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Neurocognitive Inefficacy of the Strategy Process

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Neurocognitive Inefficacy of the Strategy Process

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ABSTRACT

The most widely used (and taught) protocols for strategic analysis – SWOT and Porter's (1980) Five Force Framework for industry analysis – have been found wanting as stimuli to strategy creation or even as a basis for further strategy development. We approach this problem from a neurocognitive perspective. We find profound incompatibilities between the mental image representations evoked by these strategic analysis frameworks and the neural processes going on within the brain that comprise "thinking." The analytical structure (or "*propositional representation*") of these tool results in a mental dead end, the phenomenon known in psychology as "functional fixedness." The difficulty lies with the inability of the brain to make out meaningful (i.e., strategy provoking) stimuli from the mental images (or "*depictive representations*") generated by strategic analysis results. We propose decreasing dependence on these tools and further research employing brain-imaging technology to explore strategy protocols with richer mental representation potential for strategy creation.

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3 Most major corporate and other large organizations engage in the strategy process (or “strategic
4 planning process” or “strategic management process”) on a periodic basis ostensibly for the
5 development of new or revised business strategy. In spite of this, the application of purportedly
6 “rational” tools or techniques or protocols or models or frameworks to the problem of new
7 strategy formation appears overwhelmingly ineffectual. Few, if any, organizations actually
8 obtain new or revised strategy from such efforts. When the genesis of a dramatic change in an
9 organization’s objectives and strategies finally is tracked down, it invariably is the result of an
10 “informal” process, more often than not unrelated to the formal planning effort itself.
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24 This serious failure of formal planning has been well known, if not fully understood, and was
25 documented more than twenty-five years ago. It even was recommended at the time by some
26 reputable scholars in the field that new strategy formation not be attempted through the formal
27 planning process. Since “strategy” had been observed in a variety of large organizations to
28 successfully evolve incrementally of its own accord, it was suggested that this was the
29 appropriate way for the organization to adopt a new strategic direction.¹ Currently, there is no
30 evidence that corporations are consciously employing “Logical Incrementalism” as a means for
31 new strategy formation. Rather, formal strategic planning continues to be an integral activity in
32 most large organizations, employing essentially the same techniques of strategic analysis as used
33 a generation ago.²
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48 There is some evidence that expectations of the formal strategic planning process have
49 diminished even as it continues to be conventionally practiced. More recently, some major
50 corporations have reoriented the planning process toward addressing specific strategic issues in
51 order to reach finite decisions.³ Others have restructured the formal planning protocol with the
52 aim of consciousness-raising concerning the factors/issues management needs to consider in
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1 dealing with the more amorphous, less structured strategy formation task, “to build prepared
2 minds that are capable of making sound decisions.”⁴

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6 Unfortunately, the strategic analysis protocols at hand – what James March has called “rational
7 technologies” – for “preparing” these minds are sorely lacking.⁵ There is little, if any, evidence
8 that the current techniques do what they are supposed to do, namely, either lead to new strategies
9 or inspire or stimulate the minds of decision makers in new strategic directions or trigger some
10 new strategic insights. If anything, the opposite tends to be the case. The greater the reliance on
11 techniques of strategic analysis within the planning system, the greater the attempt to
12 “rationalize” the process, the more formalization of the planning process, the less “out-of-the-
13 box” thinking can be anticipated.⁶

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25 **We believe that there is yet a far more fundamental basis for the inefficacy^a of formal**
26 **strategic planning efforts, one that goes well beyond behavioral, process and these other**
27 **explanations. This phenomenon is due to profound incompatibilities between the cognitive**
28 **process – *deductive* reasoning – channeled into the collective mind of strategists within the**
29 **formal planning process through its tools of strategic analysis (i.e., rational technologies) –**
30 **and the essentially *inductive* reasoning process actually needed to address ill-defined,**
31 **complex situations. Thus, strategic analysis protocols that may appear to be and, indeed,**
32 **are entirely rational and logical are not interpretable as such by the processing end of the**
33 **brain, the neuronal substrate level where “thinking” takes place. The difficulty lies with the**
34 **inability of the brain to make out meaningful (i.e., strategy provoking) stimuli from the**
35 **mental models (or “mental visualizations”) evoked by strategic analysis protocols.**

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In this paper, we focus arguably on the most ubiquitous of strategic analysis techniques, SWOT
Analysis⁷ and Porter’s Five Force Framework⁸ (see Exhibit 1 for a series of links to SWOT
analysis and FFF definitions and applications). Not only have these approaches been widely used
and taught internationally, but these constructs still are foundational to current strategic analysis

1 proposals⁹ and pedagogy. Both these “tools of rational analysis” are to be found and
2 recommended (to varying degrees) for use in each of the four top selling strategic management
3 texts (accounting for more than half of the market).^{10,11,12,13} Using these two pillars of strategic
4 planning exercises, we show why strategic response cannot derive *directly* from performance of
5 these analyses; why these techniques do not and cannot trigger or provide the stimuli for the
6 creative act of making or revising strategy. **The problem lies with the actual and implied
7 cognitive process conveyed by these techniques and the *mental model representations* (or
8 “mental imagery”) that these evoke in the mind of the decision-maker.**

20 **Plan of the Paper**

21 First, we discuss the various activities that comprise the rubric of “strategic planning.” We
22 clarify the key contextual differences between new strategy creation, what we define here as a
23 Strategy Situation (SS), and making Strategic Decisions (SDs). Next, we summarize the
24 perceived major inadequacies of formal strategic planning and analysis technology as conveyed
25 by leading organization scholars as well as the very limited empirical data available on the actual
26 utility of both SWOT Analysis and Porter’s Five Force Framework (FFF). Then, we identify the
27 cognitive interpretations – what appears in “the mind’s eye” – indicated by the structure of these
28 analytical approaches; that is, the mental imagery evoked by these techniques and how this limits
29 cognitive processing. Next, some key neurobiological concepts that underlie strategic thinking
30 (actually *all* thinking) will be presented to explain this mental impasse. And since thinking and
31 problem solving are inextricably tied to memory, we identify some important neurocognitive
32 aspects of memory activity and mental imagery that are relevant to inductive, strategic thinking.
33 In light of these, we then suggest why these two tools even when used correctly are not
34 supportive of the creative act of strategy making and how the mental representations these evoke
35 need to be reinterpreted by the brain in order to make strategic sense.

