

Learning from Failure

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Failure is, in a sense, the highway to success, inasmuch as every discovery of what is false leads us to seek earnestly after what is true, and every fresh experience points out some form of error which we shall afterwards carefully avoid. *John Keats*

I. Introduction

This issue of the *Journal* is devoted primarily to ways to avoid failure. It is the premise of this paper that failure, like death, has an undeservedly dismal reputation.¹ Without death there is no life, similarly without failure there is no success. In nature an individual organism “fails” if it dies before reproducing; if the reason for its premature demise is genetically transmissible, then its death has made the gene pool of its species better adapted to surviving in the existing environment. In market economies firms fail because they do not produce goods and services desired by their customers at prices they are willing to pay; in short, these firms are less competitive than their rivals.²

If we extend the analogy, and speak, not of the death of an individual, but the extinction of species (or industries), when species become extinct it is because they are less well adapted to the existing environment than rival species. We may deplore the loss of species, but we have to recognize that it is part and parcel of life. Industries fail whenever customers value the industries’ output at less than the costs of producing it. The carriage-making industry disappeared because innovations made the resources devoted to carriages

¹ An exception to this generally dismal view of failure is an article by K. Mathew Wong (2003); he argues that the availability of bankruptcy will be viewed by management as a viable business strategy. He recognizes the obvious moral hazards, and observes that the data support the theoretical conclusion that risks are hedged more when management has significant equity in the enterprise.

² This is a widely acknowledged consequence of a “properly functioning” market system, not only in economics but also in sociology. W. Richard Scott, a sociologist, explained that “. . . the market provides a mechanism for linking the interests of organizational participants and external constituencies in such a manner that the former do not prosper unless they serve the interests of the latter. The effectiveness of market-controlled organizations is directly determined by their consumers: if their interests are satisfied, then they will continue to supply the inputs required by the organization; if not, then they can withhold their contributions, causing the organization to suffer and perhaps ultimately to fail” (1992, p. 349).

more valuable in alternative occupations. Although we may deplore the loss of skills associated with the making of fine Conestoga wagons, do we want to replace the internal combustion engine and literally rely upon horse power? In a dynamic and growing economy there have to be failures *because* the economy is dynamic and growing.

Further reflections on failure lead to insights that are directly applicable to business management. However, we have to have a more nuanced view of failure rather than simply existence or non-existence. Businesses cannot literally die because they have no existence in physical reality. The actors behind firms are the people who run, work for, and supply inputs, all of whom will typically survive firm failures by many years. The analogy between business failure and mortality is a useful metaphorical device, but we must not let it mislead us. Learning what works and what does not, can be gained by trial and error. People do not like to admit mistakes, but the early recognition of mistakes may avert disasters. The knowledge gained by misfortune makes future profits more likely in the years following a failure. So while we continue to analogize between the failure of the firm and death, again it is a metaphor, not to be taken literally.

In addition to a nuanced view of failure, we have to view firms in all their complexity. Firms can be thought of as combinations of many sub-units acting under the direction of “central planners” or entrepreneurs, who have to decide which units are to be kept, expanded, reduced or shut down. Whether the firm would be more profitable using markets and outside contractors to undertake certain activities rather than producing them in-house is one of the crucial determinants of firm profitability and survival.³

³ Ronald Coase (1937, pp. 390-391) explained the existence of the firm this way: “The main reason why it is profitable to establish a firm would seem to be that there is a cost of using the price mechanism. . . . It is true that contracts are not eliminated when there is a firm but they are greatly reduced. A factor of production (or the owner thereof) does not have to make a series of contracts with the factors with whom he is co-operating

Consequently early recognition of intra-firm failures is an attribute that managers must cultivate if they (and their firms) are to be successful. For example, the Ford Company once produced its own steel rather than purchasing it from outside suppliers; outside suppliers were cheaper, eventually management recognized that the production of steel was reducing firm profitability (i.e. Ford's steel mills were "failures") and disposed of the steel division. Outsourcing firm activities to increase profitability means that management has recognized the failure of within firm production. Recognizing failure is essential to success because it implies that core competencies have been identified. As in the economy at large, in dynamic and growing firms the termination (failure) of sub-par activities are inevitable features of success.⁴

II. Literature

The size of the literature on failure precludes a comprehensive review in a single article. Presumably, this is one of the reasons for the special issue of the *Journal*: the diverse perspectives offered herein bring sharper focus to specific facets of the literature on failure.⁵ We review those articles that are most pertinent to the premise of our paper: that failure often serves the advancement of society in ways that are analogous to the role of death in healthy and evolving biological systems.

within the firm, as would be necessary, of course, if this co-operation were as a direct result of the working of the price mechanism."

