R&D Intensity and Regulation Fair Disclosure

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Abstract

This study examines the relationship between R&D intensity and disclosure. R&D activities are essential in bringing innovation to companies. However, R&D activities are naturally uncertain and increase information asymmetry. Thus, firms with high R&D activities are more likely to have the incentive to communicate the potential of R&D investment to the market through voluntary disclosure and, concurrently, resolve information asymmetry. Meanwhile, incentives to less voluntary disclosure exist because of the proprietary cost and the risk of competitiveness loss. Furthermore, the uncertainties inherent in R&D activities caused the possible decrease in the information accuracy. For the two opposing views, this study investigates the relationship between R&D intensity and disclosure frequency using the Regulation Fair Disclosure data in Korea. Moreover, the relationship between R&D intensity and usefulness of the information disclosed is also examined. Using firm sample listed in the 2011–2016 Korea Stock Market, results show that firms with high R&D intensity make disclosures more frequent. Subsequently, the analysis using forecast sample shows that management forecast error is higher in firms with high R&D intensity. This research contributes to the existing literature by presenting evidence that R&D intensity is a significant factor affecting manager's disclosure behavior and information usefulness.

Keywords: R&D intensity, Information asymmetry, Regulation fair disclosure, Disclosure quality.

JEL Classification Code: O32, M14, M41.

1. Introduction

This study examines the relationship between corporate R&D intensity and disclosure. R&D activities are a major driving force for sustainable growth by bringing innovation and strengthening competitiveness. However, an uncertainty exists on whether or not R&D activities lead to performance and when. Therefore, accounting standards require that R&D costs be expensed rather than capitalized, except when certain criteria are met. This concept is appropriate from a conservatism perspective, but a limitation that financial statements do not properly reflect intangible assets exists.

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In this regard, Barth, Kasznik, and McNichols (2001) reported that high analyst coverage is required in order to supplement the insufficient information in firms with high R&D intensity. Amir, Lev, and Sougiannis (2003) found that firms with high R&D intensity are more likely to lack financial information, and analyst earnings forecast information is complementary to these limitations, but not perfect. Barron, Byard, Kile, and Riedl (2002) also found that for firms with high-technology intangibles such as R&D, analysts often rely on private information to supplement corporate financial information, and the consensus is lowered.

The limitations of financial information are an important issue for firms with high R&D intensity, and it is necessary to mitigate information asymmetry and obtain an appropriate evaluation in the market. This study is aimed at investigating whether or not firms with high R&D intensity intend to transmit their growth potential to the market through voluntary disclosure. Specifically, this study analyzes the relationship between R&D intensity and fair disclosure frequency and usefulness for the period after the adoption of the Regulation Fair Disclosure, which was adopted in November 2002. This regulation requires companies to provide important information to all stakeholders

simultaneously, rather than offering it selectively to a specific group or individual. Furthermore, Regulation Fair Disclosure is essentially a voluntary disclosure in that the firm has the discretion whether to disclose information or not.

Results are as follows. First, higher R&D intensity is associated with more disclosure. By disclosure item, the results are significant only in actual sales or earnings announcement and future plan announcement. Second, the analysis using forecast sample shows that the management forecast error was higher for firms with higher R&D intensity than for those with lower R&D intensity. In summary, the above results indicate that firms with higher R&D intensity disclose more frequently, but the results vary depending on the disclosure items, and in particular, the accuracy of the forecast information is low.

Despite the theoretical background, studies investigating the relationship between proprietary costs and voluntary disclosure are limited with mixed results (Bamber, Hui, & Yeung, 2010; Baik, Farber, & Lee, 2011). Particularly, in Korea, studies on R&D activities and disclosures are sparse. Thus, this study contributes to prior research in that it examines the impact of R&D intensity, which is a key element for sustainable growth, on the disclosure behavior of the firm.

2. Literature Review and Hypothesis

R&D activities are characterized by high uncertainties; hence, much research on various topics has been actively conducted, for example, incentive of managers and control mechanism (Narayanan, 1985; Dechow & Sloan, 1991; Baysinger, Kosnik, & Turk, 1991; Hoskisson, Hitt, & Hill, 1993; Bushee, 1998; Hanlon, Rajgopal, & Shevlin, 2003; Cheng, 2004; Roychowdhury, 2006), recognition and value relevance of R&D activities (Lev & Sougiannis, 1996; Aboody & Lev, 1998; Kothari, Laguerre, & Leone, 2002; Han & Manry, 2004; Beaver, McNichols, & Rhie, 2005), activity of investors and analysts (Barth et al., 2001; Barron et al., 2002; Amir et al., 2003), and auditor's characteristic (Godfrey & Hamilton, 2005).

