leading firms wrestling with the innovator’s dilemma today, in an earlier incarnation made effectual decisions about its resource allocation for technology commercialization. As the historian Rowena Olegario (1997) records it:

During the 1950s and 1960s, IBM’s managerial hierarchy faced the critical problem of building consensus between two very different groups of people: engineers on one side, marketers and professional managers on the other. In the early 1950ss, when IBM first entered the electronic computer market, the two sides had come into direct conflict. The marketers and managers, led by Thomas J. Watson, Sr., resisted computers because they represented such a heavy capital investment that the company’s financial health might be endangered. Also, should computers be a success, the lofty position of marketers within the firm might be rendered less influential. On the other side were a group of electrical engineers, who were able to convince Thomas J. Watson, Jr. that computers would revolutionize the data processing industry.

Again, in the 1960s:

The company invested \$5 billion in System/360, about three times its revenues in 1960. It hired more than 60,000 new workers, bringing total employment to 190,000 in 1966 and 325,000 by 1970. Developing System/360 put the company under tremendous pressure. It was an all-or-nothing gamble. IBM aimed to replace existing computers, including the 1401, its bestselling product at the times, with a technology that had never before existed in the marketplace. In addition, the new machines were targeted at both the scientific *and* business markets, which had very different computing needs. The whole 360 strategy alienated many of IBM’s own employees, who had a stake in the company’s older technologies. Tom Jr. and Vin Learson, the executive in charge of the 360 project, had to whip all divisions into line to support the new strategy. Learson, writing to a reluctant colleague, laid down the corporate policy thus: “By 1967 the 1401 will be dead as a Dodo. Let’s stop fighting this.”

Both decisions were made using a complex combination of causal and effectual processes. While they were not devoid of existing customer feedback, they were not exclusively predicated upon that feedback. Also, they were more effectual than causal because they

proceeded without a clearly pre-existing market with well-defined streams of future cash flows and psychologically comforting projections of profit margins. Instead, in both cases, IBM relied on its established customer base and network of relationships to shape and create the market for the revolutionary new product lines that it introduced. Yet, prediction was used in a curiously effectual manner, predicting not what the market for its new products would be, but to predict the extinction of its current product. This prediction was combined at the same time with the insistence on the necessity to invest in what may or may not be successful products in the future, but which were highly likely to be within the company's control to shape into future markets. As Vin Learson eloquently put it, "We did what Charles Kettering, an engineering genius and president of the General Motors Research Division, always advised against: we put a delivery date on something yet to be invented."

The IBM story demonstrates that means (who we are, what we know, and whom we know) matter as much, if not more, to long-run strategic decisions within established firms, as the externally-driven goals (such as market penetration and ROI targets) based on feedback from existing customers and predicted industry trends. The saga of the innovator's dilemma too makes the same point. Our conventional assumptions of predictive rationality and pre-existent markets are adequate, if at all only in very small corridors of space and time. They are definitely inadequate in the long run and over larger contexts because we live in a world where our purposes are not given to us *a priori*, and our markets are endogenous constructions of our economic endeavors.

What is required therefore, is a vast and deep change of our conceptualization of how technologies, firms and markets get created, interact and get destroyed. This reconceptualization involves a shift of the magnitude of the historical shift from a hunter-gatherer to an agricultural

society. Our dominant economic models are analogous to a world of spatially finite but temporally eternal markets where firms forage and compete fiercely even unto to death to capture market share and perpetuate themselves and their progeny. What we really need in a world of rapid technological change instead, is a view of firms as sowers, nurturers, and ultimately reapers of mortal markets, markets that are artificial, a creation of the actions of the firm, not just a pre-existent reality *within* which firms strive to survive. In this view, firms not only need to invent better weather balloons, they need to develop devices such as crop rotation and hot houses as well, devices that create as well as adapt to their environment.

We are well aware that what we are calling for in this paper, namely the need to redefine some of our fundamental conceptualizations about firms and market competition may arouse a queasy feeling in our scholarly innards. Here it might help us to remember Kepler's experience when he was confronted with the inescapable divergence in the orbital path of Mars that compelled him to discard his elegant theory of circular orbits based on the perfect Pythagorean solids, *God's own harmony of the worlds* as he believed it to be for a major part of his life. His visceral reaction to the elliptical orbits was, "I am left with a pile of dung." Yet, his laws of planetary motion based on elliptical orbits hold even as we send ships to Mars and beyond in the twenty-first century. It is time for us as scholars of technological change and business strategy to accept the discrepancies in our data and to commit ourselves to economic models "yet to be invented."

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