THE THEORY OF THE BUSINESS, FALSIFICATION AND AVOIDING MANAGERIAL UNAWARENESS

Doron Faran[1]

[1]Department of Industrial Engineering and Management Ort Braude Academic College of Engineering, Karmiel, Israel, dfaran@braude.ac.il

Abstract:

Organizational strategy is based, too often implicitly, on a theory about the organization's environment. Although the falsity of this theory puts the entire strategy at risk, managers are usually unaware of both the theory and the peril. The issue of theory falsification is mostly associated with the philosopher Karl Popper, but unfortunately the management literature identifies with his rival, Thomas Kuhn. The wish to apply Popper's doctrine in the managerial context faces another difficulty – the formation of the theory. Whilst Popper sketches a hierarchical structure of a theoretic system, managers hold a one-tier theory-of-action that harms falsification. An adaptation of the Popperian method for the managerial context is suggested and examined through Action Research. The findings indicate that a careful extraction of an upper-level theory from the theory-of-action and its testing through derivable scenarios enables early falsification, namely before the actions are taken.

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The Practical Problem: Managerial Unawareness

Strategy, whether planned or emergent, rests upon a theory; not in the meaning of scholarly theories *about* strategy but rather the strategy-maker's worldview that underlies the strategy. Drucker (1995) named it "theory of the firm"; Mintzberg (1987/a) called it "strategy as perspective", and the school represented by e.g. Huff, Huff & Barr (2000) links it directly to the strategist's cognitive structure. The theory demarcates the business environment, nominates the driving forces within it and determines the interrelationships among them.
Problems arise when the theory is false. Sometimes it is false from the beginning; in other cases it fails to follow changes in the environment and becomes obsolete. The peril is that managers are unaware of the falsity since, most often, they have not explicated their theories; nor have they actively been engaged in testing them. The field of strategy is highly attentive to uncertainty, but much less to the risk of unawareness of theory's falsity.

Examples for such a failure are plenty, and the two that are succinctly presented here are nothing but representatives. Grove (1997) describes vividly how Intel (which he headed) encountered a strategic disaster in 1994, as a considered-to-be a frequent glitch during a chip development had been blown up toward an uncontrolled credibility crisis. What came out in retrospect was that the PCs' end-users, who have never been thought of as Intel's direct customers, took the "Intel Inside" campaign too seriously and demanded the chip's replacement – allegedly without technical justification. Intel has not internalized the change in time, Grove concludes his personal experience.

Another example, based on cognitive analysis of secondary sources, is provided by Barr, Stimpert & Huff (1992). They draw the history of two railroads that had shared identical initial conditions but have reached different ends: one company prospered whilst the other faced bankruptcy. The authors point to the sluggishness of the latter to perceive new business factors as the cause of its deterioration.

The management literature pays much attention to uncertainty, which is inevitable in strategic decision making. Uncertainty implies incomplete information, and may vary by severity from lacking the future state of certain factors (Courtney, Kirkland & Vigueri, 1997) to questioning the factors themselves (Dequech, 2000); uncertainty may also result from insufficient knowledge about the relations among those factors (Milliken, 1987). Regardless the level of severity, underlying all the levels is *awareness* as a state of mind; Zack (2001) concludes: "In all cases, the interpretive context of the uncertainty is assumed to be well-defined and meaningful". In contrast the point in our case is *unawareness*: the decision-makers are unaware of the unknown, all the more so their very being in this state. This is the problem we address.

Theoretical Background: Traditions of Theory Validation

The question of the trueness or falsity of a theory lies at the heart of the philosophy of science. Without discounting the contribution of others, the debate during the second half of the 20th century has concentrated around two competing schools: Popper and Kuhn; traces of this debate populate the management literature.

I. Philosophy of Science: Popper vs. Kuhn

Popper (1961), stating in the 1930s, established the stance of Critical Rationalism. Popper is not interested in the theorizing phase, which is subject to personal factors; instead he concentrates on the theory's testing, which in his opinion has to be purely logical. "Testing" means deliberate efforts to falsify the theory (more about it later), which holds as long as this falsification fails. Four Popperian themes are especially remarkable:

1. The identification of the scientific method with deductive logic, in contrast with induction.
2. The activeness of the scientist who should consciously suspect his theory and tries to refute it.
3. The exclusion of the psychological dimension from the science's demarcation; Popper does recognize this dimension but nevertheless denies its systematization (points 1-3 refer to Popper, 1961).
4. The portrayal of the scientist as a problem solver, in accordance with the problem (defined as a deviation from the expected) as a precondition for theorizing (popper, 1994).

