



Perspectives

Decision Errors, Organizational Iatrogenesis and Errors of the 7th Kind

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4 **Decision Errors, Organizational Iatrogenesis and Error**
5 **of the 7th Kind**
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Abstract

This paper offers a framework for understanding how management decision errors may lead to iatrogenic outcomes. Organizational iatrogenesis is the unintentional genesis of qualitatively different problems due to mistakes like unwise intervention strategies, well-intended work on the wrong problems or ignorance of significant correlations. Iatrogenic outcomes sometimes involve black swan (Taleb, Nassim Nicholas 2007) scenarios. Three error types are well documented in the literature. Type I or “Alpha” errors and Type II or “Beta” errors form the foundation of interpreting data in statistics. Mitroff and Betz (1972) introduced Type III “Error of the Third Kind,” a meta-error of focusing upon or solving the “wrong” problem(s). We add innovation error (Type IV), action errors (Type V and Type VI), and the cascading iatrogenic (Type VII) error of the 7th kind, a dangerous source of irreversible organizational iatrogenesis. While many undesirable outcomes result from uncontrollable interaction of exogenous black swans with unavoidable endogenous ignorance, many are the result of controllable endogenous factors like poor choices, faulty tactics, poor vision, “gung-ho” attitudes toward action, lack of patience, ignorance, and faulty data analysis. Our framework clarifies for leaders where and why to drill down in the decision process to lower risk of uncontrollable iatrogenic outcomes.

Introduction

Iatrogenesis is the process-cause of many failures and disasters that spawn from decision errors. Iatrogenesis is well-documented in medical science and health care management, and in a handful of sociological studies. Iatrogenesis is not well-discussed in social sciences or studies concerning organizations and has yet to be examined in fields such as business administration, organization theory and business strategy. By applying the concept of iatrogenesis to organizations, some major sources of downside risk during strategic and leadership decision making are exposed.

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3 Organizational iatrogenesis as a topic of inquiry is fertile new ground for impactful organization
4 theory development and testing.
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9 We offer no particular comment on the micro-factors that lead to poor judgement or bad decisions.

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11 Our goal was offering a framework for making sense of how especially poor outcomes come about
12 and identifying decision process intervention points for designing iatrogenic disaster mitigation
13 tactics. For in-depth discussions on micro-factors related to poor judgement and bad decisions,
14 there are excellent comprehensive overviews (Brest & Krieger 2010), critical reviews (Newell &
15 Shanks 2014) and specialized reviews (Shepherd, Williams, & Patzelt 2015). Furthermore, for an
16 indication of how overwhelming the decision bias problem is, see the Wikipedia entry “List of
17 Cognitive Biases” (Wikipedia 2017).
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28 Making strategic decisions about what actions could be taken, and whether or not to act at all, is
29 fundamental to both managing and leading. When managers focus upon event attributes and event
30 structures related to issues and problems, they face (at least) four stages of analysis and decision
31 making. First, as Mitroff and Betz (1972) demonstrated, they must be sure they are working on the
32 right issue or problem. We call failure to get this right “vision error”. Second, they should figure
33 out how the forces involved in the problem correlate with each other and how they interact with
34 the problem. Mistakes here are “correlation errors.” Third they should innovate; developing
35 feasible and effective possible courses of action and choosing from among them. Flaws at this
36 stage are “innovation errors.” Fourth, they must “make the call,” deciding to act or to not-act.
37 Mistakes in this stage are “action errors.” The likelihood of overall program, strategy or system
38 failure increases as sub-level errors compound and interact. Furthermore, the principal of
39 iatrogenesis says that endogenous error can lead to exogenous disasters. In this context,
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3 endogenous means within the system or organization, and exogenous means outside the system or
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5 organization.
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8 Previous research indicates that performance improvement interventions regularly lead to
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10 *decreased* organizational performance (Bernardez 2009) or fail altogether (Nutt 1999). While this
11
12 may not be completely surprising, it is troubling. Not all wrong decisions are equal -- some
13
14 decision errors lead to far worse outcomes than others. Among the most dangerous decision paths
15
16 are those that lead to irreversible negative *iatrogenic* outcomes.
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20 We do not present a complicated idea or have illusions of brilliance on our part. We write this up
21
22 and publish this work because iatrogenesis is real, deadly serious and tremendously important.
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24 Lives are lost, taken or otherwise ruined, organizations fail, nations go to war, bombs are dropped,
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26 careers are destroyed, environments are ravaged, and other irreversible social and physical damage
27
28 is inflicted by decisions that lead to iatrogenic outcomes. Sadly, this not a rare phenomenon.
29
30 Serious detrimental “organizational iatrogenesis” occurs frequently. We hope this paper helps
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32 decision makers, leaders and scholars understand organizational iatrogenesis, so we can jointly
33
34 focus on finding ways to avoid catastrophes.
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39 We describe two major contexts for organizational iatrogenesis. Iatrogenesis may be endogenously
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41 triggered, exogenously triggered or both. The endogenous interaction of decision errors by
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43 organizational actors is the focus of this paper. Understanding it involves unpacking the decision
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45 process into stages and examining how decision errors within stages may interact between stages.
46
47 “Black Swans” (Taleb, Nassim Nicholas 2007) are implicated on the exogenous side when they
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49 are “released” or “unleashed” by internal decisions errors. Organizational interaction with
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51 exogenous black swans is a secondary focus of this paper.
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3 In order to unpack the basics of the organizational iatrogenesis process, we elucidate seven
4 different kinds of error in a four-stage strategic decision-making process. The paper is organized
5 with headings for each type of error. Within each main heading, there is a basic literature review,
6 some examples of the error, and then discussion of circumstances in which that type of error may
7 lead to organizational iatrogenesis. Along the way we summarize relevant literature on the major
8 types of decision error categories that we use in our framework – from Neyman and Pierson’s
9 (1933/1967) introduction of type one and type two correlation error, to Mitroff and Betz’s (1972)
10 introduction of meta-error (of the third kind), Peters and Waterman’s (1982) famous promotion of
11 bias for action, to Nutt’s (1999) surprising finding that at least half of organizational decisions fail,
12 to Taleb’s (2009; 2007; 2011) explanation of Black Swan’s, to the U.S Government’s (2011)
13 Financial Crisis Inquiry Report to Thornlow et al’s (2009; 2013) work on the irreversibility of
14 cascade iatrogenesis. We present previous studies to build upon them, drawing logical implications
15 and creating useful basic categories within the decision process to help identify likely sources of
16 iatrogenesis.

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19 The first three kinds of error (type I, type II and type III error) are already well documented and
20 familiar to management scholars and practitioners. Using cases and examples, we postulate about
21 what errors combinations are more likely to lead to significant effect size organizational
22 iatrogenesis. We build up to “Error of the 7th Kind,” which is a complex interaction of other errors
23 that leads to negative cascade iatrogenesis.

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26 All of the terms, stages, interactions and variables depicted in **Figure 1** are explained in the paper.
27 This includes (a) describing iatrogenesis itself; (b) describing four stages of strategic decision
28 making and the core decision errors associated within each stage; (c) explaining black swan
29 variables and black swan barrier variables; and (d) examples of two major types of iatrogenic
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3 instigations: interaction within and between internal decision process stages and interaction of
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5 internal decisions with exogenous black swan field variables.
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11 INSERT FIGURE ONE ABOUT HERE
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17 **IATROGENESIS**

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20 Iatrogenesis is the unintentional creation of a new (usually negative) situation from interacting
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22 decisions, forces and actions stemming from (usually positive) naive intentions. Almost all of the
23
24 literature on iatrogenesis is focused upon attempted solutions that do more harm than good,
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26 generating new (and worse) areas of risk/harm that did not previously exist. In the medical
27
28 profession and literature, iatrogenesis is understood as inadvertent impacts or outcomes brought
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30 forth by a treatment or supposed cure and is commonly used to describe serious new adverse effects
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32 brought about by unforeseen interactive forces. We find no good reasons why this concept does
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34 not accurately extend to organizations and institutions.
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40 Including and attending to iatrogenesis in decision making is critical because iatrogenesis
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42 substantially changes the risk profile of decisions and actions. This is especially true for a strategy
43
44 of trial and error, or rushed analysis in a complex environment. A care free tactic of “that did not
45
46 work, let’s try something else” becomes far less viable when unexpected disastrous problem(s)
47
48 may grow from uninformed experimental or gung-ho investigations or actions. Type 3, Type 2 and
49
50 Type 1 error in and of themselves may be culprits (see **Table 1**). Focusing on the wrong problem,
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52 including and investigating variables that do not belong, not investigating or excluding variables
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3 that should be belong can create unexpected havoc. Employees and other stakeholders may revolt
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5 if they are considered a problem when they are not, or if implicated as a force in a circumstance
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7 when they are in fact uninvolved. When critical actors and forces are left out that are in fact
8
9 involved, they may continue wreaking harm, and act (adapt) in new and different ways in light of
10
11 the variables that they learn *are* included. Iatrogenesis can begin regardless of subsequent
12
13 strategy/tactical plan development or action errors, like failing to act). Taking action based on
14
15 plans rooted on previous errors is even more likely to generate iatrogenic problems. Better
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17 decisions are based in respect for the creation on new problems, not just consideration of when a
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19 plan does or does not work. A firm may cut costs successfully, and also accelerate their demise.
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24
25 Ivan Illich (1975) published much of the seminal work on the topic, offering sociological theory
26
27 on changing human health care requirements and systems. Illich (1974; 1976; 1975) described
28
29 three levels of iatrogenesis: clinical, social and cultural iatrogenesis. While Illich was certainly
30
31 concerned with a poor statistical record of medical intervention on individual medical health
32
33 improvement, he stressed the greater importance of noticing iatrogenesis in organizational and
34
35 social life. His passionate essay on the medicalization of life was a call for noticing nearly invisible
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37 iatrogenesis at work, reaching beyond medicine to organizational and cultural sense making. This
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39 call to look for unexpected exogenous results of health care decisions and actions was as much the
40
41 main point of the seminal works as looking for unexpected endogenous results.
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47 Although Illich's work was largely ignored and panned as alarmist and uninformed by researchers,
48
49 a well-regarded (and much better informed) iatrogenesis literature eventually developed. Further
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51 iatrogenesis literature was robustly integrated across the fields of medicine, pharmaceuticals and
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53 health care management. This began in earnest when Brennan et al (1991) published a widely cited
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55 Harvard Medical School study that found nearly 4% of all hospitalizations resulted in subsequent
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3 negative iatrogenic events, 14% of them fatal (0.5% overall). Hofer and Hayward (Hofer &
4 Hayward 2002) offer an excellent run-through of the typical medical situation, and explain how
5 error and uncertainties compound to create harm. This is now referred to as “cascade iatrogenesis,”
6 which is discerned and described by Thornlow et al (Thornlow, Anderson, & Oddone 2009;
7 Thornlow, Oddone, & Anderson 2013) as a series of or combination of diagnostic, correlation and
8 action/treatment errors that lead to irreversible deterioration. There is now a vast literature on
9 clinical iatrogenesis among health care’s various specialty areas.

