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경영학 석사학위논문

**Categorical Performance Feedback and New
Product Development in U.S. Film Industry:
The balance of exploitation and exploration revisited**

범주적 성과 피드백 및
기업의 신제품 투자의사결정

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서 하 람

Abstract

Categorical Performance Feedback and New Product Development in U.S. Film Industry:

The balance of exploitation and exploration revisited

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In the behavioral theory of the firm literature, the mechanism of problemistic search predicts that organizational failures foster change. However, real-world observations that failures fail to serve as a positive trigger in many firms run counter to this general view. This study investigates how firms' learning from their failures can be misdirected from institutional concerns. To examine this, I classified performance feedback from multiple products of firms into two categories: categorical feedback from exploitation and exploration. When failures are attributed to executives' prior engagement in exploration—deviation from the

institutionalized norm of doing business, executives risk more severe punishment from shareholders and board members, and thus show more sensitive reaction by changing the investment portfolio. I examine this phenomenon based on new product development investments of film producer organizations in the United States from 2000 to 2012. My result of a Tobit panel analysis showed that explorative categorical feedback more significantly moderated the effects of firm-level feedback on firms' investments, supporting my hypothesis. Failures in exploration make managers less inclined to invest in subsequent exploration, implying that institutional illegitimacy imposed discriminately on exploratory failures indeed misdirects firms' learning from failures.

Keywords: the behavioral theory of the firm, category-dependent legitimacy, negative performance feedback, risk-taking

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I . INTRODUCTION

Organizational theorists have long recognized the importance of decision making inside the firm as the basis of the firm (March & Simon, 1958). In particular, students of the behavioral theory of the firm (BToF) have investigated decision making of the firm by focusing on the organizational learning from performance feedback (Cyert & March, 1963; Greve, 2003). Studies on this model point to the importance of negative performance feedback that prompts management to recognize the current problem and to willingly take required risks (Cyert & March, 1963; Kahneman & Tversky, 1979). Such feedback also serves as useful information for managers searching for promising alternatives and for determining appropriate strategic changes (Cyert & March, 1963; Greve, 2003). Experiences of negative performance feedback prompt firms to engage in massive risk-taking changes toward improvement. The verdict of this model is found in various decision-making domains, such as research and development (R&D) investment, innovation, diversification, alliance-partner selection, and strategic reorientation (including market entry) (Greve, 2003; Massini, Lewin, & Greve, 2005; Baum, Rowley, Shipilov, & Chuang, 2005; Shipilov, Xiao, & Greve, 2011; Iyer & Miller, 2008).

However, firms' persistence with the status quo during failure situations is not infrequent (Audia & Brion, 2007; Audia & Greve, 2006; Desai, 2008; Greve, 1998). These rigid responses are inconsistent with the prediction of traditional

BToF model because firms fail to show expected post-failure risk-taking changes. By bringing in the shifting focus model (March & Shapira, 1992), researchers accommodated such inconsistencies as results of the shift in firms' focus from aspiration to survival. The shift is contingent on resource reserves; threats in the form of severe scarcity prompt firms to focus on survival by keeping their operation strictly to the essentials and avoiding risks as much as possible. However, this explanation is only partially successful; it accounts for inconsistencies only in the extreme case of constraints on resources such as bankruptcy (Lant & Hurley, 1999). Firms that are stable and in normal operating conditions also vary in the extent to which they respond to negative performance feedback (Jordan & Audia, 2012).

Our incapacity to successfully account for this variation can be attributed to our incomplete theorization of feedback-based decision-making process of firms. The mechanisms behind these inconsistent firm behaviors are twofold. First, firms go against the suggestion of negative performance feedback when they have secured other performance indicators that inform the inadequacy of such a suggestion. Most firms engage in various product businesses by devising separate budgeting subunits where they also receive performance feedback (Eggers & Suh, 2012; Gaba & Joseph, 2013). Thus, in addition to the singular, aggregated performance feedback at the firm level, firms also collect multiple performance feedback from various levels and product areas. Although studies in the BToF

literature explain firm behaviors mostly with an exclusive focus on the singular firm-level feedback (Gavetti, Greve, Levinthal, & Ocasio, 2012; Greve, 2003), the original contention of Carnegie School is that multiple feedback arising from multiple goals largely shape firms' behavioral decisions (Cyert & March, 1963). The accurate theorization of informative functions of multiple performance feedback in guiding firm behavior is crucial in understanding firms' variation, as observed in response to firm-level negative performance feedback. Such multiple feedback at the sub-level often contradict those at the firm level as regards necessary strategic change. Following March (1991), I reinforce the argument by categorizing subunit-level feedback into the two most essential and distinct categorical feedback, namely exploitation and exploration. Separate feedback information from these categories would help managers—who are attempting to fix the problem indicated by firm-level negative feedback—discover the actual problem area (i.e., whether exploitation or exploration) and accordingly adapt their investment portfolios.

Second, the process in which firms collect and interpret the multiple feedback can be misleading, hence a picture different from that predicted on the assumption of accurate and fairly objective decision-making process. Although the original contention of behavioral theory is that performance is understood not merely as a specification of the situation as it “really” is (March & Simon, 1993), very few studies in BToF literature has investigated these possibilities, except for a

few recently developed notable work (Jordan & Audia, 2012; Fang, Kim, & Milliken, 2014; Dye, Eggers, & Shapira, 2014). The actual decision-making process by feedback is inherently entangled with a high level of uncertainty (Kaplan, 2008), thus implying that the learning process is subject to possibilities of “distortion” from decision makers’ biases or institutional concerns. The present study focuses on the implications of institutional legitimacy, one of the most unattended pillars of the BToF tradition (Dye, Eggers, & Shapira, 2014). Legitimacy serves as a lens through which shareholders and board members evaluate the gravity of firms’ failures and determine the level of punishment on executives (Smith, 2011). The prospect of punishment is a great concern that can sway the behavioral decision making of executives, thereby indicating another plausible reason for the different firm behavior or reaction compared to that predicted by traditional BToF argument. Legitimacy is category-dependent (Zuckerman, 1999); when a firm’s failure is attributed to executives’ prior engagement in explorative category—that is, deviation from the accepted exploitative norm of doing business—executives risk a very severe punishment and show sensitive reaction by changing the prior investment portfolio, which are the extensions of category-dependent illegitimate accounts (Benner, 2007; Benner & Ranganathan, 2012).

I investigate these two mechanisms created by multiple categorical feedback—the mechanisms that result in firms’ behavior deviating from the

traditional prediction of BToF. I examine this phenomenon based on new product development (NPD) investments of film producer organizations in the United States from 2000 to 2012. NPD investment is one of the important learning areas at the workplace, such that a firm's competitive advantage draws heavily on its ability to launch new products (Dougherty, 1992; Griffin, 1997; Greve, 2007). The empirical investigation of this mechanism requires collecting performances from various products of a firm. The film industry is an ideal research setting because the performance by each film product is revealed through box office records. By using a tobit panel analysis at the firm level, I examined how 311 film producers adjusted their NPD investment according to performances in exploitation and exploration products. My result shows that explorative feedback showed more significant interaction effect with firm-level feedback than exploitative feedback, thereby supporting my hypothesis. This finding means that institutional pressures that discriminate against exploratory failures largely prevent firms from sustaining exploratory investments.

II. LITERATURE REVIEW AND HYPOTHESIS

1. Relationship between Risk Taking and Firm-level Performance Feedback

Firms exhibit behavioral response to performance feedback resulting from certain business strategies. Extensive research on the issue examines how feedback, relative to aspirations (reference point that distinguishes organizational success and failure), affects the likelihood of different types of action (March, 1988; Miller & Chen, 1994; Ocasio, 1995). Researchers based their argument about the effects of negative performance feedback on the models of problemistic search and prospect theory. According to problemistic search based on behavioral theory perspective (Cyert & March, 1963), positive performance feedback allows firms to revalidate their belief in current strategies and negative performance feedback prompts firms to perceive a need for change. Those firms, mostly regarded as problem solvers (Jordan & Audia, 2012), “search” for ways to improve their performance. As posited by the model of prospect theory, the direction of problemistic search would be toward increasing risk propensity because decision makers of the failing firm are inclined to take additional risks in such a state of loss (Kahneman & Tversky, 1979).