⁴ An anonymous referee suggested that this is in keeping with Adam Smith's advice: "It is the maxim of every prudent master of a family, never to attempt to make at home what it will cost him more to make than to buy. The tailor does not attempt to make his own shoes, but buys them of the shoemaker. The shoemaker does not attempt to make his own clothes, but employs a tailor. The farmer attempts to make neither the one nor the other, but employs those different artificers. All of them find it for their interest to employ their own neighbors, and to purchase with a part of its produce, or what is the same thing, with the price of a part of it, whatever else they have occasion for. What is prudence in the conduct of every private family can scarce be folly in that of a great kingdom" (quoted in Heilbroner, 1986, 265-66).

⁵ For a more comprehensive review of the literature on organizational decline see William McKinley (1993). For a history and comprehensive treatment of contrasting organizational paradigms in general (the "rational," the "natural," and the "open systems") see W. Richard Scott (1992).

Biological models are well-known and relatively widespread in the literature on business survivals and failures. Michael T. Hannan and John Freeman (1977) explicitly incorporate quantitative ecological models into their analysis on the population of firms. In their analysis firm survival is functionally related to the stability of the environment. Newborns, both human and corporate, are particularly vulnerable to death and failure. Dean A. Shepherd, Evan J. Douglas and Mark Shanley (2000) develop theoretical models that incorporate “novelty” (newness) into the analysis of the risks to corporate ventures.⁶ In an empirical study of the survival of corporate ventures Holmes and Schmitz indicate that: “. . . among businesses with managers who have the same tenure at their business, the probability that a business fails is decreasing in the age of the business. . . . [This] suggests that business success [or failure] relies on more than how well the individual [manager] is suited to it” (1995, p. 1006). Reinforcing the theoretical models of Shepherd et al. (2000) the data reveal that newer businesses have higher failure rates (for any given level of managerial experience). This indicates that managerial competence is insufficient, in and of itself, to explain failure; consequently to adequately analyze failure the scope of the study has to be greater than managerial competence.⁷ Gort and Klepper (1982, p. 651) study the evolution of 46 industries; their analysis suggests that the age of the industry, and the diffusion of innovations and knowledge are key considerations in determining success or failure. They conclude (p. 651) that: 1) “New industries generally pass through a stage

⁶ They echo Frank H. Knight’s (1921) classic economic analysis of the motivation behind the existence of firms.

⁷ There is also a wealth of evidence supporting the existence of a positive correlation between firm age and survival probabilities in genera, see: Dunne, Roberts and Samuelson (1989), Baldwin and Goreki (1991), and Audretsch (1991). In his research on relation between organizations and social structure, Stinchcombe (1965, pp. 148-150) provides as reasons for the “liability of newness”: 1) the newness of roles in new organizations; 2) The “high costs” of: inventing new roles, determining “mutual relations” between new roles, and “structuring the field of rewards and sanctions so as to get maximum performance;” 3) the greater reliance in new organizations upon social relation between and among strangers; 4) the absence of “ties” (e.g., personal loyalty) between “consumer and producer.”

in which the number of producers declines significantly;” and 2) “. . . the structure of markets (in terms of numbers and composition of producers) is shaped, to an important degree, by discrete events such as technical change and the flow of information among existing and potential producers.”