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There is a small set of research reports observing that iatrogenesis as a phenomenon is not limited
to the doctor/patient/disease level of analysis, nor is it even bound to health care. This small sample
of studies offers evidence of iatrogenesis intruding into technology, economics, poverty, copyright
law, social work, language use and general risk management (Avitzur 2013; Dymitrow & Brauer
2016; Kennedy 2015; Meessen, Zhenzhong, Damme, Devadasan, Criel, & Bloom 2003;
Melendez-Torres et al. 2016; Palmieri & Peterson 2008; Wiener 1998). The absence of
iatrogenesis research and discussion in management, organizations and social institutions is
unfortunate. Even a minimal commitment to risk management, innovation and solution
effectiveness in business dictates that unexpected and uncontrollable negative fallout of decision
errors be minimized. Understand and managing iatrogenic risk should be the first thing to which
we attend.

Perhaps the most popular work was by Tenner and Rall (1997), who described numerous
unintended consequences of technological solutions as “revenge effects.” These include greater
risk taking due to improved safety technology (helmets, smoke alarms) and the use of antibiotics
leading to more resilient strains of bacteria.

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3 While the scope of the research is broad, the number of studies remains tiny and we find very
4 limited discussion of iatrogenesis in the management literature. The most (and perhaps only)
5 detailed discussion of iatrogenesis in risk management literature is provided by Wiener (1998)
6 who demonstrates that “excessive countervailing risks are systematically generated by institutions
7 that regulate target risks”(Wiener 1998, p44). Wiener develops a compelling analogy between
8 medical iatrogenesis and regulatory iatrogenesis. The only business centric investigations we
9 found are in a chapter on decision errors (Boal & Meckler 2010) and a short study (Kennedy 2015)
10 in the legal and economic context of U.S. copyright law.
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22 One take-away from the literature is the simple deduction that avoiding iatrogenesis requires
23 increasing attention on the decision of whether to act or to withhold from acting. The general bias
24 of the management literature is that action is preferred (Patt & Zeckhauser 2000a; Peters,
25 Waterman, & Jones 1982), and to focus on courage to act (Clawson 2009; Jones 1991) or how to
26 get from intention to action (Fishbein & Ajzen 1977). On the other hand, deciding when to
27 withhold and not-act is the major focus in the health care literature, specifically as a result of
28 industry-wide awareness of iatrogenic events. Perhaps an underlying business management bias
29 for action assumes that *of course* we should act (Child 1972). A bias for action was, at least for a
30 while, considered a best practice (Collins, James C. & Porras 1994). Here we ask: what happens
31 if we treat this as a core stage of the decision-making framework? What are the results of action
32 errors as they interact with error(s) from other parts of the process? This leads to contemplation
33 about instances when it is best to *not* act, even in the presence of a feasible, empirically tested and
34 verified strategy for action. Certainly, research specifically about the art and science of
35 withholding from action will be helpful to managers and decision makers, and we hope our
36 discussion of iatrogenesis encourages scholars to pursue that topic.
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3 **Black Swans and Iatrogenesis.** Taleb (2009; 2007; 2011) coined the term “Black Swans” to
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5 connote occurrences of highly unlikely of forces, circumstances, or other phenomena. The point
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7 being that just *highly unlikely* or even extremely unlikely does not mean none or never, it means
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9 very few and very infrequently. Taleb demonstrates convincingly that over time the odds are that
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11 even extremely unlikely occurrences will present themselves. Taleb finds it ironic that we should
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13 be surprised at all by the sudden appearance of a Black Swan. For the rest of the paper, we will
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15 use the term black swan to connote an exogenous variable with an extremely low probability of
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17 occurrence. Please note that the probability of occurrence of a black swan is not correlated with
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19 probability of interaction of a black swan with other variables, if there is occurrence. The existence
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21 of most Black Swans has no practical impact on organizational events and outcomes. However,
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23 some Black Swans have a major impact. Subsequent papers by Taleb and others are dedicated to
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25 emphasizing the extent to which the world is shaped by the interaction of Black Swan variables
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27 with routinized and institutionalized systems and processes. Some black swan events, like an
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29 unlikely urban earthquake or a low probability large asteroid impact, are harmful in and of
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31 themselves, and indifferent to human decision or action.
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39 However, most black swans are of no particular harm (or help) in and of themselves. Firstly, it
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41 may be the case that they create harm only when they unexpectedly and significantly interact with
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43 a more mundane variable. That is, there are all kinds of low probability exogenous variables that
44
45 *almost never* interact with managerial decisions and actions. However, some new decision might
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47 just be the one to trigger the unlikely interaction. These are rooted in the curse of bounded
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49 rationality (Simon 1991); we never really know all of the forces at play or their potential
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51 correlations and only learn after observing the result. Sometimes it is too late. An ironic popular
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53 example of this may be observed in the management satire movie “Office Space.” The decision to
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3 take away a Swingline brand stapler from an otherwise highly compliant employee (Milton)
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5 triggers sudden interaction with a hidden psychopathic seed. Also not expected, red Swingline
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7 staplers became a premium item and remain to this day a best seller on Amazon.com (Lewis 2016).
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10 In fact, Mike Judge, the writer and director of the movie, approached Swingline about a
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12 sponsorship but management decided to turn him down (Fowler 2002).
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15 **Black Swan Barrier Variables.** Some black swans that could be harmful or at least significantly
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17 alter the course of events are blocked from doing so by barriers. An obvious barrier example is a
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19 locked door in a safe neighborhood blocking the extremely low probability of malicious actor
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21 entering the office and doing harm. An oblivious barrier is when a stand of tall old-growth trees
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23 just off property is what is keeping a major warehouse from becoming an easy bomb target if a
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25 war broke out. Or when allegiance to the company softball team is what is keeping a valuable
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27 asset from leaving the company were they to receive an offer from the competition.
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32 Black swan barriers may be intentionally designed or in place by chance. From an analyst's point
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34 of view an important modifier to black swan barriers is how much we know or do not know about
35
36 it. Decision makers could be ignorant of the barrier that holds black swan interaction at bay, or (to
37
38 some extent) could be aware of the barrier, or may hold unproven beliefs that there may be a barrier
39
40 holding a black swan variable at bay.
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44 **Black Swan Iatrogenesis Generic Example.** Suppressed, latent or ignored forces that were in the
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46 probability tails from the organization's perspective began correlating and interacting at significant
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48 levels either due to chance or some organizationally endogenous decision. The decision either, a)
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50 ignored a barrier to some force or threat in the probability tail, b) purposely increased the
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52 correlation of the threat in the tail with an internal variable, c) removed a barrier to a possibility in
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54 a tail unwittingly, or d) removed a barrier to a possibility in a tail knowingly but thinking that
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3 because the black swan is so unlikely the barrier was a waste. The black swan is now “unleashed”
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5 as it significantly correlates and combines with both endogenous forces and other exogenous forces
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7 to create a new and unexpected situation. To the extent that these combinations are complex they
8
9 are not reversible. The iatrogenic result may impact other organizations much more or much less
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11 than the one who unleashed the black swan in the first place. In general variables (or sets of
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13 variables) that were previously either not significantly correlated, or were significantly correlated
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15 but controlled, got their situation altered by an unwitting action initiated somewhere along the
16
17 internal decision process. Due to an unwitting decision, these forces, variables or actors become
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19 significantly correlated and begin significantly interacting with little or no useful controls in place.
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21 The unexpected interaction creates a brand-new situation. This is black swan iatrogenesis and it is
22
23 relatively simple to understand.
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29 **Iatrogenesis from interaction of error across decision phases.** While Black Swans are defined
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31 by their incredibly low likelihood and statistical insignificance leading to virtually unavoidable
32
33 type II errors, more common organizational iatrogenesis cannot so easily be pawned off as due to
34
35 an unforeseeable Black Swan event. Organizational Iatrogenesis may have its origins in an
36
37 *avoidable* type II decision error. Organizational iatrogenesis can also occur directly through simple
38
39 interaction of decision errors of the first through the sixth kind. In the pages ahead, we describe
40
41 the major kinds of error (one through six) and the compound error of the seventh kind and what
42
43 may occur when they interact with each other or with the occasional Black Swan. If the findings
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45 from human healthcare research are indicative of or transferable to organizational health issues,
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47 then it is not un-rare for iatrogenic outcomes of organizational decisions to cascade, leading to
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49 irreversible organizational decline or exogenous disasters.
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IATROGENESIS, IRREVERSIBLE CASCADES AND DISASTERS

Research on disasters discerns between natural disasters and man-made disasters. Many man-made disasters are the result of unforeseen consequences of existing forces at play as social actors and technologies interact. Tenner and Rall (1997) referred to unforeseen consequences that produce the result opposite of what was intended as “the revenge effect.” Many “revenge effect” outcomes are administrative annoyances not disasters (such as the creation of more paper use, not less, in computerized offices) and fail to mention related benefits (Segal 1996).