Distinguishing The Strategic Situation (SS) from Strategic Decision (SD) Making

The terms strategy formation, strategic planning, strategic decision making and strategy selection are used casually, often in place of one another, to denote different contexts and application. The easiest to categorize is what usually is meant by the “strategic decision making” situation. Here, the decision issue in question is reasonably clear – in the important sense that it is commonly understood by decision makers – as are the alternatives (or choices) available. Significance alone does not make any particular decision “strategic” in nature. The decision could be situated in a complex environment where the external forces normally relevant may be in flux, where there may be some ambiguity in the attributes of the decision choices and, most importantly, the decision could alter the way the company conducts its business (i.e., its strategy). However, the conceit is that common, measurable outcomes can be determined (qualitatively or quantitatively) from each of the decision choices. Such SDs are tangible and constrained to one immediate purpose or goal (but could have broad company-wide effects), about which there would be substantial agreement among involved parties.

Although there is no one agreed upon definition of a Strategic Decision (SD), there is a sense that in any one organization, decision makers would be in reasonably common agreement as to what constitutes such a decision. A recent examination of strategic decision making effectiveness using different decision processes provides some examples of what are considered “strategic decisions:” “Chemical company enters sealant business;” “Close overseas electronics manufacturing plant;” “Lighting company creates European office;” and “Adopt new compensation system in electronics company.”¹⁴ From an analytical standpoint, these decisions, although culled from a variety of companies in different industries, have a number of characteristics in common: much past experience and rationality could be brought to bear on the decision process; there is nothing inherently unique about these decisions, however strategically

1 important these might be; the actions (open a foreign office, install a new compensation system,
2 close a plant, etc.) are themselves generic; and the factors that would be considered in making
3 such decisions are well known. If not previously addressed by the individual decision-maker, the
4 factors could be determined easily by examining the experience of others who had to confront
5 this same type of decision. In other words, the use of a rational, analytical process would be
6 indicated, a *deductive reasoning* protocol.
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8 In contrast, we have the Strategic Situation (SS), a commonplace of corporate-level management
9 in the midst of turbulent environments. Here, the decision makers are confronted by a situation^b
10 at the outset of unknown scope, potentially affecting a large number of organizational decisions
11 and/or activities. Previously disparate decisions or activities may need to be coordinated and
12 collectively agreed upon. A multitude of relevant extrinsic factors, events, conditions (possibly
13 causally or casually, directly or indirectly related) affecting decisions/activities may need to be
14 addressed or reevaluated due to dramatic changes in a business environment that is in a constant
15 state of flux with no prospect for stability in sight. Nor is it clear which decisions among many
16 specifically need to be addressed or reevaluated immediately, coordinated or examined in what
17 order or priority. Thus, defining the SS is itself a problem, one arrived at using a good deal of
18 *inductive reasoning*.
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20 Consider The War on Terror. Can one, even at this stage, clearly identify the particular decisions
21 (or activities) and the specific alternative choices for each of these decisions that need to be taken
22 in response to this “War?” What are the final objectives in fighting this War? Could we define,
23 say, “winning” clearly enough so that we would know if and when this goal is achieved? Will
24 what we today consider to be some adverse set of circumstances for which we have a studied
25 response stay still long enough for a rehearsed action to be effective? What about some
26 unanticipated terrorist action or other disaster? What actions (or decisions) need to be taken
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1 immediately? In what priority for the subsequent ones? What decisions and/or actions need to be
2 coordinated? What ought to be the specific objectives of proposed actions?
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6 At the inception of the Department of Homeland Security, the U.S. Government released a chart
7 showing 123 USG entities (agencies, offices, departments, etc.) that were somehow involved in
8 domestic U.S. security and, presumably, in the War as well.¹⁵ Each of these was connected to at
9 least one other security-related organizational unit; a number had several such relationships. This
10 number does not include the thousands of state and local agencies whose resources and
11 requirements similarly are involved with some form of homeland security. One can only imagine
12 how much reconfiguration in these arrangements would have to take place when confronted by
13 an unanticipated catastrophic event. An ambiguous, complex situation, indeed!
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16 Where does one even start? How does the collective mind of the organizations's decision
17 makers, in this case the U.S. Government, encompass this situation? As this hardly is a
18 hypothetical situation, here described is one early attempt to do so, as reported in the New York
19 Times of April 28, 2004:¹⁶
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36 *Soon after the Sept. 11 [2001] attacks, a two-man intelligence team set up shop in a windowless,
37 cipher-locked room at the Pentagon, searching for evidence of links between terrorist groups
38 and host countries.*

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*The men culled classified material, much of it uncorroborated data from the C.I.A... They
recorded and annotated their evidence on butcher paper hung like a mural around their small
office. By the end of the year... the men had constructed a startling new picture of global
terrorism.*

Presumably, these high-level Department of Defense officials had at their disposal the latest,
state-of-the-art, rational technologies for addressing the situation. Yet they required more than
two months in order to assemble their "picture" of the problem and, of course, lots of butcher
paper.