The most extensively examined firm behavior is R&D investments, which are regarded risky because the fruits of such investments can be realized only in the long term. Firms tend to increase R&D investments when they experience low performance (Greve, 2003; Chen & Miller, 2007; Shinkle, 2012). Researchers also

looked at other forms of risk-taking. Baum, Rowley, Shipilov, and Chuang (2005) showed that low performance prompts firms to risk allying with non-repeated, distant partners, whereas Shipilov, Xiao, and Greve (2011) found that such a risk-taking partnership strategy is also exhibited in the form of status-heterophilous ties. Other forms of risky changes implemented after firm losses or failure include strategic reorientation (Lant, Milliken, & Batra, 1992; Ketchen & Palmer, 1999), operational changes (Greve, 1996), and diversification (Jones & Kashlak, 2001).

How is the post-failure risk-taking tendency of a firm manifested in NPD investment decisions? As noted by Greve (2007), products of a firm are differentiated by the extent of associated risks. Novelty in technological and market domain can become a useful criterion in judging risks associated with products (Greve, 2007; Rosenkopf & Nerkar, 2001; Benner & Tushman, 2003). High-novelty products in technological and market domains are considered “explorative” investments, whereas those without such novelty are deemed “exploitative” investments (Greve, 2007). The standard for differentiating between exploitative and explorative products is well-established at the industry level, especially in the film industry where I base my arguments. The prevalent use of film category as “blockbuster” and “indie” represents this standard. Blockbuster and indie films vary in human resources (“star” directors and actors) or in content (sequel). Indie films based on unknown human resources and content come across to firms as possessing technological novelty; firms that are not accustomed to such resources

and combination methods deal with unpredictable development. Indie films face numerous risks in market success because of lacking star power (e.g., director/writers) or established brand (contents) that can attract a readily created audience. Starring and sequel have been proven effective in helping boost a film's success rate and its overall revenue record (Vany 2011; Hadida 2009; Palia, Ravid, & Reisel, 2008; Basuroy, Chatterjee, & Ravid 2003).

In this light, the joint prediction by problemistic search and prospect theory is that a firm would increase its investment in exploratory products in its NPD portfolio because such an investment requires high risk-taking. Greve (2007) empirically showed that a firm tends to sensitively increase its investment in exploration than in exploitation after negative performance feedback at the firm level. The following hypothesis serves as a baseline on which I examine the effects of sub-level performance feedback:

Hypothesis 1: Firm-level negative performance feedback increases the firm's subsequent exploration ratio.

2. Relationship between Risk-taking and Categorical Performance Feedback

Although the above prediction is the reasonable extension of theoretical and empirical argument found in numerous performance feedback studies, many studies reported that firms stick to status-quo behaviors in failure situations (Audia & Brion, 2007; Audia & Greve, 2006; Desai, 2008; Greve, 1998). Prior research

reconciled these conflicting tendencies by bringing in the shifting focus model (March & Shapira, 1992), which shows that decision makers' focus of attention shifts from aspiration to survival as the resource reserves of their organizations decline. Decision makers suffering from a severe resource scarcity tend to show "survival rigidities" when they attend to the survival point; they keep their operation strictly to essentials and avoid risks.

This argument explains why firms' behavior differs from that predicted on the basis of problemistic search and prospect theory, but it does not fully account for the behavioral inconsistencies of firms because this analysis is naturally applied only to cases of extremely low performance, such as bankruptcy (Lant & Hurley, 1999). In other words, the shifting focus model cannot cover firms that do not show post-failure risk-taking changes despite sufficient resource reserves. Very few researchers have brought this issue to light and maintained that future research is necessary on the matter, possibly from different perspectives that can address routinized business decision making (Jordan & Audia, 2012; Eggers & Suh, 2012).

I believe that our further understanding is impeded by the major neglect prevalent in the current performance feedback literature. Most of the research in performance feedback focus on singular performance feedback at the firm level (Bromily, 1991; Greve, 1998) and on aggregate, singular performance measures, such as return on assets or market shares (Gavetti, Greve, Levinthal, & Ocasio, 2012; Greve, 2003). This practice would not be a serious problem if managers base

their NPD decisions solely on the information from a single performance feedback determined at the firm level. However, most firms engage in various businesses by separately budgeting subunit organizations, and thus receive performance feedback at those subunits as well (Eggers & Suh, 2012; Gaba & Joseph, 2013). Once managers recognize a problem at the firm level, they use performance feedback at the subunit level to scan for sources of the problem. Thus, decision making by performance feedback is a two-stage process where firm managers collect and aggregate multiple feedback arising both from the firm level and the subunit level (Eggers & Csazar, 2012). This contention is well positioned in the tradition of the Carnegie School. Cyert and March (1963) noted that an organization, as a coalition of diverse-interest parties, operates multiple dimensions of goals through collective bargaining. In turn, these multiple goal dimensions generate multiple performance feedback (Cyert & March, 1963).

Multiple goals and performance feedback are often grouped into two distinct categories—incremental vs. radical (Dewar & Dutton, 1986; Ettlie, Bridges, & O’Keefe, 1984) and core vs. non-core (Vanhaverbeke, Gilsing, Beerkens, & Duysters, 2009). In particular, March (1991) emphasized that a firm should manage its goal in both exploitation and exploration processes. A firm’s long-term survival will be threatened if the firm sticks to its core competency; at least two forms of organizational goals (i.e., exploration and exploitation) are necessary. Considering that these goals are inconsistent with each other, many firms organize a separate

subunit that focuses on exploration and exploitation to ensure simultaneous achievement in both goal dimensions; this practice is known as structural ambidexterity (Tushman & O'Reilly, 1996). These categorical goals serve as a collectively agreed basis on which information is filtered and collected. Thus, categorical performance feedback each from exploitative and explorative category are collected and interpreted by firms that operate multiple business models on a regular basis. Mental accounting in psychology also points to the importance of “category”-dependent evaluation and adjustment (Thaler, 1999). Hollywood film studios operate a sub-division that exclusively focuses on indie and B-movie production and labels categorized failures as “blockbuster flops” and “indie flops.” On this note, I intend to examine how sub-level categorical performance feedback (i.e., exploitation- and exploration-induced feedback) affect a firm’s NPD investment.

I examine the role played by negative performance feedback from exploitation in determining the firm’s NPD investment decision. As noted, firm managers collect and interpret performance feedback at the subunit level to uncover the source of the problem indicated by a firm-level negative performance feedback. The two-stage decision-making process indicates that negative performance feedback from exploitation—identified in the second stage—would function as a clue or basis for managers in determining the adequacy of increasing

exploration as suggested from firm-level feedback.

As is the case of the effects of performance feedback at the firm level, I examine the effects of categorical feedback at the subunit level by using the model of problemistic search and prospect theory. The model of problemistic search (March, 1991) points out that negative performance feedback prompts a firm to search for alternatives to the existing set of activities, which are deemed as the source of the problem. Unfortunately, firm-level performance feedback does not indicate a specific problem area, hence the failure to specify the adequate direction of search, which is the limitation previously noted by researchers (Gavetti, Greve, Levinthal, & Ocasio, 2012; Greve, 2003). Thus, the second stage of the decision-making process is needed so managers can acquire additional information indicative of specific directions. The greatest advantage of subunit performance feedback from product categories is that they specify problem areas, thereby suggesting appropriate search directions. Organizations are likely to shift resources away from the source of negative performance in favor of other opportunities (Cyert & March; 1963; Denrell & March, 2001; Eggers, 2012)¹. Thus, a subunit

¹ Several studies predict increased resource allocation to the problem area, such as the work of Chuang and Baum (2003), Haunschild and Sullivan (2002), and Haunschild and Rhee (2004). This research is different yet not inconsistent with the findings of previous studies. First, the performance goal in these studies is largely fixed (e.g., airline/railroad accident rate and automaker recalls; they would strive for zero fatality); because such operational goals are so crucial, firms cannot possibly allocate their investments in favor of other opportunities. Second, even allowing for the possibility that more resource allocation leads to problem detection, the argument of this study still stands

negative performance feedback from exploitation serves as valid information on which managers identify exploitation as the problem source and thereby switch to an available alternative, i.e., exploration. Thus, negative performance feedback from exploitation would intensify managers' tendency to increase exploration generated from firm-level negative feedback by reassuring managers that increasing their investment in exploration is actually a smart move to deviate from the problem source of exploitation.

Increasing investment ratio in exploration does not contradict the firm's tendency to engage in a local search. Firms engage in a local search by narrowing down search areas to "the neighborhood of the current alternative" (Cyert & March, 1963. P. 170). Considering that this study analyzes the decision-making process of a firm that operates its products both in exploitative and explorative product categories, "switching" to the other alternative by re-balancing its investment allocation is deemed as a local search.

