

The Information Content and the Stock Market's Reaction to New Product Announcements in the Computer Industry

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Abstract

This study examines the relationship between the stock market's reaction and the information content of new product announcements/ information in the computer industry through the use of the event study methodology.

The results show that the stock market reacts positively to detailed, as opposed to non-detailed, new product announcements/ information in the computer industry. Whilst the firms' financial variables were not significant in explaining variability in the excess market returns when detailed new product announcement/ new product information is released; the size-adjusted advertising budget was significant when non-detailed new product announcement/new product information is released.

The results also suggest that the market forces appear to be efficient in utilising publicly available information in the computer industry and are capable of policing computer manufacturers with respect to the information that they provide to the public, hence no additional external intervention is needed.

Keywords

**Information Content
New Product Announcement
Computer Industry
Event Study Methodology
Efficient Market Hypothesis**

Introduction

The level of competitive activity, in many ways, influences the behaviour of firms as well as their innovative processes (Beales, et al., 1981; Stiglitz, 1979). The amount of time and other resources that a firm devotes to strategy formulation could be a reflection of the intensity of competitive activity in that industry (see Ohmae, 1990; Santos and Wollard, 1988). While a common strategy pursued by many firms to gain or maintain market share in a competitive industry is to frequently introduce new products or update the existing products, there is evidence that strategic calculations are being brought to bear not only on the products that are being introduced, but also on the manner in which information regarding these new products is released to the public (Koku, 1994).

The role of information in making the market more competitive is well-established (Salop, 1976; Stigler, 1961; Stigler, 1971). Information in the market also makes consumers better informed on prices (Benham, 1972; Cady, 1976; Bloom and Stiff, 1980), better educated on product quality (Nelson, 1970; Schwartz, 1985; Tellis and Wernerfelt, 1982), and better informed on the availability of offerings (Maynes and Assum, 1982; Krishnamurthi and Raj, 1985). However, in the exception of Eliashberg and Robertson (1988) and Koku, et al (1997), not much is available in the literature on how firms release information on their innovative activities to the market. Besides the strategic implications such as surprising one's competitors, research in this area is important given the attention that the audience of such information (i.e., market analysts, investors, consumers and competition) pays to clues on a firm's innovative activities.

Previous research that examined how firms release information on innovative activities, particularly new products referred to the practice in which firms released new product information more than four weeks in advance of the product's arrival in the market as preannouncements and information released in less than four weeks of the product's arrival in the market as announcements. They also tried to answer the question of why some firms release product information long in advance of

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the product's arrival in the market while others do not.

Eliashberg and Robertson (1988) in one of the first studies on this issue suggest that conditions such as market dominance, company, attractiveness of the competitive environment, and customer switching costs could explain the practice in which firms preannounced or announced products. However, Koku (1994), and Koku, et al. (1997) using signalling theory suggest that attempts by firms to signal their relevance to competition and consumers could explain firms' choice of preannouncements or announcements to reveal their innovations.

Notwithstanding these studies, perhaps because of the absence of an established theory on the release of new product information, studies on how firms manage the flow of information on innovations to the market has been minimal. This dearth of studies limits our understanding of possible strategies that might underlie the release of information on innovative activities and processes to the public. Previous studies Koku (1994) and Koku, et al. (1997) as well as casual observations suggest that firms do not always use the same means to release information on their innovative activities to the public. While some new product announcements and announcements of innovative activities are lengthy and detailed, others are short and crisp or long but void of specifics (see Appendix 1, for an example of detailed new product announcement and innovation information in which IBM provides prices, time of availability in the market, and other product attributes. See also, and compare Appendix 1 with Appendix 2 in which Sun Microsystems Inc., releases information on a new product but provides no such product specifics).

This practice raises several questions. Why do firms release different types of information on new products or innovation processes? If the objective of releasing information is to inform and educate the public, then shouldn't more information be better than less information? Furthermore, how the intended public (B2B buyers, B2C buyers, and other market participants collectively referred to as the market) perceives the different types of

information should be a matter of interest not only to the firms and the other market participants, but also to the newspapers (media) that carry the information since it is not a paid advertisement. In other words, does the information type matter to the market? If it matters, then naturally the market would react differently to the different types of information. If it does not matter, then the newspapers need not devote their limited business news space to lengthy and detailed new product information released by firms, rather they should edit all new product information into brief statements.

Given these questions, the objective of this paper is to investigate the market's reaction to the different types of information on new products and innovative activities that firms release to the public. We focus our investigation on the computer industry (firms classified under the SIC 350) because it is one of the most active industries with regard to new product innovation and introduction (see Hendericks and Singhal, 1997).

The insight gained from this study will improve our understanding of strategy formulation and the management of information on innovations in other competitive industries such as the pharmaceutical and the photographic equipment industries.