The War on Terror as an example of an SS is not unique. Actually, it mirrors the corporate
strategic planning situation closely. Klein was able to examine the results of a comprehensive

1 strategic planning effort performed within a major electric utility company in the early 1990's, a
2 company, albeit large, producing essentially one product. This effort was provoked by the
3 passage of Federal legislation that effectively would deregulate the electric utility industry during
4 the ensuing decade, thereby completely changing the prospective competitive landscape and its
5 existing way of doing business (i.e., the utility's existing strategy). The entire electric utility
6 industry, in the span of a decade, would move from being a large group of local independent
7 regulated monopolies to a smaller number of consolidated national competitors. This radical
8 industry restructuring would take place concurrently in an otherwise changing environment.
9 Klein found that the management identified no fewer than 34 SD issues and/or activities (e.g.,
10 generating capacity, fuel mix, demand side management, transmission type and requirements,
11 central vs. local generation, pricing, etc) that required reconsideration; a company-wide,
12 extensive environmental assessment, engaging over 100 company personnel supplemented by a
13 variety of outside experts and consultants , yielded about 70 extrinsic factors, forces, and issues
14 that either directly or indirectly had relevance for the aforementioned decisions.¹⁷

15 In a similar but even more extensive strategy reassessment conducted by an international
16 petroleum company for its U.S. subsidiary, over 90 SD issues, activities and functions were
17 identified along with well over 250 relevant external factors – an even more complex SS. In
18 both the electric utility and petroleum company situations, the initial objectives of their
19 respective planning exercises were not the creation of new strategies, but the identification of
20 just what decisions had to be made, the state of the relevant external factors that impinged upon
21 the identified decisions, and what types of action the respective companies could take to
22 moderate prospective adverse events.¹⁸

Efficacy of Strategic Analysis Techniques – Evidence and Assessment

Evidence

Empirical research with the aim of establishing the efficacy of strategic analysis techniques and their contribution to strategy formation is practically non-existent. There are a large number of studies that have examined the *perceived value* of formal planning systems and analytical tools, some with favorable results and others unfavorable. In virtually all of these studies, the measure of “value” or “effectiveness” has been subjective (the *ex post facto* assessment either of an observer of the situation under study or of the decision making participants themselves). For example, Sinha’s large sample survey of Fortune 500 companies and their use of formal strategic analysis tools for specific SDs found that these were positively valued (i.e., strategic programming).¹⁹ Alternatively, Bresser and Bishop’s meta-assessment of the use of formal protocols for “strategic planning” (i.e., strategy formation) could only find contradictory results among the empirical studies undertaken.²⁰

The utility of rational analytical techniques for addressing specific SDs seemed to be supported, when compared with use of political processes, in a 1996 study.¹⁴ A more recent, (2003) in-depth examination of corporate-level, strategic planning practice among eight major international oil companies revealed their shift away from strategy formation within the formal planning process (an explicit acknowledgement of the incapacity of the formal process to generate new strategy). The focus was found to be broad goal setting and consideration of major specific SDs. Strategic planning was devolved to individual divisions. In this research effort, as with virtually all others attempting to measure or otherwise evaluate the worth of formal planning processes and rational techniques, the raw data were personal assessments, the views and experiences of managers who participated in the planning process under study.²¹

Remarkably, there appears to be only one extensive, systematic examination extant of the actual results of a standardized application of a strategic analysis tool/technique. Hill and Westbrook

1 gained access to the results of the formal strategic planning efforts of twenty UK manufacturing
2 companies. Thanks to a UK Government-funded effort to encourage and facilitate the use of
3 rational planning and decision-making practices, a series of professional consultants were teamed
4 with various company managements to assist them in going through a formal strategic planning
5 process, following exactly the same protocol. One step, in each case, was the performance of a
6 “SWOT Analysis.” Hill and Westbrook examined the resulting strategic planning results. They
7 did not find one instance among the twenty where the SWOT results were used *at all* in
8 subsequent steps of the planning exercises (in 14 of the 20 cases, professional strategic planning
9 consulting assistance was provided). They concluded that the use of SWOT analysis should be
10 discontinued.²²

11 Porter’s (1980) Five Force Framework (FFF) has not fared much better. The operational
12 difficulties in applying the framework were identified soon after its publication.²³ These
13 weaknesses have not been resolved.²⁴ Both techniques, it has been argued, convey no notion of a
14 temporal dimension in competitive dynamics, induce cross-sectional thinking, are vague as to
15 application of results even within the purported analytical framework, and have no discernable
16 relevance for strategy implementation. To date, no study has been performed, comparable to that
17 of Hill & Westbrook’s, that examines the effectiveness of actual use of the FFF. This is
18 surprising – and dismaying in light of its stellar position within the strategic management
19 firmament.

20 **Assessment**

21 More than a decade ago, Mintzberg conducted, perhaps, the most extensive and thoughtful
22 examination of the causes for failure of formal strategic planning systems and strategic analysis
23 techniques. He concluded that planning is an “analytical” exercise, but strategy creation is
24 “synthesis.” Strategy will derive from other, more “informal” activities, but not from the process
25 itself, which is more appropriate for “strategic programming” – “codification, elaboration and
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1 conversion” of strategies into detailed, implementable plans. The clearer a stated strategy – what
2 you want done and essentially how you ought to do it – the greater the likelihood that it can and
3 will be implemented.
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8 Mintzberg concluded seemingly correctly that strategy is the product of “right-side of the brain”
9 thinking. Analysis (which he deemed “planning”) is a “left-side of the brain” activity. Hence,
10 corporate planners should revert to a facilitating function, act as “catalysts” for some “black box”
11 whence strategy will emerge (the “black box” presumably being the collective mind of the
12 corporate strategic managers). Clearly, there are different thinking processes involved in
13 “analysis” and “synthesis.”²⁵
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23 Others have come to similar conclusions.²⁶ Most recently (2006), James March, a founder of the
24 field of organizational science, has seriously questioned the very utility of “the core technologies
25 of strategic management.” That is, the strategic analysis techniques at the heart of strategic
26 planning processes, what March variously refers to as “rational technologies” or “techniques of
27 model-based rationality” or “analytical tools.” He concludes that there is no evidentiary basis for
28 believing that these supposed analytical techniques are capable of addressing complex strategic
29 problems. It is useful to mention March’s summarization of the “difficulties” that contribute to
30 the “misspecification of situations,” diminishing the applicability of strategic analysis
31 techniques: Uncertainty, about the attributes of the situation; Causal complexity, the many
32 interdependencies among situation variables; Confound of measurability and importance, the
33 tendency of analysts to give more weight to measurable variables than more-difficult-to-measure
34 ones; Preference ambiguity, the indeterminacy of values and utilities of action; Interpersonal
35 trade-offs, the difficulty of determining combinatorial preferences of situation participants; and
36 Strategic interaction, the causal interdependency of action-reaction among organizations. March
37 notes the seeming total confidence of strategic management scholars in the ultimate usefulness of
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2 rational analytic techniques for addressing complex SSs. His concise description of this
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4 phenomenon: “The Heroism of Fools.”⁵