Unfortunately, some of Tenner’s examples do qualify as disasters. For example, the (continuing) escalation of major injury in sports resulting from decisions to (continuously) enhance “protective” gear, and the iatrogenic cascade devastation of forests in the USA from the introduction of gypsy moths for the silk industry both qualify as disasters. Throughout this article, we refer to administrative decisions about various corrective measures leading to the global financial crisis of 2008, a recent socio-economic event that qualifies as a disaster under the definition above. Certainly not all iatrogenesis leads to disaster, but lesser problems and difficulties like a bankruptcy or an avoidable death in a hospital still warrant our concern and attention

Most unforeseen consequences are iatrogenic, leading to situations new and different from the origin or the intention. Especially important in this iatrogenesis are incubation periods during which haphazardly introduced forces begin to interact creating emergent properties (Turner & Pidgeon 1997). Some disasters are the result of a human escalation of commitment in decision making (Ross & Staw 1993), while ignoring the impact (or potential impact) of these emergent properties.

VISIONING ERROR, CORRELATION ERROR, INNOVATION ERROR AND ACTION ERROR

Clawson (2009) described the leadership point of view as seeing what needs to be done; understanding the underlying relationships and forces at play and having the courage to initiate action. This framework describes major categories of strategic cognition (Narayanan, Zane, & Kemmerer 2011) in which leaders must engage as they formulate and implement strategy. Omitted by Clawson in the strategic leadership process (Boal & Schultz 2007; Boal & Hooijberg 2000; Finkelstein, Hambrick, & Cannella 2009) is pre-action responsibility for eliciting effective courses of action and choosing feasible effective solutions (Rumelt 1980). Putting these four leadership stages together, a four-part decision error framework emerges tracking the four major areas of concern: “visioning errors,” “correlation errors,” “innovation errors” and “action errors.” The first three types of errors are well researched and documented in the literature. Table I summarizes all of these errors and when they usually occur. We describe each of them in detail below.

INSERT *TABLE I* ABOUT HERE

CONCATENATION OF VISIONING ERROR, CORRELATION ERROR, INNOVATION ERROR AND ACTION ERROR

There is no guarantee that only one kind error is committed per problem. It is possible for decision-makers to enact all the kinds of error, none of the errors, or any combination. Poor decision makers (or those with bad luck) might find themselves all too often working on the wrong problem,

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3 accepting unfounded cause and effect relationships, denying well-founded relationships, inventing
4 and choosing questionable strategies and then acting when they should not and not acting when
5 they should. While we can all insert our favorite manager cartoon here, all too often the results are
6 seriously damaging and not funny at all.
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13 Strategic leadership errors are commonplace. Previous decision-making research indicates that
14 management decisions frequently fail. Nutt (1999) reports that half of the decisions made in
15 organizations fail. While alarming, we do not find this claim surprising. To make the point,
16 consider as a thought experiment the following (perhaps overly) simplistic decision tree-type
17 probabilities that may be generated when these different kinds of errors interact. When there are a
18 host of issues facing the organization, there is a possibility that management will work on the
19 wrong issue(s). Let us assume that an organization is *good* at recognizing and prioritizing
20 problems/issues and gets this pretty much right 80% of the time. Further assume that this
21 organization is a stickler for an audit trail, tracking assumptions, making sure that all the
22 reasonably available evidence is gathered, correctly measured and tested. So we assign a high 0.95
23 probability that no correlation error will be made when analyzing the evidence, with a 0.025 chance
24 of Type I error and 0.025 chance of Type II error. Next, assume the administration has a talent for
25 designing, choosing and sticking to strategies that are both feasible and likely to be effective, and
26 is correct (enough) about these things 95% of the time. Finally, assume that this organization is
27 exceptionally good at knowing when to act, when to withhold action, has the courage to act when
28 it is indicated, and the strength of will to hold off even under severe peer pressure to act. So, we
29 then assign a 0.95 probability this good decision maker does not make a Type V error or a Type
30 VI action error.
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3 The initial indication for this most excellent administration is disturbing. Given this simple
4 decision tree experiment, there is only a 68.59 percent chance ($0.8 \times 0.95 \times .95 \times 0.95$) that such
5 an excellent decision maker will “get it right,”(Baillie & Meckler 2012) and that’s excluding the
6 less than perfect likelihood of strategy execution going well. One would expect that a more
7 average executive decision-maker would have a lower probability of making the right decision,
8 bringing this experiment more or less in line with Nutt’s (1999) findings.
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11 While volatility, uncertainty, complexity, and ambiguity (Bennett & Lemoine 2014a; Bennett &
12 Lemoine 2014b) may make decision contexts seem chaotic and bleak, there are patterns that may
13 be found (Amigó, Kocarev, & Szczepanski 2006; Chatrath, Adrangi, & Dhandra 2002; Davis,
14 Eisenhardt, & Bingham 2009; Priesmeyer & Baik 1989). We suggest building awareness of each
15 of the major decision points, the errors that occur at each and how these may interact.
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18 The rest of this paper is organized as follows. Seven types of error are named, described and
19 explained. Then combinations of the kinds of error are considered and thought experiments about
20 the outcomes are offered. We conclude by summarizing and calling for research to lower the
21 chances of seriously disruptive errors of the seventh kind. Perhaps this will spur experts to find
22 strategies that minimize these dangerous risks without handcuffing our ability to pursue rewards.
23 We use roman numerals to refer to different error types, and those are defined in the headings.
24

25 **Error of the first kind and error of second kind: Correlation Error, Type I and Type II**

26
27 *Correlation errors* occur when pondering, testing and deciding about relationships between
28 variables such as existing forces, possible actions and potential outcomes related to a problem.
29 These errors are the classic Type I (α) and Type II (β) errors described by Neyman and Pearson
30 (1928/1967; 1933/1967). Type I (or α) errors occur when the null hypothesis is mistakenly rejected
31 -- we mistakenly reject that there is no relationship between the variables. In other words, there is
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3 not in fact sufficient evidence to support the hypothesis, but we mistakenly decide that the evidence
4 does support the hypothesis. It is not unusual to find managers believing they have evidence that
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6 “A” is the cause of “Problem B,” when there is in fact not sufficient evidence of a relationship. A
7
8 good short answer for why so many type I and type II errors are made (leading to poor decisions)
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10 is systemic complexity driven by severe environmental and technological instabilities (Hunt,
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12 Osborn, & Boal 2009).
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16 17 Error of the 1st kind, Correlation Error, Type I

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20 When attention is focused on the right problem, and no action is taken, the problem can escalate if
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22 a Type I correlation error has been made. Some argue that President George W. Bush’s
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24 administration erred in early 2002 in this way when it concluded that Iraq was an immediate
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26 terrorist threat based upon evidence of weapons of mass destruction (“wmd’s”), when the evidence
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28 was not in fact sufficient to support that hypothesis.
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32 The global financial crisis that occurred in 2008 was a disaster that impacted millions of people,
33
34 ended careers, and the lives of organizations and even people. Causes of this disaster from a
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36 financial perspective are covered extensively by Allen and Carletti (2010). Two years before the
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38 October 2008 global financial system crisis that sent equity values down over 40% and shut down
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40 interbank lending, Senators Barak Obama and John McCain had separately spoken about the sub-
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42 prime mortgage crisis especially how it was affecting Fannie and Freddie Mac (mortgage
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44 investment companies), and yet nothing was done (The Financial Crisis Inquiry Commission et al.
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46 2011). Loose monetary policy meant to help the economy fueled the subprime industry and a real
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48 estate boom (Allen & Carletti 2010). One could argue that the right problem *was* brought to
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50 attention, and *was* worked on, but then a Type I error was made. The Senate committee gave too
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52 much weight to the evidence pushed forth by Fanny and Freddie Mac lobbyists, who demonstrated
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3 a strong inverse relationship between the existing controls and the size of the mortgage asset
4 problem. Leaders were therefore convinced that using the existing control systems more would
5 make the problem less. This was not also an error of non-action. That is, action was (correctly)
6 not taken on a problem that (it rationally seemed) *should not have been acted upon* because
7 adequate existing resolution systems *seemed* in place. However, while resolution systems *were*
8 already in place, they were not in fact adequate. The adequacy was (incorrectly) established at the
9 correlation error point, not at the action decision point. Errors are often rooted in this kind of
10 bounded rationality. What we mean is that sometimes action and non-actions decisions are rational
11 at the time of the decision, given the problem as presented and the evidence at hand, but in fact
12 wrong due to error caused by complexity, information equivocality, tunnel vision and so forth.
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26 Error of the 2nd kind; Correlation error, Type II

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28 Type II errors occur when a hypothesized relationship does in fact exist, but decision makers fail
29 to incorporate this fact. For example, a series of decisions from 1995 to 2005 by the Union Cycliste
30 Internationale (UCI) relied upon incorrect conclusions that performance enhancing drugs were not
31 significantly influencing the outcomes of races such as the *Tour de France*. Perhaps the UCI's
32 tests were showing insufficient evidence to claim the presence of illegal performance enhancement
33 supplements when such supplements were in fact present. Furthermore, past errors do not
34 necessarily help future problems. In 2016 the International Olympic Committee (IOC) and
35 International Association of Athletics Federations (IAAF) had to go backwards to correct major
36 errors that allowed cheating athletes to participate in the 2012 Olympics, despite testing and
37 evidence gathered by World Anti-Doping Agency (WADA). Perhaps these (Type II) errors had
38 another cause, or some collection of causes. Reasons for this type of error (such as cognitive bias,
39 faulty testing, faulty analysis, ignorance, inattention and so forth are well covered elsewhere. What
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3 we do know is that false negatives were claimed, and the problem festered to the point that nearly
4 the entire Russian contingency to the 2016 Olympics in Brazil was banned.
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8 In 1985 The Coca-Cola Company decided to abandon their original recipe for Coca-Cola in favor
9 of a new formula. They tested to find out if existing loyal customers would be turned off by the
10 change, and tested if non-customers might be more likely to adopt the new product. Unfortunately,
11 they made a Type II error, and failed to reject the null hypothesis when testing for an inverse
12 relationship between demand by existing customers and the new coke formula. While they were
13 correct that potential new customers were more willing to adopt new coke than classic coke-cola,
14 they erroneously failed to reject the other null hypothesis, concluding that there was no inverse
15 relationship between changes in the formula and demand from their existing customers. Focused
16 on the right problem (i.e. gaining new customers), Coca-Cola tested for the relevant correlates and
17 made an error, then rationally acted, abandoning the original recipe and launched New Coke. The
18 point here is that Type II error alone can cause serious organizational damage.
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34 **Error of the Third Kind: Visioning, Type III**