Toward Developing a Framework for Releasing Information on Innovative Activities

The importance of innovation to market economies and to the success of firms that are at the forefront of innovation explains the enormous research efforts that have been directed at understanding factors that drive innovations (Schumpeter, 1942; Acs and Audretsch, 1991; Chandy and Tellis, 1998). Other issues associated with innovations such as the incumbent's curse (Chandy and Tellis, 2000; Ghemawat, 1991), and the strategic planning that allows radically new products to be developed (Cooper, 2000) have also contributed to the on-going inquiry on innovations. Research efforts have also been directed at studying innovations and announcement of new products (see Wittink

and Burrus, 1982; Chaney, et al., 1991; Kelm, et al., 1995; Koku, 1994; Koku, et al., 1997). However, to the best of our knowledge, no study has specifically examined how firms in the computer industry (SIC 360) release information on their innovative activities and new products to the public.

This research gap, for several reasons, needs to be addressed. Firstly, given the intensity of competition for market share in the computer industry, an examination of how firms in the industry release information on their innovative activities and new products could give us a clue and help in developing a formal theory on how information on innovations is released to the public. Secondly, as the ultimate “end result” of competition among firms, a study of new product innovations and their associated announcements could give us a window into new and practical strategies by which firms live or die. The demise of firms such as Zenith, Data General, and Wong Computers which could not come out with new products drives home this point. At the same time the exemplary turnaround of Apple Computers is evidence of the role of innovations in the computer industry.

Eddy and Saunders (1980) conducted one of the earliest studies on how the market received new product information. They analysed the stock market’s reaction to new product information on 66 products covering a 10-year period (from 1960 through 1969) and concluded that the stock market does not react significantly to new product information. It is, however, possible that Eddy and Saunders (1980) did not find the market’s reaction to be significant because they used monthly stock returns instead of daily stock returns. The monthly event-windows are very large, and do easily allow confounding events which can mask the true effects of new products announcements.

Wittink, Ryans and Burrus (1982), acknowledging the uniqueness of innovation strategy in the computer industry, focused their study on the stock market’s reaction to new product announcements in the computer and office equipment industries. This study used new product announcements data on computers and office machines for a 2-year period (1979 and 1980), and analysed the data

using the event study methodology. The authors found only a slightly significant stock market reaction to the new product announcements. Even though the authors realised the importance of new product information in the computer industry, the study did not examine the actual information released or the process in which information was released.

Chaney, Deviney and Winer (1991) in a comprehensive study of new product announcements used a larger sample size collected over a 10-year period (from 1975 through 1984). Similar to earlier studies, these authors also examined how the market receives new product information using the stock market’s reaction. The study also distinguished between “updates” and “new products”, and information on single and multiple new products. The authors conclude that while the market does not show any significant reaction to information on single and multiple products, it does show a significant reaction to new product announcements as opposed to announcement of updates. However, this study also, as pointed out by Koku, et al. (1997), may have suffered from data aggregation bias as the authors did not distinguish between preannouncements and announcements.

Kelm, Narayanan and George (1995), in a project management oriented study, examined the stock market’s reaction to announcements of R & D projects made in the innovation and commercialisation stages of the R & D process. The authors analysed 501 announcements spanning 23 industries over a 13-year period (from 1977 through 1989), and found that the stage of the R & D process moderates the relationship between the wealth effects and technology and market variables. The former are more important than the market variables in the innovation stage, and both are important during commercialisation. While this study focused on the importance of R & D in the innovation process, it too did not examine how information on the R & D is communicated to the marketplace. Will the market react differently to new product information that reveals the amount of money that is being committed (R & D) to the specific product that is being launched? We contend that information on the amount of money that

is being committed to a specific innovation/project (R & D budget) could be important to the market in assessing the significance of the innovation. Furthermore, because firms could release new product information on products that do not have any realistic chance of being brought to market, participants could use the size of R & D budget on specific products to determine the likelihood that an innovation is real.

In one of the later empirical studies on new product innovation, Koku, Jagpal and Viswanath (1997) used signalling theory to analyse the stock market's reaction to new product information which they classified as Information Revealing Events (IRE). The authors examined 635 events collected over a 10 year-period (from 1980 through 1989), and distinguished between new product preannouncements and announcements. Using a scheme based on the number of product specific information (i.e., prices, date of delivery, product attributes, cost of the innovation) contained in the information released, the authors also distinguished between detailed and non-detailed new product announcements and theorised that under signalling theory, detailed new product announcements and preannouncements convey more credible signals than their non-detailed counterparts.

The authors concluded, on the basis of their analysis that while the stock market reacts positively to IREs, the reactions are only industry specific. Explaining their findings, the authors surmised that the market does not simply react to every new product announcements and preannouncements.

