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## Perceive it or Not: Information Quality and the Investors' Response to Earning Surprises of Technologically Advanced Companies

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## Perceive it or Not: Information Quality and the Investors' Response to Earning Surprises of Technologically Advanced Companies

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### ABSTRACT

*One of the primary measures of information systems (IS) success that has been the subject of much investigation in a variety of contexts is information quality (DeLone & McLean, 1992; 2003). This paper hones in on the impact of perceived information quality in the context of the financial markets, where quality of accounting information is particularly important, as it informs investment decisions and impacts stock prices. In particular, seminal accounting research has consistently found that earnings announcements possess informational value (information content) based upon which the market reacts (Beaver, 1968). Market reaction to surprises in earnings announcements has long been used to understand the quality of the earnings announced and studies have explored various factors affecting the response. The current study adds to this body of research by factoring in the perceived quality of the information systems environment. We hypothesize that information reported by companies known for developing and employing sophisticated IT systems is weighed more heavily by investors. We conduct an analysis of stock price before and after earnings announcement surprises among firms known for sophisticated IT systems. Results provide direct support for our hypothesis, indicating that the market reacts more strongly to earnings surprises (both positive and negative) reported by innovative users of IT as compared to less innovative users of IT.*

*These results contribute to a new insight into the circumstances that affect the information content of earnings announcements as well as a richer perspective on the impact of investment in advanced information systems in terms of perceived quality of a company's information environment by the financial markets.*

**Keywords:** ERC, Perceived Information Quality, Earnings Surprises

## INTRODUCTION

In recent years, new and improving forms of information technology (IT) have been revolutionizing business processes, redefining financial practices, and recreating industry dynamics. Not excluded from this phenomenon, the functions of finance and accounting have seen drastic transformations in information processing and business norms due to technology developments (Altschuller & Altschuller, 2018). In this environment, investment in technology is reaching record highs (Laudon & Laudon, 2018, pg. 6). Yet for decades, practitioners and researchers alike have grappled with the question of how to justify individual investments in information technology systems (Kohli & Devaraj, 2003). Despite the ubiquity of technology, managers continually seek concrete measures of the success of the systems they implement (Doherty *et al.*, 2012; Petter *et al.*, 2013). The first step in this process is understanding the impacts and improvements that advanced technology systems have on business processes and outcomes.

Though the impacts are manifold and diverse, the focus of this research is on the relationship between advanced business information systems and information quality. Among the various measures of information systems success, information quality is an important dimension because it describes the semantic level, the middle of the three levels of IS functionality. This level is a pivotal area to focus on since it consists of the properties of the information product that has been created at the technical level and leads to an effect on recipients at the influence level (Mason, 1978; DeLone & Mclean, 1992). In particular, financial information that is of poor quality can lead to reporting misstatements, poor business decisions, and/or an unfavorable image. Because investors rely on high quality information to inform their investment decisions, the stock market is a good indicator of the nature of the information being produced by organizations. Accordingly, the following research investigates the concept of information quality in the context of financial markets. In the case of financial markets, perception of information quality is an important angle.

Therefore, the motivation of the study that follows is to examine the impact of technology-produced information on market reactions as an indicator of perceived information quality.

One way that information quality has been examined in the market context has been via the Earnings Response Coefficient (ERC), which has been used to measure earnings quality, i.e. how informative a company's earnings announcement is to investors. As will be elucidated below, several factors (such as audit quality and others) emerged as researchers attempted to measure the ERC and determine what affects it. Still, although accounting theory indicates that ERC directly reflects earnings quality, findings in the research indicate that the observed ERC is not

consistent with the theoretically predicted ERC. We contribute to the accounting and IT research by introducing the quality of firms' information technology into the analysis of the role of accounting information in capital markets. Drawing from IS research, we propose that perceived quality of the information produced by companies is a significant contributing factor to the ERC. Thus, our study simultaneously addresses an ERC 'conundrum' that has puzzled accounting researchers while highlighting the relationship between high-quality business systems and the perceived quality of the information they produce.

To our knowledge, this is the first study to suggest the role of perceived information quality as an important factor in investors' reaction to earnings announcements. This finding, besides contributing to the accounting research by suggesting a new variable to use in theoretical models, would also contribute to business practice regarding the importance of IT investment. This has practical implications for managers, as it highlights the value to a firm of investing in IT that will enable better and more timely information. Investors tend to reward firms that are more transparent and informative with a lower cost of capital. This study can suggest such benefits to companies that invest in enhanced IT systems.