Although different in mechanism, the model of prospect theory and the model of problemistic search give out similar predictions that negative performance feedback from exploitation would strengthen the effects of negative feedback at the firm level. Unlike the model of problemistic search, prospect theory

because I studied balancing of investments and not the absolute amount.

is not concerned about source of the problem, rather, it is concerned about the problem itself. Prospect theory states that when managers perceive the current performance situation as loss, they tend to be willing to take great risks (Kahneman & Tversky, 1979). Drawing on this premise, negative performance feedback uncovered at the subunit level of exploitation would further intensify risk-seeking tendencies generated by firm-level negative performance.

In sum, negative performance feedback from exploitation strengthens the increasing exploration effects of firm-level performance feedback. Such feedback from exploitation confirms the appropriate change direction as additional exploration and further intensify risk-taking propensity that is associated with exploration

Hypothesis 2a. A firm's negative feedback relative to aspiration level in exploitation strengthens the subsequently increasing exploration effect of firm-level negative feedback.

I examine the role played by negative performance feedback from exploration in determining NPD investment decision. As in the case of effects of performance feedback at the firm level and those of feedback from exploitation, effects of feedback from exploration are predicted with the models of problemistic search and prospect theory. Under the model of problemistic search, managers use negative performance feedback from exploration as information that identifies

exploration as the major problem source (Cyert & March, 1963); thus, negative performance feedback from exploration suggests that managers deviate from exploration and reallocate investments to available and safe alternatives, that is, exploitation (Denrell & March, 2001; Eggers, 2012; Greve, 2013; Eggers & Suh, 2012).

The tendency to evade exploration that negative explorative feedback creates contrasts with the tendency to increase exploration that negative feedback at the firm level creates. Decision makers greatly value such contradictory suggestions from categorical feedback for better-informed decisions and aggregate such information into the final decision making. Fixing the problem by increasing the investment in exploration is unreasonable when exploration is perceived as the main contributor of such problems. Recognizing this possibility allows viewing from an entirely new angle the reasons for certain firms not showing the post-failure behavior predicted in the literature (Audia & Brion, 2007; Audia & Greve, 2006; Desai, 2008; March & Shapira, 1992; Jordan & Audia, 2012)—that is, firms might have decided to go against the suggestion of negative performance feedback at the firm level because they have secured other performance feedback that informs the inadequacy of such a suggestion. Therefore, although negative performance feedback at the firm level increases a firm's exploration, if such negative performance feedback is largely attributed to prior exploration, this increasing tendency would be weakened.

Hypothesis 2b. A firm's negative feedback relative to aspiration level in exploration weakens the subsequently increasing exploration effect of firm-level negative feedback.

However, another valid model of prospect theory predicts its effects in the opposite way: similar to the predicted effects of negative performance feedback from exploitation under the prospect theory, negative performance feedback can intensify risk-taking tendency from firm-level negative performance feedback by strengthening the cognition of state of loss (Kahneman & Tversky, 1979). Thus, if firm managers' decision-making process is more strongly governed by the psychological state of risk propensity than by rational aggregation of conflicting performance feedback information, the following prediction comes out in the opposite direction.

Hypothesis 2c. A firm's negative feedback relative to aspiration level in exploration strengthens the subsequently increasing exploration effect of firm-level negative feedback.

3. The Role of Category-dependent Legitimacy on Categorical Feedback

Theorization that performance feedback and the decision making process based on it is category-dependent allows the accounts of category-dependent legitimacy to come into the picture. Legitimacy is category-dependent (Zuckerman,

1999; Benner & Ranganathan, 2012; Benner, 2007) and the legitimacy imposed discriminately across different categories of firms' businesses serves as a lens for external parties to evaluate negative performances of those business categories (Smith, 2011). Thus, comparable negative performance feedback in legitimate category and that in illegitimate category can very well take on different meaning from each other, with one of them having more amplified influence on the decision making of firms. Indeed, the original contention of behavioral theory is that performance gets understood not merely as a specification of the situation as it "really" is (March & Simon, 1993). High levels of equivocality are inherently entangled with the way performance feedback is collected and perceived (Kaplan, 2008). Still, very little research in the literature has acknowledged the possibility that the decision making process of firms based on performance feedback can be swayed from non-economic factors. Several scholars only very recently pointed to this prevalent and significant neglect in literature and started to delve into the matter (Jordan & Audia, 2012; Fang, Kim, & Milliken, 2014; Dye, Eggers, & Shapira, 2014). In particular, the implications of external institutional concerns on decision making have been highlighted as one of the most unattended pillars of the BToF tradition (Dye, Eggers, & Shapira, 2014). Thus, I study the behavioral implication exerted by institutional concerns on the processing of divergent and often conflicting negative feedback from exploitative and explorative product categories. This stance implies another plausible reason why firms often do not

react according to the prediction of traditional BTOF argument.

Social legitimacy concerns affect firm strategists' decision-making process by influencing perceptions of the appropriateness of their actions (DiMaggio & Powell, 1983; Meyer & Rowan, 1977; Porac, Wade, & Pollock, 1999; Zuckerman, 1999). External interest parties, such as shareholders and board members, evaluate firm performance by institutional legitimacy associated with certain strategic firm activities. Certain strategic actions that are believed to guarantee satisfactory outcomes—in this study, exploitation—are stabilized as a norm in the industry and acquire a taken-for-granted status of approved category (Zuckerman, 1999; Benner, 2007). Strategic investments with distant and uncertain cash flows (i.e., exploration) tend to create the perception that the firm's strategies are not creating shareholder value (Benner & Ranganathan, 2012). When a firm's strategies depart from "legitimate exploitation" to "illegitimate exploration," decision makers of the firm should risk getting illegitimacy discounts during evaluation (Benner, 2007; Benner & Ranganathan, 2012; Zuckerman, 1999).

Illegitimacy discounts include those in external evaluation of firm performances (Gaba & Joseph, 2013). Negative performance feedback from exploration, unlike that from exploitation, is perceived as "illegitimate failure" because the legitimacy identity of a certain activity serves as a lens through which information about it pass and take on meaning, thus rendering otherwise comparable information differently evaluated (Smith, 2011). Although firm

decision makers are held accountable for the failure in general, they are likely to be severely challenged and reprimanded when such failures are attributed to prior engagement in exploration, a decision that is deemed highly questionable by itself. Such external challenges include indirect and direct threats to managers, such as investors losing faith in further prospects (Benner & Ranganathan, 2012), analysts' negative forecasts and recommendations (Zuckerman, 1999), and higher likelihood of executives firing (Warner, Watts, & Wruck, 1998). Such negative reactions give organizations difficulty in sustaining exploratory investments (Benner, 2007). Therefore, bigger threats associated with exploration failures present decision makers a greater need to regain legitimacy (Bushee, 1998; Benner & Ranganathan, 2012) and thus trigger them to devote additional effort to change after the failures. Internal political dynamics would also contribute biased perception and reaction of decision makers because the exploitation unit, based on its legitimacy-driven power, dominates over the interpretation of divergent information in its favor (Kaplan, 2008; Burgelman, 1983; Dearbon & Simon, 1958; Fang, Kim, & Milliken, 2014).

Hypothesis 3. The moderating effect of a firm's negative performance feedback in exploration on the effect of firm-level negative feedback is more significant than that of a firm's negative performance feedback in exploitation.

The above mechanism is mathematically represented as the following. Two of categorical feedbacks from exploitation and exploration at time t are given

by

$$X_t = \{x_{it}, x_{-it}\}$$

where X is the total categories of activities while x_i is exploitation and x_{-i} is exploration. These two categories of exploitation and exploration can be ordered with respect to their operating risks:

$$R(x_{it}) < R(x_{-it})$$

Performance feedbacks from the two categories of x_{it} and x_{-it} at time t are represented as $a(x_{it})$ and $a(x_{-it})$, respectively, where $a_t(x)$ is >0 or <0 .

Thus,

$$\text{if } a(x_{it}; x_{-it}) < 0, \text{ then } \Delta x_{-i,t+1} > 0 \text{ (H1)}$$

$$\text{if } a(x_{it}; x_{-it}) < 0, \text{ and if } a(x_{it}) < 0, \text{ then } \Delta x_{-i,t+1} > 0 \text{ (H2a)}$$

$$\text{if } a(x_{it}; x_{-it}) < 0, \text{ and if } a(x_{-it}) < 0, \text{ then } \Delta x_{-i,t+1} > 0 \text{ or } \Delta x_{-i,t+1} < 0 \text{ (H2b and c)}$$

$$\text{if } a(x_{it}; x_{-it}) < 0, \text{ and if } a(x_{it}) \text{ and } a(x_{-it}) < 0, \text{ then } \Delta x_{-i,t+1} < 0 \text{ (H3)}$$

where $\Delta x_{-i,t+1} = x_{-i,t+1} - x_{-i,t}$.

