



Balancing exploration and exploitation capabilities in high technology firms: A multi-source multi-context examination[☆]

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ABSTRACT

Based on the dynamic capability view, this study examined the balance between exploration and exploitation capability. With this, we proposed a framework that synthesizes the impact of new product creativity and marketing program creativity on new product quality (*internal* product quality and *external* product quality), and further understanding the path to performance of new products in a select number of industrial and consumer products. The main findings revealed that the effect of new product creativity in consumer product firms through internal and external product quality was less dominant than those in industrial product firms. In contrast, the effect of marketing program creativity in industrial product firms through only *external* product quality was less dominant than those in consumer product firms. Additionally, this paper also discusses the research limitations, future research directions, and theoretical and practical implications.

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1. Introduction

Product quality has been viewed as an important capability and exploration activity within an organization (Garvin, 1988). Generally, quality activity involves the following: the removal of unwanted variations, the enforcement of strict standards and controls, the application of the best practice, and the elimination of waste and errors (Garvin, 1984b). In addition, creativity is also seen as an important exploitation activity of firms because it involves exploring many radical and unorthodox ideas by deliberately deviating from existing standards and controls. This even involves experimenting with prototypes and devoting resources to projects which are likely to fail. Hence, product quality and creativity are considered as two opposing philosophies requiring very different mindsets and attitudes.

However, from the dynamic capability view, the dynamic processes of exploitation and exploration are the key sources of an organization's sustainable competitive advantage (SCA) (Eisenhardt & Martin, 2000; March, 1991; Teece, Pisano, & Shuen, 1997). This distinction is drawn from March's (1991) view of exploitation as "the refinement and extension of existing competencies, technologies, and paradigms" and exploration as "experimentation with new alternatives that have returns that are uncertain, distant, and often negative." Discussions on the relationship between exploration and exploitation competence (or

capabilities) on a firm's performance have attracted much research interest (e.g., Menguc & Auh, 2008). However, relatively little is still known about the reasons why some firms were able to successfully use or balance their exploration and exploitation capabilities (i.e., product quality and creativity), while others were not able to do so. In addition, previous studies indicate that maintaining an appropriate balance between exploration and exploitation activity is a primary factor for the entirety of a firm's system survival and prosperity (March, 1991; Rothaermel & Deeds, 2004).

Sethi, Smith, and Park (2001) suggest that the most important manifestation of creativity may be the success of product quality en route to the success of a new product. Miller (1993) argues that quality improvement is the application of creativity in solving problems in work processes to produce breakthroughs as well as incremental change. The creativity (or innovation) process would include a broader range of criteria in which creativity is linked with product quality (Atuahene-Gima, 2005; Tatikonda & Montoya-Weiss, 2001). However, previous studies did not employ the antecedent factors perspective in examining the relationship between creativity and product quality. Furthermore, the exact conceptualizations and meaning of creativity to product quality are still unclear (Siguaw, Simpson, & Enz, 2006), and it need to be addressed along this line. With this, the first objective of the current study is to contribute to the literature by establishing the relationship among creativity, new product quality, and performance.

To date, however, there has been relatively little research conducted on the marketing of creativity impact on product quality as well as new product performance under multiple industries comparison (i.e., industrial and consumer product firms). Cho and Pucik (2005) argue that understand the potential stable characteristics of the company, analysis must first determine which of the target industry sectors affect the

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industry life cycle. Hence, this study's second objective is to examine the differential impacts of *industrial characteristics* (i.e., industrial and consumer product firms) on creativity and product quality relationships to performance.

Final objective of this study as Ozer (2006) points out that in the opportunity identification and idea generation stages of the NPD process, Asia can be a valuable source of ideas on new products for the future, which is not only for the Asian market but also for the rest of the world. Hence, this study promotes each construct relationship more stable that select the Taiwan's high technology industry research sample. Furthermore, Siu, Lin, Fang, and Liu (2006), Tu and Yang (2008), and Yang and Kang (2008) state those high-technology firms in Taiwan are highly adept and aggressively competitive in their NPD capabilities. Under such highly competitive environment, the findings of this study will help to clarify the relationship between each construct.

Overall, this study is to address these oversights and present a framework that synthesizes the available knowledge in the creativity and new product quality by further understanding the path to performance of new products. Specifically, this study investigates two facets of creativity, namely, new product creativity and marketing program creativity. Then the paper proceeds with an assessment of the impact of each facets of creativity on the new product quality component, and further path to the new product performance in a select number of industrial and consumer products.