7 **Strategic Analysis Techniques Applied – In the Mind’s Eye**

9 The formalized steps in the comprehensive strategic planning rubric (or the “strategic
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11 management” or the “strategy process”) are well known and have been accepted for decades,
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13 being a variant of the rational decision-making model. The nomenclature may vary, but the
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15 essentials of the steps are the same: set organizational objectives; conduct an environmental
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17 assessment (internal to the organization and external to it); form or revise a strategy; implement a
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19 strategy through such actions as organization structure redesign, resource allocations for
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21 operational programs, complementary management information and other internal systems
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23 development, adjustment of the organization’s reward system, etc.; enact strategic control by
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25 monitoring and analyzing feedback of the organization’s performance in relation to its goals;
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27 and, finally, take timely corrective action in response to observed deviations in desired
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29 performance. In situations where it is obvious to the collective management that the organization
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31 is confronting major external environmental change, where the likelihood is high that the
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33 organization will need to revise significantly its existing strategy or devise a new one if it is to
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35 survive, the environmental assessment step is performed first, in place of objective setting.
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39 The essential tools of strategic analysis that comprise each of the steps surprisingly have not
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41 changed materially during the last twenty years or so. Often, the most critical step in the formal
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43 strategic planning process, the environmental assessment step which provides the
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45 stimulus/impetus for strategic response, is comprised in large part of the FFF and/or variants of a
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47 SWOT analysis (see Exhibit 1).
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54 The essence of the FFF is conveyed visually, by means of the five-force diagram, “industry
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56 rivalry” at the hub surrounded equidistantly by the four external “forces” impacting the industry;
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58 visually, a hub/force with four spokes/forces. Each of the latter four rather general “forces” (i.e.,
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1 the power of buyers, the power of suppliers, threat of substitute products, and threat of new
2 entrants) in turn is comprised of a series of more specific forces, easily from five to ten or more.
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4 Thus, the force, “supplier power” might comprise: Supplier concentration; Importance of volume
5 to supplier; Differentiation of inputs; Impact of inputs on cost or differentiation; Switching costs
6 of firms in the industry; Presence of substitute inputs; Threat of forward integration; and Cost
7 relative to total purchases in industry. Any robust FFF for an industry could have 25 to 30 or
8 more individual “forces impinging on the “Industry Rivalry” force (hub) which itself is
9 comprised of 10 or so industry attributes.
10

11 The most commonly encountered variant of a so-called “SWOT Analysis” is a series of verbal
12 statements organized into four distinct groups, classified according to the sense of the SWOT
13 acronym (i.e., a series of simple or annotated statements listing Strengths, another listing of
14 Weaknesses, etc.). The relevance of any list item is not usually stated explicitly; nor is there
15 indication visually or otherwise of any interdependency or connection in any way of items within
16 a list or among lists. Hence, the SWOT representation simply consists of four lists with varying
17 degrees of detail for each item.
18

19 **Mental Visual Representation of SWOT and FFF Constructs**

20 From a cognitive perspective, both approaches have important similarities despite seemingly
21 different representations. Both the SWOT and the FFF convey the notion of a number of
22 issues/variables/forces *simultaneously* and *mutually exclusively* affecting something: the former
23 implied, usually the “corporation”; the latter quite explicitly, the “industry.” In the case of the
24 SWOT, four sets of items where each item either is descriptive of the organization (in the case of
25 S’s and W’s) or relevant to the organization (in the case of O’s and T’s).
26

27 One can only surmise, but with some confidence, how the mind frames the problem conceptually
28 in statement form, *the propositional mental (verbal) image* or its visualization, *the depictive*
29 *mental (visual) image*.²⁷ For both tools, the structure of relationships (or lack thereof) is clearly
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explicit. In recognition of the vagaries of SWOT, at times Strengths and Weaknesses might be individually arrayed opposite Opportunities and Threats, creating four sets of SOs, WOs, STs and WTs; this has been termed a TOWS Analysis.²⁸ Presumably, this reconfiguration of the four sets of items into two pairwise sets overcomes the deficiencies of the SWOT analysis. But does it? Now, with the TOWS arrangement, depending upon how fertile is the imagination or recall in generating the original SWOT lists, one is confronted by a set of seemingly mutually exclusive paired items of indeterminate number (each application would yield different results and pair relationships). A responsive strategy would need to be created for each pair. No protocol is provided to address these multiple paired relationships.

The FFF need not be imagined, as the construct always is presented pictorially, i.e., a hub with four spokes, arranged in the appearance of the face of a compass. Similarly, the SWOT simply consists of four lists. Sometimes shown in vertical sequential order; other times depicted in a four quadrant square, the Strength list opposite the Weakness List and, below, the Opportunity list opposite the Threat list. As indicated above, the relevance (i.e., the rationale) for any one item's presence on any of the four lists can only be inferred as there is no explicit indication from the visual representation itself.

Exhibit 2 (appended) provides generalized representations of the propositional and depictive mental images of both the SWOT and FFF. Schematic A should be recognizable as the general case of the FFF except here shown with eight nodes (or "forces") connected to a central node or hub ("industry rivalry" in the case of the FFF). Schematic B is a list of nodes, all commonly connected to another node; this might be an interpretation of, say, "Strengths" of the firm (the firm being the single node to which the other eight are connected). A comprehensive visualization of SWOT might be four such lists. It should be evident that both Schematics A and B are identical structurally, both from a propositional and depictive standpoint!