Rather, it reacts only to those that convey important new information that has not been anticipated and whose effects have not been, a priori, factored into the market prices. We advance Koku, et al's (1997) in this study by using a consensus of opinions of market participants instead of the authors' to define what constitutes detailed and non-detailed new product information, and by focusing on how information on innovative processes is release in the computer industry.

While it is important for a firm to inform the market (the market participants) with detailed

information, it is also important to note that the inclusion of details in new product announcements and innovation processes could tip off competitors on the projects that a firm is planning to presently bring to market. The dilemma that confronts firms in a competitive industry, such as the computer industry, regarding new product information that they release to the public is therefore an interesting one. Should they inform the market by releasing detailed information on their innovative activities and risk tipping off competitors, or keep information on their innovative activities brief and devoid of specifics?

Theoretical Framework

Firms often release information on the so-called "forthcoming" products that they do not launch or do not even intend to bring to the market. Such information is released to either elicit response from competitors, or to defend the announcing firm's territory (Farquhar and Pratkanis, 1986; Johnston, 1995). Firms also use such announcements to create a favourable image, such as being on the cutting-edge of technology, before consumers (see Heil and Robertson, 1991). To the extent that firms use such tactics, to avoid being "tricked", the financial markets will look beyond new product announcements for credible cues of a firm's commitment to launching the announced product. It would therefore be in the interest of firms that are serious about their intention to bring new products to the market to make their announcements credible in order to distinguish themselves from firms that use "vaporware tactics" (that is announcing non-existing "forthcoming" products).

In explaining how manufacturers could use new product announcements, for example, to create a favourable consumer impression, Klein and Leffler (1981) used a signalling model in which they suggest that a major concern of consumers who buy durables, such as refrigerators and cars, is that the company whose products they buy be around to produce replacement parts if the products need to be repaired at some future time. Thus, in KL's model, high sunk cost will signal a firm's commitment to be "around" to purchasers of durables. Similarly, we argue that frequent announcements of "real" innovations which

are followed by introduction of new products to the market would signal the market participants that a firm is not likely to go out of business because it has products at the various stages in the product life cycle (PLC). In other words, new products are always in the pipeline to take the place of those that become obsolete.

We apply this logic to the computer industry. Firstly, the short PLC of products in the computer industry requires that good firms frequently introduce new products to stay competitive. Secondly, because of the short PLC, frequent updates, and the significant cash outlay that is involved in the purchase of computers, “consumers” or purchasers of computers (households and businesses) expect the firms from whom they buy to be around for a long time to provide technical support services and “updates”. Focusing on the computer industry, and applying the signalling framework further, we hypothesise that the inclusion of “details” or specifics of innovative activities in new product announcements and new product information could serve as a credible cue that could separate serious “launchers” from “vaporware” tacticians. The problem, however, is what constitutes detailed information?

To determine what could constitute “a detailed” or specific new product information, we polled 35 individuals including market analysts, day traders, financial economists, and professors of finance, computer science, and marketing who teach courses in the management of innovations. The list that was compiled from the poll was shown to the 35 individuals who were asked to add things that could be considered detailed new product information. The final list that emerged includes the following: the expected time or date of a new product’s arrival in the market, how much money the firm is spending or plans to spend on the product’s development, the proposed price or price range of the new product, the advantages of the new product over the existing products, joint partnership in the product innovation or project (if any), and the attributes of the new product such as computing capacity or speed.

We theorise that space is limited in a reputable

newspaper such as the Wall Street Journal, the Baron, the New York Times, and The Washington Post which we used as sources of our announcements and innovation data, and because of this scarcity space will be used to cover only newsworthy items (that is items that are not paid advertisements) that, in the opinion of the editors, will be of interest to readers. Furthermore, we assume that the penalty that the market will, in the long-run, exact on firms that cheat or go through lengths to make up these details or specifics for “vaporware” will far outweigh the short-term benefits. Thus, only firms that truly have new products to launch will announce, as such the market is more likely to react favourably to new product announcements and innovation information that include detailed information as they will be regarded as more credible.

