

On the Quality of failure

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ABSTRACT

No innovation without failed experiments. No acquisition of competency without hard work, efforts to translate mistakes and insufficient – failed – attempts into mastery. The human condition is one defined by trial and error. Success equates with narrow escape from failure, whereas failure may be a success just missed. The purpose of management can be said to achieve success, so the management of failure is a key one, seeking to turn failure into profit. Almost no successful solutions remain eternally, so signals indicating that they have arrived in their twilight zone are important. Success may be too comforting and lulling, creating a dangerous success lock-in. Courting failure by acting against conventional wisdom and routine intuitions may, though risky, generate huge payoffs. A productive failure management should appreciate that failure is a way to uncertainty reduction, to better information and knowledge, new wisdom and new intuitions. Failure can and should be celebrated and harvested. The most successful mineral prospectors are those who drill more holes; while their percentage of dry ones is average, their number of lucky ones makes for success. The same holds for ideas, where there is the additional benefit that a larger number of ideas, diverse as they are, makes for improved idea handling proficiency.

Introduction

Might the notion of *failure quality* be meaningful? Not quality as in 'the qualities' of failure, the functions, properties, specifications, or attributes applying, but quality as a level of 'perfection', of utility. One way of defining failure is to say that it is a deviation, an error, an exception from the norm or the standard: from that which was desired. TQM (total quality management) claims to be designed to minimize or eradicate failure, though failure of sorts. 'Failure quality' might therefore seem to qualify as an oxymoron. Quality of a deviation, an aberration perfected?

Yet if we subscribe to a principle of profit, innovation, and success through failure, of failing forward, of failing fast and often (and on a small scale), then several factors suggest themselves as quality indicators. We may well start by underscoring that failure is part of life, that science advances through failing –and sometimes also successful –experiments, that drugs are tested until they have been judged besting any serious side effects, thus risks for failure. Makers of technology, from Edison to James Dyson, record how many thousands of experimental designs they tried until one could be deemed successful, the others failures (no, not failures, Edison retorted: knowledge).

The road to innovation is a perilous one, paved with failure. This essay sets out to attempt to specify how we may judge the quality of failure. Examples will range from the arts and sports to technology and business. Failure may certainly differ between domains but outside aspects may also provide sideways spotlight. Should TQM be complemented with PFM, productive failure management (The Failure Issue 2011). The (impossible?) challenge may be to design systems that improve with each failure, that become Anti-Fragile (Taleb 2012).

Failure a Necessity

First, let us reiterate that failure is integral to all human activity (Ormerod 2005). It is the high road to learning (Vedin 2013). Instead of failure, think 'iterations'. Or develop distinctions, such as Harford's

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between slip, violation, and mistake (Harford 2011). (and more categories have been suggested²). In fact, children who have been taught that failure 'is good for learning' also get better study results. A bit more than one hundred French youngsters were given anagrams too difficult to solve, but about half of the students were told that failure was part of the process and therefore prodded to try again and again (Cf Langer 1997). In subsequent tests this group outperformed the kids in the other group (Autin & Croizet 2012).

Innovation consultant Tim Ogilvie³ and P&G CEO A G Lafley⁴ agree that failure, though sometimes painful, should be judged to be more instructional than success. You may fail but that does not mean that you are a failure (McArdle 2014)⁵. The difference between success and failure in a startup, for example, is sometimes very small. And it may be a narrow thing: a startup may fail and close shop –but if it gets acquired, that outcome is viewed as a success; time horizon matters. (We should note that the Ogilvie-Lafley view is not universally shared –management guru Peter Drucker argued the opposite.)

In a sense, since learning is essential, human beings can be said to be designed for failure. In contrast, companies are optimized for performance. But failure is of course related to objectives. A decidedly odd example is provided by a British inventor who for a while irritated the patent office by applying for patents that were patentable but with no commercial application in mind. This was a person for whom it was success to see a patent granted, meeting the compulsory requirements of novelty and demonstrable function. So for him the unlikely event that his invention(s) should obtain commercial value, reach business success, would paradoxically result in, by his own odd measure, failure. Recall that A G Bell regarded his most famous invention, the telephone, a disturbance to his real work as a scientist and refused to have a telephone in his study. Some failure!