R&D intensity is a general proxy representing the proprietary cost of a firm. Theoretically, firms with high proprietary costs tend to be less inclined to voluntarily disclose information (Verrecchia, 1983). In other words, a firm with a high proprietary cost has the incentive to take a superior position in the competition by protecting its own information. In this regard, some empirical studies have reported that firms with higher proprietary costs are reluctant to disclose corporate information, and when they disclose information, it is in a less informative way (Bamber & Cheon, 1998; Botosan & Stanford, 2005; Jones, 2007; Wang, 2007;

Bamber et al., 2010). For example, Wang (2007) reported that in the USA, before the Fair Disclosure was adopted, firms reported earnings forecast information only to specific information users such as analysts; however, after the adoption of Fair Disclosure, they no longer disclose their information. On the basis of these studies, the frequency of disclosure is expected to be smaller for firms with high R&D intensity.

By contrast, incentives are available for firms with high R&D intensity to disclose information for emphasizing differentiation in the market or for mitigating information asymmetry. For example, Jones (2007) presented two methods of disclosure of firms. First, they disclose managerial earnings forecasts, not only avoiding disclosure of detailed proprietary information but also signaling the potential of the firm. Second, they disclose detailed information to clearly convey their distinctive characteristics. Gelb (2002) suggested that firms with high intangible assets tend to disclose information to mitigate information asymmetry and that such disclosure is highly valued in the market. Consistently, Ng, Tuna, and Verdi (2013) reported that market reaction to management forecasts is stronger for firms with high proprietary costs. This statement suggests that the information of companies with high R&D intensity is perceived to be more credible in the market. In Korea, Yoo, Cha, Yoo, and Lee (2013) showed that management earnings forecast reduces the cost of equity capital as it alleviates the information asymmetry. Firms more engaged in R&D activities are likely to use voluntary disclosures as a way to lower the cost of capital, given that a greater information asymmetry exists in those firms. On the basis of the two contradictory views, this study posits the following null hypothesis.

H 1: There is no relation between R&D intensity and the frequency of disclosure.

A series of literature supports that better disclosure quality results in greater stock liquidity, and eventually lowers companies' cost of equity capital (Verrecchia, 2001; Baimukhamedova, Baimukhamedova, & Luchaninova, 2017), which means that the information provided by the company has a significant information effect on the market (Baygi, & Javadi, 2015; Lee, & Chae, 2018). However, all the information provided under Regulation Fair Disclosure may not have the same degree of accuracy or information effect. First, the uncertainty associated with R&D spending may cause difficulty for managers and markets to accurately forecast profits (Rogers & Stocken, 2005). Second, managers may strategically choose accuracy of information according to certain circumstances such as proprietary cost. Specifically, the higher the R&D spending, the more likely it

is that managers will provide information that is less accurate and optimistic (Bamber et al., 2010).

Taken together, the uncertainty and proprietary costs of R&D spending are expected to reduce the accuracy of disclosure for firms with large R&D spending. Nevertheless, managers with more R&D spending will possibly try to provide accurate information in order to increase market confidence in investment performance. Using management sales forecast, this study posits the following null hypothesis.

H2: There is no relation between R&D intensity and the accuracy of management sales forecasts.

3. Research Design

To investigate Hypothesis 1, the clustering regression is performed using Equation (1).

$$
\begin{aligned}
DISCLOSURE_{i,t} = {} & \alpha + \beta_1 XRD\_INTENSITY_{i,t} + \beta_2 SIZE_{i,t} \\
& + \beta_3 ROA_{i,t} + \beta_3 GROWTH_{i,t} \\
& + \beta_4 LEVERAGE_{i,t} + \beta_5 FINANCING_{i,t} \\
& + \beta_7 STD\_RET_{i,t} + \beta_5 AGE_{i,t} + \beta_6 LARGE_{i,t} \\
& + \beta_8 FOREIGN_{i,t} + \beta_9 ANALYST_{i,t} \\
& + \beta_{10} BIG4_{i,t} + \sum YEAR + \varepsilon
\end{aligned} \quad (1)
$$