Because our main reason for focusing on the computer industry in this study is the intensity of competition in the industry (see Hendericks and Singhal, 1997), and because of the intense competition and the advantages that come from the reputation for being innovative in the industry (see Wind and Mahajan, 1997; Geroski, et al, 1993), it is important for the firms who are working on innovative activities to signal their position to the market through credible signals. Thus, we hypothesise that:

H1: *Firms in the computer industry will more often use detailed new product innovation information and new product announcements to release information to the public.*

H2: *There is a difference in the stock market’s reaction to detailed and non-detailed new product announcements and innovation information.*

The success of a new product or an innovation in the marketplace is not guaranteed. While the statistics vary, studies have indicated that between 30 to 35% of all new products fail (see Montoyo, et al, 1994; Booz, et al, 1982). The spectacular failure of new innovations such as the Next computer, Texas Instrument’s home computer, and RCA’s videodisc players makes this point clear. The success of a new product or an innovation in the marketplace is determined by several factors including but not limited to the firm’s ability to promote and market the innovation, the product’s relevance

to the market, its attributes, and its ability to draw on the firm's existing strength (see for example, O'Regan et al, 2008; Millson and Wilemon, 2008). How the firm promotes the product is determined by such factors as creativity, and the firm's promotional budget.

Even though a firm's advertising budget revealed in its annual publicly available financial statements (at least publicly held firms in the United States) does not show how much or what percentage of the budget is devoted to a specific product or offering, a large advertising budget is a credible signal that shows how committed a firm is to promoting its products. Thus, all things being equal, the larger the firm's advertising budget, the more funds it will devote to promoting its new products, and the higher likelihood of success of a product that is well promoted. This higher likelihood of the product's success in the market will in turn elicit a positive reaction from the market, because the market's reaction represents the participants' calculations of the product's discounted future cash flow, when new product information or innovation information is released (see Fama, et al., 1969; Channey, et al., 1991). Thus, we hypothesise that:

H3: *The larger the firm's advertising budget the larger the stock market's reaction to the new product announcement/ innovation information.*

If the market participants find a firm's announcement to be credible and think the product is likely to succeed, they will quickly incorporate the future streams of income that will be generated from the innovation into the firm's current asset prices. Hence, the stock market should react positively to credible new product announcements and innovation information.

All things being equal, firms that are committed to innovations will devote significant sums of money to innovative activities as such they will have large R & D budgets. Thus R & D expenditures have come to be used as a proxy for innovativeness (see O'Regan, et al, 2008). Because R & D expenses are known to the public through annual statements and other disclosure

documents such as the SEC filings, firms that devote significant sums of money to R & D develop a reputation as firms that stake their competitive advantage on being innovative. However considering the fact that both professional investment analysts and amateur investors extensively analyse firms' financial variables for clues for their investment decisions, it is possible that R & D budgets will convey no new information to the market through new product announcements and innovation information. Hence:

H4: *The R & D budget will not explain the stock market's reaction to new product announcements or innovation information.*

Even though releasing a detailed new product announcement and innovative information will make the information credible, in competitive industries such as the computer industry, releasing detailed new product information could be a double-edged sword. While it makes the firm credible, it also alerts competition to the product that the announcing firm intends to presently bring to market, thus competition has a warning so to speak to take an appropriate defensive posture or even make a pre-emptive move. This competitive reaction might not however be possible with non-detailed new product information which does not reveal product specifics. We argue that in the absence of details or specifics in new product information, because the market participants have already used a firm's R & D budget as a proxy to gauge that firm's seriousness about innovations, investors will rather look to a firm's advertising budget as an indicator of a new innovations likelihood of success. Thus, we hypothesise that:

H5: *Advertising budgets will be significant in the stock market's reaction when new product information is non-detailed.*

H6: *Advertising budgets will not be significant in the stock market's reaction when new product information is detailed.*

Data

We collected data over a twenty-four year period; from January 1980, through December, 2003. We used a two-step process; first, we

used the indices to four main newspapers listed above to identify all the new product announcements made in the computer industry (SIC 350) during the period. Second, we read all the actual copies of the new product announcements and content analysed them for the informational cues. Obtaining the actual copies of the announcements also allowed us to eliminate news on other confounding events. To avoid clustering of events and confounding effects, we eliminated subsequent events released by the same firm within three days of the event window. There were a total 220 useable events, i.e., events that have not been confounded by other firm announcements or events. While 220 useable events might look small for the period, it is a reasonable size when compared to previous studies, i.e., Eddy and Saunders (1980) which used 66 events over a 10-year period, and Kelm, Narayanan and George (1995) which used 501 events from 23 industries over a period of 13 years.

Next, using the criteria described above we classified the new product announcements and innovation information as detailed and non-detailed. We considered 138 of the new product announcements and innovation information to be detailed, while 82 were considered to be non-detailed. In order to establish consistency, four knowledgeable individuals independently classified the data. New product announcements and innovation information that provided three or more of the criteria indicated above were classified as detailed, while those that provided less were classified as non-detailed. We had over 98% consistency level using the classification scheme; that is all four individuals classified the same announcements as detailed or non-detailed over 98% of the time.

To test our hypotheses on the size of R & D budget and the size of advertising budget, we also collected data on the firms' R & D expenditure and advertising budgets which are publicly available and published in Standard and Poors' Annual Corporate Reports during each of the 24 years studied. To control for size bias, we divided the R & D and advertising budgets respectively by the firm's total asset.