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2 In essence, these are the verbal and diagrammatic analogs, respectively, of a linear, multiple
3 regression equation, but without coefficients and with a vague dependent variable (the
4 “corporation” or the “industry”). And that might very well be the mental model evoked in the
5 mind of an economist. Someone else, say, a business analyst, indoctrinated in the applicability of
6 the FFF, more likely would envisage a bicycle wheel arrangement. But, again, analytically these
7 are one and the same problem constructs.
8
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15 **Arriving at a Mental Dead End – The Functional Fixedness Problem**

16 There are two difficulties with these formulations: (1) these don't jibe with reality; and (2) the
17 mind cannot possibly process these problem representations as given (i.e., depictive schematics
18 A or B in Exhibit 2). Neither the SWOT nor the FFF representation conveys any temporal or
19 serial quality of the arrayed forces/factors/issues.^{29,30} All forces, in fact, do not act
20 simultaneously nor are these mutually exclusive of one another; they are highly interdependent
21 and, often, causally related but not in a quantitatively describable fashion. And while an
22 econometric model exercised on a computer can handle multiple factors simultaneously (given
23 the appropriate input data), the human mind, at the conscious level, does not and, more
24 importantly, cannot execute that task.^c
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40 Exacerbating the cognitive problem is the use of the terms “analysis” (always attached to
41 “SWOT” as in “SWOT Analysis”) and “model” (often used with the FFF), where the FFF is
42 referred to loosely as the “Five Force *Model*” as opposed to the “Five Force *Framework*.” Porter
43 himself has been careful to make the distinction between the attributes of a “model” and a
44 “framework.” The latter is conceived of as a more robust construct in theory building, inclusive
45 of more variables, more complex. It does not need to meet the criterion of application as it not
46 intended for that purpose. A model has fewer variables, is less comprehensive, and more
47 appropriate for hypothesis testing.³¹ But when the FFF is dubbed the “five force *model*” does it
48 not suggest to the planner that an analytic application is called for? And the expectation of
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1 simultaneous consideration of the relevant forces affecting the industry? Or, in the case of
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4 SWOT lists, that the variety of positive (“strengths”) and negative (“weaknesses”) organization
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6 attributes need to be considered in responding to the positives (“opportunities”) and negatives
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8 (“threats”) of the prospective environment? Or collectively considered in developing a company
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10 strategy?
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12 Here, the semantics – the propositional representation – and the visualization – the depictive
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14 representation – mutually support channeling the brain toward attempting an analytical,
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16 *deductive* solution. Additionally, there is the reinforcing effect of being exposed repeatedly to the
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18 notion that the use of SWOT or the FFF is an “analysis” that will lead to strategic revelations.
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20 The ubiquitous nature of SWOT and FFF in business school classrooms and in planning practice
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22 would seem to assure their status as what cognitive psychologists refer to as “frames” or
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24 “scripts” – routines, heuristics and memorized procedures for addressing particular problems.³²
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26 Figuratively and perhaps literally speaking, these mental constructs have been “hard-wired,”
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28 into the psyche of the strategic analyst and decision-maker.
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31 But what can the mind do with these mental models? The FFF provides no clue as to how to
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33 handle the identified forces either in relation to each other or to “the industry” In the case of
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35 SWOT, the problem of model construction is worse still as there is no “dependent variable,”
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37 however ambiguous, upon which to focus the items in each of the SWOT lists and there are no
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39 constraints on what can be included or omitted from these lists.³⁰ Other versions of SWOT, such
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41 as TOWS, that attempt to add some structure and simplification, i.e., S-W or O-T pairwise
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43 constructs, only add a different type of ambiguity to the problem: Are the pairwise relationships
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45 mutually exclusive? If they are not, how are they related? How can these relationships be
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47 expressed in an objective manner? And what does one do with these anyway?
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1 Obviously, something useful. A recent (2006) assessment of the “big ideas” in “strategic
2 thinking,” the ones that have stood the test of time and practice, identified four “new, sharper
3 analytical tools that help managers make better sense of their markets, competitors, and
4 industries.” SWOT and FFF (called “industry structure”) were included along with “product life
5 cycle” and “market segmentation.”² But recall that the UK study, the only empirical assessment
6 of the actual use of SWOT analysis results as inputs to strategy formation, found no indication
7 that the SWOT lists were used subsequently in the identification or creation of new or revised
8 strategy. Neither the SWOT nor the FFF provide any further problem solving heuristics beyond
9 the potential trigger to memory embedded in the list items themselves. Hence, the output from
10 these two “analyses” – essentially lists – in some manner act as extrinsic stimuli raising to the
11 conscious level different problem solving heuristics; alternatively, these analyses are mentally
12 discarded and the problem addressed anew.

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30 From a neurocognitive perspective, the SWOT or the FFF sets up an insoluble problem for the
31 brain – a mental dead end. There are no instructions, no protocol, no practiced analytical
32 approach provided; each application is unique. There is no prescribed way, no script in the
33 analyst’s mind, to examine simultaneously two or more of the five forces and their multiple
34 components or the dozens of items on the SWOT lists. If the analyst is “fixated” on the mental
35 model evoked by the FFF or SWOT, there is no way for the brain to proceed (recall the criticism
36 above).

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What appears to result is the “functional fixedness” effect³³ or mental fixation³⁴: unless what is
construed as an analytical problem is mentally reconfigured, it cannot be solved.³⁵ If, indeed,
functional fixedness is taking place (it can only be inferred from observation alone), the original
mental model (i.e., the FFF or SWOT) is more or less discarded. In the absence of any further
analytical guidance, the mind presumably falls back on prior experience (i.e., memory) in
dealing with like situations. In laboratory functional fixation experiments, once a subject is

