The Psychology of the Competition in High-Tech Industries

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Abstract

We integrate the behavioral theory of the firm and competitive anxiety theory to propose a model of competition shadow that explains how managers to attend to competition shadow of emerging competitors in technology firms. By acknowledging that diverse trait anxiety is elicited by different structural positions within the firm, we suggest that these differences in competitive anxiety influence the allocation of the resource to competitive behavior warning of an unknown and emerging threat. We conclude by discussing which personality might better reflect threats of emerging rivals in high-tech firms which suggesting significant contribution for choosing the managers and performance prediction.

I. INTRODUCTION

Competitive shadow (CS) involves perceiving an imbalance between firms’ capability and environmental demand and is, therefore, integral to many managers’ strategizing particularly the demand is moving due to entering new rivals. Recently, big data allows firms to create models of consumer behavior that are correlated positively with historical data and use these models to predict future behaviors. Because, in our big data era, data comes in real-time and because we have developed highly complicated and robust hardware and software for processing this “Big Data,” firms can adjust their business decisions real time[1]. Every moment, a possible competitor can enter the market with innovative business model and eat the market share of any firm in high-tech industries. In some fields, for instance, financial services, big data has initiated entirely new business models. For example, algorithmic trading analyzes massive amounts of momentary market data, identifying interesting opportunities to capture value, a process unheard of a five years ago. In the retail sector, big data hastily develops an analysis of current purchasing behaviors. With such real-time insight into demand shifts, new business models can adjust merchandise, stock levels, and prices to maximize profit. Across high-tech industries, big data can produce large data sets coupled with extensive processing capabilities to almost fast growth and open cost-reducing opportunities. While each industry uses different approaches and focuses on variety aspects of marketing to supply chain and operational management, almost all are immersed in a transformation that leverages analytics and big data[2]. Big data and business analytics are used to improve business models, stimulate innovation, increase the entering new firms to the market that makes market unpredictable due to entering novice rivals with attractive business model and products. As a result, nowadays, business is not like a basketball
player trying to shoot at the right goal. It is like a basketball player shooting at a goal that is moving or as a track athlete who just sees ahead and don’t have enough information about followers. The pioneer tries to finish the race successfully without knowing the speed and distance of followers. Followers are trying to get him, but the pioneer is a moving target.

Environmental ambiguity has long been recognized as an important variable in the explanation of organization equilibrium and performance [3]. Especially, in high-tech industries competitive advantage is all too quickly eroded, so there’s a constant search for new business opportunities, requiring both new technological and market knowledge to be developed. Many companies tackle this by radical or incremental innovation. There are much business success and failures stories of such innovation in the market. A recent story, at the end of 2010, Nokia had introduced its most successful handset ‘ N8 ’ and most successful Symbian operating system upgrade, Symbian three ever seen, with 4 million N8 sales powering a total of 5 million of the new Symbian S^3 device sales in Q4 of 2010 [4]. That is all means that Nokia feels fitting to market needs. It so dominated the global smartphone market; Nokia was increasing the gap between it and the rest of the challengers. This is a fact. Nokia was declared bankrupt in less than a year. Is this happened due to feeling fitting with the environment? What factors get the firms to strive higher for continuous development and innovation in the highly turbulent market?

Using behavioral theory of the firm, this article seeks to bridge this gap by explaining heterogeneity in managers’ encountering competition shadow from mature and emerging rivals. A behavioral theory of the firm gives insights into the process of goal formation and fixation of aspiration levels and resource allocation by proposing two main assumptions: profit satisfying and imperfect knowledge. Cyert and March mention five goals that real world firms possess: production; inventory; market share; sales and profits that these goals need to satisfy rather than maximize. Thus, it suggests that decision makers operating based their perception of market demand, organization capability, their goal and previous performance. The pool of imperfect information is then used by top management to make decisions determining the organization’s actions.

This has two important implications. First, a manager typically makes decisions based imperfect information with their feeling about a current situation based their previous performance. Second, in a certain condition, when one manager decides to invest more in innovation project, another manager may decide to stop new product development that call the personality role and information processing in making decisions. That is, detection of threats by the manager in one technology firm is not synonymous with another top managers attending to those threats. Consequently, this matter can produce different substantial evaluations of the environment by top managers.