A summarised descriptive statistics of firms that released new product announcements during the period studied is presented in Table 1. The size of firms in the study ranged from approximately \$523 million to \$149.5 billion in total assets. When the data are adjusted for confounding events (as discussed earlier), they show that IBM released new product information most frequently during the period studied; it had 28 events, while Intel had the least number of events - one.

Methodology

We analysed the data also using a two-step process. First, we used the event study methodology (Brown and Warner, 1985) which allows us to detect the impact of unanticipated events on stock prices to analyse the stock market's reaction to new product announcements. The event study technique uses the efficient market hypothesis (EMH), and the rational expectations model (REM). The EMH posits that publicly traded asset prices reflect all publicly available information, while the REM posits that current asset prices represent the discounted streams of future income. Using these two theoretical models as the underlying construct, we use the market model to capture the effect of the market's reaction.

The market model posits that the expected returns on any asset, in a given period, are linearly related to the return on a market portfolio over the same period (see Brown and Warner, 1985). The basic assumption is that all firms in the economy are affected by the changes in the economy. The market model could be algebraically written as:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \gamma_{it} \quad (1)$$

Where:

R_{it} = the return on stock i time t ,

R_{mt} = the return on market portfolio at time t ,

α_i = the intercept,

β_i = the slope,

γ_{it} = the error term.

Table 1: Descriptive Statistics of the Sample of 220 Announcements

	Net Income (Mill. \$)	Sales & Admin (Mill. \$)	R&D Budget (Mill. \$)	Total Asset (Mill. \$)
Mean	3131.9	4422.7	4361.1	18650.0
Median	290	834.50	592	4553.7
Std. Dev.	12050.0	6971.1	27680.0	30310.0
Maximum	89890.0	21380.0	299300.0	149500.0
Minimum	-4965.0	1.74	1.9820	5.2270

We estimated the unknown parameters (α and β) in the model using Ordinary Least Square regression, returns data, and a value-weighted market portfolio from the CRSP tapes. The estimation period consisted of 224 days (t-245 to t-21) which is consistent with prior studies.

The market's reaction is measured as $ER_{it} = R_{it} - \alpha_i - \beta_i R_{mt}$. The excess abnormal return is the difference between the actual and the predicted return on the event day t0 – that is the day that the new product information or innovation information was printed in the newspapers was noted as t0. Because newspapers carry news items of the previous day, information on new innovations was released a day prior its appearance in the newspaper and as such noted as day t-1.

The unanticipated news contained in the new product information would result in the presence of excess return that is not equal to zero, that is $E(\gamma_{i,t}) \neq 0$ (see Fama, et al, 1969). Positive unanticipated news will result in positive excess returns, while negative unanticipated news will result in negative abnormal returns.

To test the hypotheses (H2 through H6), similar to Chaney, et al. (1991), and Bhagat, et al. (1988), we run a linear regression using the standardised excess returns for all the 220 events as the dependent variable on a set of explanatory variables. These explanatory variables include a dummy variable to capture detailed and non-detailed information, and size-adjusted advertising and R & D budgets as indicated in the following equation:

$$EXR = Const + Dumdet + Adrd + Adad \quad (2)$$

Where:

EXR = standardised excess returns

Const = constant
 Dumdet = a dummy variable
 Adrd = R&D budget adjusted for size
 Adad = advertising budget adjusted for size

The dummy variable for detailed information takes on a value of 1 if the information was determined to be detailed and 0 if it was determined to be non-detailed. To test H5 and H6, we divided the data into two groups, detailed and non-detailed announcements and innovation information, and run two separate regressions, but this time include only the size-adjusted advertising and R & D budgets as explanatory variables as shown in equation 3.

$$EXR = Const + Adrd + Adad \quad (3)$$

Where:

EXR = standardised excess returns (run separately for detailed and non-detailed announcements)

Const = constant

Adrd = R&D budget adjusted for size

Adad = advertising budget adjusted for size

Results

As described above 132 of the 220 useable events were detailed while 82 were non-detailed. This shows that about 60% of the events were detailed compared 40% which were non-detailed. This indicates that firms in the computer industry will more likely than not release new product information and innovation information through detailed as opposed to non-detailed information. Other results of our analyses are summarized in Tables 2, 3, and 4.

Table 2 shows that the financial markets do react differently (more positively) to detailed

as opposed to non-detailed new product announcements and innovation information in the computer industry. The coefficient of the dummy variable that distinguished the detailed new product announcements from the non-detailed is 0.04754 with a t-value of 2.03. This is significant at 2.5% level of significance (one-tailed test). The fact that the market's reaction to detailed new product information is significant and positive is consistent with H2.