1 shown how to “reframe” the problem, the subject most often can solve it easily.^d But in such
2 controlled experiments, there always is a correct and finite solution. It is possible to measure the
3 exact time it takes to reach a solution under both conditions or if a solution is reached at all.^{34,36}
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8 There are no comparable objective measures with the application of SWOT or the FFF. There are
9 no generalized follow-on protocols extant for coping with the various FFF generated forces or
10 items on the SWOT lists.
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15 In effect, every strategy formation exercise is a novel one, requiring anew the integration of prior
16 knowledge and experience with new extrinsic stimuli that trigger associations in the mind of the
17 strategist. It should be expected that novices in the use of these “analytical tools” would have
18 difficulty in their application. However, continued exposure to examples of their application (as
19 in the classroom through case studies) along with practice in attempting to apply the tools
20 themselves appears to provide egress from the encountered mental dead ends, a process that
21 might appear seamless to the observer.
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32 Consequently, in order for the SWOT or FFF contents to prove useful in the subsequent strategy
33 formation step (as it appears to be, given their iconic status), some unobserved thought process
34 (or change in thought process) must be taking place. Those that start their “analyses” with the
35 SWOT or FFF mental image would need to reconfigure their mental model of the problem,
36 something they would learn to do almost unconsciously. The more astute (or experienced)
37 among us, having frequently confronted this kind of problem before, intuitively (from implicit
38 memory) reconfigure it so as to address each factor/force individually or in some simple
39 combination.^{37,38} The even brainier, perhaps, might clump related factors before beginning their
40 analysis or explicitly search for some common threads or linkages among the various
41 factors/forces. The problem might be reconfigured along the lines of Schematic C in Exhibit 1,
42 where the implications of the interrelationship of two factors are considered in relation to the
43 results of two other interdependent factors.
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1 Depending on what kind of representations are evoked in the brain, different associations will
2 surface different configurations of prior knowledge which in turn will activate different parts of
3 the brain and, hence, different memories.³⁹ Ultimately, given the multiple factors in the initial
4 condition and those others triggered from memory, an inductively-derived reasoning process
5 should emerge. In contrast, if an individual remained “fixated” on trying for a dead
6 end analytical solution (where there is not one), brain activation patterns should be different,
7 perhaps within brain regions that support deductive reasoning.⁴⁰

18 **Relevant Neurocognitive findings with respect to thinking and memory**

20 Investigations in cognitive neuroscience have yielded explanations of how thinking and memory
21 work (the two are wholly interdependent phenomena) – and how these processes come about.
22 These provide further explanations for the inefficacy of SWOT and the FFF for new strategy
23 creation and the importance of mental visualization in making sense of a complex SS. SWOT
24 and FFF are little more than lists of issues/forces/factors to consider in the complex task of
25 strategy formation. In effect, these are extrinsic inputs to the brain. Without further instruction
26 on how to proceed, the mental visualization evoked by the SWOT analysis (i.e., lists) or the FFF
27 (i.e., the hub and spoke diagram with “The Industry” or “Industry Rivalry” at the center)
28 becomes important. That determines the mental model driving the solution attempt.⁴¹
29 Individuals will address these SWOT/FFF lists differently from one another. Each item
30 individually or in some combination will activate different types of memory and, consequently,
31 different areas of the brain. Instructions, for example, to deal sequentially with items or in
32 certain order will trigger different activation patterns.⁴² An attempt to deal with two or more
33 tasks simultaneously excites different brain regions and produces different activation patterns
34 than performing the same two tasks sequentially.⁴³ Also, mental performance will drop when
35 compared to performing either task alone. The frontal lobes of the brain are engaged during such
36 conditions in an attempt to coordinate and allocate sufficient attentional resources to handle
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2 concurrent tasks successfully. The frontal lobes are also important for selecting among
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4 competing choices in solving problems. However, two tasks that require recruitment of similar
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6 areas of the brain will be competing for limited resources and absolute successful performance
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8 will be difficult unless the subject can be trained extensively to create a more automatic
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10 routine.^{44,45}

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13 Notwithstanding whether these factors would be addressed individually or clumped, the four
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15 impacting forces or their components in the FFF and the larger number of strengths, weaknesses,
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17 opportunities and threats would each (or in small groups) be dealt with mentally in a *serial*
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19 fashion. There is no getting away from it: in order to proceed, different mental processes are
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21 followed than those conveyed by the original representations.
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25 It has long been known that even simple tasks, such as scanning our memory for information to
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27 be recalled, are performed in a serial fashion.⁴⁶ For example, subjects that are asked to recall a
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29 single letter from a remembered list of 6 letters will take longer to recall the letter than if the
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31 remembered list was 3 letters. In perceptual tasks, searching for a target within a vast of array of
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33 similar targets also is performed in a serial fashion.⁴⁷ Simultaneous stimuli are processed less
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35 efficiently by the brain than are the same stimuli
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39 provided in sequential fashion.⁴⁸ Thus, it seems counterintuitive, from a neuroscience
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41 perspective, that a human presented with a difficult problem would be able to simultaneously
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43 process all aspects of the factors involved in coming up with a solution, say, to a multivariate
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45 strategic problem in a manner analogous to how a computer can perform a multiple regression.
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49 We summarize below some of the key incompatibilities between relevant memory attributes and
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51 strategic analysis tools:
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56 • Memories that are the basis of new ideas, solutions, creations (i.e., strategic options) are
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58 spurred by some trigger or association (these rarely come about from some “mental leap”
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1 from nothingness); the “trigger” is all-important. Hence, the more vague the trigger, the less
2 likely some meaningful association will come about. *In its most common representation, the*
3 *SWOT exists without relevance for any particular aspect of the organization for which it is*
4 *performed. When SWOT list items are paired, as they often are when using some variant of a*
5 *TOWS construct, one has yet again a mutually exclusive set of more complex relationships*
6 *(e.g., a strength arrayed against a weakness*