## **THEORETICAL BACKGROUND**

### ***Information Systems Success***

Information systems and IS projects tend to be complex, involving many differing players and stakeholders. As such, evaluating the success of a system has proven tricky. For decades, researchers have studied the concept of information system success, aiming to remove some of the ambiguity around what qualifies as a successful information system and how the success can be measured.

While some researchers are of the opinion that success of an IS is not a static, objective state (Cecez-Kecmanovic *et al.*, 2014), and others profess that success is an emergent and long-term process (Orlikowski, 1996), much work has been done to identify and measure the main factors and antecedents for IS success. Central among these efforts has been the work of DeLone and McLean who developed a model to explain the multifaceted nature of IS success (DeLone & McLean, 1992; 2003). The D&M model, which has been applied and tested extensively over the last two decades, maintains that along with (but separate from) system and service quality, *information quality* is one of the three core antecedents to system use and satisfaction with information systems, ultimately leading to net benefits from an information system.

### ***Information Quality & Perceived Information Quality***

Delving deeper into the concept of information quality, we find a course of study that has also been diverse and complex. Researchers have proposed and investigated many dimensions of information quality including accuracy, completeness, consistency, ease of understanding, personalization, relevance, reliability, security, and timeliness (Bailey & Pearson, 1983; Lee *et al.*, 2002; Wand & Wang, 1996; Wang & Strong, 1996). The characteristics by which we measure information quality often depends on the context in which the information will be used (Nicolaou & McKnight, 2006). Whichever way we choose to approach information quality, however, it is clearly a significant construct. Research has found significant impacts of quality information on decision-making performance, job effectiveness, quality of work, and web site visits (Etezadi-Amoli & Farhoomand, 1996; Seddon & Kiew, 1994; Teo & Wong, 1998; Wixom & Watson, 2001).

Seminal among the research in this area is Wang & Strong's (1996) *Conceptual Framework of Data Quality*. Outlining the dimensions of data quality, Wang and Strong describe quality information as having intrinsic, contextual, representational, and accessibility quality attributes. Each of these categories is further broken down into what data consumers define as quality data in each of these areas. In the "intrinsic" category, Wang and Strong describe that data is intrinsically higher quality not only when it is accurate and objective, as you would expect. They also include *believability* and *reputation* quality in their breakdown of intrinsic data quality. Thus, the *perceived* quality of information is a fundamental factor of intrinsic quality just as is accuracy of the data.

In fact, perceived information quality (PIQ) has been an important factor in understanding systems, their impacts, and use. Perceived information quality has been described as the "cognitive beliefs about the favorable or unfavorable characteristics of the currency, accuracy, completeness, relevance, and reliability of the information," or as the "user reaction to the facts and figures the system produces," (Nicolaou & McKnight, 2006; Bailey & Pearson, 1983; Ives *et al.*, 1983). PIQ is an important construct in that it has been linked to user trust in data exchanges (Nicolaou & McKnight, 2006), web site loyalty intentions (Pearson *et al.*, 2012), and user satisfaction (DeLone & McLean, 1992; McGill *et al.*, 2003). Given its prominence, research has examined the antecedents of PIQ which include such things as information content depth and breadth (Agarwal & Venkatesh, 2002), information currency (Nielsen, 2000), and system design interventions such as control transparency and outcome feedback (Nicolaou & McKnight, 2006). In addition, overall reliability of the system itself has been mentioned as a contributor to perceived information quality.

### ***Perceived Information Quality and System Quality***

Much classic IS success research addresses system quality and information quality as distinct indicators of success (DeLone & McLean, 1992; 2003; Seddon & Kiew, 1994; Teo & Wong, 1998). However, prior research does indicate that there is some interaction between the two in their impact on user satisfaction. Several works have drawn connections between system quality and information quality (McKinney *et al.*, 2002), noting that crossover effects exist between system quality and information quality factors (Nelson *et al.*, 2005). Gorla *et al.* (2010) have even demonstrated a link between system quality and information quality. As a result, it is not surprising that several researchers have suggested that system factors do affect the user's perception of the information provided by the system (Nelson *et al.*, 2005; Bennett, 1983). However, the direct relationship between system quality and perceived information quality has not been extensively addressed by prior research. Distinct from the measurement of actual information quality, perceived information quality is often relevant when users interact with the information at a higher level.