2. Theoretical background and hypotheses

There is no shortage of examples in the academic literature that illustrate innovation (or creativity) and product quality relationship (Cho & Pucik, 2005). However, most prior studies dealt with the impact of product quality on innovation (or creativity) and performance. These were conducted using the quality management perspective to discuss how product quality affects innovation and performance (e.g., Lin & Lu, 2006; Perdomo-Ortiz, Iez-Benito & Galende, 2006). Other studies were done using the strategic management perspective to examine the relationship among creativity, product quality, and performance using the resource-based view (Cho & Pucik, 2005). Most researchers posit the effect of product quality on creativity. However, these results were not consistent and consequently may mislead managers and researchers. The main reason for this is that they may fail to consider creativity as an important exploration activity for product quality. Hence, the value of this current analysis lies in clarifying the role that creativity exerts as an important antecedent factor influencing new product quality. This study attempts to employ March's (1991) exploration and exploitation viewpoint to examine the effect of product on creativity, and likewise attempts to render a richer industrial contextual setting.

2.1. Internal/ external product quality: Definition and classification

According to Garvin's (1984a) definition,¹ high-quality goods can be ranked by customers or buyers according to the number of desired attributes that they possess. Therefore, product quality involves not only improvements in product-related functions but likewise the enhancement of the aesthetical presentation of product-related aspects. Basing on previous studies' definitions and discussions, the current study thus classifies two types of product quality, namely, *internal product quality* and *external product quality*. There were some similar descriptions and definitions have existed in the prior literature (e.g., Garvin, 1984a,b; Kano, Seraku, Takahashi, & Tsuji, 1984). For instance, Kano et al. (1984) stated that product quality may be understood from two perspectives: the "must-be quality" of a

product should involve superior functions, whereas its "external quality" involves its ability to satisfy customers' needs which is influenced by individual customers' preferences and their impressions on the good image or the popularity of a company. Another similar dichotomous concept appeared in an organizational behavior field research, like the work of Amabile (1996) which dealt with "technical quality" and "aesthetic appeal quality." However, in previous studies, there is an absence of a clear definition and the failure to explore the depth of its significance.

Therefore, current study used product quality categories by—the internal product quality and external product quality. "Internal product quality" is defined as the essential function of a product which can provide customers with the best value. On the other hand, "external product quality" refers to the impression that consumers have regarding a product, which is not related in any way to that product's practical function. Likewise, it raises the image of the product itself and attracts consumers on its external product quality. The internal versus external distinction captures the fundamental dichotomy in the competitive product quality construct and encompasses the concept of the two levels. Therefore, this study particular pertinence to the research framework that investigating how creativity affects new product quality under such a dichotomy.

2.2. The relationship between creativity and new product quality

Before going any further, it is important to explain why this current study uses the construct of creativity rather than that of innovation to understand the creativity and new product quality relationship. There are three reasons for this. First, creativity is a more concrete construct than innovation and has generally been viewed as a construct that precedes innovation (Im & Workman, 2004). Amabile and colleagues (1996) state that "all innovation begins with creative ideas ... creativity by individuals and teams is a starting point for innovation; the first is a necessary but not a sufficient condition for the second." Second, innovation may involve creativity as in the discovery and development of a new process, but not all innovations will be creative (West & Farr, 1990). Therefore, research relating to a new product which employs creativity constructs instead of innovation constructs should be able to concretely determine the relationship between creativity and new product performance. Third, this study also adopts the opinions of Im and Workman (2004) that creativity should be used in a more specified context (i.e., in industrial or consumer product firms), thereby avoiding overly general responses that may result when innovation is measured at the more abstract SBU level. Moreover, from different viewpoints on the marketing of creativity, the relationship between new product quality and new product performance is examined.

Previous studies conducted on the creativity in the marketing field have gained increasing attention (e.g., Sethi et al., 2001). On the other hand, in this field, attention has been heaped on exploring various concepts such as new product development (NPD) team affective tone (e.g., Tu, 2009), performance management (e.g., Merlo, Bell, Menguc, & Whitwell, 2006), marketing strategies (e.g., Sethi et al., 2001), and integration of new product creativity and marketing program creativity (e.g., Im & Workman, 2004). However, the impact of creativity on product quality has been neglected in some standpoints in these studies. Sethi (2000) notes that in the high-technology industry where technology is rapidly evolving, firms may need to focus on product innovativeness rather than on the continuous improvement of quality. Furthermore, Amabile's (1996) study suggests that creativity is indeed correlated with technical quality (i.e., internal quality), and that it may be most highly correlated in expert-level works.

To further clarify the relationship between creativity and new product quality, this study on creativity adopts the definition set forth by Im and Workman (2004). Their research object focused on the high-technology manufacturing industrial firms perspective to explore two

¹ Following Garvin (1984a) product-based definition that refer to product quality as the "differences in quality reflect differences in the quantity of some ingredient or attribute possessed by a product."

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