IV. METHODS

1. Research Setting and Data Sources

The research setting for this study is the U.S. Hollywood industry. Among various forms of industry participants in this industry, my study focuses on film production companies, which are directly responsible for the fundraising and the whole development process of film projects. I try to prove the suggested mechanism based on the empirical examination of how film production companies' balancing of exploitation and exploration is affected by their recent failure experiences. The film industry is optimal in many ways to examine this issue. Failure experiences in the industry are salient and frequent as numerous films are released and determined as box office disaster in no less than 3 weeks. In addition, there exist a well-established industry norm as to the differentiation of exploitation and exploration product. Despite unavoidable market risks entailed with each film, firms try to find ways to raise their success chances, and the so far the most effective and extensively used safe-bet product strategy is star packaging or sequel.

I selected the film producers using three criteria. First, each selected firm participated at least once in the films with the top 5 billing between 2000 and 2012 in U.S. market. Second, the films such film the film producers were engaged have public records of total box office revenue and production budget. Third, the firm of analysis has participated in the film investment for two years in a row at least once between the analysis period, to capture the firm's changing investment ratio

according to the recent performance resulting from last year's investment. The sampling criteria resulted in a sample of 311 film producers.

I collected data covering all films released in the U.S. from 2000 to 2012, inclusively. The main data source was the Internet Movie Database, a database which is the largest and extensively used as most of the data base for research regarding film industry. And it included the following information: film releasing title, production year, releasing year and month, name of producing firms engaged in the film making, name of directors, writers, producers, and actors, total box office revenue, production budget, film genre, film rate. I gathered the data of producing firms that participated in the film with the top 5 billing as noted, and the data of participating human resources with the top 3 billing. To improve the reliability of my pooled data results through IMDb, I corroborated the film data with the database of Opusdata, the film industry analysis expert agency. I recorded only records of released films and according information that could be confirmed in both data sources. In addition, as numerous firms have subsidiaries that release films on the subsidiaries' own producing name and these ownership structure had gone through continuous variation through merger and acquisitions, I figured out the ownership structure of the producing firms at the analysis period of interest through various data sources. The main data sources are annual report, Thomson M&A deal records, the 10K and 20F filings, Factiva. To capture parent company-level investment adjustment trend, I devised each year's parent company-level code

that cover every film producing company.

2. Variables

Dependent Variable

Exploratory innovation ratio. The dependent variable, the level of risk and uncertainty in a bank's investment portfolio of film projects, was defined as the proportion of a firm's exploratory projects invested in each year, i.e., the number of exploratory film projects invested in a given year divided by the number of total film projects invested in the same year. Innovations that address unfamiliar markets thereby having unpredictable market success are regarded exploratory.

Operationally, I defined a film project as exploratory when the film is deemed risky by standard of human resources involved in the project or contents. As for the human resources involved in the film, whether the star director or actor is associated with the film is the main standard on which the film gets assessed its embodied market risks. This is because the supposedly existing star power of such star director/writers or actors helps 'grand opening', which is the marketing strategy that maximizes the film's appeal to the mass audiences at the first opening week (Vany, 2011). Contents also play a major role in film producers' trying to structurally increase their success chances: sequel – a remakes of previous hits – is perceived as safe-bets by many in that the film has already established brand power and created audience ready to enjoy it. Such starring and sequel are indeed proven

to be the factors helping the film's success rates and its overall revenue record (Vany 2011; Hadida 2009; Palia, Ravid et al. 2008; Basuroy, Chatterjee et al. 2003).

In my statistical analysis, each director, writer, or actor are considered to be a 'star' based on his or her past performance; the maximum figure of the total box office revenue of film projects that the principals participated over the three years preceding the release of the current film are identified (Eliberse 2007; Eliashberg, Elberse et al. 2004; Vany, Walls, 2004; Hadida 2010; Vany, Walls, 2002) and the principal whose figure is over \$100 million is grouped as a star. Indeed, certain individuals having involved in many high-grossing films may act somewhat like a brand name in attracting audiences, and the typical key domestic box office benchmarks of film revenue hit is \$100 million: a movie movie that grosses more than \$100 million cumulatively in U.S theatres is typically considered a 'blockbuster' (Vany, Walls, 2002; Vany 2011). Sequel is identified straight away as information in film genre data. Therefore, a film that includes a 'star' principle or is a sequel of past hits is exploitative investment alternative, and otherwise a film is explorative project.

Consider *The Avengers*, a 2012 American superhero film based on the Marvel Comics superhero team, produced by Marvel Studios. It was directed by Joss Whedon, a renowned screenwriter and director for *Toy Story* (1995) and features a star cast including Robert Downey, Jr., Chris Evans, Mark Ruffalo, Chris Hemsworth, Scarlett Johansson, all of whom recorded over \$100 million box office

revenue in the recent years. Thus, it is categorized as exploitative film product in my analysis, as it scores well over minimum standards of at least one star member participation in human resources involved in the film. *Avengers: Age of Ultron*, which is scheduled for release in 2015, would be even more readily categorized as exploitation not that it boasts not only huge star powers of actors and director, but also established brand power of contents as a sequel.

Independent Variables

Negative performance feedback. The independent variable measuring negative performance feedback was an average of the ROI of the films which focal firm produced in a year of analysis, in consistent with the prior literature (Greve, 2003; Miller & Chen, 2004; Audia & Greve, 2006). I measures net profits of the films accrued to the film producers as one-half of the theatrical box office revenues minus production budget² (Vany, Walls, 2002; Vany 2011). This is the industry analysts' rule of thumb applied when estimating net performance per film. This is

² Measure of production budget comes from the information recorded in IMDb. These data have some limitations. Neither imdb.com, nor any other source, carries budget data for all films. No legal regulation compels the private companies producing most films to disclose their costs. And since accounting is notoriously non-standard in Hollywood, the accuracy of some of budget information disclosed might also be questioned. Still, most movies that had actual box office record and involved more than two film producers contained information have budget information, thus making missing data based on budget information less an issue. And as it is of interest to know the relative profitability of films released in each year, occurring errors in recording exact actual number of budget information can be deemed not a major problem.

an approximation to “real” profits, which are known only to the producer. One-half of box office revenues approximates rents that are paid the distributors . Thus, a film would normally need to make twice its production budget to break even.

$$\text{Performance Feedback of firm } i = \frac{1}{n} \sum_{j=1}^{j=n} ROI_j,$$

for n is the number of films that firm i invested in, and ROI_j is the ROI of the j_{th} film

A focal firm experiences a negative feedback when its performance is below the aspiration level such that its performance-aspiration gap is minus. The negative feedback is defined as the difference between the performance and aspiration level. Using a spline function, I recorded negative feedback as 0 for all observations in which the performance of the focal firm is greater than its aspirations. Following the formal model of Cyert & March (1963), aspiration levels are computed as a weighted average of historical and social aspirations; $A_{it} = \alpha HA_{it-1} + (1 - \alpha) SA_{it-1}$. A focal firm’s historical aspiration at time t , HA_{it} , is an exponentially weighted moving average of its past performances; $HA_{it} = \beta P_{it-1} + (1 - \beta) HA_{it-1}$ where P_{it-1} is the performance in terms of ROI. Its social aspiration, SA_{it} , is the average performances of industry peers in the current year (Baum & Dahlin, 2007). The weight α and β was chosen by searching over all possible values in increments of 0.1 and then using the value that yielded the maximum log-

likelihood (Gaba & Joseph, 2013). This procedure resulted in $\alpha=0.2$, $\beta=0.5$.

Aspiration levels are defined both at firm level and at product sub-unit level (exploitation and exploration). Thus, there exist three separate forms of negative feedbacks – firm-level negative feedback, negative feedback in exploitation, negative feedback in exploration. For ease of interpretation, I reverse-coded negative feedbacks of a focal firm so that its values are positive.

Interactions. I test how negative categorical feedbacks from exploitation and exploration at sub-unit level moderates tendency of more exploration following negative feedback at the firm-level, with two interaction terms: (H2) Firm-level negative feedback X Negative feedback in exploitation, (H3) Firm-level negative feedback X Negative feedback in exploration. Interaction term were also measured by multiplying reversed-coded negative feedbacks of the focal firm.

Control Variables

Positive performance feedback. As success experience of firms has been proven to lessen the perceived need of the firms to change and take risks, thus decreasing innovation propensity. Therefore, positive performance feedback at the firm level, measured the difference between the performance and aspiration level, the figure calculated as an average of the ROI of the films a focal firm participated, is included. A focal firm experiences a positive feedback when its performance is

above the aspiration level such that its performance-aspiration gap is plus. There exist three separate forms of positive feedbacks – firm-level positive feedback, positive feedback in exploitation, positive feedback in exploration.