Table 1: Variable Definitions

Variables	Definition
DISCLOSURE	A firm's disclosure frequency during a year
(1) DISCLOSURE_Forecast	Management forecast
(2) DISCLOSURE_Actual	Actual (preliminary) results announcement
(3) DISCLOSURE_Plan	Future business and management plan
(4) DISCLOSURE_PreActual	Notice of actual (preliminary) announcement
(5) DISCLOSURE_Other1	Matters related to timely disclosure
(6) DISCLOSURE_Other2	Others
XRD_INTENSITY	R&D intensity
SIZE	Log of total assets
ROA	Net income relative to total assets
GROWTH	Change in sales over the past year
LEVERAGE	Total liabilities divided by total assets
FINANCING	Indicator variable that is equal to 1 when the sum of total liabilities and total shareholder's equity increases over the past (or following) year, 0 otherwise

STD_RET	Standard deviation of daily returns over the year
AGE	Log of the number of years from listed year
LARGE	Largest shareholders' ownership
FOREIGN	Foreign ownership
ANALYST	Analyst following
BIG4	Indicator variable that is equal to one if Big 4 auditor, 0 otherwise
∑YEAR	Year dummy

In Equation (1), DISCLOSURE denotes the frequency of disclosure and is measured as a firm's Fair Disclosure during a year, which is taken from the Korea Investor's Network for Disclosure system (KIND). XRD_INTENSITY denotes the R&D intensity and is measured as the ratio of R&D expenditures to total sales (Baysinger & Hoskisson, 1989). Therefore, the positive and significant coefficient on XRD_INTENSITY indicates that firms with high R&D intensity disclose more frequently than those that with low R&D intensity and vice versa on the negative and significant coefficient. In Korea, Fair Disclosure is classified into six categories according to the contents. Therefore, additional analysis is conducted to determine whether the effect of R&D intensity on disclosure frequency varies according to Fair Disclosure contents, which are classified as follows: (1) management forecast, (2) actual (preliminary) results announcement, (3) future business and management plan, (4) notice of actual (preliminary) announcement, (5) matters related to timely disclosure, and (6) others. Control variables are included, following prior studies (Lang & Lundholm, 1993). First, if the size (SIZE) is large, it is expected that the disclosure frequency will be high because not only the amount of information of the company is large but also the demand of the stakeholder is high. Also, the larger the size of a firm, the lower the average cost of disclosure. We expect profitability (ROA) and sales growth rate (GROWTH) to increase as the financial condition of the company is better. Next, there may be incentives to resolve information asymmetry and to lower capital costs if the debt ratio (LEVERAGE) is high or the need for financing (FINANCING) is high. Next, we included volatility of daily stock returns (STD_RET) to control the effects of uncertainty on the firm. The number of listing days (AGE) reflects the amount of information and disclosure requirements of the company. In general, a company with a short listing period may lack information about the company and thus may be highly demanded for information. In addition, managers of these companies will be more motivated to signal their growth potential. The largest shareholders ownership (LARGE) and foreign ownership (FOREIGN) represent the ownership

structure. Analyst coverage (ANALYST) represents demand for information. Finally, whether the auditor is a Big 4 (BIG 4) indicates the audit quality. If audit quality is high, disclosure quality is expected to be high. All variables are defined in Table 1.

Subsequently, to analyze Hypothesis 2, the clustering regression is performed using Equation (2).

$$MFE_{i,t} = \alpha + \beta_1 XRD\_INTENSITY_{i,t} + \beta_2 HORIZON_{i,t}$$
$$+ \beta_3 SIZE_{i,t} + \beta_4 ROA_{i,t} + \beta_5 GROWTH_{i,t}$$
$$+ \beta_6 LEVERAGE_{i,t} + \beta_7 FOREIGN_{i,t}$$
$$+ \beta_8 ANALYST_{i,t} + \sum YEAR + \varepsilon_{it} \quad (2)$$

Table 2: Variable Definitions

Variables	Definition
MFE	|Management sales forecast − actual sales| divided by lagged market value
XRD_INTENSITY	R&D intensity
HORIZON	Log of days from disclosure date to year-end
SIZE	Log of total assets
ROA	Net income relative to total assets
GROWTH	Change in sales over the past year
LEVERAGE	Total liabilities divided by total assets
FOREIGN	Foreign ownership;
ANALYST	Analyst following
∑YEAR	Year dummy

In Equation (2), MFE denotes the management sales forecast error and is measured as the absolute value of management earnings forecast error deflated by lagged market value. XRD_INTENSITY denotes the R&D intensity and is measured as the ratio of R&D expenditures to total sales (Baysinger & Hoskisson, 1989). Therefore, the positive and significant coefficient on XRD_INTENSITY indicates that firms with high R&D intensity disclose less accurate management forecast than those with low R&D intensity and vice versa on the negative and significant coefficient. Control variables are included, following prior studies and all variables are defined in Table 2.