Given uncertainty, imitation is a way of minimizing the risk of failure in both biological and business environments. Armen Alchain (1950) argues that imperfect efforts of firms to imitate other firms may give rise to innovations that reduce risks and increase profits of firms.⁸ This is analogous to the random genetic mutations that arise in biological reproduction that produce diversity and may give rise to more adaptive individuals

Building on this perspective, Jovanovic and MacDonald (1994) argue that the “mass exodus” of failing firms in the American tire industry between 1922 and 1931 is explicable:

As for exit [failure], it is assumed that innovation is stochastic, so that some firms succeed before others. Since innovation lowers marginal production cost, as firms innovate, industry output rises and the product price falls to clear the market. Naturally, this makes the industry less attractive to those incumbents that have yet to innovate. Eventually, they prefer to seek their fortunes elsewhere: they exit. In sum, innovation possibilities fuel entry, and failure to innovate prompts exit. (p. 326)

Along these lines Denrell (2003, p. 47) states: “. . . even if performance is entirely random, it is nevertheless likely that an examination of historical data will detect at least some attribute of firms that is correlated with performance.” Consequently, historical data and case studies will likely constitute biased samples, because failed firms will be

⁸ Also citing Alchain (1950), Paul DiMaggio and Walter Powell (1983) provide an explanation of how mimetic processes lead to institutional isomorphism. They (p. 151) point out that “Modeling (mimicry of organizational forms by other organizations), as we use the term, is a response to uncertainty.”

underrepresented.⁹ Denrell hypothesizes two groups of firms; one group following a risky strategy, the other a conservative one. The risky group is likely to have many fewer survivors than the conservative group. However sampling **surviving** firms will reveal greater profitability in the risky strategy group¹⁰. Generating managerial principles from observations of surviving firms inevitably leads to “myths” concerning success in business.¹¹

III. Patterns of Failures and Their Contributions to Knowledge and Wealth

A simple definition of failure is in order here. We define business failure as when an enterprise has not survived the market test. The market test is one that compares and in and revenues and costs: if revenues do not sufficiently exceed costs to make continuing the enterprise attractive, then it has failed.¹² The enterprise has not supplied goods or services

⁹ Casual empiricism readily confirms Denrell’s point: In searches of the world-wide web using the Google search engine on May 26, 2004, the number of “hits” from searching on “business success” was 12,400,000, whereas the number of “hits” stemming from “business failure” was only 7,420,000.

¹⁰ Conversely, if the sample were taken from all firms that followed the two strategies, the sample from the group of firms following the conservative strategy would have more survivors. Whether their mean return was higher than that of the sample from the entire risky group strategy is problematic. Regardless, sampling all the firms in the two strategic groups will make the conservative strategy appear *relatively* better than if only surviving firms were sampled.

¹¹ Indeed, Jerker Denrell (2003) and Denrell and James G. March (2001) argue that the entrepreneurial attributes of both success and failure may be similar. Other works that assess the selection biases of the environment include: R. Nelson and S. Winter (1982); O. E. Williamson (1975); J. Mata and P. Portugal (1994); Courtney, Kirkland, and Viguerie (1997); Kahneman, Slovic, and Tversky (1982); Frank and Cook (1995); Gordon and DiTomaso (1992); Jacobsen (1988); Janis (1972); Lant and Mezas (1990); Sitkin (1992); Strang and Macy (2001). For a book devoted to the history, and persistence of self-styled management experts, see Micklethwait and Wooldridge (1996).

¹² Organizational theory offers a number of different perspectives on decline, adaptation and death. Again, in this paper, “failure” refers simply to activities that do not pass the market test of having generating revenues that are sufficiently larger than costs. The “enterprise” that fails can be either the firm or a subunit of the firm in our usage of the term. This is a broad definition of failure that can cover both adaptation and firm death (bankruptcy). As an anonymous referee pointed out, other definitions of failure can “muddy the waters,” making organizational decline, adaptation and death difficult to distinguish. Zammuto and Cameron (1985) have a detailed discussion of how different schools of thought view decline and adaptation; they also explicitly model evolution and ecological niches into their analysis of firm organization and change.

at prices that customers are willing to pay and that allow it to pay for all its inputs plus returns to invested entrepreneurial efforts and capital.¹³