Failure constitutes an indispensable part of Darwinian evolution, and Darwinian processes are not just restricted to biology but define a general mechanism (Dennett 1995): innovation, mutation, variation, or recombination, then proliferation, and competition (fitness test). It is part and parcel of experimentation and testing, and stands for the 'error' part of trial-and-error. Failure should be seen as an investment in experience, in knowledge, in practical know-how. James Joyce called failures "portals of discovery". Ormerod posits the existence of "An Iron Law of Failure".

Persistence in what seems as failure is more important than intelligence. Among elite figure skaters, gymnasts, divers, those athletes attempting movements at the edge of their mastery have most misses during practice, while their peers abstaining from pushing their limits do not fail so often, but do not achieve as well either⁶.

Philosopher Daniel Dennett states that the history of philosophy in large measure is the history of very smart people making very tempting mistakes (Dennett 2013). And "mistakes are not just opportunities for learning; they are, in an important sense, the only opportunity for learning or making something truly new".

Failure may, on a personal level, lead to rejection or a feeling of having been rejected. In a study of performances, a group of rejected individuals significantly outperformed those included instead of rejected⁷. Individuals who were independent gained in creativity after suffering rejection. (So is 'suffering' really a reasonable qualifier here?)

An innovation may represent an eminently successful novelty, but it will inevitably one day succumb to something superior. To different degrees, success is ephemeral. The same holds for companies competing in the marketplace. The average firm life on the S&P 500 list has declined from 61 years in 1958 to less than 20 now. Failure is part of the human condition; very little is immune against failure. Failure is a requisite for beauty, for our appreciation of beauty, so we have to appreciate failure too. With Karl Popper, we may submit that *all* sources of knowledge will, at times, lead us into error, however 'reliable' they are. *At times*, so when, and where, and how?

²Gopalakrishnan, R. (2013). Supporting creative failures. Business Standard, August 8, 2013. Retrieved from website: http://www.business-standard.com/article/opinion/supporting-creative-failures-113080801374_1.html

³How Your Failures Can Help You Succeed. (2013). Entrepreneur, January 23, 2013. Retrieved from website: <http://www.entrepreneur.com/article/225199>

⁴Dillon, K. (2011) Interview: I Think of My Failures as a Gift. Harvard Business Review, 89, (4),86-89.

⁵Munk's tale. (2014). The Economist, 411, (8883) April 19, 58.

⁶Cf website: <http://billsmusings.com/?p=89>

⁷Kim, S. & al. Outside advantage: Can social rejection fuel creative thought? Journal of Experimental Psychology: General, 142, (3), 605-611. doi: 10.1037/a0029728

The olympic motto is the latin 'citius, altius, fortius': faster, higher, stronger. A world record in running or swimming is bound to fail to survive eternally. Humans age, and thus fail in endeavors that they mastered when younger. We do not always regard this as failure, and with good arguments.

The reason failure is something we tend to avoid is the investment it represents. Failure may be costly, and the upside, the experience, the knowledge only perceived in retrospect. Methods for calculating profit-and-loss and for establishing balance sheets do not include proper tools or measures to take failure into account. (Arguably, a productive failure management system may include such.)

Another reason why failure, even if considered necessary, is problematic for organizations is that it is shrouded in uncertainty. Entrepreneurs act as uncertainty absorbers but by the same token failure and uncertainty may become associated with an individual, someone blamed for a failure. So while the price for the organization may be measured in money or resources, an individual may suffer losses in trust and reputation, in perceived lack of value to the organization. Failure in a nascent company can be fatal, while large concerns are more resilient. Given (or taking) the chance, the failing entrepreneur may try something new, seasoned from experience⁸.

An eminent Italian designer, with a track record of successes, illustrates the genuine uncertainty when confessing that he did neither know what constituted success, nor what constituted its opposite. He conceded that some of his greatest successes were products that he had had misgivings about. Whereas when he had been convinced that a product was destined for a bright future, it more than once just bombed in the market (Utterback et al.2006).