Whilst Popper presents a normative theory (an ideology, according to Kuhn's allegation [Kuhn, 1970/b]), Kuhn (1970/a) draws a historical account from which he derives a theory. Kuhn coins the term "normal science" to describe a branch of science that converges around an accepted paradigm, within which the basic assumptions are not challenged. What scientists do, he argues, is solving "puzzles" – a tern that intentionally bears a flavor of fixed, agreed-upon gaming rules; both the unchallenged postulates and the accumulation of solved puzzles indicate an inductive mode. Kuhn (1970/a) sees the scientist's psychological drives and cognitive biases as inseparable factors, not (unlike Popper) something to fight against. He recognizes the social impact that the scientific community has over the individual scientist, who is captured by the prevailing convictions.

Although Kuhn (1970/b) and Popper (1970) criticize each other fervently, their stances are hardly commensurable, at least upon the following dimensions: (a) the essence – a methodology (Popper) vs. a descriptive theory (Kuhn); (b) controllability of the scientific process (which Popper advocates, but Kuhn denies), and (c) the leading theme under which the scientist operates – logical reasoning (Popper) vs. social conventionalism (Kuhn).

II. Reflection in the Management Literature

Kuhn is clearly more favored in the management literature; many of his concepts are reflected vicariously on top of direct references (e.g. Huff, Huff & Barr, 2000; Prahalad & bettis, 1986). Kuhnian reflections are fourfold:

1. Equating strategy with the notion of paradigm (Huff et al, 2000; Prahalad & bettis, 1986).
2. The social dimension of organizational knowledge, which is analogous to the scientific community (Cook & Brown, 1999; Durand, Mounoud & Ramanantsoa, 1996; Sandelands & Stablein, 1987; Von Krogh, Roos & Slocum, 1994; Weick, 1996).

3. The centrality of induction in managerial inference (Weick, 1995) as well as the saliency of experience (Levinthal & March, 1993; Lyles & Schwenk, 1992) and the significance of intuition (Erat & Von Krogh, 2000).
4. Acknowledgment of the psychological drives and biases that managers act upon (Bazerman, 2006).

It is much harder to trace Popperian ideas in the management literature, let alone named references. Mostly traceable is the central Popperian theme of problem solving, which is echoed first and foremost in Simon (e.g. 1945/1997). Besides, the notion of theory testing through hypotheses is mentioned by Hedberg (1981), although in the context of incomplete learning. Another reflection is the employment of deductive derivation during scenarios generations (Dutton, Fahey & Narayanan, 1983), sometimes in order to compensate for weak inductive ground (March, Sproull & Tamuz, 1996). Alas, the latter is regarded (by organizations) as a second best rather than the preferred alternative.

In summary, the management literature clearly tends to follow the Kuhnian tradition, although Popper's perception of the scientist's motivation as a problem-solver and decision-maker is much closer to the manager's image than Kuhn's "puzzle" concept. On the other hand, the unawareness phenomenon is more explainable upon Kuhn's thesis. We should also remember that both Kuhn's account and the corresponding management literature are descriptive whilst Popper's stance is normative; since we aim at *curing* the unawareness problem, drawing on Popper is self evident.

The Theoretical Problem: The Level of the Tested Theory

Say that one accepts the previous conclusion and wishes to employ the Popperian method in managerial context; is this necessary condition sufficient? The argument below is that the core problem has to do with the type of the theory under test. We first briefly check what a theory is according to Popper and then compare it with the theory held by managers.

Popper (1961) defines a theory as a universal law ("*all* A's are B's"), namely a statement that is true anytime and anywhere. Such a statement is by definition unverifiable, since no empirical test can encompass the entire spectrum. Therefore the scientist can only try to falsify the theory, and that s/he does by logically deriving *singular* statements ("*some* A's are not B's") that are empirically verifiable. Once the derived statement is verified, the hosting theory is falsified. This is a syllogistic structure: a theory as the major premise, initial conditions as the minor premise, and the expected result to be tested.

Such a structure is the building block of a *theoretical system*, which may contain several levels of statements that are more and more singular down the derivation road. Still the same principle holds, namely that each statement does not stand for itself but serves to falsify its progenitor. Hence a theory may be considered universal even if it relates to an individual entity.