This paper also offers four primary contributions. First, the literature on the behavioral theory of the firm has described the process by which an individual collect, analyzes, and communicates information about an environment. In this paper, we explain why some managers allocate more attention to the possible threats. Second, a tacit assumption of many studies in the behavioral theory of the firm is that, once a manager discovers an environment misfit, the top manager will attend to it sufficiently. We help explain why managers’ assessments can be differ based their personality. Third, much research on the processing or acting on the behavioral theory of the firm has focused on a single entity. In this model, we capture the differences across managers, and we investigate how these differences impact the generation incremental and radical innovation. Finally, although research on the behavioral theory of the firm has grown considerably, studies in an individual setting are still quite rare. We concentrate on the competitive anxiety of individuals, the interactions of resource, slack, aspiration, and how their trait impacts the innovation and performance.

II. LITERATURES

Firm aspiration

Researchers have argued that profit maximizing should be replaced with a goal of making satisfactory profits[5, 6]. Satisfactory profits represent a level of aspiration that the firm uses to evaluate alternative policies. The aspiration level may change over time, but in the short run it defines a utility function with, essentially only two values - good enough and not good enough[7].

Mezias, Chen [8] indicated previous aspiration, rather than attainment discrepancies, is the most important variable in predicting an aspiration level. Behavioral researchers have added two reference points based on empirical observations. The first, survival, extends the original view by proposing managers judge firm performance about one of two reference points—an aspiration level or a survival level (bankruptcy;[9, 10]; also specified in[11]). The second, organizational slack, has long been recognized by researchers to be important. Iyer and Miller [12] provide strong arguments and empirical indications that firms shift their attention among aspirations (social comparison), survival, and slack, depending on their performance. As a result of these two additional reference points, survival, and slack, organizational, financial health is indirectly identified as an antecedent to performance aspirations.

Social comparison
Social comparison is a central feature of human social life. Even more so, according to Allan and Gilbert [13], the need to compare the self with others is discovered in many other species as well and has evolved as a very adaptive mechanism for scrutinizing one’s competitors. On humans, theorizing and research on social comparison can be traced to some of the classic contributions to Western philosophy[14]. In the social sciences, the notion that comparisons with others, play an important role in evaluating and constructing social reality goes back to the seminal work of Sherif [15], who showed that two individuals who face the same unstable situation together develop through a process of mutual social influence a single characteristic reference point. Compare processes were also highlighted in the sociological research on reference groups that was prompted by the work of Hyman (1942), who demonstrated that the assessment of one’s status on such dimensions as financial position, intellectual capabilities, and physical attractiveness is dependent on the group with whom one compares oneself.

According to Festinger (1954), individuals are stimulated by a desire for self-evaluation, a motivation to establish that one’s opinions are right and to know precisely what one is capable of doing. Festinger believed that individuals prefer objective information to compare their position ‘on a given attribute, but will, when such information is not available, turn to others for social information. He emphasized the interpersonal aftereffects of social comparison, by suggesting, for instance, individuals will seek out the company of others similar to themselves and will try to persuade others who are dissimilar’.

Experimental studies have shown that the tendency to upward comparison is stronger when the comparison can be made privately than when one anticipates actual contact with the comparison other. In this way, individuals exaggerate the real differences when making an upward comparison because they have more attention to the positive characteristics of the comparison objects.

### Competitive anxiety

Anxiety is an unpleasant state of inner turmoil, often accompanied by nervous behavior. It is the unsightly subjective feelings of fear over something unlikely to happen, such as the feeling of imminent death. Psychological literature has demonstrated that the ability to cope with intense anxiety is integral to success in a competitive situation, particularly at the highest levels[16, 17]. For example, a great deal of research has been directed towards the study of anxiety in sport, much of it utilizes the Competitive State Anxiety Inventory-2[18]. The CSAI-2 assesses the intensity of cognitive anxiety (characterized by negative expectancies and self-doubts), and somatic anxiety (typified by symptoms such as increased heart rate and muscular tension). Several studies on sports psychology have investigated debilitating and facilitative effects of competitive anxiety symptoms on sports performance. Jones (1995) proposed a debilitating and facilitative anxiety model based on Carver and Scheier’s (1988) control-process theory of stress and coping[19]. This model tries to explain how indications related to players’ experienced anxiety about match stressors could be met as facilitative or debilitating anxiety. If individual’s expectancies of ability for achievement and coping are desirable, anxiety will be facilitative, and if these expectancies are undesirable, anxiety will be perceived debilitating[19, 20]. Therefore, interpretation of anxiety symptoms is determined based on individuals’ cognitive and somatic appraisal of ability to control the environment and themselves [19].