Success Quality

Let us have a look at failure's flip side: success. Perhaps discussing the meaning or the definition of success quality might contribute to our failure deliberations. Let us start with sports. It is success for a runner, for example, to score a win or a new record. That would equate with some regular level of quality.

Several sports events have been in for breakthroughs, with someone blazing a new trail. One example is the Fosbury flop in high jump (and before that, the Californian style). This would equate with a true breakout, an innovation quality. Sometimes the breakout is too radical and a new rule forbidding it is instituted. Such was the case for the 'soap style' in javelin throwing, where a Spanish athlete rotated like a hammer or discus thrower and had his hand soaped for the javelin to slip away smoothly as he rotated at maximum speed. All records were broken, and that caused one problem; no stadium was sufficiently large. A second problem was that throw directions could not be controlled, creating even more dangers for audience and functionaries.

Sometimes success is such that rules or practices have to be amended. This happened when Jan Boklöv invented the V style in ski jumping. At first, the judges found his thoroughly non-conservative style abhorrent, but on the other hand his jumps were about the longest. So the way, the paradigm for judging style was adjusted. In cross-country skiing, the invention of skating, as a contrast to the classic way, called for the eventual creation of two categories. The speeds attainable depend critically on the style applied, much as judges have to check whether race walkers actually do abide by the rules and do not run. (The difference between skating and classic skiing is more easily perceived.)

The evolution of two ways of cross-country skiing made for two trails of materials evolution: skis, boots, and poles are different. Materials evolution may require changes in methods and style, like with fiber glass (versus bamboo) poles in pole vault, or low friction swimming suits (eventually regulated or forbidden, as was the soap style), or the clap skate in speed skating on ice.

In addition to 'regular success', the Fosbury Flop, e g, seems to suggest path-breaking or renewing success. The V-style and cross-country skating would equate with rule-breaking, rule-busting success. The clap skate, and others, must be classified as equipment evolution induced success. Boklöv might have failed, as

⁸How 5 Successful Entrepreneurs Bounced Back After Failure. Entrepreneur, 23 January 2013. Retrieved from website: www.entrepreneur.com/article/225204

he did initially, to convince the judges to adapt. Skate style skiing is much faster than the classic variant so without the establishment of two categories, the classic style skiers would have been doomed to fail.

May the principles indicated apply in other domains? Only partially. In the corporate world, evolutionary product refinement equates with regular success. A painter or an author may refine her mastery of the craft. And she can also practice rule-busting (often risky in the short term: risking failure, like Boklöv). Cirque du Soleil's Blue Ocean strategy would qualify as a true Fosbury breakout, blazing a trail (Kim & Mauborgne 2005) like he did.

For technology, we would have to add some principles bred from the art or the practice of it. Success might come out of *technology substitution*, such as when word processors substituted typewriters and electronic calculators their mechanical predecessors ('failing' after a century of success). *Novel* product categories, *innovative* novelties such as video or computer games, which are no substitutes for chess, domino, bridge, or Monopoly, would equate with the creation of entirely new sports, like wind-surfing, boardercross, or slopestyle.

In addition to substitution and wholesale novelty, we might submit the category of *integration*. A personal computer integrates the functions of telefax and calculator –and much more. The eponymous Swiss Army knife is a primitive but much earlier forerunner in the integration category. Currently, the smartphone integrates an amazing collection of functions. If, for example, its compass fails, lots of other functions do not. For sports, decathlon or triathlon may seem somewhat contrived, while skiathlon allows for the combining of skate and classic skiing.

Success Lock-In

Present success may equate with failure later, as Christensen has chronicled (Christensen 1997). The market dominating innovator, with a 'perfect' technology, dismisses the new, marginal technology which is no match for their 'perfect' product(s). The newcomer, 'the disruptor', may just capture an insignificant, obscure part of the market. Then that foothold and those obscure applications turn out to generate sufficient and rapidly growing value so that the blindsided 'innovator' is forced to play catch up (or disappear).

