The Impact of IT Investment Announcements about Y2K Compliance on the Firm’s Market Value

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The Impact of IT Investment Announcements about Y2K Compliance on the Firm’s Market Value

Research-in-Progress

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Abstract

Do IT investments add value to firms? Famously, Carr (2003) argued “No”. Increasingly, the evidence is a resounding “Yes” (Dehning et al. 2003). However, under what conditions do these investments make an impact? This underpins the research aim of this paper to improve the understanding of how IT investment announcements affect the value of firms. To achieve this aim, this study will answer this research question “How do IT investment announcements regarding Y2K compliance affect the market value of companies?”

The study will examine and extend current knowledge by proposing an enriched research model. It will then use the event study methodology to test this model assuming a semi-strong market hypothesis. Through the observed abnormal returns, causal relationships will be able to be seen between the variables and their respective market reaction. This will provide conclusions on the variables that influence investor interpretation of a signal, and therefore market reaction.

Keywords: IT investments, Regulatory announcements, Compliance, Year 2000 (Y2K), Event study methodology, Abnormal returns (AR), Cumulative abnormal returns (CAR), Cumulative average abnormal returns (CAAR), Value creation, Competitive advantage.
Introduction

Since the advent of Information Technology (IT), companies have spent billions of dollars (US) investing in IT. However, a pertinent question remains: How do IT investment announcements regarding Year 2000 (Y2K) compliance affect the market value of companies? Carr (2003) concluded that IT does not matter. His contention was that IT, like electricity, has become a commodity, and thus cannot be a source of competitive advantage. However, the paradox is that companies continue to invest and spend billions on IT investments. Carr’s (2003) paper fuelled heated debate in its time with numerous other researchers proposing counter arguments. Others have concluded that IT does matter and have tried to design methodologies of measuring the value impact of IT. Brynjolfsson and Hitt (1996) found a positive relationship between IT investments and firm output or productivity. Other research has tried to find a relationship between IT investment and firm performance. However, Im et al. (2001) noted that this causal link between IT investment and firm performance is hard to justify because firm performance is impacted by a large number of varying factors.

Event study methodology was recently proposed to eliminate other factors by measuring how markets react to firms’ IT investment announcements (McWilliams and Siegel 1997). More generally an event study methodology is used to measure how a firm’s stock price reacts to new information provided to the market (Ball and Brown 1968; Brown and Warner 1985; Fama et al. 1969; Seiler 2004). It is conducted by measuring stock prices before and after an announcement to ascertain how the market reacted to that announcement. It is based on the premise that new investments should have a positive Net Present Value (NPV) to create value and be undertaken, which will add to the firm’s market value (market capitalization). For a publicly listed firm in an efficient market, this NPV will be reflected in a stock price soon after the announcement is made public (Dos Santos 1993).

Increasingly, event studies have provided the evidence that IT investments are indeed making an impact on the market value of publicly listed firms (Dehning et al. 2003; Ferguson et al. 2005; Oh et al. 2006a). The question though is under what conditions? This question is of interest to business practitioners making IT investment decisions and justifying their expenses. It is also an important link to all investors seeking to assess the firm’s market value using stock prices, and it is for the most part uncharted territory for academia (Gill and Bhattacherjee 2009). If managers are to maximize shareholder value measured by stock price, they must understand the effect of IT investments. If investors seek to invest their monies efficiently to achieve the greatest yield, then they must be able to determine the effects of IT investment announcements on stock price.

Therefore, the research aim is to improve our understanding of how IT investment announcements affect the market value of publicly listed firms. It adopts Bacon’s (1992) definition of IT investment: “Any acquisition of computer hardware, network facilities, or pre-developed software or any in-house system development project, that is expected to add to or enhance an organization’s information system capabilities and produce benefits beyond the short term” (Bacon 1992, pp. 335-336). The research is specifically focusing on IT investments in Y2K problem projects in a regulatory compliance context in Australia from 1998 to 1999. It examines how the announcements about IT compliance investment projects affected the market value of publicly listed firms in Australia.

For business practitioners, understanding the Y2K phenomenon will allow them to understand how the financial markets react to this kind of crises and therefore, how they can strategically position themselves. This understanding will provide some light on how public stock exchange announcements get interpreted and are acted upon, when announcements should be made, whether to involve a third party expert in these crises situations, and whether companies should just seek to comply to settle worries or use the crisis as a catalyst to extend their compliance efforts to demonstrate the achievement of some competitive advantage and value creation. In this way, companies can use the results to best solve problems to achieve a favorable reaction from their respective equity base. In conjunction, it is important to understand how different strategies can relate to different successes.