### Strategic fit

Strategic fit declares the degree to which an organization is collating its resources and capabilities with environmental opportunities. The matching should accomplish through the strategy. Therefore, it is vital to the company that has the actual capabilities to support the strategy. Strategic fit can be used actively to appraise the current strategic situation of a company as well as opportunities and divestitures of organizational divisions. Strategic fit is related to the Resource-based view of the firm[21, 22] which suggests that the profitability could gain not only through positioning and industry selection but rather through an internal focus that seeks to utilize the unique characteristics of the company’s portfolio of resources and capabilities[23]. An inimitable combination of resources and capabilities can, in the long run, be developed into a competitive advantage that the company can gain profit. However, it is vital to differentiate between resources and capabilities[24]. While capabilities describe the accumulation of learning the company possesses, resources relate to the valuable, rare, inimitable, non-substitutable production owned by the company.

A motivation to drive firm’s capabilities

The strategic reference point theory[25] builds on prospect theory[26] argues that managers of firms purposefully select aspirations to focus the attention of organization members on desired performance targets[27, 28]. Firms are risk averse when their performance is above (better than) the strategic reference point and risk taking when performance is below (worse than) the strategic reference point[25]. However, if this, why firms continue their investment in their new product development with highly risky? We believe that this behavior is related to feeling missing information that leads to perceived ‘CS.’ This is, in part, because managers will frame the issues as threats, when above their reference point, or opportunities, when below their reference point. Managers determine reference points through considerations of internal capability, external conditions, and time. Internal capabilities include both strategic inputs (organizational capabilities, functions, value-added activities) and strategic outputs (results of the firm’s operations). The time dimension includes both the past (organizational learning and identity) and the future (strategic intent)[27].
Strategic reference point theory bases its arguments around three sets of factors, drawing on various theories that provide prescriptions for the selection of specific goals or reference points. Firms that continuously adapt their aspirations to changes in internal and external conditions and exhibit higher consensus on those reference points are predicted to achieve high performance. In addition to establishing reference points, strategic managers also make complementary interventions such as restructuring, reallocating resources, and redesigning reward systems to influence outcomes[25]. These interventions are performed to change the mental maps and schemata of organizational members to realize target performance levels[25]. These interventions moderate the aspiration–consequence relationship. This view of active strategic management is similar to the management control theory, in which managers influence worker motivation by using organizational goals as performance reference points[27, 29-32].

In risk theory, individuals seem to have a dual focus on both the potential to recover losses and security against probable disastrous losses[33]. Individuals in escalation situations stop investing when their losses reach a sum close to the potential win[34], which indicates that they set a limit of maximal acceptable losses similar to the security motive in risk taking. CS has been interpreted as risk-seeking in a situation framed as a loss[35], similar to escalating the commitment after negative feedback. The choice between a certain loss and a chance of recovery is a situation that encourages escalation more strongly than a choice of different risky options, as a choice of risky options might include one that would allow recovery of the loss with lower risk for further losses than reinvesting in the project that caused the losses.

Follow or not follow firm’s aspiration

The psychology literature on individual goal setting is highly developed and supported by more than 400 empirical studies across the globe[36, 37]. It is based on motivations in work settings and considers group and team goals [36, 37]. While caution is suggested in equating individual-level to organization-level behavior, insights may be fungible across this boundary.

The psychological goal-setting theory provides several factors that may have influence at the organizational level. The first factors are goal specificity and difficulty—specific, difficult goals lead to higher performance. Difficult performance goals, increase the riskiness of the strategies selected[36] while achievable goals are more motivational [38]. Another factor that influences goals is self-efficacy—task-specific confidence. Finally, goal conflict studies suggest personal goals mediate assigned organizational goals and external incentives[36]. In psychological goal-setting theory, goals affect performance through four mechanisms: (a) directive function—directing attention and effort, (b) energizing function—high goals lead to greater effort, (c) persistence—hard goals prolong effort, and (d) goals lead to the search for and use of task-relevant knowledge and strategies[36]. There are several moderators of the goal–performance relationship. The first is commitment—the goal–performance relationship is stronger when people are committed to their goals. Goal commitment is related to the importance of outcomes and self-efficacy. It is important to note that organizational aspiration levels correspond to goal acceptance, not goal commitment[39]. The second moderator is feedback—clarity and specificity are salient. The third is task complexity—goal effects are dependent on the ability to discover appropriate task strategies. The fourth moderator is goal framing—“approach success” versus “avoid failure.” Fifth, higher level goals and organizational visions have been shown to moderate outcomes[40]. The integrating psychological goal-setting theory with organizational aspirations may provide an increased ability to explain heterogeneity in both aspiration selection and consequences. For example, goal difficulty and goal commitment (strength of aspirations) appear particularly salient at the organizational level.