Slack. Firms' slack resources tend to trigger slack-based search.

Organizations with spare time and spare resources have greater opportunities for experimentation and less strict performance monitoring and so have the resources and managerial patience needed to innovate (Greve, 2003). However, accounting data required to compute standard measures of organizational slack (Greve, 2003) were not available for the mainly privately held banks in the sample. Also, among few public firms whose financial information are disclosed, another problem exists: since these few public firms are mostly conglomerates and runs film producing division as one of their many subsidiaries, using the firm's slack figure at the whole group level is highly unlikely to account for the resource sufficiency that decision makers at the film division afford. Therefore, I instead computed slack by the available film data. Slack is measured as the surplus amount that is a result of net financial performance of the whole film project a focal firm participated.

Proximity to bankruptcy. Huge failure that puts firms proximate to bankruptcy triggers survival rigidities, reducing exploration. This is because firms put at a risk of bankruptcy would limit their investment expenditures only to operational necessities, rather than taking risks (Ketchen & Palmer, 1999; March & Shapira, 1992). For the exact same reasons, standard measures of bankruptcy risks

were not available. Proximity to bankruptcy is measured as the absolute deficit amount that is a result of net financial performance of the whole film project a focal firm participated.

Firm size. Firm size can have both negative and positive effects on firm innovation (Teece, 1992). Also, firm size has been shown to affect how firm responds to performance feedback (Audia & Greve, 2006) I controlled for firm size using aggregated number of film projects a focal firm participated for the past three years.

Firm age. As firms age, they tend to stick to the existing norm of business – exploitation and become less reluctant to changes rather than explore new and unfamiliar technologies (Sorensen & Stuart, 2000). Also, firm age tended to influence the selection of reference points, resulting in different behavioral response of firms to performance feedback (Short & Palmer, 2003). As most of the firms of analysis are private and their foundation year information are not readily available, I regarded the firm operation year as the year passed since the first record of the firm participating as a producer between 1990 and 2012.

Lagged exploration ratio. I also included a focal firm's exploration ratio at the prior year for two reasons. First, firms have the tendency to repeat previous actions, largely driven by organization momentum. Thus, an organization is more likely to make an exploitation innovation the more recently it has made an exploitation innovation, and is more likely to make an exploration innovation the

more recently it has made an exploration innovation (Greve, 2007; Amburgey & Miner, 1992). Second, as I pooled the repeated observations on each producing firm, this is likely to lead to serial correlation in the dependent variable, rendering incorrect variance estimates. Therefore, I explicitly include the previous year's exploration ratio to acknowledge the theoretical momentum effects and control serially correlated part of dependent variable.

Network size. More network partners may provide a firm with access to greater resources and insights to generate more exploratory innovation. Moreover, measures of ego network density are sensitive to network size, making network size an important control variable (Phelps, 2010). Network size was measured as the number of ties a focal firm formed in a given year.

Repeated tie ratio. Prior ties between firms can increase interfirm trust, the development of relation-specific learning heuristics, and interfirm learning (Lane & Lubatkin, 1998). In hollywood industry, firms may prefer to repeat collaborations with others whom they believe will enhance their chances of film project success (Uzzi & Spiro, 2005). Following Gulati and Gargiulo (1999), I calculated the ratio of repeated ties as the number of repeated ties divided by the total number of ties over three year window.

3. Model Specification

In my study, the dependent variable is a proportion and presents several

challenges to linear regression (Gujarati, 1995). The proportion, as having always positive value, zero inclusive, creates a challenge where dependent variable is limited by censoring. Censoring occurs when we observe the independent variables for the entire sample, but for some observations we have only limited information about the dependent variable. With the censored data included as 0's, OLS regression of dependent variable on independent variables for all observations results in inconsistent estimates. A recommended approach for this matter is estimating the tobit model. The tobit model uses all of the information, including information about the censoring, and provides consistent estimates.

Since there is high possibility that exploration ratio of a firm at time t is largely dependent on the exploration ratio at time $t-1$ based on the firms' tendency to repeat previous actions, dependent variable and thus error term might be serially correlated. To detect the possible presence of autocorrelation making estimator inconsistent, the Durbin's t -statistic (Durbin, 1970) was computed: the resultant p -value from pooled time series cross-sectional model was 0.0003. Therefore, the null hypothesis of no first-order correlation is rejected. Therefore, I included lagged value of the dependent variable as a control to capture serially correlated effects explicitly. As current level of dependent variable is likely to be heavily influenced by its past level based on organizational momentum mechanisms, the decision to include a lagged dependent variable is valid both theoretically and empirically.

According to the resource-based view of the firm, a firm's performance

and behavioral decision largely results from the unique resource characteristics that accumulate inside it. This strongly claims the possibility of heteroscedasticity: a single common variance does not successfully represent the error terms of different firms. Homoskedasticity fails whenever the variance of the unobservable changes across different groups in the population (Wooldridge, 2012). When homoscedastic assumption of error term is violated, while consistency of estimates is still preserved, the inference statistics such as t and f are no longer valid. To detect this problem, Wald test on pooled time series cross-sectional models was done: p-value was 0.000, indicating the strong presence of heteroscedasticity. To control for unobserved firm heterogeneity, I used estimated random-effects GLS models (Greene, 1997) in line with the prior research (Phelps, 2010; Baum, Rowley et al. 2005).³ Reverse causality issue can also emerge. While performance feedback firm experiences exploration ratio of the firm, exploration ratio – investment allocation decision – can also largely determine performance feedback. When independent and dependent variables are determined simultaneously in this suggested scenario, bias and inconsistency in OLS estimation is resulted (Wooldridge, 2012). This

³ The result of the Hausman test was a rejection of the null that difference in coefficients between the two model is not systematic (p-value = 0.000). However, the interpretation of the Hausman results here requires careful consideration in that it was based on the transformed log-odds model, rather than the tobit, main estimation method of my study. Most importantly, tobit is a non linear function and the likelihood estimator for fixed effects is biased and inconsistent (Greene, 2002). Also, the simultaneous use of lagged dependent variable and fixed effects is deemed highly problematic by researchers (Angrist, Pischke, 2009).

reverse causality issue is resolved by lagging all independent variables one year, which reduced concerns of reverse causality and avoided simultaneity (Phelps, 2010). Lagging independent variables is also valid theoretically in that decision makers assess current year's performance feedback and reflect implications driven from it to consequent year's investment decision. In turn, the expected ratio of exploratory innovation of a firm i in year t , $\lambda_{i,t}$, is specified in the following way.

$$\lambda_{i,t}^* = \beta_1 NP_{i,t-1} + \mathbf{X}_{i,t-1}\gamma + \varepsilon_{it},$$

$$\lambda_{i,t} = \begin{cases} \lambda_{i,t}^* & \text{if } \lambda_{i,t}^* > 0 \\ 0 & \text{if } \lambda_{i,t}^* \leq 0 \end{cases}$$

where $NP_{i,t-1}$ indicates the negative performance feedback in the firm level of a firm i in year $t-1$, $\mathbf{X}_{i,t}$ includes all control variables, and ε_{it} refers to an error term. I designed a model that includes interaction terms between the negative performance feedback in the firm level of a firm i in year $t-1$ and the negative performance feedback of a firm i in exploitation and exploration in the same year. This is specified below:

$$\lambda_{i,t} = \beta_1 NP_{i,t-1} + \beta_2 NP_{i,t-1} \times NPT_{i,t-1} + \beta_3 NP_{i,t-1} \times NPR_{i,t-1} + \mathbf{X}_{i,t-1}\gamma + \varepsilon_{it}$$

where $NPT_{i,t-1}$ refers to the negative performance feedback of a firm i in exploitation in year $t-1$ and $NPR_{i,t-1}$ indicates the negative performance feedback of a firm i in exploration in year $t-1$. STATA version 12 was used to fit the models to the data.