Managers have what Argyris & Schon (1978) call "theory of action", that from a cognitive perspective consists of schemas (instead of statements). A schema reads: "in situation S, if you want to achieve consequence Q, under assumptions a…n, do A" (p. 10). This structure parallels to what Popper calls the minor premise and the result; what is missing is the major premise, or the upper-level theory – although it tacitly exists beneath the schema, as Argyris & Schon (1978) indicate. Whilst Argyris & Schon (1978) further divide the theory-of-action into espoused theory on the one hand and theory-in-use on the other, Weick (1995) discounts the difference as both mutually affect the theorizer's perception.

Schon (1983) explains why deductive falsification is inappropriate in practice; the practitioner, unlike the Popperian scientist whose aim is problem solving, struggles first of all to *set* the problem. The steps of setting and solving the problem are interwoven and project on one another, since the problem is deliberately set in a solvable manner. The practitioner, Schon argues, is interested in the result rather than the reason; therefore, as long as the result satisfies the quest for further knowledge ceases. It is the typical dilemma between scientific rigor and practical relevance, where the latter prevails.

Still, as Hedberg (1981) states, the action is the hypothesis upon which the theory is tested; if so, is Popper's request satisfied? The answer is no, because being the "theory of action" both the highest and the lowest level of the theory (i.e. the only one) harms the benefits of falsification (if achieved) on two dimensions: time and quality. Here is why:

1. Falsification may occur fatally too late, especially when the action in point is of strategic significance (the aforementioned Barr et al [1992] is an example).
2. The refuted "hypothesis" has no ground to reflect upon; in other words, the rejection of the hypothesis (i.e. the action) leaves the experimenter in the dark.
3. Besides, since the actor (i.e. the manager) is under test not less than the action, powerful biases – especially the attribution bias (Nisbett & Ross, 1980) – contaminate the derived conclusions.

Few remedies have been suggested in order to face the problem of latent falsity of managerial theories, but none of them meets all the above challenges. Simons' (1995) method of strategic control is susceptible to lateness (point no. 1); Peters & Waterman (1982) advocate strategic experiments but leave perils 2 and 3 unattended, and Ben-Israel (1989) exhibits Popperian approach but neglects the second point as he employs theory-free hypotheses.

Hence the root problems are (a) that the theory is tested too far down the derivation chain, without a higher reference, and (b) that the testing method is implicit, "Kuhnian", and loosely controlled. More formally, the two independent variables are (1) the *level of theory* and (2) *methodology awareness*, and the dependent variables are (3) the *time of theory testing* and (4) the *lucidity of the findings* (operationalization follows). Figure 1 presents the variables and their connections.

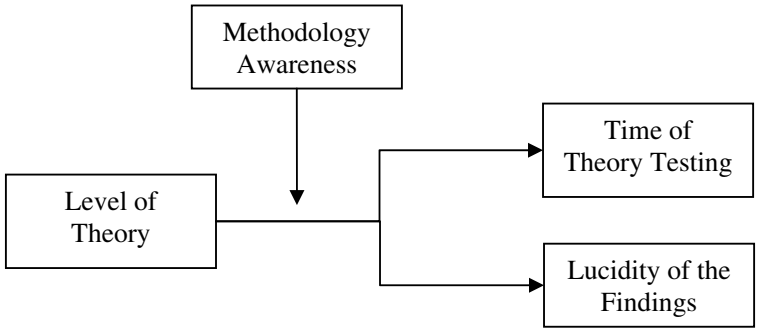

Figure 1. The problem model

The Research Design

Van Aken (2005) distinguishes between descriptive and design science: the former provides theoretical ground upon which the latter establishes *technological rules*; the research addresses both these aims. For one, and from a *critical rationalist* (Mingers, 2004) point of view, we post two questions:

Q1. Does the explication of an upper-level theory expedite falsification based on theory testing?

By *upper-level theory* we mean the theory that underlies the "theory of action", which in accordance with Popper's doctrine should exhibit greater universality than the latter. The quality of *expedition* is defined as "learning before doing", namely that falsification is reached before an action is taken.

Q2. Does the testing of an upper-level theory, upon falsification, yield insights that are more comprehensible than by testing the theory-of-action?

As mentioned above, actions taken by an enterprise evoke a feedback from the environment; however, such a feedback is doomed to vagueness without a grounding reference. Operationally this question is qualitatively measured by the managers' ability to explain *why* something happened (i.e. the cause) beyond explaining *what* happened (the effect).