The CS concept has hidden ‘avoid failure’ notion inside. It means that although the decision makers are following aspiration, they should avoid failure decision making under the lack of perfect information.

Problem motivated search

Search processes are initiated when aspirations are unmet. Within this analytical framework, the search is motivated by the problem of unmet aspirations, is simpleminded, and is biased. The intensity of the search is dependent on “the extent to which goals are achieved and the amount of organizational slack”[7]. As long as performance exceeds the goal, search for new alternatives is modest, slack accumulates, and aspirations increase. When performance falls below the goal, the search is stimulated, slack is decreased, and aspirations decrease.

It was found that the frequency of gathering and organizing information is correlated positively with perceived strategic uncertainty, and the information literacy skills for treating all steps of environmental scanning are more important, regarding the overall quality of the end product[41]. ‘CS’ perceive ‘information conflict’ when decision makers cannot interpret or understand the signals emerging from the organization or external environments. If the threat occurs, it will generate scanning needs that require organizations to collect actively more information about to help to understand the emerging trends. Therefore, we may conclude that theoretically higher level of perceived CS would lead to more frequent search because this is a threat for aspiration. Organizations engage in a search or the generation of alternatives via the change of a few (incremental search) or plenty (radical search) decision parameters, and then choose the alternative that performs best.
CS and fitting to the environment

A powerful strategy should fit the environment to gain competitive advantages and to cope with the environmental uncertainty. The external environment, including government policy, market opportunities, competition position, and environmental uncertainty, has a vital influence on organizational performance. Hence, organizations have to adjust their strategies to cope with the environmental variation. However, if the top manager as a decision maker has a low level of anxiety feels a significant fit with the environmental change[42, 43], should just focus on problematic search while decreasing the slack search. Although the slack search resulting from extra resources available for experimentation when the firm feels fitting the environmental turbulence decide to decrease it and just focus on problematic search that is an institutionalized search facilitated by specialized organizational units such as R&D, market research, or strategic planning; being deliberately managed. Those possess a better strategic fit are more likely to gain higher organizational performance. When the maximum problematic search simultaneously operates with the strategic fit, the firm can increase the productivity and the performance. The psychology literature has shown that individuals evaluate objects and events efficiently whenever the result from those objects and events are pertaining their personal concerns. Given feeling strategic fit surrounding emerging threats can increase the productivity and close the eyes of the managers to the organizational environments in which they are likely to arise, especially influential in the early detection of threats. As it shown in figure 1, thus:

Proposition 1: The stronger feeling of strategic fit, the more likely of incremental innovation and less radical innovation.

Figure 1 Competition shadow driving the productivity in firms feeling fit to the environment

Misfit to the environment in firms with low trait anxiety managers

As Venkatraman and Camillus (1984: 513) have noted: ‘The field of business policy—the initial strategy paradigm (Schendel and Hofer, 1979: 8)—is rooted in the concept of “matching” or “aligning” organizational resources with environmental opportunities and threats.’ Miles and Snow (1994: 12) suggest that ‘the process of achieving fit begins, conceptually at least, by aligning the company to its marketplace this process of alignment defines the company’s strategy.’ When a firm perceives misfit with the environmental turbulence and the changing demand of the market, personality enters to shot his role[42]. The transactional model of stress and adaptation developed by Folkman and colleagues used to investigate emotional reactions to CS and how entrepreneurs/owner managers cope with this experience[44]. This model takes as the starting point that how an individual appraises a stressful experience influence how they respond with the experience. It takes into consideration the reciprocal interaction between personal factors and environmental demands[45] and is, therefore, an interactive process that unfolds over time[46].