Examples abound; among others, Christensen highlights hard disk memory. Ken Olsen and Digital Equipment Corp created, invented, the minicomputer category. Eventually they were taken unawares by its demise. Likewise with Wang, for a while synonymous with word processing. In its earlier days, Intel was, not least to its leadership and employees, synonymous with memory chips. They were disrupted by new Japanese competitors, and saw their company's future demise. Top executives Grove and Moore discussed the precarious situation and asked what an outside consultant would prescribe. 'Certainly a radical cure: take us out of memory chips!' Grove and Moore decided to act that consultancy role themselves, and substituted memory production with a radical, untested novelty: the microprocessor (Grove 1996).

Arthur Conan Doyle had a spectacular success lock-in. When he got tired of constructing more Sherlock Holmes mysteries, he had his hero following arch enemy Dr Moriarity to his death at the Reichenbach falls. But locked in the poor author was: his readers did not grant him any peace until he had his, their, hero resurrected.

Two painters who have opted for escape from success lock-in are Harold Cohen and Lucian Freud. After being established –successfully –with an admired style, they both had the epiphany of facing a future of being one's own epigone (Freud did not want to do 'what people expected of him' (Gayford 2010). Cohen's became a quest to understand art-making in general, his own in particular). Cohen's search led him on to computer art (McCorduck 1990). Freud's to his developing a very different style that made at least one influential critic (previously very positive to Freud's work) dismayed. Doris Lessing wrote two novels trying to avoid them being 'vintage Lessing'. Under pseudonym (Jane Somers), they were refused by several publishers: "The Diary of a Good Neighbour" and "If the Old Could. . .". Braque seems to have indicated a particular expression of success lock-in, success leading to a kind of general authority, when he in later years was asked about his views on his old friend and co-creator of cubism, Pablo Picasso: "Oh, Pablo... he used to be a good painter, but nowadays he is just too occupied with being Picasso".

Ludwig Wittgenstein impressed Bertrand Russell and many others with his early work "Tractatus Logico-Philosophicus"⁹. He left this early success for the isolation of a Norwegian forest and, after that (and war duty), working as a moody teacher on the primary and secondary school levels in remote Austrian villages. Eventually returning to philosophy, he avoided success lock-in and discarded what had so impressed his peers, seeing it as a failure, and took off in other directions (Monk 1990).

Had Hannibal failed, suffered (limited) disaster, he might have been liberated, forced to evacuate the Italian peninsula, thus saving Carthage. The tough, rough Catalan infantrymen the Almogàvers were first mobilized to defend Catalonia against the French king Philip le Hardi. Successful, they were next recruited and paid to fight in Italy. Next their commander Roger de Flor sold their services to the Byzantine emperor. They did his bidding so successfully that he had de Flor murdered, so success cost de Flor his life. This unleashed a violent rampage as the revengeful Catalan mercenaries fought their way south from Constantinople, destroying everything, to finally end up creating a (formally) Catalan duchy in Athens¹⁰. This lasted almost a century – a locked-in success. Pyrrhus, king of Epirus in Greece, created lasting renown for himself when he after winning a pitched battle concluded: "Another such victory, and I would be done in".

Something similar might be the fate of a new company. First anxious for landing no sales, suddenly the exhilaration of getting one or two big orders. Extrapolating on these early wins makes for a vertigo of happiness. But those early customers may turn out to belong to a rare breed of 'innovators' or pioneers eager, and well-endowed enough, to try something new. They are a demanding lot, requesting numerous adaptations, modifications, advice, and hand-holding. In not so many words: what seemed profitable is but doubtfully so, and draining resources that would be needed to entice a broader range of new customers¹¹.

Success may well be just transient. If a non-proprietary improvement gives a lead, it may rapidly be emulated by the competition, the lead only temporary. There will be a Red Queen (as in "Alice in Wonderland") stalemate: running fast to stay in the same place. Success may also make for complacency, halting a learning process under way and thus incomplete. A frequent type of success is making for a risk of preparing for later failure. That is when problem signals, early indications that something is amiss, are met by dedicated efforts – successfully, though just in the short term, as it turns out. Or the failures seem so small that the fact that they indicate deeper trouble is overlooked. The papering over only causes complacency, and critical time is lost, fundamental analysis ignored. The signal might even have been a random effect of dynamic interactions in a complex, tightly coupled system, a dangerous combination, a latent risk for an out-of-control chain of events¹². Hubris, of course, is an even more dangerous affliction. Icarus surged upwards, getting too close to the sun. Less dramatic is the example of the successful demand for safety belts and airbags in cars – which may result in more speeding and drunk driving, in an overconfident feeling of security.