35 A typical statement about “Error of the Third Kind” (1972) is that it is solving the wrong problem
36 very precisely. While this statement does not cover all of visioning (or Type III) error, it does
37 capture the spirit of the phenomenon. The administrative leadership misdiagnoses the situation.
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39 *Visioning error* occurs when managers or leaders are deciding what problems or issues to work
40 on and making judgements about the scope of the issue. These meta-level errors were named
41 “errors of the third kind” by Mitroff and Betz (1972). When management does not discern or attend
42 to core issues and levers, then they have made visioning errors. When management focuses upon
43 corollary issues that only indirectly impact desired outcomes, or when attention is limited to effects
44 of root problems rather than the root problems themselves, then management is committing errors
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3 of vision. When management inadequately prioritizes issues they are making visioning errors. In
4 terms of strategic leadership, “seeing what needs to be done” means discerning which
5 problems/issues are tightly linked to the prioritized outcomes they hope to bring about. Mitroff
6 and Betz (1972) labeled the mistake of solving the wrong problem or issue an “error of the third
7 kind.” Goal instability is an obvious precursor to the different sorts of type III error described
8 above, and as Hunt et al. (2009) emphasize, goals instability is ubiquitous in organizations.
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12 Visioning, and visioning error have a lot to do with perspective and level of analysis. It is quite
13 common for a problem and solution to seem quite clear on one level of analysis, but for the problem
14 to be quite something else when considered from a more macro, or more micro perspective. For
15 example, in 2016, Daimler Trucks of North America (DTNA) predicted the demand for short haul
16 electric sprinter vans and trucks to go up due to advances in 3D printing and electric drive trains.
17 A six-week study with consultants led to a strategy proposal of outfitting UPS and FedEx with
18 subsidized electric short haul fleets and recharging hubs on the outskirts of major urban areas. Just
19 short of the presentation to the executive summit a systems perspective (Forrester 1997) was
20 introduced by a U.S Department of Energy specialist. The DOE explained that existing energy
21 grids in most urban areas could not handle a large-scale conversion to locally charged electric drive
22 train trucks and could lead to broad energy network failures. From this meta-system level of
23 analysis, the nature of the problem looked quite different and a visioning error in this case would
24 likely have led to serious iatrogenic outcomes. Although the team consulting with Daimler was
25 certainly thinking at a macro level of analysis in their innovation thinking, they had not looked
26 macro *enough*.
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3 Adequate visioning seems to require more than just having the capacity for taking a macro-system
4 perspective. We suggest that better visioning entails the capacity for discerning issues from
5 multiple levels of analysis simultaneously, from the macro down to the micro and up to the meta.
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10 **Metastasis.** When organizations work on the wrong problems, at the very least the original
11 problem lingers. It may do so benignly still requiring a solution, but it may fester requiring greater
12 resources to solve. Organizational decline is often characterized by the process of denial, followed
13 by action involving errors of the third kind, which do not stop the decline. Unfortunately, when
14 the organization gets around to solving the real problem, the problem has festered requiring greater
15 organizational resources to solve but which the organization no longer has, and decline continues.
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20 When there has been an error of the 3rd kind, the solution is at best only indirectly effective, on
21 average irrelevant and at worst iatrogenic at another level not initially contemplated. In the best
22 case, there are already effective administrative structures in place to deal with the true problem,
23 and the problem gets solved even though it was not addressed by decision makers. In the average
24 case, the true problem remains unaddressed and lingers, yet perhaps remains more or less in check
25 because action is being taken on a related, but wrong problem. In worse cases, the lingering true
26 problem festers, perhaps becoming more difficult to remove. In even worse cases, no action is
27 even taken on related (yet wrong) problems. (This compound situation we describe below as an
28 error of the 7th kind.) An error of the 3rd kind can be quite serious.
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46 **Error of the 4th Kind: Innovation Error, Type IV**

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49 Type IV errors occur when the wrong potential solution is chosen. By itself, this can be described
50 as the case in which leadership has focused the organization on the right problem, has properly
51 understood the relationships between the forces at play, but has chosen an inferior solution;
52 perhaps one that will not work at all or one that will be generally ineffective even if implementation
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3 goes well. Rumelt (Rumelt 1980) pointed out that this is a strategy issue; either the choice is not
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5 consistent internally, not consonant externally, not effective or not feasible, or some combination
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7 of all four. To put it simply, it is the common case of choosing from alternative ideas a course of
8
9 action that will not actually solve the problem.
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13 Strategic errors where infeasible or ineffective courses of action are decided upon despite decision
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15 participants having the correct knowledge or live hypothesis (James 1896) about the problem and
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17 the relationships between the variables are certainly not uncommon. In the Spring of 2002, a
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19 college reviewed twenty-four years of data and found that new faculty hires were most successful
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21 if they had three to five years of previous experience at another university. The analysis was
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23 discussed and agreed upon as highly relevant prior to searches from 2002 through 2006. However,
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25 this relationship was ignored in the formal selection strategy. This led to a series of failed career
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27 starts, recurring recruiting expenses and organizational stress at the college. New leadership
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29 implemented a policy in 2007 that experienced candidates be given formal preference. With this
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31 strategy error corrected the college had a series of successful hires and low turnover.
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37 Daniel Kahneman's (Kahneman 2011) recalls how he noticed the now famous "illusion of
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39 validity" and how it leads to decision errors. The error is continuing a tactic that is proven to not
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41 work. Illusion of validity is the opposite situation in which the strategy decided upon is based on
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43 relationships that have repeatedly been demonstrated to be in error. We can also juxtapose this to
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45 Type I correlation error: when we hire experienced candidates despite no repeatable observational
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47 evidence that experienced candidates perform better on the job, we are making a Type I error.
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49 When we fail to give preference to experienced academic candidates despite repeated
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51 observational evidence that they do perform better on the job, we are making a Type IV error:
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53 choosing a course of action that will not be effective.
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3 Why do leaders and decision makers choose from the pool of possible solution courses of action
4 that do not work, even in the face of evidence that they have not worked in the past, or that they
5 probably will not work in the near future? The voluminous literature on cognitive biases and
6 decision biases certainly helps explain this. However, specific research is needed to more tightly
7 link the decision error literature with strategy development and selection.
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15 **Error of the 5th Kind, Action (Type V), and Error of the 6th Kind; Inaction (Type VI)**

17 *Action errors* occur when deciding whether to act on a proposed solution. Managers, after deciding
18 what needs to be done, face a decision of whether or not to take action. Distinct from other parts
19 of the overall process, there comes a time when the manager or leader must “make the call” (Tichy
20 & Bennis 2007). There are two kinds of action errors that occur here: actions that you should have
21 taken but did not and actions that you should not have taken, but did. Action error does not occur
22 in cases when action is taken when action is truly needed, and when action is not taken when it is
23 not appropriate. Action error *does* occur when action is taken, when it should not be taken, and
24 when action is not taken when it should be taken.
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37 Certainly there are multiple possible causes for a manager, having already decided what might be
38 done *about* a problem, to then either act or not act. Sometimes a manager acts on a correct decision
39 about what needs to be done, and the problem gets solved. When managers fail to act, this may be
40 the result of a belief that systems and procedures are already in place to solve the problem at hand.
41 Sometimes managers decide not to act because they believe that the problem will simply go away,
42 or at least fade into inconsequence, if they exercise patience and wait it out. Sometimes, it is simply
43 a case of social loafing (Latane, Williams, & Harkins 1979). In any event, the decision to act may
44 be the correct decision, or the decision to forebear may be correct. Unfortunately, managers often
45 get the call wrong. We call these action errors ‘Errors of the 5th and 6th kind. These action errors
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3 deserve special attention because they are the kinds of error that can lead to iatrogenesis on their
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5 own.
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7 8 Error of the 5th Kind, Action (Type V) 9

10 Acting to solve a problem, be it the right problem or the wrong problem, can create other
11
12 difficulties. Sometimes solutions are “iatrogenic,” meaning that they create more, or bigger
13
14 problems than they solve. Faced with such a possibility the decision maker should thoroughly
15
16 examine all the potential system effects, and perhaps refrain from action. In the case that the
17
18 decision was an attempted solution to the right initial problem, and the problem variables were
19
20 well understood, one important problem is now replaced by another, perhaps worse problem.
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25 *The iatrogenic decision maker.* Here the decision maker takes charge, makes a decision based
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27 beliefs supported by correlation errors, resolving the existing problem yet creating more and
28
29 greater problems to be solved. This often occurs when the manager cannot anticipate the
30
31 interconnections between elements, especially non-linear interactions. This may occur because the
32
33 manager compartmentalizes the decision not foreseeing how the effects may set up other, more
34
35 difficult problems, or because the manager's time frame is too limited. In general, we know that
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37 managers and decision makers have at least somewhat of an irrational bias for action, especially
38
39 in the pursuit of fostering specific improvements (Patt & Zeckhauser 2000b). We might call one
40
41 who takes this path “the narrow scope iatrogenic decision maker.” A classic example is Three Mile
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43 Island (Osborn and Jackson, 1988). There was a leak in the coolant system and the valve froze up.
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45 They decided to fix the problem by draining the coolant, and this lead to the disaster in which the
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47 plant went south in a major meltdown. While this is a dramatic example of an iatrogenic outcome,
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49 such outcomes are more prevalent than we realize. For example, most medicines give list of contra
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51 indications, i.e., don't use this medicine with that medicine. However, drug companies rarely look
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3 past two-way interactions, and pharmacies who dispense medication often get it wrong anyway
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5 (Malone et al. 2007). One of the authors takes eight different medications, prescribed by three
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7 different doctors, per/day for multiple ailments. Yet none of his doctors can tell him if he should
8
9 be taking the eight medications together or not. People who suffer from multiple ailments are
10
11 always at risk from unknown drug interactions. Some solutions have unknown consequences, but
12
13 some solutions can be anticipated to cause other problems. Sometimes, because decision makers
14
15 do not anticipate the futurity of their decisions, focusing, on too short a time period, problems that
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17 could reasonably be anticipated are ignored. Sometimes, the decision maker might realize his
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19 solution will cause other problems, but because he thinks the immediate problem is more
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21 important, or he believes the anticipated problem is a bridge to be crossed when it happens, or the
22
23 stakeholder group is too weak to worry about, s/he will go ahead and make a decision that they
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25 know will create more and greater problems for the organization. But, that will be someone else's'
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27 headache.
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34 Some have argued that President George W. Bush's administration committed this kind of action
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36 error of the 5th kind in March of 2003 by initiating (military) action in Iraq when they should not
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38 have. The critic's argument is that is even if there were no α -error and Iraq was in fact gathering
39
40 WMD's, the decision to *act* upon it was in error because broad and powerful international
41
42 diplomatic systems and control processes were already in place that would have solved or at least
43
44 contained the problem. Critics point out that the Bush administration acting when they should not
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46 have acted created an iatrogenic outcome; that is, taking action made the problem worse instead
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48 of better.
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3 Error of the 6th kind, Inaction (Type VI)
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5 Deciding to take no action, when no action is called for is the correct solution. However, falsely
6 believing that the problem will either solve itself or simply go away is an error of the 6th kind.
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8 These ζ errors allow situations to linger, at best, or to fester and worsen requiring greater resources
9 to solve. Someone who habitually takes path might be described as “the wishful non-action taker.”
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11 This person mistakenly thinks that if they do nothing the problem will either go away or resolve
12 itself through existing processes and network externalities. What they don't realize is that the
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14 problem either will not go away or that the original problem will metastasize and require great
15 resources to solve the longer organization waits. Collins (2001) discusses how the Great Atlantic
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17 and Pacific Company (A&P) went from dominating the grocery business in the first half of the
18 twentieth century to an also ran behind Kroger in the second half of the twentieth century. Despite
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20 data that consumers wanted superstores, and that they had a model that worked (Gold Key stores),
21 A&P failed to act because it did not fit their identity. As Ralph Burger, then CEO of A&P said,
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23 “you can’t argue with 100 years of success.” Fox-Wolfgramm, Boal, and Hunt (1998) describe
24 how an organization’s identity can directly lead to resistance to change. Boal (2007) notes that
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26 the rules and routines that make up an organization’s transactive memory inhibit search, and lead
27 to a misdiagnosis of the problem or non-action. Such was the case with Sony when it could not
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29 let go of its cathode ray tube (CRT) technology for making televisions, while Sharp, Samsung, and
30 LG Electronics forged ahead producing liquid crystal display (LCD) televisions. Wetzels and
31