V. RESULTS

1. Descriptive Statistics

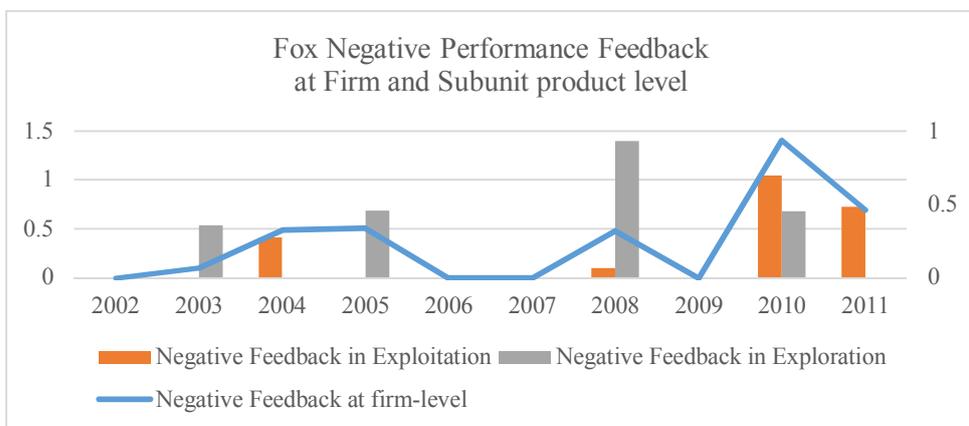
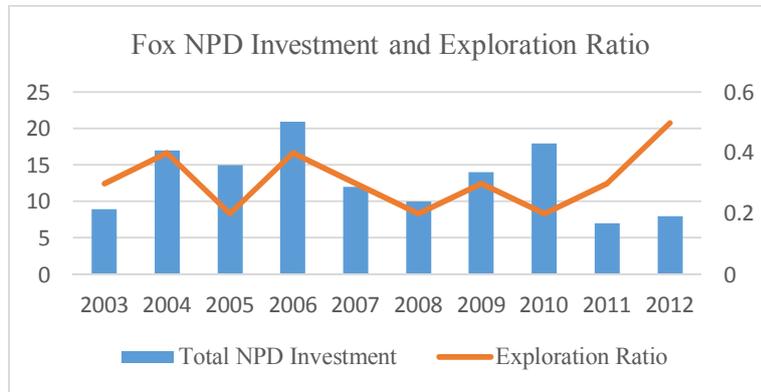
Means, standard deviations, and correlations for all study variables are given in table 1. To check whether the model has a multicollinearity problem, I conducted a variance inflation factor (VIF) test. In general, a model is not considered to have a serious problem of multicollinearity unless the VIF value of a variable exceeds 10 (Chatterjee, Hadi, & Price, 2000). In the VIF test with all explanatory variables excepting squared term and interaction terms, no scores exceeded 10, with the mean VIF value being 4.25. Therefore, all of the variables were included in regression models.

My data shows that from 2000 to 2012 each film producer had produced about seven new film products in each year. There is large variation across firms; while most firms produced one to three films, but a few firms produced up to thirty films in a year. Moreover, my data shows diverse patterns of temporal change in negative performance feedbacks of firms both at the firm and at the subunit product levels. Figure 1 illustrates sample cases of Twentieth Century Fox Film Corporation and Universal Pictures. Fox and Universal continuously adjusted its NPD investment portfolio by changing their focus on explorative products during the period of analysis from 2003 to 2011. They experienced significant variation in the performance feedbacks during such period, and experienced negative performance feedbacks during many of those periods in varying degrees. Their

performance feedbacks at the subunit level of exploitation and exploration also show significant variations. In this context, I tested how firms' balancing investment portfolio between exploration and exploitation is affected by recent experiences of their negative performance feedback both at the firm and subunit product level.

FIGURE 1

Sample Cases of Twentieth Century Fox and Universal Pictures
 – Temporal Change of NPD Investments and Performance Feedbacks



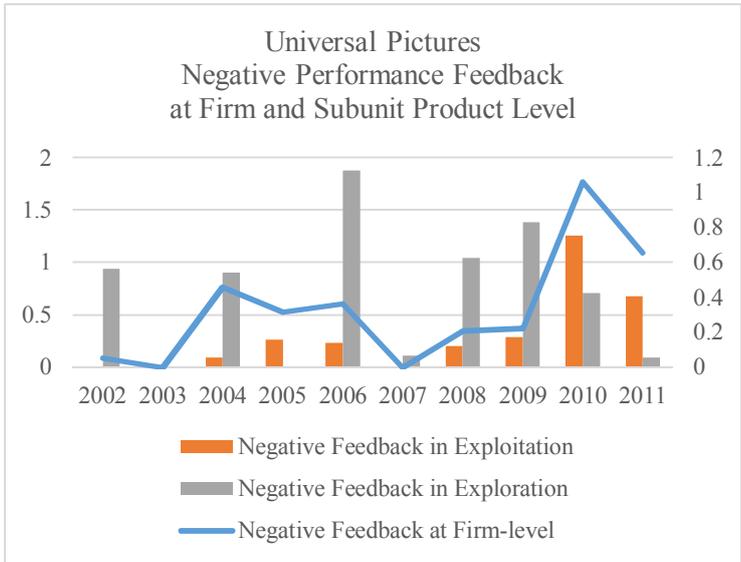
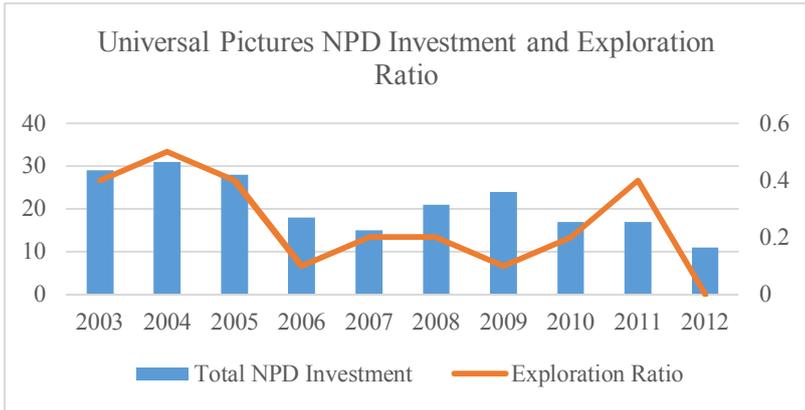


Table 1. Descriptive Statistics and Correlations

| Variables | M | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|--|-------|-------|------|------|------|------|------|------|------|------|------|------|------|-----|
| 1. Negative performance feedback at the firm level | .42 | .46 | -- | | | | | | | | | | | |
| 2. Negative performance feedback in exploitation | .39 | .65 | .72 | -- | | | | | | | | | | |
| 3. Negative performance feedback in exploration | .71 | .86 | .16 | -.03 | -- | | | | | | | | | |
| 4. Positive performance feedback at the firm level | .18 | .76 | -.22 | -.13 | -.08 | -- | | | | | | | | |
| 5. Positive performance feedback in exploitation | .23 | .95 | -.21 | -.15 | -.02 | .93 | -- | | | | | | | |
| 6. Positive performance feedback in exploration | .38 | 3.16 | -.04 | -.02 | -.10 | -.00 | -.02 | -- | | | | | | |
| 7. Slack | .00 | .00 | -.32 | -.19 | -.17 | .13 | .06 | .00 | -- | | | | | |
| 8. Proximity to bankruptcy | .00 | .00 | .38 | .21 | .05 | -.10 | -.10 | -.04 | -.26 | -- | | | | |
| 9. Firm size | 22.38 | 22.66 | -.21 | -.16 | -.09 | .59 | -.07 | -.02 | .56 | -.09 | -- | | | |
| 10. Firm age | 10.39 | 5.40 | -.08 | -.02 | -.01 | -.04 | -.06 | .05 | .33 | -.23 | .38 | -- | | |
| 11. Lagged exploration ratio | .31 | .29 | .16 | .12 | .01 | .03 | .02 | -.01 | -.17 | -.08 | -.12 | -.03 | -- | |
| 12. Proportion of repeated partners | .44 | .22 | .01 | .01 | -.04 | .02 | -.01 | -.00 | .23 | .76 | .33 | .19 | -.77 | -- |
| 13. Network Size | 29.49 | 26.49 | -.09 | -.07 | -.04 | -.00 | -.02 | .00 | .44 | -.08 | -.76 | .44 | -.08 | .58 |

2. Results of Hypothesis Testing

The results of a Tobit regression analysis with random effects are presented in Table 2. Model 1 includes only control variables. In model 2 and 3, Hypotheses are tested. Hypothesis 1 predicts that the exploration ratio of a firm increases as its firm-level negative feedback increases. The results in model 3, the full model that included all the interaction terms, show that the coefficient of firm-level negative feedback is positive and significant ($\beta=0.303, p<0.05$), supporting hypothesis 1. This result is consistent with the findings of earlier studies, and become the baseline on which moderation effects I propose in this study get tested.