4. Results

4.1. Sample

This study uses data from firms listed on the Korean securities market over the sample period (2011 – 2016). Financial data are extracted from Dataguide 5, and the Regulation Fair Disclosure data are collected directly from the KIND system. The collected Regulation Fair Disclosure data are from November 2002 when the Regulation Fair Disclosure was adopted. However, the main financial statements have been changed to K-IFRS consolidated financial statements starting 2011. Consequently, the information provided through the disclosure was gradually based on the consolidated financial statements. Therefore, sample period of this study is from 2011.

The sample selection process was performed according to the general criteria. We exclude the following firms: (1) companies in the financial industry; (2) firms with fiscal year-end other than December; and (3) firms with negative total assets and equity capital. We also eliminate observations with missing variables. Finally, all variables are winsorized at 1 percent tails to control the effect of outliers. The final sample consists of 2,330 firm-year observations.

4.2. Descriptive Statistics and Correlation Matrix

Table 3 provides descriptive statistics. The mean value of DISCLOSURE is 2.284, which indicates that firms disclose 2.284 times a year on average. Decomposition of disclosure content shows that the most frequent disclosure is related to DISCLOSURE_Actual and followed by DISCLOSURE_PreActual with mean values of 1.586 and 0.371, respectively. The mean value of DISCLOSURE_Forecast is 0.133, which is lower than DISCLOSURE_Actual and DISCLOSURE_PreActual. Moreover, the mean value of XRD_INTENSITY is 0.013, which implies that the ratio of R&D expense to total sales is 1.3%.

Table 4 presents the correlations among the variables. DISCLOSURE is positively and significantly related to XRD_INTENSITY. With regard to control variables, DISCLOSURE is positively and significantly related to SIZE, ROA, FINANCING, FOREIGN, ANALYST, and BIG4 consistent with prior literature. Thus, this paper examines whether the relationship between DISCLOSURE and XRD_INTENSITY is significant after controlling for other significant factors through regression analysis.

4.3. Regression Results

Table 5 presents the clustering regression results for testing Hypothesis 1 using Equation (1). The estimated value of β_1 is positive and significant at 10% level (β_1 = 8.9227, t = 1.87). This value confirms that firms with high R&D intensity disclose more frequently than those with low R&D intensity.

Table 3: Descriptive Statistics (*n* = 2,330)

Variables	Mean	Std.	Median	P25	P75	Min.	Max
DISCLOSURE	2.284	3.688	0	0	4	0	18
DISCLOSURE_Forecast	0.133	0.392	0	0	0	0	2
DISCLOSURE_Actual	1.586	2.726	0	0	3	0	16
DISCLOSURE_Plan	0.033	0.18	0	0	0	0	1
DISCLOSURE_PreActual	0.371	1.064	0	0	0	0	4
DISCLOSURE_Other1	0.064	0.303	0	0	0	0	2
DISCLOSURE_Other2	0	0	0	0	0	0	0
XRD_INTENSITY	0.013	0.021	0.004	0.001	0.014	0	0.113
SIZE	20.301	1.698	20.045	19.098	21.232	17.15	25.23
ROA	0.014	0.081	0.025	0.001	0.054	-0.375	0.169
GROWTH	0.306	1.717	0.037	-0.039	0.137	-0.441	15.556
LEVERAGE	1.455	1.731	0.997	0.495	1.7	0.113	12.573
FINANCING	0.854	0.353	1	1	1	0	1
STD_RET	2.654	1.037	2.427	1.908	3.153	1.016	6.065
AGE	2.89	0.761	3.135	2.485	3.466	0.693	3.892
LARGE	0.434	0.162	0.431	0.318	0.535	0.083	0.835
FOREIGN	0.105	0.131	0.048	0.013	0.149	0	0.573
ANALYST	4.771	8.576	0	0	4	0	33
BIG4	0.714	0.452	1	0	1	0	1
MFE	0.312	0.634	0.113	0.03	0.292	0.003	4.446
HORIZON	5.414	0.677	5.793	5.356	5.814	3.664	5.865

The descriptive statistics of the variables are reported.