It is also important for governments to learn from the Y2K phenomenon. Quigley (2005, p.288) explained that “Y2K offers us an exceptional opportunity to examine how governments respond to risks that include industry, government, regulators, and the media, with potential health, safety and economic consequences... What is important now is to focus on the reaction to Y2K in retrospect and try to understand the strengths and weaknesses, opportunities, and constraints that shaped the regulatory response and in doing so draw lessons to make present risk management more effective”. While Y2K received much attention in the media and in popular culture, very little has been done to understand how the stock market reacted to this issue (Krishann and Sriram 2000). The literature offers little evidence to either side, and these views are conflicting. King and Winters (2008) find that there was no value
created for banks, which contrasts with Krishnan and Sriram (2000), Anderson et al. (2001), and Anderson et al. (2006), who find Y2K remediation efforts are associated with a positive return on the market value of the firm. This study will add to the body of evidence and provide greater clarity on how the stock market in an Australian context reacted to announcements regarding the Y2K phenomenon.

The next two sections discuss the literature, theory and methodology relevant to this paper's investigation. The following sections discuss the results, limitations, contribution, implications and conclude briefly outlining further research to complete this study.

**Literature Review and Theory**

There are many different theories that can be used to study the impact of IT investments on the market value of a firm including: efficient market hypothesis, resources-based view of the firm, process theory, transaction cost theory, resource dependence theory, and real option theory (Zhang and Huang 2009).

In this study, the efficient market hypothesis is leveraged in understanding how stock prices reflect the result of an IT investment announcement. Fama (1970) posits that market prices reflect information known about a company at varying levels:

1. Weak efficient market – market integrates all historical information,
2. Semi-strong efficient market – market integrates all publicly available information, and
3. Strong efficient market – market integrates all information (public and private).

This study assumes a semi-strong efficient market whereby the market price of a stock reflects all publicly available information (Fama 1970). Accordingly, if an unexpected IT investment announcement hits the market, then any new stock price will reflect this new information in its valuation. If this IT investment announcement will have a future effect on cash flows, then the discounted present value of these cash flows will now be reflected in new prices for the stock. Thus, any abnormal return observed can be associated with this IT investment announcement and analysis can understand the market value impact of an IT investment announcement. Another important assumption is that the information provided by the announcement was new to the market. Prior to the announcement this information was unknown to external parties of the company. Therefore the announcement provided new information to the financial markets. “Abnormal returns can then be assumed to be the result of the stock market’s reacting to the new information” (McWilliams and Siegel 1997, p. 634). Another assumption is that the return of the market index on day $t$, $R_{mt}$, is uncorrelated with the random variable $\varepsilon_{jt}$ (Cowan 2005). Where $E(\varepsilon_{jt}) = 0$, is the expected value of the random variable in the market model must be zero (McWilliams and Siegel 1997).

According to Seiler (2004), the estimation period is “the period of time over which no event has occurred. It is used to establish how the returns on the stock should behave in the absence of the event” (p. 424). Seiler (2004) recommends that the estimation period must be long enough to capture the relationship between the stock and the market, but not too long that the estimated relationship is not recognizable. The event window is “the number of trading periods (days) examined preceding and following the event date” (Seiler 2004, p. 424). The choice of the length of the event varies amongst event studies. It is commonly a trade-off between the event study recognizing some abnormal return and ensuring the accuracy of the reaction. More recently, as better data has become available researchers have chosen narrower event windows. There are several commonly used windows. The first is: 5 days before and after (-5,+5) an announcement used by Dehning et al. (2004), Ferguson et al. (2005), Oh et al. (2006b), Cheng et al. (2007), Nagm and Kautz (2008), and Subramani and Walden (2001). The second is 1 day before and after (-1,+1) an announcement and is consistent with Chatterjee et al. (2001), Chatterjee et al. (2002), Campbell (2003), Dehning et al. (2003), Dehning et al. (2004), Dewan and Ren (2007), Hovav and D’Arcy (2003), Oh et al. (2006a), Khallaf and Skantz (2007), Nagm and Kautz (2008), and Ranganathan and Brown (2006). The event date is “the time when the market first learns of the relevant new information” (Seiler 2004, p. 217). Few researchers have studied Y2K using an event study lens.