On a final note, a more frequent "failure break-out": failure a dead end, translating into a necessity to change direction – eventually resulting in success along this new direction. Samuel Morse failed as an artist so he went for the mysteries of electricity. Daguerre is not known for his paintings, nor his panorama (which provided for him while working on what became photography). Manhattan's High Line (or its Parisian model) was abandoned when the time for the original application had run out, so an elevated railway was converted into an urban meadow (Lewis 2014). Einstein was no bad patent clerk (as far as we know) but his heart was somewhere else (which we know).

Resounding, Energizing Failure

When the thirteen colonies started the American revolution, they had to do with a provisional process for government. This worked so badly that even if the two political parties of that day were opponents in most ways, they agreed on one thing: the new Union needed a proper, a functioning constitution. The utter failure initially paved the way for profound considerations based upon history, philosophy, and political science. The first attempt had been so convincingly proven a failure that it provided the impetus for something of a

⁹Wittgenstein, L. (1922). *Tractatus logico-philosophicus*. London: Routledge.

¹⁰Muntaner, R. (1328/1332). *Crònica*. Xirivella.

¹¹How Early Success Can Lead To Failure. Retrieved from website: <http://blog.thefailcon.com/post/63715884489/how-early-success-can-lead-to-failure>

¹²Harford, Op cit.

breakthrough. While something like holy writ in the United States of America, the US constitution has become a golden standard and a model sometimes emulated in other countries.

For many years, ITT and LM Ericsson (now named just Ericsson) were the two telecommunications equipment companies with a truly world-wide market presence. Both were basically locked out from their home markets, American ITT because of AT&T's dominance in the US, LM Ericsson since the state agency Televerket had a practical monopoly in Sweden. The community of telecoms engineers is an open one, so when, in the mid 1950's, AT&T at an international conference told of experimenting with computerized telephone exchanges, ears were pricked and tentative work started in, for example, England as well as in Sweden. Hitherto, exchanges had been electromechanical, so electronics, soon semiconductor circuitry, and computer software production were foreign and difficult elements to learn to master.

When Televerket eventually had a version of its first electronic exchange ready and installed, it was a catastrophe. LM Ericsson had its own AKE, sold early on to the Netherlands, and installed there. It required perpetual handholding and error hunting –a failure headache. But, quite naturally, the engineers believed in their creation, which they expected only needed some burning in and fine-tuning. So far, it was decidedly unattractive as a showpiece.

Eventually, after Ericsson's loss of a 'safe' market and pressure from on-high, the government agency and the private firm created a joint development company, chartered to start with a clean drawing-board, creating a telephone exchange from scratch. A system if possible immune to the problems that had so plagued the earlier attempts. The final result was system AXE. The immense project does not concern us here; an objective was phrased thus: the most flexible system possible. In retrospect, the problematic forerunners suffered from being complicated and tightly coupled, that dangerous combination. The road pursued for AXE was modularization in several dimensions (Vedin 1992).

In hindsight, AXE turned out to be an extraordinary success, now sold to upwards of 130 countries. The two failures were sufficiently convincing to allow for the clean restart –quite naturally challenged by those who at the time believed in fine-tuning what they judged to be an 'almost perfected system' as a faster and much less costly trajectory.

When Commodore Perry's 'Black Ships' opened fire on Tokyo in 1853 and forced Japan to open up to the external world, it served to demonstrate the utter failure of a previously immaculate, perfectly isolated system. The shock set in motion movements that would lead to the 'Meiji restoration' fifteen years later. Since the early 17th century, Japan had existed in splendid isolation, calibrated against the risks of foreign influence and internal strife. The disruption of this all-encompassing system had such a quality as to make for a revolution 'from above', a systematic collection of the best Western practices to emulate, with concomitant breakneck industrialization and militarization.

Nursing a Crisis

A failure may be turned into an advantage. Thus quality is dynamic in the sense that failure might be adapted and re-interpreted into something advantageous. With a price paid, the meaning of the failure may be consciously and purposely re-designed.