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16 • Memory is wholly dependent on circumstance; memory is not static; it does not exist without
17 relation to a stimulus (a “stimulus” to memory may come from within the brain itself,
18 exemplified by the common experience of something just having “popped” into one’s head
19 seemingly without any extrinsic input). Even the slightest variant in the stimulus can lead to a
20 different fragment of memory surfaced to the level of consciousness – which in turn may
21 serve as the stimulus that elicits some new memory (i.e., a new idea synthesized from
22 existing and/or reconfigured memory fragments). *The 5F representation suggests mutual*
23 *exclusivity of each of the forces, more than likely resulting in diminished consciousness-*
24 *raising within the mind of the strategist.*
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38 • Data and information derived from data tend to be clustered (“clumped”) within the mind
39 based on some commonality(s); the composition of a memory cluster is situation-specific and
40 can change materially even with the slightest alteration in situation (read “stimulus”). *Both*
41 *the 5F and the SWOT representations do not even remotely encourage the notion of joint*
42 *consideration of forces/factors (i.e., mutual exclusivity).*
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49 • Multiple stimuli presented concurrently actually cause lower measurable activation patterns
50 within the brain than do the same stimuli presented in serial fashion. *Hence, the*
51 *representations themselves immediately reduce strategic thinking “efficiency.”*
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56 • Finally, at the highest level of consciousness, when we are confronted by complex, non-
57 routine cognitive tasks, the brain is mainly a serial processor. It is only at lower levels of
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conscious – what has been called the “preconscious” or, further down, the subconscious levels – that the brain exhibits parallel processing capabilities. *Hence, the more complex the strategic decision issue and the more factors that have to be taken into account, the greater the necessity for mapping out a more serial protocol with explicit triggers to provoke a creative response on the part of the strategic decision-maker.*

This provides a rationale for de-emphasizing the use of SWOT results in strategy formation processes, even once this analysis has been accomplished comprehensively. Indeed, it could be hypothesized that the more strengths, weaknesses, opportunities and threats surfaced, the less will be the utility in so doing. Similarly, with the FFF. Without any further protocol or heuristic for handling only the four general forces impinging on “the industry,” their effects cannot be systematically evaluated. If strategic management texts continue to incorporate these tools for strategic analysis, caveats concerning the cognitive weaknesses of these techniques ought to be included (as some already do) – if for no other reason than to reduce the frustration and ego-deflating effect on students (and planners?) who are expected to produce strategy from such analytical results.

The Importance of Mental Imagery

The capacity to reason through a complex problem is enhanced by its visualization (i.e., mental model), either in depictive or propositional form.⁴⁹ In collaborative circumstances particularly, the condition most prevalent in organizations, a commonly shared understanding of the initial problem situation is of critical importance to effective decision making. It has been shown that agreement at the outset of the “initial situation” and the final “goals” – the mental model of the situation – is even more important in effective decision making than the ensuing problem solving protocol followed.⁵⁰ Particularly, when the initial condition is that of a complex dynamic system, being able to grasp the system causal structure and the interdependencies of causative factors

1 improves ability to exercise overall system control.³⁸ The important role of mental image
2 representation (i.e., the construct of a problem as it appears within the brain) in determining the
3 efficacy of high level, problem solving heuristics (or protocols) has been explored extensively at
4 the behavioral level.^{51,52} Mental imagery has been found to be a significant factor in determining
5 the quality of the solution for structured problems.⁵³ and, more recently, in more creative
6 problem solving.⁴⁹ It also has been shown that the choice of problem solving protocol derives
7 from the envisaged mental representation; more importantly, it can bypass the functional
8 fixedness phenomenon.⁵³

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21 In The War on Terror SS provided above, defining the “initial conditions” was the subject of
22 NYT-described, ad hoc search process (recall the locked room with butcher paper adorning the
23 walls). Although the “locked room” does not suggest much interest in sharing understanding of
24 the situation, procedurally the attempt at laying a visualization of this complex problem was
25 laudable. Such a shared understanding certainly is unattainable if there is no recognition of the
26 need to search for it in the first place

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When used as the basis for the environmental assessment step in the planning process or an
industry structure analysis, the SWOT or FFF lists, respectively, defines the “initial situation.”
There is no complementary problem solving protocol and there is no further meaningful
indication of interdependencies or causal relationships among the SWOT list items or FFF
forces. No analyzable mental model can ensue from these depictions. It would seem that the
functional fixedness effect is all but assured.

Final thoughts

To date, virtually all decision making studies – whether it be in cognitive psychology, cognitive
neuroscience, neuroeconomics or economics – have been premised on the existence of
alternative decisions, where the problem is one of choice. Indeed, a recent special issue (May
2007) of the Annals focused on “Current Trends in Decision Making.”⁵⁴ Decision making was

1 defined as “the processes by which animals [and humans] choose between competing actions on
2 the basis of the expected value, or utility, or their consequences,” thus, more or less
3 encompassing the SD but certainly not the SS problem.
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8 The “unstructured” decision situation *per se*, where some cognitive process must be gone
9 through in order to arrive at decision options, is virtually uncharted territory.⁵⁵ Instead, the focus
10 has been on understanding how the brain functions in essentially deductive decision making
11 contexts.⁴⁰ Even in neurocognitive experiments, where choices considerations are ill-defined, but
12 there are choices, and “adaptive” decision making is called for, very different brain activity is
13 detected from clear choice contexts.⁵⁶ Brain activity when confronted by the SS should be
14 expected to differ substantially from the two above contexts. It is questionable how much
15 understanding has been gained in cognitive and neurocognitive research that is applicable to the
16 Strategic Situation.
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30 The correct identification of the obstacles to the use of such techniques as SWOT and FFF for
31 understanding and analysis of complex situations cannot be overstated. A good deal of pedagogy
32 at all levels of education rests on similar types of mental models. Decision making in virtually
33 every domain of human activity one can conceive of uses SWOT Analysis^e or one of its variants,
34 notwithstanding its known limitations. The FFF is similarly ubiquitous internationally.
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44 The degree to which the mental imagery plays a role in furthering decision making in highly
45 complex, more ambiguous SS situations has not been explored – and, most likely, cannot be
46 through controlled behavioral studies (as employed in the above cited research). The functional
47 fixedness/mental fixation phenomenon, for example, can only be inferred from behavioral
48 experiments alone.
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56 Until very recently, the idea of distinguishing patterns of brain activity of different kinds of high
57 level thinking would have been inconceivable. Now, with dramatically improved brain imaging
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1 techniques brain activation patterns triggered by even subtle syntax changes in speech can be
2 discerned (for example, a change in the tense of a sentence); implicit and explicit learning
3 activity can be identified;⁵⁷ the efficacy of brain activity in switching between tasks has been
4 deciphered;⁴³ the distinct brain regions engaged in the performance of simultaneous and
5 sequential task have been determined,⁴³ among other brain mapping advances. Recent brain
6 mapping studies examining the occurrence of insight in problem solving activity have been able
7 to discern the functional fixedness effect.³⁴