King and Winters (2008, p. 91) concluded that “solving the Y2K problem did not create value for bank shareholders. That is, announcements of solving the Y2K problem were not accompanied with positive stock price reactions”. However, although they concluded no financial gain could be achieved by “early movers nor banks that solved the problem before the end of 1999… it did create increased risk for those that appeared unlikely to solve Y2K in a timely manner” (King and Winters 2008, p.101). From these results it seems that solving the Y2K problem was a matter of staying competitive rather than using the situation to provide any form of value creation for a firm.
Economics and Value of Information Systems

There is another school of thought which associates Y2K efforts with a positive return on the market value of a firm. Krishnan and Sriram (2000) conducted an analysis on 190 firms that had disclosed their total Y2K-compliance cost estimates in their 1997 annual reports and compared this to the respective share prices. They concluded that “estimates of Y2K-compliance costs were positively and significantly related to share prices after controlling for earnings, book value of equity and other factors… that the stock market … consider[ed] investments in Y2K remediation efforts a significant and value increasing activity for the average firm” (Krishnan and Sriram 2000, p.1). Anderson et al. (2001) examined 721 Fortune 1000 firms who had disclosed Y2K remediation costs in the annual 10K and quarterly 10Q reports filed with the US Securities and Exchange Commission (SEC). Their contention was that Y2K spending reflected investments in IT infrastructure that complemented changes in business processes. They found that there was a strong positive association between firm value and industry spending on Y2K (Anderson et al. 2001). Dehning and Richardson (2001, p.12) summarize Anderson et al. (2001) thus, “They [found] that on average the market value of the firm increases by 20.3 times the amount spent on Y2K when firms spend more than the industry median. The market value of the firm decreases by 40.5 times Y2K spending when firms spend less than the industry median. Industry median Y2K spending was associated with an increase in the market value of firms within the industry of 123.5 times the industry Y2K spending”.

Evidently, the conclusions of various studies produce mixed results. The event study methodology employed by King and Winters (2008), concludes a non-event unless a firm is unlikely to solve the Y2K problem, whilst two studies employing the Ohlson (1995) model of market value produce significant positive returns. This paradox lends itself to further clarification and research into what effect Y2K spending actually had on firms. This is one of the primary motivations for this research.

Methodology

For this study, an estimation period of -301 days to -46 days before the event date (0) is used, i.e., 255 day event period (see Figure 1). This study will examine two common event windows, -5 to +5 days, and -1 to +1 day. The abnormal return (AR) of the stock will be calculated during the event window to examine the cumulative abnormal returns (CARs) and the mean of the CARs, i.e., cumulative average abnormal return (CAAR). These are the Eventus’ event study software “default settings” (Cowan 2007, p. 6) and are consistent with Scholes (1972). The market model is estimated with “data prior to the event period and measure (estimate) the abnormal return during the period as the prediction error based on the returns and parameter estimates. It is assumed that the coefficients are constant during the estimation and event periods” (Binder 1998, p. 113). The important consideration about the event date is that some providers of data have reporting delays. If the event date is inaccurate, then the power of the test is diminished. However, as Securities Industry Research Centre of Asia-Pacific (SIRCA) source their data directly from the Australian Securities Exchange (ASX), this study is confident about the accuracy of the announcement date. The market index selected is the All Ordinaries on the ASX which a market capitalization weighted index. The index represents 500 of the largest companies listed on the Australian Securities Exchange.

Data

The sample was selected from a database ‘Signal G’, maintained by SIRCA. Signal G stores all news announcements made through the ASX by Australian firms from 1998 to 1999. This data reflects all available daily information that has ever been recorded in the Australian public firm sphere.

The search for announcements was hand coded and based upon the keywords from Bacon’s (1992) definition along with some additional words: ‘information technology’, ‘computer’, ‘hardware’, ‘software’, ‘system’, ‘investment’, ‘acquisition’, ‘purchase’, ‘development’. From this sample, announcements were filtered via a financial academic and IT practitioner to remove announcements that were duplicates, irrelevant, negative (i.e., that they have been...
rejected or abandoned by the announcing firm or had confounding events) (Gill and Bhattacherjee 2009). This resulted in 2,468 relevant announcements ranging from two to eight for each firm. The stock tickers (i.e., alpha symbols usually with three letters on the ASX) for these announcements were the unique identifiers resulting in 957 ASX companies for which we have announcements. The additional filters of requiring 301 trading days of daily price series before an IT announcement, coding for the first announcement of projected cost of Y2K compliance, left 149 firms each with several announcements. These firms’ raw stock prices had to then be adjusted for various corporate actions including dividends and stock splits. Most commonly, this adjustment is completed by using a dilution factor. There are many different dilution factors to be calculated on an individual basis as per each corporate action. As one example, if a dividend is paid the dilution factor is calculated as:

\[
\text{Dilution} = \frac{P_{\text{ex}}}{P_{\text{ex}} + D},
\]

(Equation 1)

where \(P_{\text{ex}}\) is the ex-dividend stock price and \(D\) is the dividend amount.