32 Johnson (1989) discuss how organizational failure and decline is almost always preceded by a
33 denial of reality leading to non-action.
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35 While not taking action may be the correct decision, in many managers’ eyes a worse outcome is
36 a reputation of lack of courage or initiative to take action. This would be an especially powerful
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3 fear if a boss incorrectly believes that you were aware of the problem but chose not to act thereby
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5 risking the creation of a bigger problem. This reinforces the schema that managers are problem
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7 solvers/decision makers, choice makers and action takers (Child 1972), creating a general bias for
8
9 action. For the manager decision-maker, there exists a risk management dilemma: which is worse,
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11 making an action decision that turns out bad or not making a non-action decision that allows a
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13 problem to evolve into a disaster.
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17 Furthermore, the decision maker cannot know if action will unleash a black swan interaction, or if
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19 a seemingly useless action is preventing this from occurring. In organizational cultures with a bias
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21 for action, we would likely find more errors of the 5th kind than errors of the 6th kind. In
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23 organizational cultures or structures with a bias for inaction, we would likely find more errors of
24
25 the 6th kind than errors of the 5th kind.
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29 Sometimes an action error takes the form of *waiting too long* for action. Often it is hoped that not
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31 taking action will allow the problem to solve itself or become a non-problem. If the decision maker
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33 may believe that merely delaying action will not be fatal or cause further damage, and that the
34
35 problem will stay of the same shape and form requiring the same resources to solve it. In other
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37 words, the decision makers sometimes act as if the problem does not have a time dimension or
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39 minimize subsequent interactions with future events. Often by delaying the action decision,
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41 greater resources may be needed to solve the problem, but the needed resources are manageable.
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45 46 **No Error**

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48 The ideal situation is when no decision errors are made. There are two main no error outcomes.
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50 The first describes the leader making no errors. In this path, the decision may be assumed to be
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3 sufficiently solved with no enduring outcome problems connected to the solution.¹ Leadership has
4 done at least four things correctly. Firstly, leadership has the organization working on the right
5 problem. They have had clear enough macro-vision to see what needs to be done and not get
6 distracted into working on subordinate, associated or inconsequential problems. Secondly,
7 leadership has ensured that the organization gathered enough of the proper evidence/information
8 to discern fact from belief, desire and fiction, and to uncover true correlations among the forces
9 involved from apparent but non-existent correlations, and to locate true causes from among the
10 many effects and correlates. Third, the leader has wisely chosen among possible solutions,
11 promoting a feasible and effective plan. Fourth, the leader has initiated action, implementing the
12 plan based upon this evidence because there is not another effective curative process already
13 underway.
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29 The second possibility is similar to the first in all respects except that management has the good
30 judgment to refrain from taking action, even though the causes of the problem are now understood.
31 This might be described as the “Good vision, good research, good contingency plan, no action,
32 problem solved” path. Refraining from action may be the proper decision for a variety of reasons.
33 Perhaps ironically speaking, there is a rather large class of problems for which taking no or
34 minimal action adequately solves the problem.
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48 ¹ When saying sufficient we make no claims to the decision being optimal in outcome or optimal in process. It is our
49 perspective that many fine decisions are suboptimal, as managers satisfice in order to move forward. Sufficient
50 resolution also does not mean that the decision maker went through all of the steps normative decision making models
51 would describe i.e. problem identification, diagnosis, idea generation, criteria sieve, alternative selection, and
52 implementation. Competent decision making also does not necessarily mean following an optimal search pattern. For
53 example, Simon's satisficing model follows a different search pattern than does Einhorn's Elimination by Aspects
54 model and both wind up with a decision, often different and often sub optimal, but not necessarily. A successful
55 decision and successful action simply means that the decision and the action work in terms of the problem.
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3 Firstly, the problem may be the type that just goes away if one waits it out. Dealing with the
4 common cold and or an employee's occasional bad mood seems to fall into this category of
5 problem. Burgelman and Grove (1996) describe how various instances of dissonance require no
6 action, (unless it is "strategic dissonance"). Leaders, they say, should know their organizations
7 well enough to discern between ordinary dissonance that is best ignored and will go away, and
8 strategic dissonance that requires action. Boal and Hooijberg (2000) suggest that discernment lies
9 at the heart of managerial wisdom. It involves the ability to perceive variation in both the
10 interpersonal and non-interpersonal environment. In addition, it involves the capacity to take the
11 right action at the appropriate moment. Second, there may be structures and processes in place
12 that will solve the problem if you do nothing. The real question is whether or not the manager can
13 yield to the logic of this path given the "bias for action" that many managers have. At least in terms
14 of financial portfolio management, it has been demonstrated that men are more prone to this error
15 than women (Barber & Odean, 2001). A further complication is that leaders may need to defend
16 their reputation as a take charge decision maker, and thus act when they would be better off not
17 acting. Some wisdom about this on the part of the decision maker is certainly called for and leaving
18 things (more or less) alone is sometimes a quite viable long term solution.