### ***Information Content of Earnings Announcements***

Surely, the financial markets are a medium that has proven the power of perceptions by the very tenets of their existence. The underlying concept of financial markets is one which allows shareholders to evaluate public companies and express their confidence in them via stock pricing. Thus, shareholders, investors, and analysts continually look for signs and signals of a company's success to drive their purchase and sale prices of company shares. Investors collect information from various sources to inform their investment decisions. Analysts' forecasts of earnings is one indicator of a company's performance. Additionally, investors get information from the companies themselves. Seminal accounting research has shown that each quarter when a company announces its earnings, investors perceive those earnings announcements to possess informational value (Beaver, 1968). As a result, when the earnings announcement contains a surprise based on investors' expectations, stock prices tend to respond.

The measurement of the response to earnings announcements has been widely used to better understand the extent and value of information being conveyed by earnings announcements in various situations.

### ***Earnings Response Coefficient and Earnings Quality***

The objective of financial reporting is to "provide information about an enterprise's financial performance during a period" (Financial Accounting Standards Board, 2018). FASB's Statement of Financial Accounting Concepts No. 8 goes on to describe "higher quality earnings" as those that "provide more information about

the features of a firm's financial performance that are relevant to a specific decision made by a specific decision-maker". As will be discussed in this section, there is a vast body of accounting research that has focused on identifying and measuring "proxies" for earnings quality (Dechow *et al.*, 2010; Altamuro *et al.*, 2005; Hanlon *et al.*, 2008). As mentioned, one widely used approach to measuring earnings quality is investor responsiveness to earnings. Research studies in this area most commonly use the earnings response coefficient (ERC) or the  $R^2$  from the earnings-returns model as an empirical measure for earnings quality (Dechow *et al.*, 2010). These studies use Holthausen & Verrecchia (1988) as the theoretical basis for this methodology.

Accounting researchers, beginning with Ball & Brown (1967; 1968) and Beaver (1968) have long used equity market responses to earnings as a measure of earnings quality. These studies have found that earnings surprises are correlated with equity market responses (returns, trading volume, and volatility changes). As a result, accounting research has demonstrated that the equity market responses can be used to infer earnings quality.

Once this correlation was established, researchers began to investigate the determinants of earnings quality by measuring the effect of firm attributes or earnings attributes on the ERC. Biddle & Seow (1991), Ahmed (1994), and others, have examined ERCs as a function of fundamental firm characteristics to investigate how these characteristics can affect the quality of earnings. Liu & Thomas (2000) find that the ERC is higher when the correlation between unexpected earnings and analyst forecast revision is high. They conclude that when current period unexpected earnings are informative to analysts and cause them to revise their earnings forecasts, which would intuitively suggest that the earnings are of higher quality, the ERC is also higher. They conclude that the ERC can be viewed, therefore, as a measure of earnings quality.

Other studies have used the ERC as a way to examine differences in the quality of earnings measured under alternative accounting methods. A more positive correlation with the ERC indicates that an accounting method is more useful to investors. Some of the alternative accounting methods examined using this approach include revenue recognition pre- versus post-SAB 101

(Altamuro *et al.*, 2005), accounting choices related to inventory, depreciation, leases (Dharan & Lev, 1993; Pincus, 1993), and a switch to accrual-based accounting for tax reporting (Hanlon *et al.*, 2008).

Other studies have used the ERC to examine whether "higher audit quality" provides greater credibility to the financial statements. Teoh & Wong (1993) find higher ERCs for firms with then Big-8 auditors. Later studies using a similar approach include Hackenbrack & Hogan (2002) and Francis & Ke (2006).

### *The ERC Conundrum*

One rather surprising result, that has confounded researchers, is that the empirically estimated ERC is typically significantly less than predicted by accounting theory (Kubata *et al.*, 2015; Kothari, 2001). This result is troubling because it suggests that current accounting theory does not completely explain how earnings news is incorporated into stock prices. Furthermore, as Kubata *et al.* point out, it raises questions about the vast body of capital markets research which uses the ERC as a measure of earnings information content and earnings quality.

Kubata *et al.* cite several competing explanations to explain this gap between the theoretically predicted ERC and what is empirically observed. We suggest using insights from IT research to help explain this issue, by suggesting that the IT environment affects the quality of information, including earnings news.