Tautologically, all business failures are wealth maximizing. If continuing the enterprise or activity results in lower net costs than outright failure, then allowing a firm or a sub-unit to fail means that someone made a mistake, or is acting against the best interests of the owners and suppliers of capital to the firm. Beyond that point, we should recognize that some enterprises merit failure. Indeed society would be better off if some firms never existed; such as firms selling elaborate or not-so-elaborate Ponzi schemes, perpetual motion machines, time machines, fountains of youth, get-rich-quick schemes, or other fraudulent enterprises. These activities are criminal or so close to it that the distinctions between them and outright criminal enterprises are too fine for the *non-cognoscenti* to discern. Even saying that, we have to recognize that the existence of schemes to defraud investors and/or the public increases the rate of return on skepticism and scientific literacy.¹⁴ Skepticism and scientific literacy may have substantial social benefits beyond protection from fraudulent enterprises. Consequently we dichotomize business failures into two categories: one involves fraudulent enterprises; these have to fail, the only question is when. The other class contains those failures that were not doomed from the onset by their business “plans.” We all know that business failures impose costs upon the owners of the firm, their workers, and suppliers, less well known are the benefits of allowing firms to fail,

¹³ We recognize that time and the longevity of capital play explicit roles in the timing of the closure of failed firms. An enterprise that requires a substantial investment in highly specialized capital may continue to operate for years even after it has been discovered that the returns to invested capital will never be sufficient to pay a market return on the capital. The rail link between France and Britain in the tunnel underneath the English Channel falls into this category. After the tunnel had been constructed the capital used in its construction has a scrap value in other uses that is virtually zero. The rail link will continue to operate as long as: 1) the tunnel lasts, and 2) its revenues cover are greater than its out-of-pocket expenses.

¹⁴ As Sridharan, U., Dickes, L., and W. R. Caines (2002) point out, the failure of Enron has led to heightened awareness regarding potential conflicts of interest.

and fail sooner, rather than later. Whether a particular business failure is socially desirable, or not, depends not only upon the costs, but the benefits as well.

The commitment of resources to any particular activity requires the forsaking of other pursuits leads straightforwardly to a major benefit of the early admission of failure; when firms fail, the resources (land, labor, and capital) they were using can be employed elsewhere. Resources used in one venture can not be used in others. Societal wealth rises whenever productive inputs are transferred from failed enterprises to others that use the resources in the production of either greater amounts of similar goods, or the production of more highly-valued alternatives.¹⁵ Applying this fundamental principle of resource reallocation to failure reveals regularities or patterns that affect the probabilities of success or failure. These patterns are due to: 1) market size; 2) uncertainty; and 3) relative success.

Market Size and Specialization

Adam Smith recognized that specialization is limited by the size of the market. Lower transactions costs (costs of transport, trade, communications, and tariffs) expand the markets in which low-cost producers compete. Higher-cost producers, whether they be within or outside of firms, fail because they do not produce goods and services at prices that are competitive. Some straightforward implications are that: 1) the opening of trade between regions or nations increases the size of markets and is bound to lead to the closure of high-cost producers; 2) declines in the costs of communications favor firms that are more adept at acquiring and utilizing information, this reduces the viability of firms that are less nimble; and 3) an increasing market creates a market niche for specialist firms that make within firm production uneconomic.

¹⁵ An anonymous referee correctly noted that this argument is more problematic during a period such as the Great Depression in the United States when the percentage of unemployed approached 25% of the labor force.

An obvious example of in-house production becoming uneconomic is the history of the computer industry. In the early stages of the computer age IBM not only supplied hardware but also the software (including the eponymous IBM cards) to their customers. The growth of the computer market allowed specialist firms to supply non-hardware products and services at lower costs than could be provided in-house by IBM. The resulting reduction in costs increased the number of computers demanded. Subsidiary units of IBM ceased to exist (failed); the ultimate reason for their failure was the success that IBM had in selling computers expanded the markets for these subsidiary goods and services. An economic niche for specialized producers came into being and was filled by lower-cost suppliers.¹⁶ Similarly, in contracting industries specialized producers lose customers and revenues. Firms in contracting industries will have to integrate vertically if they wish to continue in business. The advent of the automobile severely damaged firms that had specialized in producing inputs necessary for carriage and wagon production. Firms producing harnesses, wheels, and other specialized items found that their markets were contracting and the lower volume of business increased the average costs of their specialized labor and capital. Firms remaining in the carriage and wagon industries found it relatively cheaper to produce many of these items in-house rather than from specialized producers; market exchange and specialization contracted as the industry contracted.