Table 4: Correlation

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
DISCLOSURE	1														
XRD_INTENSITY	0.093*	1													
SIZE	0.586*	−0.037*	1												
ROA	0.172*	0.025	0.214*	1											
GROWTH	−0.036*	−0.044*	0.054*	0.043*	1										
LEVERAGE	−0.010	−0.122*	0.121*	−0.417*	−0.015	1									
FINANCING	0.067*	0.054*	0.039*	0.346*	0.058*	−0.236*	1								
STD_RET	−0.177*	0.021	−0.331*	−0.354*	0.064*	0.226*	−0.100*	1							
AGE	−0.061*	0.004	0.063*	−0.085*	−0.016	0.035*	−0.019	0.003	1						
LARGE	−0.144*	−0.154*	−0.042*	0.206*	0.078*	−0.078*	0.069*	−0.193*	−0.169*	1					
FOREIGN	0.423*	0.064*	0.510*	0.267*	−0.016	−0.161*	0.110*	−0.267*	0.037*	−0.191*	1				
ANALYST	0.657*	0.107*	0.753*	0.188*	−0.025	−0.016	0.079*	−0.173*	−0.059*	−0.220*	0.561*	1			
BIG4	0.210*	0.073*	0.437*	0.125*	0.015	0.043*	−0.022	−0.186*	−0.078*	0.085*	0.259*	0.287*	1		
MFE	−0.006	0.030	0.267*	−0.230*	0.457*	0.437*	−0.047	0.027	0.143	0.042	−0.165	0.024	0.045	1	
HORIZON	−0.052	0.100	0.005	0.174*	−0.084	−0.119	0.220*	−0.128	−0.157	−0.266*	0.278*	0.188*	0.059	0.144	1

The correlation is presented in this table. Variable definitions are presented in Table 1. * $p < 0.1$

Table 5: R&D Intensity and Disclosure Frequency

Dependent variable: Disclosure frequency		
Variables	Coefficient	Robust t-stat
XRD_INTENSITY	8.9227*	(1.87)
SIZE	0.5806***	(3.96)
ROA	1.0763	(0.82)
GROWTH	−0.0836***	(−2.95)
LEVERAGE	−0.0188	(−0.42)
FINANCING	0.0688	(0.34)
STD_RET	−0.0335	(−0.45)
AGE	−0.2971*	(−1.77)
LARGE	−0.7906	(−0.82)
FOREIGN	1.2711	(0.60)
ANALYST	0.1808***	(6.00)
BIG4	−0.4002**	(−2.08)
Constant	−8.9727***	(−3.13)
∑YEAR	Included	
N	2,330	
Adj. R2	0.459	

Note: The clustering regression results for testing Hypothesis 1 using Equation (1) are reported. The robust t-statistics are in parentheses. Variable definitions are presented in Table 1.

Table 6 presents the clustering regression results for testing Hypothesis 1 by disclosure content using Equation (1). The estimated value of β_1 is positive and significant at 5% (10%) level only when the disclosure contents are DISCLOSURE_Actual and DISCLOSURE_Plan. Actual (preliminary) result announcement (DISCLOSURE_Actual) and future business and management plan (DISCLOSURE_Plan) may alleviate information asymmetry, while not bearing high proprietary cost which is an important factor of voluntary disclosure (Verrecchia, 1983).

Taken together, results in Table 5 indicate that firms with high R&D intensity disclose more frequently than those with low R&D intensity, while results in Table 6 are limited.