The design target concerns the methodological aspect and reads as follows:

Q3. How to explicate managerial upper-level theories and how to test them?

This objective considers the theory falsification a conscious objective, an end for itself.

As such, the research exhibits the following characteristics: (a) it deals with managers' latent knowledge, which is hardly accessible indirectly; (b) it concerns design, which in order to be acceptable had better be participative, and (c) it compares a pre- with post-intervention, thus should be longitudinal. Therefore the *Action Research* (AR) method was found the most appropriate to conduct the research. Although originally associated with Habermas' critical view (Johnson & Duberley, 2000), the AR is nowadays strongly recommended for both the critical rationalist perspective (Cunha & Figueiredo, 2002) and information systems design (Baskerville & Wood-Harper, 1998; Lindgren, Henfridsson & Schultze, 2004).
The AR contributes by both solving a practical problem that the participant organization presents and expanding the theoretical knowledge in which the scientific community is interested. The canonical AR (Susman & Evered, 1978) consists of several five-stage iterations; the steps are: (1) diagnosis; (2) action planning; (3) action taking; (4) evaluating and (5) specifying learning. Insights gained in an iteration guide and are applied in the consecutive one until satisfaction is reached by both sides.
In the current research two iterations have been implemented. The first, comprising two organizations, was dedicated to the problem diagnosis and the initial solution design; the second took place in one organization and focused on improving the solution based on the former's lessons.

The Action Research

I. 1st Iteration

The first iteration engaged two separate organizations: one industrial, hereinafter named IND, the other educational (EDU). Intercommunication across the settings was exercised exclusively by the researcher in order to mutually fertilize each organization by the lessons learned in its counterpart.
Problem diagnosis: the problems in both were similar and bore the following characteristics:

- The existence of a single layer of theory, namely theory of action; further, it was a "theory-in-use" (Argyris, 1976/b), thus quite implicit and only partially shared.
- Unawareness of the underlying assumptions and consequently of possible falsity therein (stated differently, basic assumptions have been taken for granted).
- Lack of systematic methodology aimed at validating the strategy but through the feedback from the environment in response to actions taken.
- Poor and late interpretation of the feedback.

Action planning: following the confirmation of the above problem statement we engaged in the solution design. We formally articulated the concepts of *theory* and *hypotheses*, and structured the theory-testing procedure. The essentials were:

- **The theory** (regarded hereinafter as the "upper-level theory" in order to tell it over the theory-of-action), unlike the "do-X-to-get-Y" form, addressed the question: which external forces (emphatically beyond the organization's control) shape or influence our environment and how they interrelate – which we called *the System*. By that the demarcation of the System became the core of the theory, with a good reason: we found this dilemma (where to draw the system's borders) the theory's Achilles heel. The interrelations among the system's components (i.e. direction and ratio of influence) were secondarily important.
- In order to reach, in accordance with Popper, as "universal" laws as possible, one should take a step backward (or upward) and ask: which conditions are necessary to sustain this system? The emanating statement is may be the closest possible approximation toward a scientific theory; so thus far we have a two-tier theoretical system.
- **The hypotheses**: in adherence with Popper's conceptualization (especially concerning astronomy), once a theory is in place and "initial conditions" are determined, a certain outcome is expected. In business terms we get what is known as *scenario*. Since multiple scenarios are derivable from a single theory and for the sake of manageability we would single out those two forces that are independent (within the system), most influential and most uncertain – which we call *primary forces*. Each of the two primary forces is alternately assigned two extreme values, resulting in four mutually exclusive scenarios. After some time and under the real conditions we witness, we can check whether the expected scenario (hypothesis) has materialized and judge the theory accordingly.
- **The procedure**: in order to avoid the lateness of the falsity's discovery one should not wait until a scenario is fully materializes. Instead one had better check periodically some indicators that can differentially foretell one scenario over another. The procedure therefore concerns the conception of proper indicators and their periodical tracking – say, each half a year.

Action taking: the method has been implemented to the letter and in both the settings we have managed, although not easily, to attain quite a "universal law", e.g. "X is never compatible with Y". It was achieved through laborious brainstorming in which we tackled straightaway the upper-level theory – not a good idea, as we would recognize later. In both organizations the scenarios' follow-up (2-4 reviews during approximately two years) refuted the hypothesis and led to a theory revision. As expected, the revision mainly concerned the reframing of the relevant environment, the detection of new driving forces, as well as rephrasing the game rules; for instance, IND has redefined the market (from product to service-oriented) and EDU has re-delimitated the competition arena. Both organizations, to that extent or another, improved their ability to locate and understand changes out in the environment.