Hypothesis 2a predicts that a firm's negative feedback relative to aspiration level in exploitation strengthens the increasing exploration effect of firm-level negative feedback. However, the result failed to support hypothesis 2a, showing not significant coefficient. On the other hand, Hypothesis 2b that predicted a firm's negative feedback in exploration to weaken the increasing exploration effect of firm-level negative feedback was strongly supported ($\beta=-0.270, p<0.01$). Figure 2 describes the predicted explorative investment ratio for different levels of negative performance feedback in exploration. These contrasting results in significance of two categorical feedbacks actually largely point to the validity of Hypothesis 2c. Hypothesis 2c predicted that the moderating effect of a firm's negative performance feedback in exploration on the effect of firm-level negative feedback is more significant than that of a firm's negative performance feedback in exploitation. A Wald test confirms that the difference between the two

pairs was statistically significant ($p < 0.05$), supporting Hypothesis 2c. These findings convincingly suggest that while the recent negative feedback of a firm increases consequent exploration ratio of the firm in general, it might not be the case when such failure experience can be largely attributed to the prior exploration activities. To attend the concern regarding multicollinearity problem, I estimated the model excluding the positive performance feedback in exploitation, which is the control variable that showed the strongest correlation with that at the firm level and VIF score. I also estimated the model that uses sub-samples of firms that excludes the firms which experienced positive performance feedback in the firm level. The results of both models showed no significant difference.

The results of the OLS regression analysis with random and fixed effects were derived for comparison with the results of Tobit regression analysis in Table 3. Only the results of full model 3 are included in the table for parsimony. The results of both models were largely the same with those of Tobit random effects model. As with the results of a Tobit analysis, negative performance feedback in the firm level showed a significant interaction effect with that in exploration, not with that in exploitation. This results lends credibility to the results in this study, showing robustness across different research designs.

The closer look on the actual behavior of film producers in response to feedbacks would clarify the picture. While Universal Pictures repeatedly failed to meet its performance expectations during the period of analysis, thereby predicting increased investment in exploration in general, it showed significant variations in

its behavioral responses. Actually, despite its firm-level negative performance in 2004, Universal lowered its investment ratio in exploration by about 10% in 2005, the behavior that runs counter to the prediction. Universal repeated such inconsistent behavior in another year of poor performance, 2008, when it cut down on its explorative investment in the subsequent year. This inconsistent and even opposite behaviors of Universal could be successfully accounted for by examining subunit-level product performances from exploitation and exploration. The years 2004 and 2008 are when the firm's poor performance is mostly attributed to exploration in prior years. As the problem areas that failed the firm were identified as exploration by subunit level feedback, executives at Universal must have decided to go against the suggestion of firm-level feedback to increase exploration and to rather focus their investment in safer and promising exploitation projects.

The similar picture was observed with the case of Twentieth Century Fox. While Fox increased their subsequent investment in exploration following failures, consistent with the prediction of negative feedback at the firm-level, the degree of adjustment showed meaningful variations between various failure experiences. Fox showed more significant increase after negative performance in 2011 than after that in 2010 even when the gravity of failure was actually higher in 2010 than in 2011. This seemingly nonsensical behavior of Fox actually made perfect sense as the attribution of failures was starkly different between the two cases; in 2010, it failed to meet expectations both in exploitation and exploration, whereas its failure in 2011 was mostly attributed to exploitation.

Table 2. Tobit Panel Regression for Exploratory Innovation Ratio^a

| Variable | Model 1 | Model 2 | Model 3 |
|---|-------------------|--------------------|-------------------------------|
| Constant | 0.074 (0.122) | 0.086 (0.121) | -0.025 (0.131) |
| Positive performance feedback at the firm level | -0.052 (0.084) | -0.067 (0.086) | -0.031 (0.087) |
| Positive performance feedback in exploitation | 0.055 (0.066) | 0.073 (0.068) | 0.047 (0.069) |
| Positive performance feedback in exploration | 0.006 (0.006) | 0.003 (0.007) | 0.004 (0.007) |
| Slack | -0.000 (0.000) | -0.000 (0.000) | -0.000 (0.000) |
| Proximity to bankruptcy | 0.000 (0.000) | -0.000 (0.000) | 0.000 (0.000) |
| Firm size | 0.003 (0.002) | 0.002 (0.002) | 0.002 (0.002) |
| Firm age | -0.000 (0.008) | 0.001 (0.008) | -0.000 (0.009) |
| Lagged exploration ratio | 0.141 (0.117) | 0.172 (0.125) | 0.239 [†] (0.132) |
| Network size | 0.000 (0.002) | 0.000 (0.002) | 0.000 (0.002) |
| Repeated tie ratio | -0.150 (0.187) | -0.131 (0.181) | -0.047 (0.180) |
| Negative performance feedback at the firm level | | 0.077 (0.092) | 0.303* (0.124) |
| Negative performance feedback in exploitation | | -0.018 (0.061) | 0.077 (0.102) |
| Negative performance feedback in exploration | | -0.074* (0.030) | 0.042 (0.054) |
| Negative performance feedback at the firm level x Negative performance feedback in exploitation | | | -0.084 (0.054) |
| Negative performance feedback at the firm level x Negative performance feedback in exploration | | | -0.270** (0.106) |
| Log likelihood | -154.97 | -151.45 | -147.93 |
| Observations | 253 | 253 | 253 |

^a Standard errors are in parentheses. [†] p < 0.1 * p < 0.05 ** p < 0.01

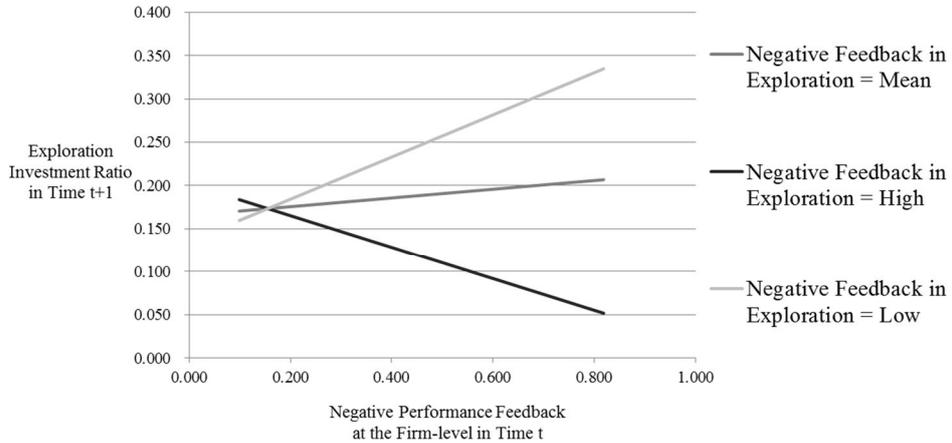
Table 3. OLS Panel Regressions for Exploratory Innovation Ratio^a

| Variables | OLS RE | OLS FE |
|--|---------------------|---------------------|
| Constant | 0.168 (0.077) | 0.430 (0.121) |
| Positive performance feedback at the firm level | -0.037 (0.065) | 0.001 (0.064) |
| Positive performance feedback in exploitation | 0.047 (0.051) | 0.020 (0.050) |
| Positive performance feedback in exploration | 0.002 (0.005) | 0.002 (0.004) |
| Slack | -0.000 (0.000) | -0.000 (0.000) |
| Proximity to bankruptcy | 0.000 (0.000) | 0.000 (0.000) |
| Firm size | 0.000 (0.001) | 0.000 (0.002) |
| Firm age | 0.001 (0.009) | -0.018** (0.009) |
| Lagged exploration ratio | 0.197 (0.067) | -0.111 (0.079) |
| Network size | -0.000 (0.001) | 0.000 (0.001) |
| Repeated tie ratio | -0.013 (0.118) | 0.024 (0.177) |
| Negative performance feedback at the firm level | 0.247** (0.089) | 0.269* (0.115) |
| Negative performance feedback in exploitation | 0.044 (0.074) | 0.008 (0.081) |
| Negative performance feedback in exploration | 0.023 (0.038) | 0.042 (0.039) |
| Negative performance feedback at the firm level x Negative performance feedback in exploitation | -0.064 (0.039) | -0.075† (0.044) |
| Negative performance feedback at the firm level x Negative performance feedback in exploration | -0.196** (0.073) | -0.175* (0.084) |
| Prob > chi-square | 0.000 | 0.000 |
| Observations | 253 | 253 |

^a Standard errors are in parentheses. † p < 0.1 * p < 0.05 ** p < 0.01

FIGURE 2

Interaction Effects of Negative Performance Feedback at the Firm-level
and in Exploration on Subsequent Exploration Investment Ratio^a



^a Lines plot Tobit estimates for the effects of negative feedback at the firm level on the subsequent exploratory investment ratio at different values of negative feedback in exploration and with remaining covariates measured at their mean values

VI. DISCUSSION

1. Theoretical and Practical Implications

This study attempts to account for the inconsistent behavioral tendencies of firms responding to negative performance feedbacks. My theorization and empirical results based on U.S. film producer organizations showed that the direction of change a firm takes after recent failures (i.e., more or less risk-taking) varies depending on the characteristic of the failures; failures are differentiated by whether they are attributed to prior engagement in exploitative business or

explorative one. If the firm experienced its failure mostly in exploitative business, the general prediction of traditional BToF argument that firms would increase explorative investments after failures holds robust. On the other hand, the firm experienced its failure mostly in explorative business, firms are driven to not increase, but rather decrease explorative investments since explorative investments are regarded as the main source of problem that has unattractive market prospects. And such drive to lower exploration gains strength as excessive institutional pressures are imposed discriminately on those explorative failures, resulting in firms reacting sensitively to the suggestions arising from those failures. This provides successful explanation as to why firms often do not engage in exploratory investments after failures even when they have enough resources to do so. This was possible by addressing two major neglects residing in the current BToF literature.