The adjusted R-square shows that the explanatory variables account for only 2% of the variability in the dependent variable. Even though this is low, it is acceptable for cross-sectional analysis of this nature (see Horsky and Swyngedouw, 1987; Chaney, et al., 1991; Bhagat, Bizjak and Coles, 1998). The results further show that R & D budget, and advertising expenditures when adjusted for the firm size do not offer a good explanation for the financial market's reaction when the excess returns to both detailed and non-detailed new product information in the computer industry are taken together.

The t-value for R & D expenses adjusted by firm size is -0.81, and the t-value for advertising and selling expenses adjusted for size is 0.99. The t-values for R & D expenditures not adjusted for size was also not significant (-0.72), similarly the t-value for advertising and selling expenses not adjusted for size was also not significant (0.82). The results of regressions in which advertising budget and R & D expenses were lagged by one year also failed to yield a significant result.

The insignificance of the effect of the advertising budget fails to support H3, however, the direction of the coefficient and the t-value lends a partial support. The insignificance of the effect R & D budget supports H4 and underscores our suspicion that both professional investment analysts and amateur investors extensively analyse the financial variables of firms for clues for their investment decisions, and use R & D budgets as a proxy for a firm's innovativeness. That being the case, new product announcements and innovation information by themselves may not bring any new information to the market. It is also important here to note that because we do not know exactly how much of the

advertising budget and the R & D budget is spent on a particular innovation, these figures only serve as a signal.

Table 3 summarizes our analysis of the market's reaction to non-detailed new product announcements and innovation information using equation 3; that is, when the standardized excess returns of non-detailed new announcements and innovation information alone are regressed on size-adjusted R & D and advertising budgets.

The results show that while size-adjusted R & D budget does not explain the market's reaction, size-adjusted advertising budgets do. The coefficient of the size-adjusted R & D is 0.0059 with a t-value of 0.04 while the coefficient of the size-adjusted advertising budget is 0.07219 with a t-value of 1.88. This result supports H5 which posits that advertising budgets will be significant in the stock market's reaction when new product information is non-detailed.

Table 4 summarizes our analysis of the market's reaction to detailed new product announcements/ innovation information also using equation 3; that is the standardized excess returns of non-detailed announcements alone are regressed on size-adjusted R&D and advertising budgets.

The results, as in the case of pooled detailed and no-detailed data, show that size-adjusted R & D and advertising budgets do not explain market's reaction to detailed new product announcements. The t-value of the size-adjusted R&D budget is -0.81 while the t-value of the size-adjusted advertising budget is 0.39. The insignificance of the size-adjusted advertising budget in explaining the market's reaction to detailed new product information supports H6, and suggests that detailed new product announcements/ innovation information by themselves provide enough information to the market.

Conclusion

We have, in this study, examined the link between the stock market's reaction and the information content of new product announcements in the computer industry. The results of our analysis are significant in the

Table 2: Least Squares Linear Regression of Excess Returns on Selected Explanatory Variables

Predictor variables	Coeff	Std. Error	T-vale	P
Const.	0.00781	0.02681	0.29	0.7713
Dumdet	0.04754	0.02348	2.03	0.0454
Adrd	-0.02023	0.02045	-0.99	0.3249
Adad	0.06517	0.08068	0.81	0.4211
R-squared	0.0477	Res. Mean Square	0.01301	
Ad. R-squared	0.0200	Std.Dev.	0.11408	

Dumdet = Dummy variable to distinguish between detailed and non detailed announcements.
Adrd = Adjusted R&D budget
Adad = Adjusted advertising budget

Table 3: Least Squares Linear Regression of Excess Returns to Non-Detailed New Product Announcements/Innovation Information on Selected Explanatory Variables

Predictor variables	Coeff	Std. Error	T-vale	P
Const.	0.00382	0.01298	0.29	0.7702
Adrd	0.00590	0.13387	0.04	0.9651
Adad	0.07219	0.03842	1.88	0.0691
R-squared	0.1172	Res. Mean Square	0.00124	
Ad. R-squared	0.0637	Std.Dev.	0.03523	

Table 4: Least Squares Linear Regression of Excess Returns to Detailed New Product Announcements/Innovation Information on Selected Explanatory Variables

Predictor variables	Coeff	Std. Error	T-vale	P
Const.	0.05766	0.03461	1.67	0.1003
Adrd	-0.02019	0.02482	-0.81	0.4187
Adad	0.05458	0.13963	0.39	0.6971
R-squared	0.0113	Res. Mean Square	0.01911	
Ad. R-squared	0.0001	Std.Dev.	0.13823	

sense that they provide documented evidence of how the stock market reacts to new product announcements with varying degrees of informational content in the computer industry. Given the frequency with which new product information is released in the computer industry, the results of this study could be of practical significance to the practitioner.