One issue with the existing research studies in this area is that they do not control for the firm's information environment. Intuition, as well as empirical evidence, suggest that there is a relationship between ERCs and other information that is available to investors. Lougee & Marquardt (2004) find that when non-earnings information is made available at the same time, the ERC improves for firms with less informative earnings. Similar results are reported by Baber *et al.* (2006) and Hanlon *et al.* (2005). In the context of the current study, knowledge regarding a company's innovative IT initiatives and its expected relationship with the quality of information would complement the market's understanding of the earnings announcement.

Prior studies suggest that IT quality should affect the quality of reported earnings. Heninger *et al.* (2018) find a positive association between information technology related internal control material weaknesses reported by public companies and income-increasing earnings management. Likewise, Haislip & Richardson (2018) find that CEOs with IT expertise make forecasts that are more accurate and announce earnings on a timelier basis than firms with non-IT-expertise CEOs. On the other hand, Han *et al.* (2016) present evidence that suggests that IT complexity may introduce additional risks and challenges for internal controls and the audit process.

Prior research suggests that investors care about, and reward firms with better IT capabilities. Kim *et al.* (2018), using data from the annual *InformationWeek* 500 list used in this study, find that firms with a reputation for IT capability tend to have more favorable price terms for bank loans. Dow *et al.* (2017) find that industries with higher levels of IT investment have lower cost of equity capital. Huang *et al.* (2018) find that firms with higher IT capability are likely to have more accurate management forecasts, and that analysts incorporate more information from management forecasts into their revisions from these firms.



## RESEARCH QUESTION

Based upon this background, it would follow that the strength of the market's reaction to earnings surprises would vary based on the investors' perception of the quality of the information being reported by the company. If the market perceives the earnings announcement as quality information, it will value the information content of the announcement heavily. Otherwise, investors will view the announcement to have less informational content, perhaps considering it an unexplained aberration, and not change their investment decisions based upon it.

The intent of the current research is to determine if companies who invest more heavily in sophisticated and innovative information systems will produce information that has greater perceived quality than will their less IT-savvy counterparts, as the research suggests. Thus, the research question being explored is: Is earnings information reported by companies that are known for developing and employing sophisticated and efficient IT systems weighed more heavily by investors than earnings information reported by other companies? It is expected that companies known for developing and employing sophisticated IT systems produce information that is perceived by investors to have higher quality and, therefore, will elicit a stronger response to their earnings surprises than companies who produce more poorly perceived earnings information.

## METHODOLOGY

In order to test whether the earnings of firms that use sophisticated and innovative business IT solutions have an incremental effect on the stock market, this study looks for a correlation between *InformationWeek 500* rankings and the market response to earnings surprises.

The *InformationWeek 500* rankings of firms' use of and investment in information technology are used as the proxy for the firms' level of information technology capabilities. *InformationWeek* is a business/technology publication read by millions of business technology professionals.

The *InformationWeek 500* (recently renamed the *InformationWeek Elite 100*) has tracked the technology practices of the nation's largest and most innovative firms and is one of the most detailed sources of corporate IT usage information available. While the *InformationWeek 500* ranking originally was based on the size of the IT investment alone, it soon began to incorporate the innovation and efficiency of IT. This ranking is an appropriate measure for our purposes, because it takes into account both the value and the innovativeness associated with IT expenditure.

These rankings have been used in prior research to measure the sophistication of firms' information technology (Hamilton & Stekelberg, 2017; Altschuller *et al.*, 2010; Altschuller *et al.*, 2013, 2016; Bharadwaj, 2000).

It is important to note that this is not a direct measure of business system accuracy and efficiency, and it is possible that non-ranked firms produce quality information as well. Rather, the 500 ranked firms have been vetted and evaluated by a renowned business organization and found to be the top 500 users of IT. It is reasonable to expect that this public acclaim would influence investors' perceptions of the information quality produced by these companies or would be an indicator of the company's reputation regarding use of IT.

The information content of earnings for this set of firms will be tested using the relationship between the market reaction to earnings announcements and deviation of earnings from analysts' predictions (earnings surprises). Market response to earnings announcements will be measured using the Cumulative Abnormal Returns (CAR) variable. A significant, positive relationship between CAR and (positive or negative) surprises for ranked firms indicates a finding consistent with our expectation.

**Hypothesis:** There exists a significant, positive relationship between the market response to an earnings announcement (Cumulative Abnormal Returns) and the quarterly earnings surprise of IW-ranked firms.