These examples suggest how failures result from and in feedback effects that accompany and advance economic change. Failures that are a result of lower-cost production convey substantial benefits. Lower costs mean that resources are released to produce other valued goods and services while still getting the output that had been

¹⁶ George Stigler (1951) explains why vertical “disintegration” is to be expected in expanding and maturing product lines, whereas vertical integration is more likely in the markets for novel goods and, paradoxically, older goods that are in declining markets.

supplied by the higher-cost producers.¹⁷ Paradoxically, lower costs may imply increased or decreased specialization. In-firm production becomes cheaper relative to outsourcing as markets contract; in expanding markets outsourcing production tends to become more economic. Change is constant, what may be a successful strategy under one set of circumstances, may be a failed one under a different set.

Uncertainty and Innovation

The stochastic nature of the business environment provides insights into additional benefits of failures. Trial and error, and learning by doing can lead to business failures when the trials lead only to errors, or when the doing results in little learning. Experimentation is risky, but necessary. Experimentation is the antecedent to the discovery of new products and techniques. Business failures could be reduced by broad prohibitions against experimentation. If effective, a prohibition would result in the almost total loss of novelty, innovation, creativity and diversity. The costs of banning experimentation are themselves prohibitive. No one can be taken seriously who states that material living standards would be higher in the United States if candles and general stores had not given way to electric lighting and shopping malls.¹⁸

History suggests that the national economies that have grown the fastest were those that have been most open to innovations.¹⁹ The appearance of new products creates an

¹⁷ We must constantly remind our students and the public at large that the function of an economic system is to provide goods and services at the least cost. Jobs are inputs into production, not a goal. A paradise such as the Garden of Eden offers no employment opportunities.

¹⁸ An anonymous referee pointed out that one reason that the some European countries (i. e., France, Germany, and Spain) have unemployment rates substantially greater than that of the United States is that the labor laws of these countries make it costly to discharge unwanted workers. Without these laws labor markets would be more flexible and employment experimentation less expensive than it is.

¹⁹ “The keys [to economic development] . . . are the laws and rules-the institutions that generate dynamic forces for progress . . . In advanced economies, laws provide positive incentives to spur enterprise and help forge markets using commercial legal and property rights systems that allow new scientific breakthroughs (technologies) to realize their full commercial-social potential.” (Walton and Rockoff, 2005, p. 21)

evolving market process where the success of some firms is, in part, attributable to the experiences of the failed firms. The automobile industry in the United States is illustrative.²⁰ In 1900 the automobile industry in the United States consisted of, at least, 57 separate firms; designs for the automobile were widely divergent. There were horseless carriages with steering pillars; there were steam, gasoline, and electrically powered vehicles; the design and variety of vehicles were astounding. Yet by 1905, higher-priced vehicles had adopted the “French” design (modeled after a locomotive) with an internal combustion gasoline engine in front, a steering wheel and a rear-drive transmission. Lower-priced vehicles copied this model with Ford’s Model T and Buick’s Model 10. Manufacturers of automobiles were market driven, rather than market-making. Robert Paul Thomas (1969) estimates that between 1900 and 1910 there were 584 firm entries into American automobile manufacturing and 432 exits (failures). These failures were beneficial to society because they released resources that were being used inefficiently, and, perhaps more importantly, they provided information concerning the probabilities of success in the manufacture of different vehicle types.

The wisest course of action for a firm within this chaotic environment was to imitate successful firms. First, historically, this involved imitation of foreign imports. Thus, observation of relative success among several firms, combined with a desire to survive, provided sufficient information and motive for firms within the industry to adopt the standard design. It requires little ingenuity to realize that profits will be greater if a firm can produce a similar product for a lower price; such a decision hardly deserves to be called an innovation, since it must be considered the first law of the market place. The trend toward lower-priced automobiles of standard design was an inevitable result of competition within the automobile industry. (p. 147)

²⁰ The following analysis is derived from an article by Robert Paul Thomas (1969) that effectively demolished the intellectual basis for relying upon individual entrepreneurial histories to explain the economic growth of the United States.

