



## Team intuition as a continuum construct and new product creativity: The role of environmental turbulence, team experience, and stress

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### ABSTRACT

Although past research has reported the benefits of intuition in new product decision-making (i.e., higher quality product; enhanced customer satisfaction), intuition has largely been studied as an individual phenomenon and little work has examined the role of intuition on new product development (NPD) project teams. Furthermore, in a turbulent environment, NPD project teams may rely more on intuitive judgments, and other factors such as experience and stress may also influence the relationship between team intuition and team decision making. Drawing from the organizational design literature on creativity in decision making, this study builds a conceptual model of NPD team intuition and its effect on the team's ability to generate creative new products. We then derive hypotheses regarding team intuition, stress, environmental turbulence, and new product creativity, and test the hypotheses using data from a sample of 155 firms operating in Ankara and Istanbul, Turkey. We specifically test whether an inverted-U relationship exists between team intuition and new product creativity (that is, a balance of both intuitive and rational judgments is preferred), and whether this relationship is moderated by team experience and stress. Moreover, direct impact of turbulent conditions (i.e. market and technical turbulence) on intuition was also examined. The results of our empirical study with a sample of 310 new product/project developers and 155 project managers showed a positive and linear relation between turbulent conditions (both market and technical) and team intuition and an inverted U-shaped team intuition–new product creativity relation for teams with high experience and low stress. Finally, theoretical implications for future research and managerial implications for practitioners are discussed in the conclusion section.

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### 1. Introduction

Intuition has become a popular research topic in the strategic management (Khatri and Ng, 2000; Elbanna and Child, 2007; Dane and Pratt, 2007), human resource management (Andersen, 2000; Hodgkinson and Sadler-Smith, 2003), marketing management (Wierenga, 2006), and project management literature (Leybourne and Sadler-Smith, 2006). Specifically, this literature suggests that many managers or employees embrace intuition as an effective approach in response to situations in a turbulent environment where decisions need to be made quickly or unexpectedly (Sonenshein, 2007), there may not be predetermined guidelines or rules to be followed (Burke and Miller, 1999), and explicit cues are not readily available to make cognitive judgments (Hitt et al., 1998). Researchers have reported various benefits of intu-

ition in decision-making. These are: to accelerate decision-making, to improve decision-making outcomes such as a higher quality product and enhanced customer satisfaction, and to solve creative and/or less structured problems such as new product planning (e.g., Glaser, 1995).

Even though many of these studies on intuition reported that intuitive judgment is a common practice among managers in a new product development (NPD) planning (Glaser, 1995; Shapiro and Spence, 1997; Burke and Miller, 1999); no empirical investigation yet exists on intuition in NPD project teams, despite the fact that they are commonly used in NPD projects. It is estimated that about 75% of NPD projects are team projects (Griffin, 1997). In a NPD project team, intuition is not only an individual but also a collective phenomenon (i.e., decisions in the NPD process are often made by team members collectively).

While one of the basic assumptions about group decision-making is that they make cognitive judgments (Akgun et al., 2008), NPD teams may rely on their intuitive judgments because NPD projects involve high levels of task-related job complexity, as well as process and environmental uncertainty. Engaged in vari-

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ous activities in such a complex and turbulent environment, NPD project teams may need to make intuitive judgments during the NPD process, such as choosing a new product idea among many others. Besides *turbulent conditions*, other factors may lead employees at work to use and rely on their intuitive judgments in making decisions related to innovation; these include *experience* or *knowledge*, and *stress*. Specifically, the literature suggests that intuition may unconsciously integrate experience and knowledge of employees into responsive and productive decision-making and, ultimately, into innovative solutions, particularly under rapidly changing, turbulent environmental decisions (Glaser, 1995).

The design literature provides guidance on creativity in decision making (e.g., Schön, 1983, 1987), focusing particularly on the need for balance between divergent and convergent processes in order to arrive at the best possible solution or decision. This literature has not been widely applied to the NPD project team context, yet would seem to be relevant in understanding how NPD project teams can make creative decisions in challenging conditions. Walck (1996), for instance, reviewing the body of research on managerial decision-making, argued that intuition appears to be positively associated with creativity, and intuitive decision-making is especially effective in turbulent conditions. Furthermore, Hallowell (2005) argues that in the current business climate, organizations are beginning to experience lower effectiveness of both cognitive and intuitive judgments made by employees and lack of creativity due to the chronic stresses of intense workload pressures in turbulent conditions.