“The main purpose of the daily dilution factor is to provide an easy method of calculating the return over anytime period” (Bellamy 1998, p. 1). According to Bellamy (1998), for SIRCA Core Research Data (CRD), a single dilution factor incorporates all of these changes. Prices are therefore adjusted by multiplying the raw price for the day by the dilution factor. There are also a number of implications with this requirement:

1. “The dilution should be calculated for all days on which a change occurs,
2. Last sale prices should only be recorded for days on which a sale occurs, and
3. All non-change days have a unity dilution factor” (Bellamy 1998, p. 2).

The sample of 149 announcements was filtered into three categories: announcements where announced cost was \(\geq A$100,000\) Australian dollars (A$, during 1998-1999 one Australian dollar on average was worth 0.6375 of a US dollar); announcements where announced costs were \(< A$100,000\) to \(\leq A$0\); and announcements where announced cost was ‘not significant’, ‘minimal’ or ‘not material’ (i.e., no dollar figure given just a qualitative opinion). The A$100,000 threshold cut-off was arbitrarily chosen by the researcher as a convenient point of comparison while the latter was given in the ‘news’ announcement data provided for this study. This filtration process resulted in 63 announcements with costs greater than or equal to A$100,000; 52 announcements with costs less than A$100,000 and 34 announcements where costs was noted as not significant, minimal or not material.

This study attempted to split the initial Y2K investment announcements (where costs \(\geq A$100,000\)) via the Global Industry Classification Standard’s (GICS) 10 sectors, as prescribed by the ASX. However, the sample was not large enough for a comparison between industries via GICS. Therefore the researcher categorized the companies into four categories: banks, mining, manufacturing and other. Banks included firms which were deposit holding institutions. The final sample size was nine firms including: major banks, regional banks, and credit unions. Mining firms included all firms which extract natural resources from the ground and the final sample was 13 firms. The 10 manufacturing firms were considered as those who took raw materials and used their capital to transform it into another product. There were 31 other firms (see Table 1).

We divided the \(\geq A$100,000\) sample of 63 stocks into large and small firms to compare the stock market reaction on their initial Y2K investment announcements (Anderson et al. 2001). There are several measures of the firm size but this study elected to use the market capitalization of the firm as its measure of firm size is consistent with Ferguson et al. (2005). The sample was divided into two groups based on the median market capitalization (A$206 million). Ideally, this would be done by some commonly used benchmark (e.g., ASX 200 versus other ASX stocks). However, this categorization would not have yielded a large enough sample. Therefore, the median was used as analogous division. This may limit the generalizability of the results but still provides useful insight to the stock market reaction (Anderson et al. 2001).

This process was completed for all relevant stock data and this data was passed through to SAS version 9.1.3 (2004, copyright) to complete the event study in Eventus via Wharton Research Data Services (i.e., WRDS, The Wharton School of the University of Pennsylvania Copyright 1994-2009) database (Cowan 2007).
Discussion of Results

Table 1 shows the descriptive statistics in Australian dollars for the announcements of the IT compliance projects where cost was \( \geq \$100,000 \) for the 63 firms from June 1998 and September 1999. Approximately 83 percent (fifty four) of the announcements were made in 1998 with the remainder in 1999 (nine).

<table>
<thead>
<tr>
<th>Year</th>
<th>Banks</th>
<th>Mining</th>
<th>Manufacturing</th>
<th>Other</th>
<th>Full Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>9</td>
<td>11</td>
<td>8</td>
<td>26</td>
<td>54</td>
</tr>
<tr>
<td>1999</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>9</td>
<td>13</td>
<td>10</td>
<td>31</td>
<td>63</td>
</tr>
</tbody>
</table>

Median Cost of Y2K Remediation: \( \$750,000 \)
Median Market Capitalization: \( \$206,031,920 \)
Median Cost/Market Capitalization: 0.33%

The output in Table 2 provide the results for the full sample of stocks as well a cross sectional analysis of the industry and size effect for firms with announced costs \( \geq \$100,000 \).