An advantage of failure is that it alerts investors to the attributes of firms that are positively correlated with failure, and conversely, success. Simple correlations can serve as guides to future activities, guiding investment away from activities that have been associated with failure, and towards those were associated with success. In rapidly changing business environments where uncertainty is the rule, businesses have to be able to utilize information economically. Copying success and avoiding failed strategies are low-cost ways of coping with uncertainty. Armen Alchian (1950) explained not only the pervasiveness of imitation and rules-of-thumb in the business world, but also their major shortcomings:

“What would otherwise appear to be merely customary ‘orthodox,’ *nonrational* rules of behavior turns out to be codified imitations of observed success, e.g., ‘conventional markup, price ‘followship,’ ‘orthodox’ accounting and operating ratios, ‘proper’ advertising policy, etc. . . . Unfortunately, failure or success often reflects the willingness to depart from rules when conditions have changed; what counts, then, is not only imitative behavior but the willingness to abandon it at the ‘right’ time and circumstances.” (p. 218; emphasis added)

Knowledge is valuable and scarce; learning from mistakes (one’s own mistakes or those of others) and emulating success are, in themselves, valuable rules-of-thumb economizing on the costs of trial and error. Alchian recognized that incremental experimentation may not lead to improvements, but: “Trial and error [becoming] survival or death.” (p. 219)

In the evolving and stochastic of business environment failures are statistical certainties. The benefits of failures accrue to the survivors, who may be: 1) the firms within which failure occurs, if failure is recognized in a relatively short order and acted upon; and/or 2) firms that learn from those firms where failure occurs. Surviving firms that have learned from failure tend to be more profitable than they otherwise would have

been.²¹ The lessons of failure can enable surviving owners and suppliers of capital to allocate and husband their resources more wisely; in competitive capital markets risk adjusted interest rates will be lowered whenever it can be increased, reflecting the reduction in risk and uncertainty that results from increased understanding.

Pulling the Plug

Managerial attention is a valuable and scarce resource. The early recognition of failure allows managerial resources to be focused upon enterprises that have greater chances of success. Jack Welch of General Electric was famous for ridding the firm of ventures that were not dominant or near-dominant players in their markets; this was pivotal to his success at General Electric. In sum, the strategy of identifying activities that are failures *relative to* existing alternatives *and* pulling the plug in a timely manner is one that is a demonstrated winner.

IV. Lemon Socialism

There is a separate type of failure that is not widely recognized as such. If firms fail the market test and the costs engendered by an enterprise are greater than its revenues (and no change is expected), the enterprise will consume all the equity invested and be unable to raise more capital. Capital markets do not typically supply capital to uneconomic firms. But the firm may survive if it is able to attract funding from the public sector. This is termed *lemon socialism*. An entrepreneur may fail in the private sector, but be successful in convincing the public authorities to take over the “lemon.” In this way entrepreneurial losses will be reduced or eliminated; the entrepreneur is off the hook, and the public is on it.

²¹ An empirical assessment of the discounted present value of the benefits of learning from failures is a topic for further research.

In the United States municipal transportation systems are obvious examples of lemon socialism; Muncie, Indiana, made famous by Robert and Helen Lynd's "Middletown" studies, has a good example of lemon socialism. Federal and local governmental subsidies enabled the municipal authorities to operate a fleet of buses that have no passengers almost all of the time. In attempts to increase ridership the transit authority has reduced fares to zero for some groups (students and the elderly). Despite these and other efforts, Muncie busses continue on their routes *sans* passengers. It is clear that: 1) the services the Muncie buses produce are less valuable than the resources that went into providing them;²² and 2) rather than creating a benefit, the Muncie buses impose net costs by increasing pollution, stress on the streets, and congestion.²³

V. Learning about Failure: A Practitioners Guide

Individuals typically wish to postpone death indefinitely, yet it is the inevitable end for all living organisms. Death may be catastrophic to the individual, but it is not a catastrophe for the species, or society. A vigorous and dynamic ecosystem requires the replacement of decayed and senescent organisms by vigorous and healthy ones. Similarly,

²² If this were not so, then private firms would not have given up the franchise and, to continue the services, there would have been no necessity for governmental intervention in the form of subsidies.