## RESEARCH DESIGN

We use the following equation to test the impact of the sophistication of the firms' information technology on the ERC.

$$CAR_{j,t} = \alpha_0 + \alpha_1 IW + \beta_1 SURP_{j,t} + \beta_2 SURP_{j,t\_IW} + \beta_3 LOSS_{j,t} + \beta_4 Q4_{j,t} + \beta_5 SIZE_{j,t} + \beta_6 MTB_{j,t} + \beta_7 LEV_{j,t} + \epsilon_{j,t} \quad (1)$$

Our dependent variable, CAR, is the cumulative abnormal return measured over a three-day period surrounding the earnings announcement date. A three-day period is the appropriate research design to examine the information content of earnings over time since it measures the market's responsiveness to the information contained in earnings announcements (Wilson, 2008; Collins & Kothari, 1989).

SURP is the firm's quarterly earnings surprise. SURP is measured as the difference between the actual quarterly earnings and the consensus analyst earnings forecast. The consensus analyst earnings forecast is calculated as the median of analysts' most recent forecasts over 60 trading days before the announcement date. This

follows several papers in prior literature (Chi & Shanthikumar, 2017; Wilson, 2008; Livnat & Mendenhall, 2006). Consistent with prior literature,  $\beta_1$  should be positive. SURP\_IW is the key variable in our study. IW is an indicator variable set equal to 1 for firms that are ranked in the *InformationWeek 500*. *InformationWeek* ranks firms based on the sophistication of their information technology as well as on the innovative ways that they use that technology. SURP\_IW is an interaction variable that interacts the SURP and the IW dummy. The coefficient on this variable is the incremental ERC for IW firms. If the market views the information content of earnings for IW firms to be richer than for non-IW firms, the coefficient,  $\beta_2$ , will be positive. We include other variables in the model to control for firm-specific factors that impact the market return.

LOSS is an indicator variable set to 1 if the firm reports a loss for that quarter. Hayn (1995) finds the information content of earnings for loss quarters to be lower than for positive-earnings quarters. Thus, we expect LOSS to be negatively related to the market reaction.

Q4 is an indicator variable set to 1 if the quarter is the fourth quarter of the year. Salamon & Stober (1994) indicate that fourth quarter earnings have lower information content, and thus we expect Q4 to be negatively related to the market reaction.

There is mixed evidence on the relationship between SIZE, measured as the log of the firm's market value of equity, and the market reaction to earnings. For instance, Chaney & Jeter (1992) find that size is positively related to the market reaction. On the other hand, Atiase (1985) finds that earnings announcements are relatively more informative for small firms, which would imply a negative relation. Thus, we make no prediction for the coefficient of SIZE.

MTB, the firm's market to book ratio, is included in the model to capture the growth potential of the company. Collins & Kothari (1989) find that growth is positively related to the market reaction to a firm's earnings. Therefore, we expect MTB to be positively related to the market reaction.

LEV is a measure of the firm's financial risk and has been found to be negatively related to the market's reaction to earnings (Collins & Kothari, 1989).

Thus, we expect LEV to be negatively related to the market return.

## SAMPLE AND DESCRIPTIVE STATISTICS

Our sample consists of all firms with all necessary data from both IBES and Compustat for the years 2000 to 2012.

*InformationWeek* data was manually collected from the magazine's annual *InformationWeek 500* issue. Our final sample consists of a total of 104,319 firm-quarter observations, of which 10,312 are *InformationWeek* ranked firms (IW

firms) and 94,007 are non-IW firms. See Table 1 for the sample distribution across the sample years. *InformationWeek* firm years represent 9.89% of the total sample quarters, ranging from a low of 7.91% in 2012 to a high of 12.06% in 2003.

**TABLE 1**  
*Sample Distribution Across Years*

	<b>Total</b>	<b>non-IW</b>	<b>IW</b>	<b>% of sample</b>
<b>2000</b>	7,316	6,542	774	10.58%
<b>2001</b>	6,876	6,104	772	11.23%
<b>2002</b>	6,717	5,925	792	11.79%
<b>2003</b>	7,087	6,232	855	12.06%
<b>2004</b>	7,672	6,825	847	11.04%
<b>2005</b>	8,159	7,374	785	9.62%
<b>2006</b>	8,435	7,628	807	9.57%
<b>2007</b>	8,823	7,953	870	9.86%
<b>2008</b>	9,206	8,290	916	9.95%
<b>2009</b>	9,082	8,250	832	9.16%
<b>2010</b>	9,060	8,287	773	8.53%
<b>2011</b>	8,962	8,221	741	8.27%
<b>2012</b>	6,924	6,376	548	7.91%
<b>Total</b>	104,319	94,007	10,312	9.89%