40 **Error of the 7th kind: Cascade Iatrogenic Errors (Type VII)**

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42 Errors of the 7th kind are compound errors that may occur in three circumstances. Two of them
43 are indicated when an Error of the 3rd Kind has already been made, and then an action error is
44 made. For example, there is the situation when Type III error has already been made, then the
45 initial problem is still outside of the attention, and so possible negative interactions with it may not
46 have been considered when a manager acts. Not only does the real problem lay untreated and
47 festering, but mistaken action on the wrong problem may introduce new correlates that may create
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3 forces that did not previously exist. This compound decision error situation is a type VII Error
4 (“error of the 7th kind”). Research in healthcare has identified these compounding errors as
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6 cascades (Thornlow, Oddone, & Anderson 2013), which are generally irreversible (Hofer &
7
8 Hayward 2002; Thornlow, Oddone, & Anderson 2013), unfolding not dissimilar to the network
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10 cascades detailed by Duncan Watts (2009; 2002) . Cases of cascade iatrogenesis are those in which
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12 erroneous action (type V or type VI) allows forces to interact that were erroneously analyzed (type
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14 I and Type II), creating more problems than it solves, creating an environment in which original
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16 issue(s) morph(s) into larger, and qualitatively different, often irreversible problems.
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22 It is only when attention is focused (Ocasio 1997), we can easily notice cases of type VII error.
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24 For example, the circumstance of taking the decision path of working on the right problem,
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26 determining a cause that does not really exist, and then acting when one shouldn’t. By introducing
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28 new forces into a group of previously uncorrelated forces, new correlations and unexpected
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30 outcomes occur. Combining the Iraq War decision errors possibilities already noted above, we can
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32 argue that the combination followed the Type VII path cascading error path. In terms of our
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34 framework, a Type I error (of believing in the existence of WMD’s) combined with the Type V
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36 error (acting when he should have allowed existing processes to solve the problem) was a Type
37
38 VII error resulting in cascading iatrogenesis. This “error of the 7th kind” may have introduced new
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40 forces that combined with existing variables in complex and unforeseen and irreversible ways. The
41
42 result was a morphing of an initial hidden terrorism cell(s) problem into a major occupation style
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44 war, irreversible bad will, foreign government-building initiatives, massive debt increases,
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46 economic hardship, global loss of power and influence for the U.S.A.
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53 In such cases when one of the two action errors (non-action, when action should have been taken,
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55 or action when action should not have been taken) are made on the “wrong” problem, and/or in
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3 conjunction with correlation errors, the true problem may very well likely morph into something
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5 unrecognizable in terms of the original problem. Unlike errors of the 5th kind (that cause escalation
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7 of the problem), and errors of the 6th kind (that give problems time to fester), errors of the 7th kind
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9 allow problems to grow qualitatively as well. We contend that these errors of the 7th kind in
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11 organizations often result in the same kind of situations documented in hospitals and health care
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13 (Brennan et al. 1991; Hofer & Hayward 2002) where the problem resolution does not just require
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15 more resources, but entirely different resources altogether.
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20 In general, when the right problem is not discerned, and a type I correlation error has also been
21
22 made and no action is taken, the problem can morph into a new shape and form. For example,
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24 when senators Barak Obama and John McCain brought to the U.S Senate the issue of how sub-
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26 prime loans might negatively affect Fannie and Freddie Mac and nothing was done, one might
27
28 argue that not only was the senate wrong that the VaR (value at risk) model was inadequate
29
30 (Rickards, 2008) and other control systems would solve the problem (as lobbyists reportedly
31
32 convinced them), but that they were also working on the wrong problem altogether. The senate
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34 (leadership) worried about Fannie and Freddie Mac, and did not focus on the roots or properly
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36 prioritize (an error of the 3rd kind). Priority attention should have been given to consumers and
37
38 businesses engaging in loans that they could not afford if even a small downturn were to occur,
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40 mortgage brokers under-disclosing loan default risk, and huge default insurance bets being made
41
42 that insurers could never cover. The Type I error was believing in a strong inverse relationship
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44 between the strength of the existing control systems and the problem: the senate believed using
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46 the existing control systems more would make the problem less. The U.S Senate also erroneously
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48 concluded that the existing control systems were a feasible and effective solution for this (wrong)
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50 problem (The Financial Crisis Inquiry Commission et al. 2011). They then made the rationally
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3 correct decision not to act. The world ended up with an irreversible iatrogenic cascade. New
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5 problems, near collapse of trade, new conflicts and economic loss at a breath and scale never seen
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7 before.
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10 The above kind of situation shows how complicated an error of the 7th kind can be, and how easy
11
12 it is for leaders to make them. Furthermore, it is easy to argue that no Black Swans were
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14 (prominently or significantly) involved in this global disaster. The interacting errors were a) vision,
15
16 did not consider the broader macro-systems effects combined with b) did not have enough clear
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18 and relevant information about knowable forces and relationships involved, c) an innovation error
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20 of deciding upon a feasible, consistent and consonant but not effective course of action (Rumelt,
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22 1980).
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27 Another finance/economics example related to the 2008 financial crises was when the Securities
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29 and Exchange Commission (SEC) leadership failed to notice that Lehman Brothers was shorting
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31 firms, and covering the short sales with treasury stock it had just taken as collateral for lines of
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33 credit to those very firms it was shorting. This Type VII error is visioning error (of the 3rd kind)
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35 combined with a non-action error (of 6th Kind). Leadership a) did not have vision to see that
36
37 unethical short selling was not the important problem, it was firms desperate for cash and about
38
39 the default on payments; b) lacked information that Leman Brothers was short selling their own
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41 clients backed with treasury stock that was collateral they had no right to float leading to c) non-
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43 action with the result of new and worse problems. As a result, Leman Brother's was eventually
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45 left to fail, and many experts in the weeks that followed, including the French minister of Finance,
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47 claimed that this was the event that led most directly to the global financial meltdown of October,
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49 2008. When a Type VII error is made, the resulting problem may no longer be recognizable in its
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51 original form. The problems are not easily diagnosable, the resources and choices available
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3 become less sufficient or desirable, the solution is not readily apparent, and the solution not so
4 attainable.
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8 Error of the 7th kind creates "wicked" as opposed to "tame" problems. Tame problems may be
9 very complex, but they are solvable such as sending a man to the moon. It was a very complex
10 problem, but the individuals could agree upon the definition of the problem and a solution could
11 be found. Wicked problems are ones for which either the problem cannot be defined or *no*
12 agreement on the solution can be found. Think about the "problem" of unwed teenage pregnancy.
13 What is the underlying problem? Hormones? Morality? Both? Neither? What's is the solution?
14 Birth Control? Abstinence? Where individuals cannot agree on the problem, much less the
15 solution, non-action is the likely outcome.
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27 **Decision errors leading to positive outcomes**

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29 We find two decision error combinations that can lead to positive outcomes. These are an error of
30 the 4th kind in the presence of an error of the 2nd kind (β), and an error of the 6th kind in the
31 presence of an error of the 1st kind (α). For example, there is the common situation in which
32 leadership is working on the right problem and mistakenly believes they have identified some
33 causal relationship that if acted upon will solve the problem. If action were taken, the decision
34 maker would be committing an error of the 4th kind. Here however, management mistakenly does
35 not act even when they believe they are supposed to act. Perhaps management is lacking the
36 courage to act, the incentive to act, or just has too much else going on to work on another
37 implementation. Unknown to the decision maker, the evidence was wrong, and by mistakenly not
38 acting, an error of the 4th kind is avoided. Holcombe (2006) details a poignant example of such a
39 situation. He brings to attention decisions regarding global climate change problems circa 1950-
40 1980. Holcombe points out that if we had acted 30 years ago to stem global climate change based
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3 upon the best scientific evidence and overwhelming consensus among our best scholars, we would
4 have tried to *warm* the planet, not cool it. By not acting, even when all evidence said should have,
5 we probably averted making a huge mistake and making the current warming trend worse.
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10 Decision makers in taking this path discern the problem well and take action when they should
11 not, on some hypothesized cause of a problem even when there is no apparent evidence that this
12 cause or correlation exists. Flying in the face of the apparent evidence, they act anyway. Perhaps
13 we can describe this kind of decision maker as the “intuitive contrarian” because the evidence was
14 in fact wrong, the causal relationship did exist but was missed (Type II error) and action was
15 actually needed. Through luck, intuition and perhaps even recklessness an error of the 6th kind is
16 avoided.
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Playing off of Holcombe’s global climate change in the 1970’s decision example, we may at the
time of this writing (2017) be in this situation. That is given the complexity of the earth’s
environment and interacting forces, it is very difficult to gain certainty about what action should
be taken to fix the global warming problem, or if action is appropriate at all. However, most climate
scientist now agree that despite not yet being certain that atmospheric CO₂ reductions will solve
climate change problems we should nonetheless act aggressively. Despite the live hypothesis that
Earth has natural cycles and systems that allow it to take care of itself, most agree that it would be
irresponsible and in error not to act. Sometimes, despite the lack of complete information, evidence
and understanding, we decide to act anyway “before it is too late” before the problem morphs into
new and worse problems. Going with intuition about causes, and taking action without full
understanding, we sometimes end up with a positive outcome.

Summary and Conclusions

Strategic decision-makers go through (at least) a four stage process: 1) prioritizing issues and goals, 2) deciding upon the forces at play and relationships between them, 3) developing possible courses of action and deciding what will work, what will not, what is feasible, and which to choose; and 4) deciding whether or not to make “the call” to act (Tichy & Bennis 2007). We outlined seven kinds of generic decision errors spanning these four stages of the strategic decision process.

Iatrogenesis is the unexpected growth of new issues resulting from treatment of an existing issue. Iatrogenic outcomes are often worse than the initial situation and, due to complex interactions, are difficult if not impossible to reverse. Iatrogenesis changes the risk profile of decisions and actions, especially a strategy of trial and error. A care free tactic of “that did not work, let’s try something else” becomes far less viable when unexpected disastrous problem(s) may grow from uninformed experimental or gung ho actions. Such actions can lead to disaster in two ways. They may inadvertently release a previously blocked external black swan variable that when unleashed quickly interacts with existing resources creating unforeseen difficulties or even disasters. Second, if simultaneously based upon type 1, and type 2 or type 3 error, such actions may in and of themselves create irreversible organizational and organizational field problems.

Table 1 summarizes the names and stages of these different kinds of error. Type I and Type II errors take place at the second stage, when figuring out the forces and relationships involved in a problem. Traditionally referred to as Type I or alpha error, and Type II or beta error, we name these kinds of error “**correlation errors.**” Type III error occurs during the first stage, sometime described as meta-decision, when deciding upon what the key issues are, what the goals are, and what issue(s) to work on. We call this level of error “**vision error**” with the sense of and reference to organizational concepts of mission, vision and goals. Type IV error occurs during the third stage,

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3 when feasible effective strategy must be chosen. Developing ineffective or non-feasible courses
4 of action is “**strategy error.**” Type V and Type VI errors are two types of “**action error**” occurring
5 during the fourth stage, when deciding whether to act on a possible corrective solution or to not-
6 act in the face of negative evidence. Type V error is acting when action was uncalled for, and Type
7 VI error is not acting when action was called for. Finally, we described Type VII error as a
8 compounding of vision, correlation, strategy, and action error with the highest likelihood of
9 yielding major iatrogenic outcomes. We named this type of error “**cascade error**” and gave it the
10 nickname: “Error of the Seventh Kind.”
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22 All the kinds of error may have serious consequences, many of them iatrogenic. The cascading
23 iatrogenic Error of the Seventh Kind is the most dangerous of all. Cascading iatrogenesis is
24 irreversible. Interactions among variables in complicated contexts, such as financial systems,
25 business operations, political arenas, global climates and so forth often exist in precarious balance
26 and sometimes chaotic order. In leadership terms, “understanding the forces at play” is absolutely
27 critical. The introduction of a new force or the withholding of an expected force can lead to massive
28 disorder, unforeseen outcomes and a transformation of one problem into brand new qualitatively
29 different and irreversible problems.
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41 Decision makers can use our framework to drill down into each component of the decision process
42 and consider potential sources of iatrogenesis. The following suggestions will diminish the chance
43 of harmful iatrogenic exposure.
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- 49 • When choosing what issues to solve, list possible black swans that could interact and be
50 very problematic. Are those black swans blocked, can they be blocked?
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- 53 • When analyzing forces at play, create alternative models including variables with low
54 statistical significance but high impact if you are wrong or if “one in a million” happens.
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- When analyzing forces at play, what variables or actors may alter their behavior just because they are included in or excluded from the investigation? What harm could this lead to?
- When analyzing forces at play, evaluate interaction effects among the multiple variables which might be at play. Go beyond simple bivariate correlations and analysis of variance.
- All along the way, follow discovery driven planning advice from McGrath and Macmillan (1995), relentlessly calling out, documenting, attending to and systematically investigating assumptions.
- When strategizing and innovating, generate multiple possible courses of action/inaction that take into account *all* of the forces at play.
- When strategizing and innovating, consider black swans when selecting from among plans that seems like they may work. Include black swan barriers in tactical planning.
- When it is time to “make the call,” (Tichy & Bennis 2007) exercise patience and consider not acting. Not all problems are solvable without creating worse problems. Do not let a bias for action cause inattention or poor analysis during the previous decision phases.
- Before acting, consider again what black swans might the organization be exposed to should they occur? Can we place an insurance barrier? Are we inadvertently removing one?

