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# Risk-taking behavior of technology firms: The role of performance feedback in the video game industry



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## ABSTRACT

This study focuses on what drives technology-driven companies to engage in risk-taking behavior by serving new markets. Building on the behavioral theory of the firm and prospect theory, this study suggests that technology-driven organizations tend to respond to past performance rather than future possibilities. Using a sample of 5312 video games from 362 game developers, the results reveal that *market* performance trend and *market* performance variability have opposing effects on risk-taking behavior: while a positive market performance trend negatively influences a company's tendency to venture into new markets, a high-degree of market performance variability tends to positively influence new market entry. The study also finds opposite results for *expert* performance trend and *expert* performance variability: companies with consistently positive expert evaluations are more likely to enter into new markets, while variability in expert evaluations has a negative effect on new market entry. Furthermore, the effects of expert performance trend and variability are conditional on market performance trends. Finally, the results suggest that companies that venture into new markets tend to choose relatively similar markets if these companies are suffering from a negative market performance trend or a negative expert review trend.

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## 1. Introduction

In the early 2000s, Nintendo, an incumbent video game console manufacturer, was suffering from a declining market share and shrinking margins, being out-competed by Microsoft and Sony. Finally, management at Nintendo decided to “break free” from the low-margins characterizing the early 2000s game console industry by reconfiguring their market. Instead of focusing on young-male consumers (the main consumers of video games at that time), Nintendo developed a relatively cheap console, known as the Wii, with a game controller able to track body movements rather than just respond to button presses. In addition, Nintendo developed video games that also appealed to non-traditional video games consumers, such as housewives and senior citizens. The new console was a great market success (Blakely, 2007; Schoenberger, 2008; Verganti, 2009; Subramanian et al., 2011).

The case of Nintendo suggests that companies may be more open towards risk-taking behavior when underperforming. This is in agreement with claims of behavioral theorists and predictions of prospect theory that managers tend to be risk-averse and respond to past performance rather than act on their expectations of future possibilities (Cyert and March, 1963; Holmes et al., 2011; Kahneman and Tversky, 1979; Lant and Shapira, 2008; Singh, 1986). In the early 1980s, Bowman (1982) introduced the concept of “risk seeking by troubled firms.” Similarly, in his influential paper on exploration and exploitation, March (1991:72) suggested that organizations have a greater stimulus to explore new opportunities “if the most preferred known alternative is below target.” Empirical studies provide support that there is indeed a strong relationship between negative past performance and future risk-taking behavior (e.g., Bromiley, 1991; Denrell, 2008; Holmes et al., 2011; Miller and Chen, 2004; Singh, 1986). This paper will explore this further, examining the influence of trends of past performance in technology-intensive companies that engage in risk-taking behavior by entering new markets.

In contrast to prior studies on performance feedback as an antecedent of risk-taking behavior (e.g., Singh, 1986; Bromiley,

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1991; Miller and Chen, 2004; Denrell, 2008), this study makes an explicit distinction between *market* and *expert* evaluations. In this paper, *market evaluation* is measured by sales figures and product evaluations (reviews) by consumers. *Expert evaluation* is measured by using product evaluations (reviews) by expert critics rather than “ordinary” consumers. Prior research suggests that consumer and expert evaluations can differ substantially, both in terms of contents and impact (e.g., Gemser et al., 2008; Moon et al., 2010). Furthermore, this study makes an explicit distinction between performance trend (the general direction in which firm performance is changing over time) and performance variability (the measure of dispersion or instability of performance over time). Financial analysts employ both of these constructs to predict future performance (de Bondt, 1993). These two constructs have different functions; variability serves to inform investors about the instability of performance, while trend provides information about the tendency of performance movement into a specific direction over time (Bondt, 1993).

This study hypothesizes that, in terms of performance *trend*, positive *market* performance provides a signal to firms that their products are appreciated by their current customers, which, in turn, will make it less likely that they will enter new markets. A positive *expert* evaluation trend, on the other hand, suggests organizations have released products appreciated by experts in the field. This could therefore provide these organizations with enough confidence about their creative and technical ability to innovate and develop new products for a new market segment.

In terms of performance *variability*, this study hypothesizes that instable *market* performance will create a more uncertain environment for organizations. Organizations might seek to offset this by means of new market entry, even though such entrepreneurial behavior in itself is also fraught with uncertainty and risk. Variability of *expert* evaluations will reduce the confidence the firm has in its capabilities to develop new products and thus reduce the likelihood of entering new market segments. Finally, the interactions between market performance trend and expert evaluations will be investigated. Considering that market performance trend is more closely linked to the bottom line of the organization, this study hypothesizes that the effects of expert evaluations are conditional on market performance trends.