Table 6: R&D Intensity and Disclosure Frequency: By Disclosure Content

Dependent variable: Disclosure frequency					
Variables	Model 1 DISCLOSURE_Forecast	Model 2 DISCLOSURE_Actual	Model 3 DISCLOSURE_Plan	Model 4 DISCLOSURE_PreActual	Model 5 DISCLOSURE_Other1
XRD_INTENSITY	−0.7182	7.1588**	0.5800*	1.6869	0.3659
	(−1.40)	(2.17)	(1.82)	(0.70)	(0.78)
SIZE	0.0428***	0.4102***	0.0110**	0.0668	0.0288***
	(3.01)	(3.29)	(2.28)	(1.44)	(3.27)
ROA	−0.2196*	1.1601	−0.0563	0.3765	−0.1324
	(−1.73)	(1.02)	(−0.91)	(1.01)	(−1.65)
GROWTH	−0.0054*	−0.0638***	−0.0008	−0.0062	−0.0043***
	(−1.75)	(−2.84)	(−0.31)	(−0.66)	(−2.84)
LEVERAGE	0.0007	−0.0238	−0.0035	−0.0071	0.0079
	(0.13)	(−0.72)	(−1.47)	(−0.47)	(1.54)
FINANCING	0.0036	0.0224	0.0015	0.0159	0.0150
	(0.14)	(0.13)	(0.14)	(0.28)	(0.80)
STD_RET	0.0036	0.0053	−0.0011	−0.0413**	−0.0020
	(0.41)	(0.08)	(−0.30)	(−2.01)	(−0.32)
AGE	−0.0424**	−0.1201	−0.0007	−0.0960	−0.0249*
	(−2.43)	(−0.89)	(−0.13)	(−1.64)	(−1.75)
LARGE	−0.1214	0.1326	−0.0616**	−0.4213	−0.0566
	(−1.31)	(0.16)	(−2.24)	(−1.54)	(−1.06)
FOREIGN	0.1896	1.6683	0.0441	−0.3074	−0.1853**
	(1.11)	(0.88)	(1.04)	(−0.65)	(−2.15)
ANALYST	0.0090***	0.1131***	0.0025**	0.0420***	0.0047
	(2.95)	(4.98)	(2.46)	(3.65)	(1.57)
BIG4	−0.0060	−0.2582*	−0.0081	−0.0332	−0.0424**
	(−0.30)	(−1.66)	(−1.05)	(−0.51)	(−2.40)
Constant	−0.5890**	−7.0472***	−0.1409	−0.5567	−0.4289***
	(−2.18)	(−2.88)	(−1.58)	(−0.62)	(−2.66)
∑YEAR	Included	Included	Included	Included	Included
N	2,330	2,330	2,330	2,330	2,330
Adj. R2	0.159	0.383	0.062	0.190	0.056

Note: The clustering regression results for testing Hypothesis 1 using equation (1) are reported. The robust t-statistics are in parentheses. Variable definitions are presented in Table 1.

Table 7 presents clustering regression results for testing Hypothesis 2 using Equation (2). The estimated value of β_1 is positive and significant at 10% level (β_1 = 8.1442, t = 1.95). The dependent variable, MFE, is the absolute value of the scaled management forecast error; therefore, the positive and significant β_1 suggests that firms with high R&D intensity disclose less accurate forecast than firms with low R&D intensity.

Table 7: R&D Intensity and Management Sales Forecast Accuracy

Dependent variable: MFE		
Variables	**Coefficient**	***t*-stat**
XRD_INTENSITY	8.1442*	(1.95)
HORIZON	0.2529***	(3.26)
SIZE	0.1736***	(2.85)
ROA	0.2822	(0.34)
GROWTH	0.1306**	(2.32)
LEVERAGE	0.2546*	(1.87)
FOREIGN	−0.2272	(−0.64)
ANALYST	−0.0278**	(−2.28)
Constant	−5.3554***	(−3.14)
∑YEAR	Included	
N	100	
Adj. R2	0.488	

Note: The clustering regression results for testing Hypothesis 2 using Equation (2) are reported. The robust t-statistics are in parentheses. Variable definitions are presented in Table 2.

5. Discussion and Conclusions

This study explores the relationship between corporate R&D activities and Fair Disclosure. Using the data of the listed companies in the Korea Stock Market from 2011 to 2016, the study shows that higher R&D intensity is associated with more disclosure. Specifically, R&D intensity is significantly related to actual (preliminary) result announcement. Furthermore, results reveal that firms with high R&D intensity disclose less accurate management forecast than firms with low R&D intensity. In conclusion, the above results suggest that firms with high R&D intensity actively disclose information, but the accuracy of the disclosed information is relatively low.

This study has the following limitations. First, the reason for the low accuracy of the management forecast of firms with high R&D intensity is not specified. In other words, the low accuracy of information may be due to uncertainties inherent in R&D activities, or it may be a strategic choice of managers, which is not clearly distinguished in this study. Second, as a measure of R&D activities, only the quantitative aspect such as R&D intensity has been considered; however, qualitative aspects also need to be considered. Furthermore, with the adoption of K-IFRS in 2011, the sample period was limited. Thus, re-examining the hypothesis of this study with more extended sample is expected in future studies.

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