Even though releasing detailed new product information to the public tips off the firm's competitors on the products that the firm will bring to the market, and could as such leave the firm vulnerable to pre-emption, the results of this study show that on average the stock markets react positively to new product announcements that are detailed.

This suggests that detailed new product information is more credible than less detailed new product information. Providing detailed new information then may be a signal to the marketplace of a firm's commitment to the project, thus practitioners in the computer industry who are serious about innovation of new products as opposed to engaging "vaporware" tactics could get better mileage from their new product announcements by including detailed information.

We also found that financial variables such as R & D budget and selling and advertising expenses do not explain the market's reaction in the case of detailed new product announcements/ information. On the other hand size-adjusted advertising budgets are significant in explaining the market's reaction when less detailed new product information is released. This finding seems consistent with signalling theory in that in the market of asymmetric information insiders will send credible signals with credible variables (see Klein and Leffler, 198; Koku, et al., 1997). Here, because non-detailed new product information could be inscrutable additional credible signals are needed for the market to discern true products from "vaporware", hence the role of size adjusted advertising and R & D budgets.

While the current results are interesting, a further study that incorporates the effect of economic cycles would be an interesting extension of this study. Further studies that apply this framework to studying new product announcements in other industries such as the pharmaceutical industry where competition is also intense could yield some interesting insights. Similarly, a study on how firms in less competitive industries such as the mining and furniture industries release new product information, and the information content of their new product announcements could contribute to our understanding of strategy formulation using new product information.

Furthermore, because we used a simple dichotomous variable of detailed versus non-detailed, a further study that develops a scale for measuring the degree of "richness" or details of the informational content of new product information/ announcement could be a worthwhile extension to this study. Also,

because we focused on the informational content of new product announcements we gathered only generic new product data without regard to the source of data, for example, is the new product information released by a CEO such a Steve Job, or Bill Gates? While we do not think that such information would in the aggregate make a difference in the market's reaction, a case study that analyses such information in the context of source credibility would be an interesting extension.

Even though the policy implications of this study are not obvious, the results seem to underscore the efficiency of the market and suggest that the market forces are capable of policing the market with regard to deceptive practices on the part of corporations in their attempts to mislead the market into believing that they plan to introduce a new product. Thus there is no need for a regulatory intervention. Finally, there have been significant changes in the computer industry during the past five years, for example Sun Systems has been acquired by Oracle, Compaq has merged with HP, and the PC division of IBM has been sold to Lenovo. Whether and how these changes impact on innovations in the industry and way new product information is released in the industry as part of general competitive strategy would be an interesting issue to explore.

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Appendix 1

An Example of Detailed New Product Announcement/Innovation Information taken from the Wall Street Journal, February 16, 1990, Page B8

“IBM Introduces Line of Workstations; Industry Analysts Impressed by Prices
International Business Machines Corp., after years of embarrassing failures in the workstation market, finally unveiled a line of products yesterday that should make it a significant player.

Although the machines' impressive performance specifications were as thoroughly disclosed ahead of time as those of any computer announced in recent memory, IBM still managed to impress software developers, securities analysts and consultants by setting prices lower than expected. While various predictions had

IBM pricing a stripped-down, low-end machine at \$15,000 to nearly \$20,000, for instance, the starting price turned out to be \$13,000.

"We've priced these things to go," Nick Donofrio, the IBM vice president in charge of workstation development, said in an interview.

Bob Djurdjevic, a consultant with Annex Research, said the price/performance ratio on IBM's machines is several times better than competitors' workstations.

Armonk, N.Y.-based IBM indicated that it hopes to increase its market share to between 15% and 20% of the workstation market by 1992 or 1993, up from its woeful 1%-2% now. And many industry executives were inclined to believe that IBM will at least approach such numbers. "This whole machine is as close to revolutionary as IBM ever comes," said Gary Gagliardi, president of Fourgen Software Inc., which makes accounting software. "This is definitely not another me-too product."

Louis J. Mazzucchelli Jr., chief technical officer of Cadre Technologies Inc., which makes computer-aided software-engineering products, said IBM is going to have a huge impact on the market and its competitors. "IBM is doing a belly flop in the swimming pool," he said. He added that "I think we're going to look back on this as one of the most significant announcements IBM has made in a very long time."

Any gains will be minimal this year, because the initial six of the nine machines won't be available until May, and it will take the company a quarter or more to get manufacturing up to full speed. The remaining three machines will become available in July, August and November.

But securities analysts said that if IBM meets its goals it could generate \$4 billion to \$5 billion of revenue a year from this line in two to three years; by comparison, IBM's total revenue was \$64 billion last year.