Technology-driven companies operating in the video game industry provide the specific empirical setting for this research on performance feedback and entry into new markets. The video game industry is characterized as very dynamic with constantly changing technologies (c.f. Subramanian et al., 2011; Oakey and Cooper, 1991; Cenamor et al., 2013). However, unlike previous studies which mainly focused on console manufacturers (e.g., Subramanian et al., 2011; Cenamor et al., 2013), this study is focused on video game developers and their tendency to expand into new market segments. This decision was made on the basis of motivations related to empirical data collection. There are many more video game developers than there are console manufacturers, allowing for more variation in the data set. Furthermore, objective performance data on video game developers is in the public domain.

The next two parts of the paper present the theoretical framework and the method. A description of the results will then be given. The paper concludes with providing implications for both theory and practice and discussing the limitations of the research.

## 2. Conceptual framework and hypotheses

### 2.1. Trends in past performance and the likelihood of entering a new market

Technological exploration is a necessity in a technology-driven

industry. In the video games industry—the context of this research—firms have to innovate in order to keep up with the increased processing power and capabilities of console hardware to create realistic in-game models. During the past decades, the processing power of video games consoles has allowed for more features to be embedded in a video game. To stay competitive, video game developers had to scale up their production processes to match the rising bar of consumer expectations, thus substantially increasing the research and development costs for new video games (Nutt, 2013). This paper investigates the conditions that can influence organizations' decisions to enter a market segment that is new to them while their environment is already fraught with risk due to rapid technological changes. This study focuses on how trends and variability of organizations' past performances affect the likelihood of such decisions.

Entering a new market may open up new opportunities that can strengthen an organization's position (Katila et al., 2012). However, like most entrepreneurial actions, entering a new market segment is a risky decision because the potential outcome of this explorative behavior is uncertain and may represent resource losses (Lehman and Hahn, 2013; Sitkin and Pablo, 1992; Clausen et al., 2013).

Both prospect theory (Kahneman and Tversky, 1979) and the behavioral theory of the firm (Cyert and March, 1963) help in understanding that risk-taking behavior should not be understood as an attempt to maximize an “objective” expected value, but to relate it to subjective estimates of and preferences for risk, which themselves can result from the decision maker's past performance and knowledge of the performance of comparable other actors (Cyert and March, 1963).

Past performance of oneself and of others can shift the target performance level; performing below this can directly affect the willingness to take risk (Bromiley and Harris, 2014; Joseph and Gaba, 2015; Shinkle, 2012). Indeed, a broad stream of studies shows that firms that perform below a target performance level are more likely to engage in risk-taking behavior, whereas firms that perform above tend to avoid risk (e.g., Audia and Greve, 2006; Bazerman, 1984; Bowman, 1980, 1982; Bromiley, 1991; Denrell, 2008; Fiegenbaum and Thomas, 1988; Klinger and Tsur, 2011; Lehman and Hahn, 2013; Lehner, 2000; March, 1991; Singh, 1986). Mone et al. (1998), Greve (2003), and Baum et al. (2005) show that declining performance, not just underperformance, positively affects risk-taking behavior. While the average decision maker may have a less accurate idea about how the company performs relative to similar others (Joseph and Gaba, 2015), he/she will in general have a clear impression of whether his/her performance has been improving or going down over time. Especially in very dynamic industries, in which present performance can greatly fluctuate, it seems reasonable to suggest that observing a negative trend in one's own performance will induce companies to engage in risk-taking behavior.

Overall, the above studies suggest that a positive market performance trend provides managers with a rationale to exploit the firm's current market segment(s) and to avoid the risk of entering into markets new to the organization. A negative market performance trend, on the other hand, compels companies into action and, by seeking new customers in as yet unserved market segments, the negative market performance trend may be reversed. Thus, the following is hypothesized:

**Hypothesis 1a.** A negative (positive) market performance trend is positively (negatively) associated with the likelihood of organizational entry to a new market segment.

As acknowledged in prior literature (e.g., Basuroy et al., 2003; Priem, 2007; Wijnberg and Gemser, 2000), ultimate market success may be contingent on obtaining expert recognition. Experts are neither the end users nor the producers, but are actors who set value standards—based on their knowledge of the field—to assist end users in their ultimate choices (Kwon and Easton, 2010;

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