²³ The cessation of subsidies to uneconomic municipal transport systems in the entire United States would bring immediate benefits. Federal and municipal matching expenditures would be reduced, which could lead to lower taxes, or more desirable expenditures; both would increase real living standards. Because a large portion of transport expenditures are covered by the federal subsidies, there are few incentives at the municipal level to constrain spending. If the costs of the service is \$100 and the city is paying ten percent of the cost, then as long as the perceived benefits are greater than \$10, it makes sense for the municipality to provide the services. But by providing the transport services society at large is worse off by the difference between their costs and benefits. Beyond the excessive net costs of public transportation systems, there are other negative consequences of these uneconomic subsidies. The cynicism of an informed public increases and, inevitably all governmental activities in general will fall into disrepute. "Good enough for government work" and pervasive cynicism undermines the body politic, and can negatively impact the legitimacy of government. These impose significant costs upon functions in which government activities are cost effective and legitimate (such as expenditures on public health), and it can undermine the voluntary compliance by the public with the tax codes. When notorious government-sponsored programs as obvious as passenger-less, forty-five seat buses persist over many years, the cynicism is compounded and the foundations of democratic government are eroded

a healthy economy requires pruning; the termination of uneconomic activities, bankruptcy, and failure are efficient means to prune under-performing organizations from the economy.

Beyond dismissing the view that failure is an utter disaster, our perspective exposes patterns whose understanding may lead to greater chances of success and profitability. Entrepreneurs and managers have to be aware of the growth and absolute size of their markets. In large and expanding markets new entrants will appear to serve niche markets. This creates opportunities to expand profitability by farming out some functions that had been done in-house. Expanding markets are also a signal that specialized production may be viable; this is a signal for entrepreneurial investigations. Conversely, in contracting markets niche producers face hard times, and vertical integration becomes more attractive.

The recognition that uncertainty is pervasive provides practical insights that are recognized but they bear repetition. Navigating in an uncertain world means that unexpected contingencies arise frequently. We cannot expect the unexpected, but in an uncertain world we can attempt to make plans that are more rather than less flexible. For example, firms may want to acquire capital that can be operated at moderately low costs over a wide range of outputs, rather than specialized equipment that operates at very low costs over a very limited range of outputs. Living with uncertainty means appreciating the ancient admonition against putting all your eggs in one basket; portfolio diversification is not just good advice for financiers, it is good advice for entrepreneurs and managers too. Three further points should be recognized: 1) imitation is *generally* a reasonable strategy to deal with uncertainty; 2) innovations arise randomly; imperfect imitations may be pivotal for success; and 3) a willingness to abandon strategies as information is acquired is necessary in navigating in an uncertain environment.

Exiting an uneconomic enterprise as soon as it is recognized as such avoids further expenditures of resources; or, as the aphorism states: throwing good money after bad. Hoping for a miracle is not a viable strategy. A clear perspective of probable outcomes conserves scarce resources. If the probabilities of success are remote, then the appropriate thing to do is to dispose of the failing enterprise, or, failing that, shut it down as soon as its operating costs are greater than its revenues. Bankruptcy indicates a twofold managerial failure: the first, and obvious one, is getting involved in an uneconomic enterprise, the second, and more egregious error, is not admitting the enterprise was a mistake while bankruptcy could still be avoided. Bankruptcy plays a useful role in dynamic economies, but it is one of the last resorts. There are other, more preferred ways of terminating projects.

Perseverance and optimism are valuable and necessary entrepreneurial traits but they have to be governed by knowledge and realism. Risk-taking in the absence of knowledge and a realistic assessment of the probabilities is simply gambling. While some gamblers do get rich (think of the mega lottery winners), the vast majority simply become poorer. On the other hand, the operators of casinos and lotteries do get wealthier because they have realistic notions of the probabilities of success and failure. Successful management recognizes that it is not omniscient, and that it can (and will) make mistakes. The recognition of failed enterprise and its termination are necessary prerequisites for managerial success.

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