Market researchers generally put the total technical workstation market at just \$4.5 billion for 1989, but the market is the fastest-growing part of the computer industry. In addition, IBM is aiming at the broader market for technical computing, which includes other sizes of machines and which covers applications beyond the simulation and modelling work traditionally done on workstations. IBM says this broader market is several times the size of the workstation market.

While IBM's entry could broaden the entire market, securities analysts said IBM should also hurt its competitors -- primarily Sun Microsystems Inc., Digital Equipment Corp. and Hewlett-Packard Co. "Investors are programmed now to believe that IBM announcements won't have a competitive effect," said Steve Milunovich of First Boston. "But I think this is clearly a negative for Digital. I also think Sun may have a little more trouble than people think."

Yesterday, however, while Digital's stock fell \$1.25 to \$76.50 in composite trading on the New York

Stock Exchange, Hewlett-Packard shares climbed 50 cents to \$47.25. Sun stock rose 62.5 cents to \$22.625 in national over-the-counter trading.

IBM still faces plenty of obstacles. Technology has been moving fast in the workstation market, with performance doubling every 15 months, so IBM is going to have to show that it can continue to push the technology hard. Competitors are expected to bring out machines as early as this summer that will boost their performance significantly by putting multiple processors into a single machine.

"The real issue will be, how long can we sustain the performance advantage," Jack Kuehler, IBM's president, said in an interview.

In addition, IBM must get software developers to get loads of applications to run on IBM's system as soon as possible. IBM has had problems with its operating system, which delayed some of that work, but it has gone to great lengths to hurry things along. It set up 22 facilities to aid in that work and has sent hundreds of executives on the road for the past two years to line up support. It has even paid many companies to move their software to the IBM hardware.

IBM said that work is going quickly enough that it should have more than 1,500 major applications available by the end of the year -- many more than was generally expected.

"By the end of this year, we'll have the best selection of applications in the industry," said George Conrades, IBM's top marketing executive in the U.S.

IBM underscored how aggressive it intends to be in marketing the machines by making point-by-point comparisons with competitors' machines, both on performance and on price. Although the conservative company has been getting tougher in recent years, it has never engaged in that sort of comparison on anything approaching yesterday's scale.

Credit: Staff Reporter of The Wall Street Journal

Appendix 2

An Example of Non-Detailed New Product Announcement/Innovation Information taken from the Wall Street Journal, October 30, 1996, Page B4

“Sun Introduces gear in battle with Microsoft

Sun Microsystems Inc., moving to defend its server-computer business, rolled out a host of new weapons in its war against Microsoft Corp.

Sun unveiled its new JavaStation network computer yesterday, as expected. But at the same time, the Mountain View, Calif., company made even more important disclosures about initiatives for taking on Microsoft in the booming intranet market. It announced new electronic-mail software, updated server software and a slew of other products that companies can use to build intranets, internal corporate networks based on Internet standards.

Sun is hoping its announcements will change the calculus in the hotly contested market for intranets, which have become popular as companies seek a standard way to set up internal networks that can shuttle corporate information. The market has become a fierce competitive arena, with Microsoft and its ally Intel Corp. vying against Sun, Oracle Corp. and their allies for chunks of a huge and expanding business.

The main battlefield encompasses server computers and the related software that power corporate intranets. Servers carry fat profit margins that dwarf those of traditional personal computers or network computers, the new simplified machines that can cruise the Internet and perform basic tasks using network-based software instead of internal disk drives.

Sun hopes to combine its new upgraded products with Java, its much-touted networking computer language, to position itself as one-stop shopping for intranets. If it can do that, Sun believes customers will buy its servers and software, instead of servers controlled by Microsoft's hugely popular Windows NT software. Windows NT's latest version, released last summer, is making rapid inroads in the corporate market. The stakes are high for Sun: It gets well over half of its revenue from server computers.

Sun's aggressive push of Java is "a proactive move against the emerging dominance of Windows NT," said Ullas Naik, analyst at First Albany Corp. "That's what this is all about."

Sun's new Java-based e-mail and server also put it in position to compete with its erstwhile partner, Netscape Communications Corp. Netscape makes its own e-mail and server software that runs on PCs but doesn't offer Java-based software for network computers. Sun "wants to be the third horse in the race so it's not just Microsoft and Netscape," said Morgan Stanley analyst Steve Milunovich.

Sun has traditionally sold its products to number-crunching industries like finance and engineering. To succeed in the new push, it must convince customers it has superior software applications for less-expert computer users.

In a bid to show it is able to broaden the appeal of its products, Sun yesterday said 65 companies have written business software in Java. But many more software developers write programs for Microsoft than for Sun, and the Microsoft tools are regarded as easier to use.