Panel A indicates the market reacted significantly to initial Y2K announcements which had estimated costs greater than \$100,000. Panel B of Table 2 demonstrates the results when the firms who announced costs greater than or equal to \$100,000 were split into their industry groups. In this study, there were three (3) emergent industries that could be tested: banks, mining and manufacturing industry groups. It can be argued from these results that the manufacturing firms are a strong part of what is driving the overall negative stock market reaction for the sample of 63 firms. Mining firms also are adding to the overall negative effect, but to a lesser extent. This result contrasts this study’s expectation that the reaction to industry would be indifferent. Panel C of Table 2 shows the results of two categories of firm size split by the median market capitalization of the sample firms (\$206, 031,920). These results

<table>
<thead>
<tr>
<th>Panel A: Cost (Total Sample)</th>
<th>Cost ( \geq $100,000 ) (N=63)</th>
<th>Cost &gt;$0 and &lt;$100,000 (N=52)</th>
<th>Cost Not Significant, Minimal, Not Material (N=34)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event Window</td>
<td>CAAR</td>
<td>Patell Z</td>
<td>CAAR</td>
</tr>
<tr>
<td>(-1,+1)</td>
<td>-1.85%</td>
<td>-2.654**</td>
<td>1.03%</td>
</tr>
<tr>
<td>(-5,+5)</td>
<td>-2.36%</td>
<td>-2.115*</td>
<td>4.71%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B: Industry Effect (Table 1 stocks)</th>
<th>Banks (N=9)</th>
<th>Mining (N=13)</th>
<th>Manufacturing (N=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event Window</td>
<td>CAAR</td>
<td>Patell Z</td>
<td>CAAR</td>
</tr>
<tr>
<td>(-1,+1)</td>
<td>0.97%</td>
<td>0.586</td>
<td>-4.97%</td>
</tr>
<tr>
<td>(-5,+5)</td>
<td>-0.38%</td>
<td>-0.285</td>
<td>-6.31%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel C: Size Effect (Table 1 stocks)</th>
<th>Market Cap ( \geq $206m ) (N=32)</th>
<th>Market Cap &lt; $206m (N=31)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event Window</td>
<td>CAAR</td>
<td>Patell Z</td>
</tr>
<tr>
<td>(-1,+1)</td>
<td>-1.70%</td>
<td>-2.05%</td>
</tr>
<tr>
<td>(-5,+5)</td>
<td>-1.33%</td>
<td>-3.43%</td>
</tr>
</tbody>
</table>

The symbols $,*,**, and *** denote statistical significance at the 0.10, 0.05, 0.01 and 0.001 levels, respectively, using a generic one-tail test.
indicated that the stock market had a significant negative reaction to initial Y2K announcements where costs were above A$100,000 and the firm market capitalization was greater than or equal to A$206 million. They also provide some evidence that markets had a significant negative stock market reaction to firms whose market capitalizations were under A$206 million.

Further analysis showed (not included for brevity) that there was stronger evidence for a negative reaction occurring for initial Y2K announcements where costs were between A$100,000 and A$750,000 than where costs were greater than A$750,000. The stock market reaction for announcements where costs were between A$1,000 and A$100,000 was slightly positive though this was not significant. The stock market reaction for announcements where costs was announced as not significant, minimal or not material was slightly negative though this result was also not significant. This summary is illustrated in Figure 2.

This reasoning is consistent with the findings of King and Winters (2008) where solving the Y2K problem did not create value for their sample, i.e., the spend on Y2K efforts was perceived by the market as a matter of survival rather than a form of value creation for the firm.

However, these findings are in stark contrast to the notion that IT investments create positive abnormal returns as suggested by much of the literature that exists (Anderson et al. 2001; Anderson et al. 2006; Krishnan and Sriram 2000). One explanation for this negative stock market reaction is that the market perceived Y2K spend as a cost of survival, rather than an ability to provide any future value. These monies spent were necessary for the business to continue as a going concern (i.e. continue operating) post 1 January, 2000, but were not useful in generating future cash flows for the company beyond survival. Therefore, the stock market penalized firms who had to spend over A$100,000 to comply with Y2K.

It is also interesting to note that these results generally contrast with the body of literature regarding IT investments. Evidence from the general IT investment literature is that IT investments do result in a positive stock market reaction (Roztocki and Weistroffer 2009). A possible explanation for this difference in evidence is that the market treats IT spend necessary for survival differently from IT spend focused on adding to a firm’s competitive advantage and value creation via selecting positive net present value projects (i.e., positive future cash flows).