Through unwise management action, a big Swedish company, not as an anonymous, abstract entity but in reality its management, fell afoul with a government agency because the company had flaunted mandatory regulations. A new outsider CEO was recruited and he changed the management team and much of corporate structure. The company got the state agency's benefit of the doubt, and was not forced to close down, which would have been a possible, catastrophic outcome.

With the words of the new CEO: 'one has to take care of, indeed nurse one's crisis'. By that he did not refer to the fact that he had to tend to the existential threat to the company but rather that this crisis could, even should, be relied upon as a lever for going in a new direction, a radical transformation ascertaining excellent profits. In effect, profits had constituted no problem at all: they already fared better than most of their peer companies. The crisis was caused by the loss of trust with one key stockholder (wielding a big, potentially lethal stick) and galvanized the staff and made legitimate tough demands for slimming the organization and changing overall structures, including benefits.

In this case –which can be proposed to be illustrative –the arduous rescue and recovery operation, painful as it was, became the company’s collective experience, made for a legend, a new powerful element in their corporate culture. Such culture is formed by signal events in an organization’s life, and also by signpost actors pursuing actions to be emulated. Failure that elevates to crisis may often constitute such a signal event. So a signal failure, and its interpretation, may be important for the future evolution of the organization. Thus failure, conceptually well managed and nurtured, can provide positive momentum.

Re-interpreting failure may affect the perceived level or quality of failure. It may become associated with a person, an organizational unit, or some external force, maybe even a Black Swan (Taleb 2007). Sometimes such roles may be nested within one another.

Rita Gunther McGrath tells of experiencing an IT system failure in an organization where she was IT responsible. Diligently, she presented her list of actions for fixing the trouble to her boss. He told her to stay away. They had long argued that overall system change was overdue, and now, underlined her superior, they had been given the conclusive argument¹³¹⁴. So the failure was a blessing in disguise.

Profit from Failure

“Fail forward, fail fast and often, smart and small” –how may that battle cry translate into quality gauging? We should preach the virtues of failure! A major reason for failure is a risky situation, or rather even a situation characterized by uncertainty. Fail forward, then, should equate with uncertainty reduction, with obtaining useful information. So an action that carries an inherent risk for failure should be designed – smartly –so as to make the potential failure generate a maximum of information. The credo of ‘fast and often’ can also be seen in the lens of information production, to which we may add ‘inexpensively’, small, in other words partial failures, no total catastrophe. When judging whether to embark on a development project hoping for an innovation (a successful idea), the advice is to look for *the* key obstacle or question mark, and then for a fast, cheap, and easy way to resolve this uncertainty (Sitkin 1992).

An American service provider applied a statistical rule for deciding whether a subscriber was likely to default on the monthly fee or steal servicing equipment, and those customers judged credit risks were therefore required to make an advance deposit; competitors had all different such statistical rules without any results indicating if any one was superior. Accepting (some) failure as a price for better knowledge, the company let up on their rule. To management’s surprise, the expected bad credits were not that bad at all. As a consequence, a much more fine-tuned algorithm could be applied (Schoemaker & Gunth 2006).

Success, and thus failure, may frequently show up in power laws, and experiments will indicate which power applies. But many models suppose a Gauss and not a power law distribution, so the appropriateness of the model, the *model quality*, is critical. Failure propagation in a network depends on the network structure so failure becomes dependent on *network qualities*.

Advertising legend David Ogilvy tested various ad designs, and ad campaign structures. He also included some which he firmly believed would not be successful –but could provide information for the design of future campaigns. The author of “Super Crunchers”, Ian Ayres, provides numerous examples of how the possibility of ‘crunching’ vast arrays of data can provide more success –the data also encompassing what turns out to be failure. He chose the title of the book this way, his preferred title proving a ‘failure’ (Ayres 2007). - Evidently, these ‘failures’ are contained and, in some way, carefully planned. They are more ‘efficient’ than ‘business as usual’ or doing nothing.