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18 What is necessary is a look at brain activation triggered by the attempted application of different
19 strategic analysis protocols. It should be possible to examine brain activity in the midst of
20 applying strategic analysis techniques to the creative act of strategy formation. The identification
21 of appropriate as well as ineffective visual representations of complex situations, the extrinsic
22 stimuli that facilitate cognition, is the first necessary step to improving the strategy formation
23 process.
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Exhibit 1

SWOT & FFF EXAMPLES AND APPLICATIONS...**For Porter's Five Force Framework...**

<http://www.quickmba.com/strategy/porter.shtml>

<http://www.ecofine.com/strategy/Porter%20%20forces.htm>

In practice by consultants:

<http://www.metrixmedia.com/5forces.html>

<http://www.chrisfoxinc.com/strategicOrientation.htm#Strategic%20Planning>

(particularly, click on Strategic Planning. See External Analysis. Note "opportunities and threats," the "O" and "T" of SWOT)

http://caps.uchicago.edu/undergrads/job_search_skills/interviewing/case_interview.html

U. of Chicago Placement Office tip sheet on interviewing for a consulting job. See "Taking a Case Interview" and note what students are expected to know.

For SWOT...

<http://www.netmba.com/strategy/swot/> (Note section on SWOT limitations)

<http://www.quickmba.com/strategy/swot/>

<http://erc.msh.org/quality/ittools/itswot.cfm> (even at UNICEF)

<http://www.psywww.com/mtsite/swot.html> (this is a good one!)

<http://scholar.lib.vt.edu/ejournals/JVTE/v12n1/Balamuralikrishna.html>

(Fully applied SWOT in vocational education)

<http://www.slideshare.net/rahulogy/textile-industry-in-india-a-swot-analysis>

(At the premier business school in India... note jump to recommendations)

<http://www.family-business-experts.com/swot-analysis.html>

(At firms large and ... quite small)

Exhibit 2

FOOTNOTES

a. The terms “efficacy” and “effectiveness” sometimes are used interchangeably. In some dictionaries, the two are considered synonyms, notwithstanding subtle but real differences in their respective definitions. Effectiveness refers to the *extent* or *degree* to which some activity is performed or accomplished. Efficacy is an assessment of the *capability* (or “*capacity*”) of an activity to accomplish some objective or achieve some aim. As we are concerned here with the appropriateness of processes and techniques of analysis, our focus is the latter – what we shall call *neurocognitive efficacy*. Or the lack of it, *inefficacy*.

a. Note that “analysis” is a deductive reasoning process and is considered mainly a “left-side of the brain activity.” “Synthesis” is an inductive reasoning process mainly located in the right-side of the brain.

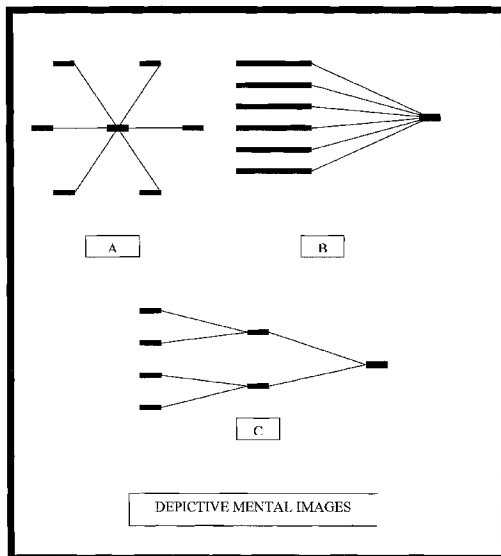
b. The term “situation” is used here to convey the lack of distinct boundaries to the problem at hand, where at its initial consideration there is no clear or even approximate idea how to formulate or structure or model the problem – what March characterized as a “complex situation.”⁵

c. That is, for high-level cognitive tasks (e.g., strategic thinking). We routinely “do two things at once,” but not two complex cognitive tasks where each demands our individual attention. One can hold a conversation while driving a car, the latter a highly complex cognitive task but one that, over time, can become automatized. But holding a conversation while watching television is difficult for most people to do simultaneously. We end up switching our attention between these two activities in serial, sequential fashion.

d. A classic functional fixedness experiment is to provide a subject with a box of matches, a candle, and a tack. The problem is to affix the lit candle to a wall. If the match box itself is seen as one of the objects that can be used in solving the problem, then the solution is readily obtained: empty the box of the matches; tack the box to the wall, creating a shelf; light the candle with one of the matches; and place the lit candle on the side of the box protruding from the wall. If the subject doesn’t see the box as a separate object to be used, but simply as a container for the matches, either the problem will not be solved or it will take materially longer. Hence, the term functional fixation: a subject is “fixated” on function of an object and does not consider an alternative use for it; in this case, the match box. Once the subject is made aware that the box itself may be used in performing the task, it is quickly completed.

e. If the reader has any doubts as to the universality of “SWOT Analysis,” just type the term into google.com in quotation marks. You will have the opportunity to wade through 1,860,000 websites (url’s). Add to “SWOT Analysis” any object whether it be bought or sold or not, any activity, any place... anything. The chances are that somewhere someone in the world has performed a SWOT Analysis on it. Try the same for “Five Force Analysis” with anything that could be considered a “business” or “industry.” You will get similar results.

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A & B ALL FIGHT FACTORS/NODES SIMULTANEOUSLY AND/OR COMMONLY IMPACT OR CREATE ANOTHER NODE

C TWO PAIRS OF NODES MUTUALLY INDEPENDENT OF EACH OTHER IMPACT OR CREATE TWO OTHER NODES. THE RESULTING TWO NODES IMPACT OR CREATE ANOTHER NODE

PROPOSITIONAL MENTAL IMAGES

Exhibit 2
216x355mm (298 x 298 DPI)