We have outlined decision errors that can, and do occur, under these conditions. Furthermore, we have argued that many of the decisions errors that occur under these conditions are iatrogenic, in that they cause more harm than the problem they seek to solve. However, we do not know how frequently management commits the various errors. If Nutt (1999) is correct that half of the decisions that are made, are incorrect. Other literature offers advice on how this percentage may

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3 be improved upon. This paper offers advice on avoiding iatrogenic problems and disasters that
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5 may occur from incorrect decisions.
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8 9 REFERENCES

10
11
12 Allen, F., & Carletti, E. 2010. An overview of the crisis: Causes, consequences, and solutions.

13
14
15 *International Review of Finance*, 10(1): 1-26.

16
17
18 Amigó, J. M., Kocarev, L., & Szczepanski, J. 2006. Order patterns and chaos. *Physics Letters A*,

19
20
21 355(1): 27-31.

22
23
24 Avitzur, O. 2013. E-iatrogenesis, cloning, pseudo-histories and other unintentional pitfalls of

25
26
27 electronic health records: An interview with james bernat, MD. *Neurology Today*, 13(7): 27-

28
29
30 28.

31
32 Baillie, J., & Meckler, M. R. 2012. Truth and objectivity regained. *Journal of Management*

33
34
35 *Inquiry*, 21(3): 248-260.

36
37
38 Bennett, N., & Lemoine, G. J. 2014a. What a difference a word makes: Understanding threats to

39
40
41 performance in a VUCA world. *Business horizons*, 57(3): 311-317.

42
43
44 Bennett, N., & Lemoine, J. 2014b. What VUCA really means for you. *Harvard business review*,

45
46
47 92(1/2).

48
49
50 Bernardez, M. 2009. Surviving performance improvement "solutions": Aligning performance

51
52
53 improvement interventions. *Performance Improvement Quarterly*, 22(2): 111.

1
2
3 Boal, K. B. 2007. Strategic leadership of knowledge-based competencies and organizational
4 learning. In Robert Hooijberg, James G. Hunt, John Antonakis, Kim Boal, & Nancy Lane
5 (Ed.), *Being there even when you are not: Leading through strategy, structures, and*
6 *systems, monographs in leadership and management*, vol. 4: 73-90. Amsterdam, the
7 Netherlands: Elsevier.

8
9
10
11
12
13
14
15
16 Boal, K. B., & Hooijberg, R. J. 2000. Strategic leadership research: Moving on. , Winter(11): 515-
17 550.

18
19
20
21
22 Boal, K. B., & Meckler, M. R. 2010. Decision errors of the 4th, 5th, and 6th kind. In P. C. Nutt &
23 D. C. Wilson (Ed.), *Handbook of decision making*: 327-327-348. West Sussex, United
24 Kingdom: John Wiley and Sons, LTD.

25
26
27
28
29
30 Boal, K. B., & Schultz, P. L. 2007. Storytelling, time, and evolution: The role of strategic
31 leadership in complex adaptive systems. *The leadership quarterly*, 18(4): 411-428.

32
33
34
35 Brennan, T. A., Leape, L. L., Laird, N. M., Hebert, L., Localio, A. R., Lawthers, A. G., Newhouse,
36 J. P., Weiler, P. C., & Hiatt, H. H. 1991. Incidence of adverse events and negligence in
37 hospitalized patients: Results of the harvard medical practice study I. *New England journal*
38 *of medicine*, 324(6): 370-376.

39
40
41
42
43
44
45 Brest, P., & Krieger, L. H. 2010. *Problem solving, decision making, and professional judgment*
46 *: A guide for lawyers and policymakers*. Oxford; New York, N.Y.: Oxford University Press.

47
48
49
50
51 Burgelman, R.A and Grove, A.S. 1996. Strategic dissonance. , 38(2): 8-28.

- 1
2
3 Chatrath, A., Adrangi, B., & Dhanda, K. 2002. Are commodity prices chaotic? *Agricultural*
4
5 *Economies*(27): 123-137.
6
7
8
9 Child, J. 1972. Organizational structure, environment and performance: The role of strategic
10
11 choice. , 6: 1-22.
12
13
14
15 Clawson, J. G. 2009. *Level three leadership (4th ed.)*. Upper Saddle River, New Jersey USA:
16
17 Pearson-Prentice Hall.
18
19
20
21 Collins, J. 2001. *Good to great*. USA: Harper Business.
22
23
24
25 Collins, J. C., & Porras, J. 1994. *Built to last: Successful habits of visionary companies*. New
26
27 York: HarperBusiness.
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
- Davis, J. P., Eisenhardt, K. M., & Bingham, C. B. 2009. Optimal structure, market dynamism, and
the strategy of simple rules. *Administrative Science Quarterly*, 54(3): 413-452.
- Dymitrow, M., & Brauer, R. 2016. Land or people? on the iatrogenesis of conflation. *Acta*
Geobalcanica, 2(2): 63-75.
- Finkelstein, S., Hambrick, D. C., & Cannella, A. A. 2009. *Strategic leadership: Theory and*
research on executives, top management teams, and boards Strategic Management (Oxford
U.
- Fishbein, M., & Ajzen, I. 1977. Belief, attitude, intention, and behavior: An introduction to theory
and research.

- 1
2
3 Forrester, J. W. 1997. Industrial dynamics. *Journal of the Operational Research Society*, 48(10):
4
5 1037-1041.
6
7
8
9 Fowler, G. A. 2002. *Cult film, 1999's 'office space' transforms swingline stapler* (July 2, 2002,
10
11 US Edition ed.). New York, USA: The Wall Street Journal.
12
13
14 Fox-Wolfgramm, S. J., Boal, K. B., & Hunt, J. G. 1998. Organizational adaptation to institutional
15
16 change: A comparative study of first-order change in prospector and defender banks.
17
18 *Administrative Science Quarterly*, 43(1): 87.
19
20
21
22 Hofer, T. P., & Hayward, R. A. 2002. Are bad outcomes from questionable clinical decisions
23
24 preventable medical errors? A case of cascade iatrogenesis. *Annals of Internal Medicine*,
25
26 137(5_Part_1): 327-333.
27
28
29
30
31 Holcome, R. G. 2006. Should we have acted thirty years ago to prevent global climate change? ,
32
33 11(2): 283.
34
35
36
37 Hunt, J. G. J., Osborn, R. N., & Boal, K. B. 2009. The architecture of managerial leadership:
38
39 Stimulation and channeling of organizational emergence. *The Leadership Quarterly*, 20(4):
40
41 503-516.
42
43
44
45 Illich, I. 1974. Medical nemesis. *The Lancet*, 303(7863): 918-921.
46
47
48 Illich, I. 1976. *Limits to medicine* Marion Boyars.
49
50
51
52 Illich, I. 1975. Clinical damage, medical monopoly, the expropriation of health: Three dimensions
53
54 of iatrogenic tort. *Journal of medical ethics*, 1(2): 78-80.
55
56
57
58
59
60

1
2
3 James, W. 1896. The will to believe. : 88-109.
4
5

6 Jones, T. M. 1991. Ethical decision making by individuals in organizations: An issue-contingent
7 model. *Academy of management review*, 16(2): 366-395.
8
9

10
11
12 Kahneman, D. 2011. *Thinking, fast and slow* Macmillan.
13
14

15
16 Kennedy, C. 2015. Economic analysis of market failures in copyright law: Iatrogenesis and the
17 fair use doctrine, an. *Wake Forest J.Bus.& Intell.Prop.L.*, 16: 208.
18
19

20
21 Latane, B., Williams, K., & Harkins, S. 1979. Many hands make light the work: The causes and
22 consequences of social loafing. *Journal of personality and social psychology*, 37(6): 822.
23
24

25
26
27 Lewis, D. 2016. *The stapler | now I know* (<http://nowiknow.com/the-stapler/> ed.).
28
29

30
31 Ilich, I. 1975. *Medical nemesis: The expropriation of health* London: Calder & Boyars.
32
33

34
35 Malone, D. C., Abarca, J., Skrepnek, G. H., Murphy, J. E., Armstrong, E. P., Grizzle, A. J.,
36 Rehfeld, R. A., & Woosley, R. L. 2007. Pharmacist workload and pharmacy characteristics
37 associated with the dispensing of potentially clinically important drug-drug interactions.
38
39
40
41 *Medical care*, 45(5): 456-462.
42
43

44
45 McGrath, R. G., & MacMillan, I. C. 1995. *Discovery driven planning* Wharton School, Snider
46 Entrepreneurial Center.
47
48

49
50 Meessen, B., Zhenzhong, Z., Damme, W. V., Devadasan, N., Criel, B., & Bloom, G. 2003.
51
52
53 Editorial: Iatrogenic poverty. *Tropical Medicine & International Health*, 8(7): 581-584.
54
55
56
57
58
59
60

- 1
2
3 Melendez-Torres, G. J., Dickson, K., Fletcher, A., Thomas, J., Hinds, K., Campbell, R., Murphy,
4
5 S., & Bonell, C. 2016. Systematic review and meta-analysis of effects of community-
6
7 delivered positive youth development interventions on violence outcomes. *Journal of*
8
9 *epidemiology and community health*.
- 10
11
12
13 Mitroff, I., & Betz, F. 1972. Dialectical decision theory: A meta-theory of decision-making.
14
15 *Management Science*, 19(1): 11-24.
- 16
17
18
19 Narayanan, V. K., Zane, L. J., & Kemmerer, B. 2011. The cognitive perspective in strategy: An
20
21 integrative review. *Journal of Management*, 37(1): 305-351.
- 22
23
24
25 Newell, B. R., & Shanks, D. R. 2014. Unconscious influences on decision making: A critical
26
27 review. *Behavioral and Brain Sciences*, 37(1): 1-19.
- 28
29
30
31 Neyman, J., & Pearson, E. S. 1928/1967. On the use and interpretation of certain test criteria for
32
33 purposes of statistical inference, part 1. *Joint Statistical Papers*: 1-66.
- 34
35
36
37 Neyman, J., & Pearson, E. S. 1933/1967. The testing of statistical hypotheses in relation to
38
39 probabilities a priori. *Joint Statistical Papers*: 186-202.
- 40
41
42
43 Nutt, P. 1999. Surprising but true, half the decisions in organizations fail. *Academy of*
44
45 *Management Executive*, 13(4): 75-90.
- 46
47
48
49 Ocasio, W. 1997. Towards an attention-based view of the firm. *Strategic Management Journal*,
50
51 18: 187-206.
- 52
53
54
55
56
57
58
59
60