This literature suggests that even experienced team members use intuition in turbulent conditions, and that stress may adversely affect the impact of intuitive, creative decisions on organizational outcomes. However, the interrelationships between turbulent conditions, experience, stress and creativity in decision making by NPD project teams have not been investigated. For example, Khatri and Ng (2000) surveyed senior managers of companies representing computer, banking, and utility industries in the U.S. and found that intuitive judgments were positively associated with organizational performance in an unstable environment, but negatively in a stable environment; however, they did not investigate the role of experience and stress in the relationship between intuitive judgment and creativity. In sum, the extant literature does not yet adequately investigate the intuitive judgments made by NPD project teams, how these may be affected by the often turbulent and stressful environments in which they work, and how the team's creativity may be affected. It is also possible that a more experienced NPD team may be able to handle these challenges better, but this is also unresolved in the extant literature. Given that so much NPD is team-based, it is an important research issue to improve our understanding of the decision-making process of NPD project teams, and in particular how the team's intuitive judgments and its creativity influence its ability to bring products to market effectively.

Our research objective is twofold. First, we examine the relationships between turbulent conditions and intuitive judgments, and intuitive judgments and creativity in product innovation, so as to better understand the effectiveness of decision-making process of NPD project teams. Second, we investigate the moderating effects of NPD project team experience and stress on the relationship between intuitive judgments and creativity is moderated by NPD team experience and stress.

Based on the conceptual framework we develop in the next section, we build a conceptual model of NPD team intuition and its impact on the team's creativity in new product decision making, and derive a set of hypotheses regarding team intuition, experience, stress, environmental turbulence, and new product creativity. We test our hypotheses using a sample of 155 firms operating in Ankara and Istanbul, Turkey. We present our analytical results, and discuss theoretical implications and further research.

## 2. Theory and hypotheses

### 2.1. Conceptual framework

Intuition has been conceptualized in several ways in the extant literature (e.g. Elbanna and Child, 2007; Khatri and Ng, 2000). Despite this diversity of thought, we use a widely accepted theoretical perspective of intuition as our framework for this study. Specifically, this perspective defines and measures intuition as a continuum with cognitive (rational) and intuitive decision making as two ends of the continuum (e.g. Sonenshein, 2007; Hough and Ogilvie, 2005). Mitchell et al. (2005), for instance, used the proximity-to-consciousness mechanism to classify and relate the antecedents and definitions of intuition. They identified four levels of cognition–intuition processes (from closest to consciousness to farthest from consciousness) on the basis of the proximity to consciousness, which is defined as the extent to which information is being deliberately retrieved. According to this classification, as the level increases on the continuum from intuitive decision making process towards cognitive decision making process, the amount of information retrieval also increases. Similarly, Taggart and Valenzi (1990) identified six information processing modes that are arranged on a continuum from most rational to most intuitive; the most rational one requires the most information processing and the most intuitive one requires the least information processing. These studies are consistent with the perspective that cognition and intuition are two ends of a continuum and thus mutually exclusive, rather than orthogonal constructs.

A formal definition of intuition, which we will use in this research, is “a nonconscious, holistic processing mode in which judgments are made with no awareness of rules of knowledge used for inference and can feel right despite one's inability to articulate the reason” (Shapiro and Spence, 1997, p. 64). This definition implies that intuitive decisions are executed rapidly upon the basis of an unconscious reasoning process which may have an affective component such as gut feeling, hunches, and “sixth sense” (Leybourne and Sadler-Smith, 2006).

The extant literature has investigated the role of intuition in the strategic decision-making process (Eisenhardt, 1989, 1990; Eisenhardt and Bourgeois, 1988; Elbanna and Child, 2007). Specifically, the relationship that has been widely studied in this literature has been between the use of intuition and decision effectiveness (i.e., the speed of decisions made by executive teams). Some of past research showed that rational and political processes have a greater influence on strategic decision effectiveness than intuition (e.g., Elbanna and Child, 2007) while some others found that intuition plays a significant role in increasing the speed of strategic decisions in a high-velocity environment (Eisenhardt, 1989). Moreover, the generalizability of the findings of these studies is limited because of using a single source (students and general managers).

### 2.2. Intuition at team level

The large body of intuition research mostly defines and measures intuition at the individual level; much less attention has been paid to the role of intuition at the team level. There are only a few studies in which the role of cooperative activities or teamwork in making intuitive judgments has been emphasized. Taggart and Valenzi (1990), in their six-mode human information processing metaphor, paired several dimensions of the rational-intuitive term and found that individuals, who rely on their intuition and feelings in making decisions, are called “person centered” and always collaborate with others in order to make effective intuitive decisions (p. 160). Similarly, Allison and Hayes (1996) argue analysts prefer to focus on detail and hard data available in books or reports,

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