Evaluating: here we faced a remarkable variance between the organizations. Whilst EDU has readily absorbed the theory's falsity and was eager to build upon the revised one, IND resisted. They failed to synthesize the process, namely to see the linkage between the rejection of the hypothesis, the falsity of the upper-level theory and especially the consequences on their theory-of-action; in their own words: "although the [logical] conclusion is such-and-such, we do not *feel* that way".

EDU's president, in an attempt to make sense of the variance, attributed the obviousness of the method for them to EDU's scientific background. He was completely satisfied with the method and its implications for his organization.

Nevertheless EDU failed to leverage the early detection ("early" means prior to a negative action-following feedback) toward a strategic change. According to its president he was unable to deliver a sense of urgency due to the "theoreticality" of the problem.

Specifying learning: we hypothesized that for non-scientists (e.g. businesspersons) the leap toward an upper-level theory is counterintuitive and a suspected source of difficulty. Therefore we should bridge this gap via a smoother path from the theory-of-action, with which practitioners indentify, to an upper-level theory. The second iteration applied this insight.

II. 2nd Iteration

One software company (hereinafter: SFT) participated in the second iteration. Its chief executive was briefed about the method, the action research, the previous round and the aim of the current one, to which she agreed.

Problem diagnosis: the same problem as before (iteration 1) was diagnosed and acknowledged. The exclusiveness of learning-by-doing as the theory falsifier was apparent.

Action planning: whilst the targeted upper-level theory and hypotheses remained as is, the major change would be the explication and articulation of the theory-of-action. Once in place we will extract an upper-level theory and continue.

Action taking: we progressed through a gradual process, starting by describing the current strategy. Later the chief executive reviewed several real cases and explained her response to each; on that mixed basis we synthesized the theory-of-action. Next came the question: why is this response appropriate? Why do you assume that this response is correct? Based on her answers we constructed the upper-level theory and went on to extract more universal statements. Finally the hypotheses (in a scenario form) were derived; they have not been rejected yet, as these lines are written.
Evaluating: the chief executive appreciated the clear continuation along the theories hierarchy, and easily grasped how her theory-of-action was a derivative of her upper-level theory. She accepted the rationale of the method and valued its counter-unawareness merit.
Specifying learning: we concluded that by departing from the manager's familiar turf and as long as the theory-of-action is maintained as a reference, the upper-level theory is more intuitively grasped and contextualized.

Discussion and Conclusions

Earlier we have posted three research questions and hereby they are evaluated upon the findings:

Q1. Does the explication of an upper-level theory expedite falsification based on theory testing?

In both IND and EDU the upper-level theory was falsified (required revision) exclusively on the basis of environmental scanning, i.e. prior to action. This quality addresses the extensive interest in the "early warning" concept across the management literature (e.g. Gilad, 2004). Falsification was most often associated with the delimitation of the relevant environment.

Q2. Does the testing of an upper-level theory, upon falsification, yield insights that are more comprehensible than by testing the theory-of-action?

EDU in particular, and IND to a less extent, improved their comprehension and were much more capable of making sense of their environment. Further, all the three participants could specify their questions and focus on concrete indicators. Once indicators have been detected it was quite easy to put them in context.

Q3. How to explicate managerial upper-level theories and how to test them?

The method takes advantage of the managers' (relative) acquaintance with their theory-of-action as a reference from which an upper-level theory is abstracted. Once a theory is constructed we follow popper's concept of "initial conditions" to derive an expectation to be tested, i.e. a hypothesis. The hypothesis, in a business context, converges with the concept of scenario with which the managers are conversant as well. This play between the familiar and the abstract alleviates the acceptance of the method.

In sum, Popper's doctrine enables managers to actively control their strategy-underlying theory, to detect its falsity sooner than by action and to avoid unawareness. In all these tenets it contradicts the Kuhnian image of the manager as portrayed in the management literature. Alas, a critical weakness is that managers, unlike scientists, are results-driven (Schon, 1983) and therefore such a theoretical scrutiny may not attract them. Further, the early awareness may fall victim to the popular proclivity for avoidance (Bazerman & Watkins, 2004; Lyles & Thomas, 1988), as happened in our action research in EDU.

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