First, I highlighted the role of multiple negative feedback arising both from different levels and from different areas in the decision making of firms. Although there have long been quest for investigation on multiple goals and feedbacks (Shinkle, 2012), only few researchers recently have started to investigated this matter (Eggers & Suh, 2012; Gaba & Joseph, 2013). In particular, no study, to my knowledge, has properly theorized the mechanism by which firm decision makers deal with divergent feedback information from different levels and areas to reach final decision making. By conceptualizing the second- stage decision making based on performance feedback, I furthered our understanding on the way

managers actually collect and process performance feedbacks at the workplace. Decision makers, when faced with failures at the firm-level, strive to make more informed reactions by collecting feedback at subunit level that points to the actual problem area. Especially, I theorized the way decision makers categorize negative feedback collected at subunit level into categorical feedback from exploitation and exploration which produces opposing suggestions as to the direction of investment adaptation. Joint consideration of such multiple feedback from different levels and categories allows decision makers to clarify the main cause of present failures as either exploitation or exploration.

Second, I revealed that the process of learning from performance feedbacks is never “objective”. As the information of performance feedback itself is highly uncertain, the decision making process is subject to ‘twists’ from various concerns other than economic calculation. Still, the possibility of such twists have been barely explored by students of the BTOF until very recently, the neglect pointed out by researchers (Jordan & Audia, 2012). While the contributions of recent studies that started to attend to this neglects are indeed notable (Jordan & Audia, 2012; Fang, Kim, & Milliken, 2013), they still do not provide answers as to the implications of institutional concerns on the feedback-based decision making process of firms. The BTOF literature is “largely silent on how stakeholder pressures influence the decision-making process” (Dye, Eggers, & Shapira, 2014, p. 1009). This limitation is crucial in that one of the most important drivers for

managers to engage in strategic change in case of failures is external pressure – consistent evaluation by shareholders and board members and risks of punishment in forms of firing or lowering compensation according to evaluation outcomes. This implies that the decision making process is likely to be significantly swayed by institutional expectations such external interest parties hold. By theorizing that category-dependent legitimacy serves as a lens by which negative feedback information from exploration category gets amplified, I found that managers tend to overreact to such feedback from fear of excessive punishment.

This study also contributes to the institutional theory literature by exploring a novel mechanism through which firm decision makers may respond to institutional concerns. The students of institutional theory tend to focus on revealing the existence of such institutional pressures often in the form of discounts in evaluations by audiences including shareholders and financial analysts and implicitly assume that such dreadful prospects of institutional discounts result in organizational conformity to exploitation. However, numerous organizations persist to invest in exploration, the variation in organizational conformity that traditional accounts of institutional theory does not adequately account for (Smith, 2011). This study provides one successful solution to the variation of organization conformity by unveiling the actual process of how such institutional pressures gets reflected and amplified in the decision making of firm managers. I posited that firms are exposed to different degrees of institutional pressures according to their recent

performances such that firms recently having recorded failures in exploration risks more severe pressures than a firm having recorded successes. This accounts for the variation in organizational conformity across different firms and also across different periods in the same firm.

Lastly, this study also contributes to the innovation literature. Our understanding of how firms determine their balance of exploration and exploitation is still largely lacking. It has been suggested to further investigate the managerial decision making process to improve our understanding on this issue (Birkinshaw & Gupta, 2013; O' Reilly & Tushman, 2013). This study shows how decision makers dynamically adapt their investment portfolio by attending to divergent feedbacks to figure out the appropriate change response.

2. Study Limitations

Still, there are some limitations that needs to be noted. The first limitation of this research is the generalizability of the framework of this research. To enhance the validity of my empirical analysis, I limited the context of exploration and exploitation only to that of product innovation and restricted our sample to producer organizations in the U.S. film industry. Accordingly, there still remain questions of whether this study's findings can be applied to other contexts, such as new market entry, and other industries, such as the technical industry, as they stand. For this reason, I call for future studies to test my framework in other

organizational and industrial settings. Second, this study addresses only one type of exploration that is defined in the industry-level, not organization-level. While decision to build up my arguments on such industry-level standard of exploitation and exploration was mainly to examine the impacts of institutional pressures exerted by major constituents of the industry, this limitation calls for additional research that explores this mechanism with other types of exploration – especially the one defined in the organization level.

Moreover, given that this study first proved that firms' decision making based on performance feedbacks can be largely misdirected from the institutional pressures discriminately imposed on certain types of failures, I expect that future extension drawing on the clues found in this study would also help us further our understandings in the behavioral decision making process of firms. While institutional pressures have important bearings on most of the organizations in the market, the magnitude of such pressures felt by organizations would certainly show variances across them. In this regard, future studies can examine when and how these institutional pressures would more strongly or rather weakly influence the organizational decision making. For example, institutional pressures can be compounding when firms are embedded in dense networks with other firms and when such firms also experience exploratory failures at the same time. With recognition of the possibility that the mechanism of categorical performance feedback and regarding institutional pressures also work on the basis of failures of

others, not just a firm's own, we might expect to account for remaining variances
firms tend to show in response to failures.

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요약 (국문초록)

범주적 성과 피드백 및 기업의 신제품 투자의사결정

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서 하 람

기업 행동 이론 문헌은 문제적 탐색 메커니즘에 입각해 기업들의 실패가 변화와 위험감수를 유발한다고 예측한다. 그러나 현실에는 실패를 겪은 후에도 유의미한 변화와 위험감수 양상을 보이지 않는 많은 기업들의 배치되는 사례들이 존재한다. 본 연구는 기업들이 실패를 해석하고 그에 대한 대응 양상을 결정하는 과정이 제도주의적 고려에 의해 영향 받을 수 있다는 점을 보임으로써, 실패에 대해 기업들의 상이한 반응 행태를 이해하는 데 기여하고자 한다.

다양한 제품 라인에서 유발되는 기업들의 실적 피드백은 크게

두 가지인 저위험 사업군(활용)과 고위험 사업군(탐색)에서의 피드백으로 범주화할 수 있다. 기업 경영진은 최근의 사업 실패가 저위험 사업군에서 유발되었을 경우에 비해 고위험 사업군에서 유발되었을 시, 외부 투자자 및 이사진들로부터 실패에 대한 더 강한 문책과 압박을 겪게 된다. 이는 각 사업군 범주에 적용되는 범주 기반의 제도주의적 기대와 규범이 다르기 때문이다. 저위험, 활용적 사업군에의 투자가 시장에서의 성공 표준으로 받아들여지는 반면, 고위험, 탐색적 사업군에 대한 투자는 확립된 시장의 제도주의적 표준으로부터의 이탈로 간주되어 투자 의사결정부터 투자의 결과까지 더욱 강한 모니터링의 대상이 되기 때문이다. 따라서 기업 경영진은 실패가 어느 사업군 범주에 귀속되는가를 판단하고, 그에 따라 상이한 반응 행태를 보이게 되는 것이다.

본 연구는 이러한 양상을 미국 영화 제작사들의 2000년에서 2012년까지의 신규 영화 투자의사결정을 통해 검증하였다. 실제로 고위험 사업군에서의 실패는 저위험 사업군에서의 실패와 달리 일반적으로 기업 실패가 가져오는 위험 감수 증가를 약화시키는 결과를 보여주었다.

주요어: 기업 행동 이론, 범주 기반 정당성, 부정적 성과 피드백, 위험 감수 투자

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