*Data are from both IBES and Compustat for the years 2000 to 2012. InformationWeek data were hand collected from the magazine's annual InformationWeek 500 issue. Sample consists of a total of 104,319 firm-quarter observations, of which 10,312 are InformationWeek ranked firms (IW firms) and 94,007 are non-IW firms.*

Table 2 presents descriptive statistics for our sample firms. Panel A reports statistics for the non-IW firms, and Panel B reports statistics for the IW firms. The IW firms seem to be different than the non-IW firms across a number of variables. They are larger (SIZE), have more debt (LEV) and have greater growth potential (MTB). In addition, they experience fewer quarters with earnings losses (LOSS) and have smaller earnings surprises (SURP).

**TABLE 2***Descriptive Statistics***Panel A: Non-IW firms (N = 94,007)**

	<b>CAR</b>	<b>SURP</b>	<b>LOSS</b>	<b>Q4</b>	<b>SIZE</b>	<b>MTB</b>	<b>LEV</b>
<b>Mean</b>	0.003	0.081	0.188	0.223	6.818	2.758	0.530
<b>Median</b>	0.002	0.047	0.000	0.000	6.730	1.913	0.527
<b>p25</b>	-0.037	-0.025	0.000	0.000	5.704	1.165	0.325
<b>p75</b>	0.044	0.188	0.000	0.000	7.838	3.259	0.715
<b>SD</b>	0.083	0.654	0.391	0.416	1.607	3.400	0.258

**Panel B: IW firms (N = 10,312)**

	<b>CAR</b>	<b>SURP</b>	<b>LOSS</b>	<b>Q4</b>	<b>SIZE</b>	<b>MTB</b>	<b>LEV</b>
<b>Mean</b>	0.005	0.069	0.071	0.234	8.720	3.021	0.628
<b>Median</b>	0.004	0.037	0.000	0.000	8.740	2.161	0.631
<b>p25</b>	-0.028	-0.000	0.000	0.000	7.719	1.371	0.489
<b>p75</b>	0.038	0.116	0.000	0.000	9.744	3.493	0.770
<b>SD</b>	0.067	0.440	0.256	0.424	1.440	3.305	0.202

**Panel C: All firms (N = 104,319)**

	<b>CAR</b>	<b>SURP</b>	<b>LOSS</b>	<b>Q4</b>	<b>SIZE</b>	<b>MTB</b>	<b>LEV</b>
<b>Mean</b>	0.003	0.080	0.176	0.224	7.006	2.784	0.540
<b>Median</b>	0.002	0.045	0.000	0.000	6.911	1.936	0.541
<b>p25</b>	-0.036	-0.020	0.000	0.000	5.814	1.184	0.341
<b>p75</b>	0.043	0.178	0.000	0.000	8.093	3.287	0.723
<b>SD</b>	0.081	0.636	0.381	0.417	1.689	3.392	0.254

*Panel A reports statistics for the non-IW firms, Panel B reports statistics for the IW firms, and Panel C reports statistics for all firms.*

*SURP is the firm's quarterly earnings surprise, measured as the difference between the actual quarterly earnings and the consensus analyst earnings forecast. The consensus analyst earnings*

*forecast is calculated as the median of analysts' most recent forecasts over 60 trading days before the announcement date.*

*LOSS is an indicator variable set to 1 if the firm reports a loss for that quarter.*

*Q4 is an indicator variable set to 1 if the quarter is the fourth quarter of the year.*

*SIZE is the log of the firm's market value of equity.*

*MTB is the firm's market to book ratio.*

*LEV is a measure of the firm's financial risk.*

To see if the differences reported in Table 2 are indeed statistically significant, we conduct t-tests on the difference in means for our IW firms and non-IW firms. The results of the t-tests are reported in Table 3. We can see that in every measure employed in this study, the IW firms are statistically different from their counterparts who were not as innovative in their IT development and use. The IW firms have smaller earnings surprises (SURP), fewer instances of losses (LOSS), are larger (SIZE), have more growth potential (MTB), and are more leveraged (LEV) than the non-IW firms.