- 1
2
3 Palmieri, P., & Peterson, L. 2008. Technological iatrogenesis: An expansion of the medical
4 nemesis framework to improve modern healthcare organization performance. *Proceedings of*
5
6 *The Western Academy of Management*, Annual Meeting(March 26-29, 2008).
7
8
9
10
11 Patt, A., & Zeckhauser, R. 2000a. Action bias and environmental decisions. *Journal of Risk and*
12
13 *Uncertainty*, 21(1): 45-72.
14
15
16
17 Patt, A., & Zeckhauser, R. 2000b. Action bias and environmental decisions. *Journal of Risk and*
18
19 *Uncertainty*, 21(1): 45-45.
20
21
22
23 Peters, T. J., Waterman, R. H., & Jones, I. 1982. In search of excellence: Lessons from america's
24 best-run companies.
25
26
27
28 Priesmeyer, H. R., & Baik, K. 1989. Discovering the patterns of chaos. *Planning Review*, 17(6):
29 14-47.
30
31
32
33
34 Ross, J., & Staw, B. M. 1993. Organizational escalation and exit: Lessons from the shoreham
35 nuclear power plant. *Academy of Management Journal*, 36(4): 701-732.
36
37
38
39
40 Rumelt, R. 1980. The evaluation of business strategy. *Business policy and strategic management*,
41 3.
42
43
44
45
46 Segal, H. P. 1996. Why things bite back: New technology and the revenge effect, review of.
47
48 *Nature*, 382(6591): 504-504.
49
50
51
52 Shepherd, D. A., Williams, T. A., & Patzelt, H. 2015. Thinking about entrepreneurial decision
53 making: Review and research agenda. *Journal of management*, 41(1): 11-46.
54
55
56
57
58
59
60

- 1
2
3 Simon, H. A. 1991. Bounded rationality and organizational learning. *Organization Science*, 2(1):
4 125-134.
5
6
7
8
9 Taleb, N. N., Goldstein, D. G., & Spitznagel, M. W. 2009. The six mistakes executives make in
10 risk management. *Harvard Business Review*, 87(10): 78-81.
11
12
13
14 Taleb, N. N. 2007. *The black swan : The impact of the highly improbable*. New York: Random
15 House.
16
17
18
19
20 Taleb, N. N., & Blyth, M. 2011. The black swan of cairo: How suppressing volatility makes the
21 world less predictable and more dangerous. *Foreign Affairs*, 90(3): 33-39.
22
23
24
25
26 Tenner, E., & Rall, J. 1997. *Why things bite back: Technology and the revenge of unintended*
27 *consequences* Vintage Books New York.
28
29
30
31
32 The Financial Crisis Inquiry Commission, Phil Angelides, C., Brooksley Born, C., Byron
33 Georgiou, C., Senator Bob Graham, C., Keith Hennessey, C., Douglas Holtz-Eakin, C.,
34 Heather H. Murren, C., John W. Thompson, C., Peter J. Wallison, C., & Hon. Bill Thomas,
35 Vice Chairman. 2011. *The financial crisis inquiry report • official government edition •* ;
36 (http://c0182732.cdn1.cloudfiles.rackspacecloud.com/fcic_final_report_full.pdf ed.).
37 Washinton, D.C, USA: Superintendent of Documents, U.S. Government Printing Office.
38
39
40
41
42
43
44
45
46
47 Thornlow, D. K., Anderson, R., & Oddone, E. 2009. Cascade iatrogenesis: Factors leading to the
48 development of adverse events in hospitalized older adults. *International journal of nursing*
49 *studies*, 46(11): 1528-1535.
50
51
52
53
54
55
56
57
58
59
60

1
2
3 Thornlow, D. K., Oddone, E., & Anderson, R. 2013. Cascade iatrogenesis: A case-control study
4 to detect postoperative respiratory failure in hospitalized older adults. *Research in*
5
6 *gerontological nursing*, 7(2): 66-77.
7
8
9

10
11 Tichy, N. M., & Bennis, W. G. 2007. Making judgment calls. *Harvard business review*, 85(10):
12
13 94-102.
14
15

16
17 Turner, B. A., & Pidgeon, N. F. 1997. *Man-made disasters*JSTOR.
18
19

20
21 Watts, D. 2009. Too big to fail? how about too big to exist? *Harvard business review*, 87(6): 16.
22
23

24
25 Watts, D. J. 2002. A simple model of global cascades on random networks. *Proceedings of the*
26
27 *National Academy of Sciences of the United States of America*, 99(9): 5766.
28
29

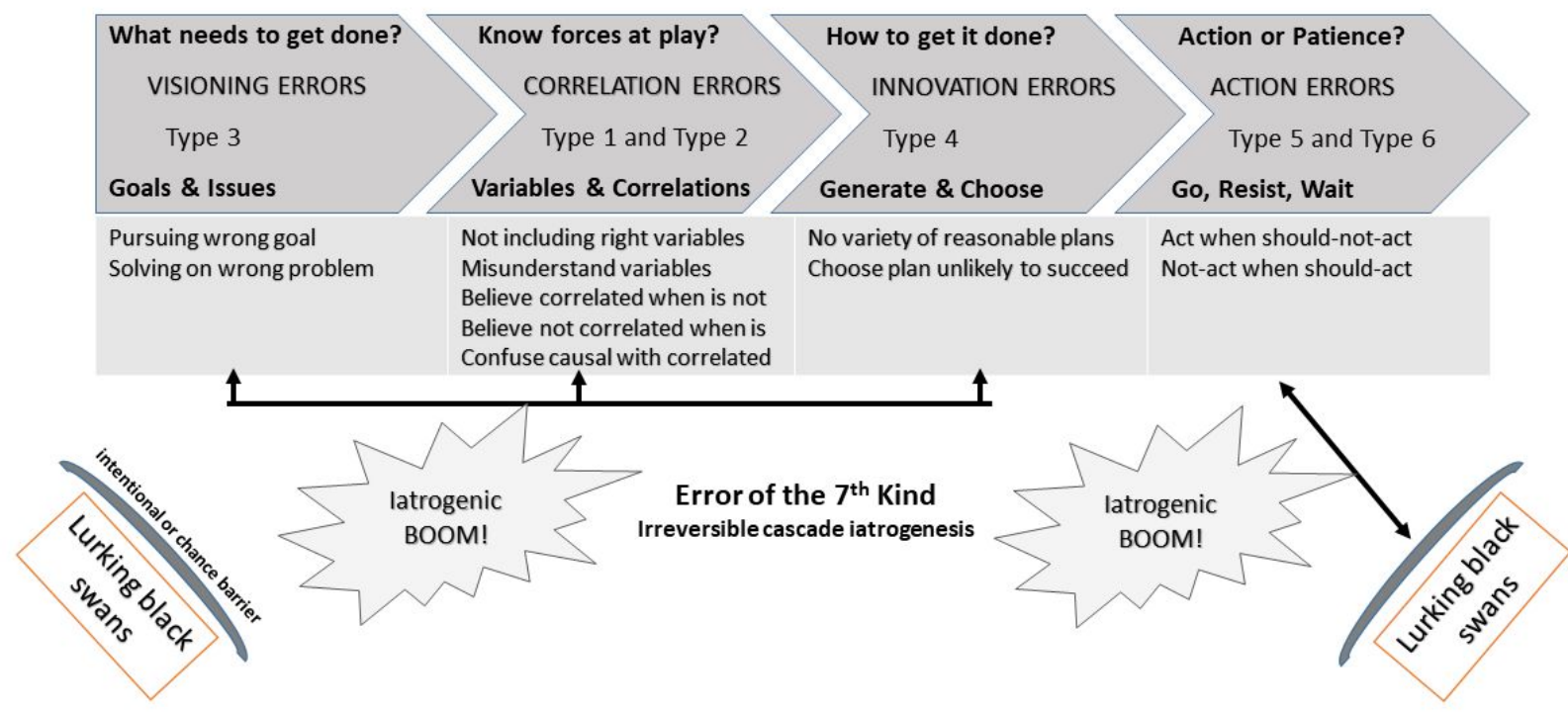
30
31 Weitzel, W., & Jonsson, E. 1989. Decline in organizations - A literature integration and extension.
32
33 *Administrative Science Quarterly*(34): 91-109.
34
35

36
37 Wiener, J. B. 1998. Managing the iatrogenic risks of risk management. *Risk*, 9: 39.
38

39
40 Wikipedia, C. 2017. *List of cognitive biases"*
41
42 (https://en.wikipedia.org/w/index.php?title=List_of_cognitive_biases&oldid=807395822
43
44 ed.)Wikipedia, The Free Encyclopedia.
45
46
47
48
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Figure 1

Iatrogenesis from interaction of errors across decision phases or from unleashing exogenous black swans



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Table 1

Summary of Strategic Leadership Decision Errors		
Category Type	Strategic Decision Process Stage	Error Type
I	Correlation	Alpha error. Misunderstanding of the forces at play. Mistakenly claiming a correlation or relationship
II	Correlation	Beta error. Misunderstanding of the forces at play. Mistakenly claiming no correlation or no relationship.
III	Vision	Vision error. Pursuing/solving the wrong issues, problems or goals
IV	Innovation	Innovation error. Proposing inadequate tactical alternatives, choosing poorly
V	Action	Inaction error. Not acting when you should
VI	Action	Action error. Acting when you should not
VII	Multiple Stages	Cascade error. Errors interact, high Cascade latrogenesis risk
<i>Strategic leadership decision process: seeing what needs to be done, understanding the forces at play, generating and choosing from possible solutions, making the call to act or to not-act.</i>		