Innovative companies have become so through a “fail-hardy” process. Studies (admittedly difficult to perform and to interpret) have indicated that just about one out of 60 ideas reaches market success, so 59 would seem to qualify as failures, making an argument for early project evaluation and judgement, before too much of resources have been squandered¹⁵. The problem is that an early evaluation has to be based on incomplete or non-existent information, with the effect that only a limited number of ideas are allowed to

¹³ Gunther McGrath, R. (2011). *Failing By Design*. Harvard Business Review, 89 (4), 77-83.

¹⁴ Gunther McGrath, R. (2013). *The End of Competitive Advantage: How to Keep Your Strategy Moving as Fast as Your Business*. Boston: Harvard Business Review Press.

progress. As a result, people learn that there is an all but impossible needle's eye, and refrain from risking idea rejection. The "fail-hardy" process means saying 'yes' to all or most ideas in the sense of allowing them some small amount of capital or time for early feasibility testing. First result is that the success rate improves many times on any 1:60 ratio. Second result is that since there is no standard innovation process but only the actual such process, which, dealing in novelty, has to display some unique characteristics; thus more processes result in more experience, practice, and learning. And then a third beneficial result: since people learn, get convinced that ideas are welcome, more ideas are generated and advanced. So, from a failure point of view: a willingness to risk more failures increases the success rate, process competency, and the production of more potential failures to better translate into success (Vedin 2004).

It is even reasonable to court failure, to make seemingly foolhardy bets. Because if it turns out that what was unanimously regarded as a dead end and an established fact turns out to be false, the reward can be immense. Obviously some conventional wisdoms, some routine instincts would have been turned upside down. Paradigm shifts in science, the emergence of new 'thought styles' (Fleck 1935) offer numerous examples, Einstein's revolution in physics but one. Or like the Sikorsky Prize winner for a human-powered helicopter. Individual photons may bind together in molecular structures, making 'light sabers' an appropriate metaphor. Arranging a metamaterial diligently makes for an invisibility cloak; in fact about a dozen invisibility cloak methods, with different particulars, exist. Obtain frictionless flow by adding more friction¹⁶. An accidentally produced magnesium carbonate with nano-particles turns out to have an 'impossibly' vast active surface: 1 g features an impressive 800 m² surface area. Dan Schechtman received a Nobel Prize in 2011 for his 'impossible' quasicrystals. The Fosburys and the Boklövs also bet against established wisdom, opting for the 'impossible'. A circus without exotic animals trained at circus tricks? Yes, Cirque du Soleil!

The Indian company group Tata features a group-wide innovation promotion program including prizes for achievements in various categories. One such category is 'Dare to try' for "Most novel, daring and seriously attempted ideas that did not achieve the desired results". This is to encourage a culture of risk-taking, perseverance, and open sharing. The 2012 program received 87 entries in this category¹⁷. Likewise, German auto maker BMW features "creative error of the month"¹⁸.

The Italian company Alessi, reliant on design-driven innovation, features an exhibition in its development department. Here they display some of their greatest failures, products introduced with lots of confident ballyhoo -before flopping. Bessemer Venture Partners feature an Anti-Portfolio where they highlight the excellent -in retrospect -investments they once nixed. There are long lists detailing stillborn initiatives from Google and Facebook, easily with more than ten items on each list.

Who says what is foolhardy? The experts, that is who! Philip Tetlock has performed a twenty year study of political experts, economists, journalists, diplomats... (three hundred in all, half of them PhDs). He found that their predictions were just a little better than flipping a coin. In addition, experts, that is those specializing in a particular domain, performed worse than generalists. The explanation seems to be that the expert is so confident in his expectations that he is over-confident and blind to factors in the 'margins' that may turn out to be not that marginal (Tetlock 2005).