**TABLE 3**

*Test of Difference in Means*

	<b>Non-IW firms</b>	<b>IW firms</b>	<b>Difference</b>	
<b>CAR</b>	0.003	0.005	0.002	***
<b>SURP</b>	0.081	0.069	(0.012)	*
<b>LOSS</b>	0.188	0.071	(0.117)	***
<b>Q4</b>	0.223	0.234	0.011	***
<b>SIZE</b>	6.818	8.720	1.902	***
<b>MTB</b>	2.758	3.021	0.263	***
<b>LEV</b>	0.530	0.628	0.098	***

\*\*\*, \*\*, \* indicates significance at the 1%, 5%, 10% level, respectively.

## UNIVARIATE RESULTS

Table 4 reports the Pearson correlation coefficients between our dependent variable, CAR, and our independent variables. Consistent with our expectations based on prior literature, the market reaction (CAR) is positively related to the earnings surprise (SURP) and future growth potential (MTB), and it is negatively related to losses (LOSS). It is positively related to firm size (SIZE), and somewhat surprisingly, the reaction is positively related to fourth quarter earnings (Q4) and leverage (LEV).

**TABLE 4**

*Correlations*

	CAR	SURP	LOSS	Q4	SIZE	MTB	LEV
<b>SURP</b>	0.006 0.000	1					
<b>LOSS</b>	-0.098 0.000	0.074 0.000	1				
<b>Q4</b>	0.008 0.012	0.008 0.008	-0.005 0.137	1			
<b>SIZE</b>	0.025 0.000	-0.041 0.000	-0.325 0.000	0.027 0.000	1		
<b>MTB</b>	0.019 0.000	-0.010 0.001	-0.006 0.052	0.002 0.513	0.189 0.000	1	
<b>LEV</b>	0.012 0.000	0.007 0.021	-0.040 0.000	0.004 0.218	0.1147 0.000	-0.085 0.000	1

## MULTIVARIATE RESULTS

The results of the regression analysis using Equation (1) are reported in Table 5. We used a robust regression approach to mitigate the effect of any outliers and we report robust standard errors in the table. Our primary coefficient of interest, for

SURP\_IW, is positive and significant, consistent with IT innovation being associated with higher quality earnings, and thus confirming our hypothesis. As for our control variables, the coefficients for SURP and MTB are positive and significant, as expected. The coefficient for LOSS is negative and significant, also consistent with our prediction. Although the coefficient for LEV does not match the predicted direction, it is not statistically significant in the multivariate analysis. The coefficient for SIZE is marginally negative in this analysis but still statistically significant, and with a statistically significant positive coefficient for Q4, the result here again is different than initially predicted.

**TABLE 5**  
**Regression Analysis**

	<b>coef.</b>	<b>SE</b>	<b>T</b>	<b>P</b>	
<b>Intercept</b>	0.007	0.001	6.25	0.000	***
<b>IW</b>	0.000	0.001	0.24	0.810	
<b>SURP</b>	0.008	0.000	24.47	0.000	***
<b>SURP_IW</b>	0.006	0.002	3.62	0.000	***
<b>LOSS</b>	-0.021	0.001	-35.95	0.000	***
<b>Q4</b>	0.001	0.000	2.75	0.006	***
<b>SIZE</b>	-0.000	0.000	-3.04	0.002	***
<b>MTB</b>	0.000	0.000	7.26	0.000	***
<b>LEV</b>	0.001	0.001	1.19	0.232	

N = 104,319

\*\*\*, \*\*, \* indicates significance at the 1%, 5%, and 10% level, respectively.

$$CAR_{j,t} = \beta_0 + \beta_1 SURP_{j,t} + \beta_2 SURP_{j,t} IW + \beta_3 LOSS_{j,t} + \beta_4 Q4_{j,t} + \beta_5 SIZE_{j,t} + \beta_6 MTB_{j,t} + \beta_7 LEV_{j,t} + \varepsilon_{j,t}$$

CAR, the dependent variable, is the cumulative abnormal return measured over a three-day period surrounding the earnings announcement date.

IW is an indicator variable set equal to 1 for firms that are ranked in the *InformationWeek 500*. SURP\_IW is an interaction variable that interacts the SURP and the IW dummy.



## RESULTS OF ROBUSTNESS TEST

Table 3 indicates that there are many differences between IW and non-IW firms. For instance, IW firms are larger (SIZE) and have fewer instances of loss (LOSS). Therefore, it is conceivable that it is these differences that drive the primary multivariate results in Table 5 rather than the fact that these firms are IW firms. Perhaps the observed relationship in Table 5 between sample firms and the earnings surprise (SURP) highlights the association between SURP and some other variable inherent in IW firms. IW firms may simply serve as a proxy for this other variable. To rule out this alternative explanation, a matched-sample approach is employed. Each of the IW firms is paired with the closest non-IW firm with respect to firm size (SIZE).