In situations that are appraised as stressful, individuals focus on managing the stress using coping responses. Situations that are appraised as either having no relevance for well-being or as being benign/positive do not require a coping response as they do not threaten the well-being[47]. Lazarus and colleagues[48] have suggested two overarching functions of coping. The first function focuses on the management of the negative and stressful emotions that arise when well- being is threatened. This is known as emotion-focused coping. The second function focuses on managing or altering the cause of the stress in the person-environment relationship. This is known as problem-focused coping. Within these categories of coping, some coping strategies have been identified; these include venting negative emotions, engaging in activities to escape, or avoiding the situation and actively planning what to do next (see Folkman & Lazarus, 1988 for additional coping strategies). A substantial body of empirical research has used this distinction to investigate how individuals respond to stressful life events (e.g. Bjorck, Cuthbertson [49]; Dewe and Ng [50]). An outcome of this research is that, in most situations, individuals use a variety of coping strategies[46] and that these strategies often do not conform to the parent categories of emotion and problem-based coping[51]. This distinction has therefore come under increased scrutiny and resulted in alternative parent categories of coping being suggested[51]. Although there is a debate about the structure of coping strategies, there is a consensus in regards to the
range of strategies used to cope with stressful experiences and that coping can either reduce or bolster the effects of a stressful experience[51].

Given the similarity of context, these findings also suggest that this theoretical framework is particularly relevant for understanding how entrepreneurs/owner managers appraise and cope with firm failure. The managers with a low level of anxiety who received positive performance feedback stand forward to make slack and problematic search together which lead to increasing incremental and radical innovation. Thus,

**Proposition 2:** The more intense misfit feeling in low trait anxiety managers, the more likely that he or she will use problematic and slack search to create incremental and radical innovation.

![Figure 2 Competition shadow driving innovation performance in firms with low trait anxiety](image)

**Misfit to the environment in firms with high trait anxiety managers**

Based what mentioned in previous part, the managers with high level of anxiety that feel high level of environmental pressure cannot focus on organization solutions and decide to save resource to preventing possible Bankruptcy, therefore it can conclude that:

**Proposition 2:** The more intense misfit feeling in high trait anxiety managers, the more likely that he or she will use decrease search to save secure exit.

![Figure 3 Competition shadow drive deciding to exit in disengagement coping firms](image)

**Organizational learning**

Organizational learning theory assumes current aspirations are a function of the previous period’s performance and are changed based on experience[52, 53], or learning. Organizational behavior is goal directed, history dependent, and rule based[54], with adaptation occurring through simple rule-based routines.

**Comprehensive conceptual framework**
Based on the reviewed literature and integrating the proposition 1-3 we can conclude the comprehensive conceptual framework shown in figure 4. In this model new path for performance feedback and organizational learning added to the integrated previous models indicated in figures 1-3.

Figure 4 The comprehensive model of dealing managers with the competition shadow
As figure 4 shows, the two major source of decisions within the firm are CS and the personality of the decision maker. On the top of diagram, the environmental turbulence leads to perceiving a special level of CS. Then the characteristics of the manager has a shot to channel the decision and navigate firm based the personality. In such a situation the decision maker in the firm ask ‘to what extent the market demand more than my firm capability?’ Researchers show that the high anxious managers filling misfit to the environment while the low anxious managers [42, 55] in low CS feel a good fit with the environment. Based the previous story these feeling lead to different kind of decisions and finally the innovation level and performance. The performance feedback is a stimulus to the decision by creating a comparison between previous performance and firm aspiration. The firm performance also could trigger the new firm entries, new opportunity discovery by other firms which all works as a driver for making the competition denser by increasing the product portfolio similarities and industry level product homogeneity[56-58].

III. CONCLUSION

The mitigation of emerging threats in big data era requires that managers deal with CS. Thus, it is focal to sustaining and enhancing organizational innovation and performance. Our model of CS integrates different personality levels of managers and environmental fit involved in the dealing process and suggests how the psychological trait and interactions between dispositional factors and personality explain the extent to which a top manager engage to an emerging threat in a high-tech firm. We identify the a comprehensive model of interaction variables as well as the type of conclude innovation and the managers personality as a key variable and suggest that the low trait anxiety in highly CS can strengthen the radical innovation projects in the firm by stimulating top managers’ attention to the high turbulence in the environment. The strength of these propositions depends on the previous performance which can shape the self-confidence and the strategic fit feeling used by the manager.

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VI. BIOGRAPHY

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