For a number of phenomena, the concept of expertise may turn out to be doubtful. Psychologist David Rosenhan and collaborators asked to be admitted to mental institutions, claiming to have suffered auditory hallucinations. Once there, they behaved as normal. Over something like three weeks, this 'normality' was not diagnosed as such; pre-conceived perceptions led the institutions' personnel to, for example, diagnose note-taking as 'compulsive writing'. Next, Rosenhan informed the institutions about his findings, and told them that he would send more such pseudo-patients. Personnel came forward and reported who were pseudo-patients. In fact, Rosenhan had not sent any!¹⁹

¹⁶Preview of research to be published in a forthcoming issue of Physical Review Letters, Retrieved from website: <http://physicsworld.com/cws/article/news/2014/apr/22/physicists-create-frictionless-flow-by-adding-more-friction>

¹⁷Tata press release, from website: [http://www.tata.com/company/releasesinside/e\\$\\$\\$\\$!CT4Y!\\$\\$\\$!\\$\\$\\$SM=/TLVr3YPkMU=](http://www.tata.com/company/releasesinside/e$$$$!CT4Y!$$$!$$$SM=/TLVr3YPkMU=)

¹⁸Retrieved from website: <http://www.telegraph.co.uk/finance/2917452/Youve-made-a-mistake-The-boss-will-buy-you-a-drink.html>

¹⁹Rosenhan, D. L. (1973) On being sane in insane places. *Science*, New Series, 179, (4070), 250-258. Also available at website: <http://www.bonkersinstitute.org/rosenhan.html>

Conclusion

My introduction posed the question whether we might search for PFM, Productive Failure Management. The examples given and the discussion above would seem to indicate the usefulness of such a concept. The global success of a series of FailCon conferences²⁰ serves as a further indication. Discussing the concept might lead in the same direction as happened with the nascent concern for TQM: the development of methods, criteria, and measures, such as 'Six Sigma' (founded on statistical quality control) and stimulants such as "The Malcolm Baldrige Award". To quote Dennett again: "So when you make a mistake, you should learn to take a deep breath, grit your teeth, and then examine your own recollections of the mistake as ruthlessly and as dispassionately as you can manage."²¹ Failure management may apply to the levels of individuals, organizations, and societies or communities, all interdependent at various degrees.

One important aspect is culture, the culture in a country or a region as well as the internal culture of an organization (Vedin 1980). Language is important too: productive experiment versus dumb failure, shame or guilt, individual versus organizational unit. On Hofstede's cultural dimensions²², failure would be more in tune with a pragmatic than a normative stance, and with uncertainty acceptance rather than avoidance. Another take on culture focuses on prejudice²³.

Failure –an unavoidable price (or reward?) for human activity –is related to uncertainty and consequently to innovation. Uncertainty reduction equates with knowledge acquisition. Failure quality may, metaphorically, be suggested as a quotient between information gathered and cost, the latter vector possibly having a pecuniary but also a psychological component. Perceived uncertainty may be reduced through forceful initiative and convincing authority. Failure can be a subjective value statement, something dependent on viewpoint and time horizon.

Success can well be regarded as failure narrowly avoided, with a small or a broad margin. Success can also be a bringer of (later or potential) failure, because of the lock-in effect, creation of complacency or a temporary papering over of crisis signals. Success can be a mirage –as can failure. "What we learn from history is that we do *not* learn from history" (attributed to Hegel –and also to G B Shaw). To make a particular success provide a recipe for more success may imply a belief in history repeating itself. In contrast, failure is instructive and represents an investment. Such an investment is also linked to a value statement, again conditioned by viewpoint and time horizon. Here, individuals and organizations may not be synchronized.

Crises, results of failure, may serve as mobilizing forces. Not only do they have to be resolved but they may energize, provide battle-cries, unification, and collaboration. There are even examples of crises consciously produced, manipulated, to shake up status quo. A threatening scenario outcome may be self-destroying, the dire scenario forecast thus a 'failure' as a forecast, but the actual outcome a success –because of the scenario signal.

Occasions of failure make for keeping awareness awake, illustrating paradoxes, conflicts, and contradictions. An organization's internal culture is formed by its history, molded by crucial events and key individuals. Shattering failure or rescue from failure may, like signal success, come to be cultural foundations. Failure, failure lessons, may be designed, re-designed, and re-interpreted, failure reframed. Selectively, failure can, should, at times be celebrated.

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²⁰FailCon website: <http://thefailcon.com/>

²¹Hofstede, G. (1980). *Culture's Consequences*. London: Sage. See also website: <http://geert-hofstede.com/dimensions.html>

²²Retrieved from website: <http://atlasofprejudice.tumblr.com/post/80937352126/20-ways-to-slice-the-european-continent-from-atlas>

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