The results of the regression analysis for this matched sample are reported in Table 6. The primary coefficient of interest, for SURP\_IW, remains positive and significant, thus diffusing the alternative theory suggested, and reinforcing the findings of Table 5. Despite slight differences in levels of statistical significance, the direction and relative magnitude of the coefficients for the various control variables remain consistent as well. The only notable difference between the two analyses is with respect to the coefficient for LEV. In the matched-sample analysis, the coefficient for LEV is negative and statistically significant, thus matching our original prediction.

**TABLE 6**

*Regression Analysis for Matched Sample*

	coef.	SE	T	P	
<b>Intercept</b>	0.013	0.003	5.08	0.000	***
<b>IW</b>	0.000	0.001	0.20	0.839	
<b>SURP</b>	0.010	0.001	8.53	0.000	***
<b>SURP_IW</b>	0.003	0.002	2.01	0.045	**
<b>LOSS</b>	-0.015	0.002	-9.78	0.000	***
<b>Q4</b>	0.002	0.001	1.87	0.061	*
<b>SIZE</b>	-0.001	0.000	-2.85	0.004	***
<b>MTB</b>	0.000	0.000	1.80	0.071	*
<b>LEV</b>	-0.004	0.002	-2.17	0.030	**

N = 20,464

\*\*\*, \*\*, \* indicates significance at the 1%, 5%, and 10% level, respectively.

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## DISCUSSION, CONCLUSION, AND CONTRIBUTIONS

Directly supporting our hypothesis, results of the regression analysis show that the Earnings Response Coefficient for IW firms is positive and significant. This indicates that the unexpected earnings announced by *InformationWeek* firms is a significant contributor to market reaction. This result holds even when using a matched-sample approach, lending further support to our theory. This finding adds important insight into understanding investors' reaction to earnings announcements. Investors seem to be valuing the information produced by IW firms more heavily than that produced by other firms. Firms who focus on efficient and innovative IT systems seem to have reaped the trust of the public in the quality of the information they produce. Thus, the market reaction to earnings announcements depends upon investors' perceived quality of the information they have received.

The results of this study help to solidify the relationship between system quality and perceived information quality discussed in IS research. Although system quality and information quality have been previously addressed as independent contributors to IS success, this study shows that companies who have invested in their business systems have affected the perceptions of the quality of the information produced. This study also contributes one more facet to building a richer perspective of the impact of investment in information technology.

It serves as a signal that an added benefit of investing in high quality business systems is based in the perceptions of the public, investors, analysts, and, hopefully, customers regarding the capability of innovative systems to improve information processing within the organization. It seems that, in fact, the suspected interaction between system and perceived information quality on user and investor satisfaction does exist.

The results of the study also serve as an important contribution to accounting research by highlighting the information environment as a significant contributor to the ERC measure. This creates a more complete understanding of investor reactions to earnings surprises and the intricacies of measuring earnings quality as well as providing an insight to the ERC conundrum. The results suggest that theoretical models that investigate determinants of the ERC need to include some measure of information quality. This recognition enables future studies to address a potential omitted correlated variables problem that is present in many prior studies in this area. For example, firms with a more significant focus on IT may also be more likely to use a large auditing firm. Thus, prior research that finds a higher ERC among firms with (then) Big-8 auditors (Teoh & Wong, 1993) may reflect the information environment, rather than audit quality. The results of this research would allow future studies to control for the information environment in such studies.

This study is significant in its application of IS research to better understand an accounting metric in concert with the application of accounting-based research to

shed light on IS concepts. The study strengthens our understanding of the relationship between system quality and perceived information quality and uncovers a significant contributor to understanding the ERC as well as market interpretations of financial information. This interdisciplinary examination of the concepts presents a broader perspective on the interplay between technology practices and their impacts in the financial arena than typical studies are able to provide. With this depth of understanding, managers gain insight into the value of information quality not only to the participants of the financial market but to their other investors and business partners as well. Based on this perspective, they can expect their investments in system quality to positively impact their interactions with business partners who also appreciate better and more timely information and may reward them with benefits such as a lower cost of capital.

The results of our study are highly consistent with the view that companies known for developing and employing sophisticated IT systems produce information that is perceived by investors to have higher quality. However, future studies might triangulate these results by addressing and measuring the actual quality of the information produced by these firms.

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