The cumulative average abnormal returns for Y2K remediation costs greater than or equal to A$100,000 are illustrated in Figure 3. This indicates that there is a decreasing cumulative abnormal returns prior to the announcement date, implying that the announcements on average across the 63 firms between June 1998 and September 1999 were leaked into the financial market prior to the public announcement via the ASX or were anticipated by the market.
The cumulative average abnormal returns for banks over the 11-day and 3-day event were not significant. This suggests that the stock market was not significantly reacting to banks initially announcing their Y2K remediation effort. This is an interesting result because banks were generally the biggest firms in the sample announcing on average an estimated cost of average A$20 million for the Y2K remediation effort. The cumulative average abnormal returns for mining firms indicates that there was a significant negative reaction to mining firms making initial Y2K announcements with costs greater than A$100,000. The cumulative average abnormal returns for manufacturing firms over the 11-day and 3-day event were significant at the 1 percent and 0.1 percent respectively. This result is strong evidence that the stock market had a negative reaction to firms in the manufacturing industry with costs greater than or equal to A$100,000.

These findings contrast the results of Im et al. (2001), which found no difference between financial and non financial firms. It is also interesting to consider that Im et al. (2001) initially argued that information intensive firms (e.g., banks) should have a greater stock market reaction to IT changes because IT changes affect the bottom line to a greater extent. However, the results from this study indicate that non financial firms (e.g., manufacturing and mining firms) received a greater negative market reaction. One possible explanation for this phenomenon is that markets had expected that banks were going to have large spends on Y2K remediation and this new information did not significantly differ from expectations. However, the market had expected that manufacturing and mining firms would not require large Y2K remediation efforts and relevant spends would be low. Therefore, as these firms announced their Y2K remediation effort costs, this new information exceeded expectations of expenditure and therefore resulted in a negative stock market reaction.

The size effect observed confirms the findings of other literature that smaller firms attract a greater abnormal return (Cavusoglu et al. 2004; Im et al. 2001; Khallaf and Skantz 2007; Lin et al. 2007; Telang and Wattal 2007; Nagm and Kautz 2008). In this case, smaller firms attract greater negative abnormal returns. There are several possible explanations for this.

Telang and Wattal (2007), argue that large firms are diversified and therefore a potential loss in one area will reflect minimally on the overall bottom line. However, the Y2K phenomenon threatened all information systems and thus the whole firm’s bottom line would be affected. Lin et al. (2007), suggest that larger firms enjoy a better reputation, lower costs of capital and greater resources to deal with a potential threat and Hayes et al. (2001), expounds that smaller firms may be less likely to have the resources or credit to sustain the potential losses. As such, the stock market is less likely to penalize large firms and instead will penalize smaller firms more heavily as their ability to weather the compliance effects (of Y2K) could be in doubt.

Limitations, Contribution, and Implications

A potential limitation of this research is the data size of 149 firms which may influence the validity and potentially the statistical power of our results because only 63 firms (those with initial Y2K compliance announcement costs greater or equal to A$100,000) were significant. This is in contrast to Krishnan and Sriram (2000), Anderson et al. (2001) and Anderson et al. (2006) with 190, 721 and 731 companies in their sample respectively.

The observed difference is primarily due to different methods of sourcing Y2K remediation costs. This study was interested in the Y2K remediation cost announced to the stock market on a discretely identifiable date. In contrast, these other studies were unable to utilize an event study methodology because Y2K efforts in their study were not disclosed on discretely identifiable dates. Moreover, this sample is constricted by the size of the Australian stock market with companies that trade regularly and the number of companies accurately announced their Y2K expenditure without confounding events surrounding announcement date. We also need to be cautious because the study is Australian based and this may impact the generalizability of our compliance results to other stock markets.

This research in progress paper contributes to academia and practice in several ways (Gill and Bhattacherjee 2009). This study is the second study the researcher is aware of that examines the Y2K phenomenon via an event study (the first study being King and Winters 2008). It is the first study to examine pre-Y2K IT investment announcements with an event study methodology using Australian listed company data. This adds to the body of limited literature regarding how the Australian Securities Exchange stock market perceives IT investments in Australian firms.

It will also contribute in improving the understanding of how IT investments affect the market value of firms by providing further evidence on variables that have previously been tested and adding new variables that the stock market considers significant when evaluating firms’ stock prices.
This study also expands the focus of research into the concept of crises caused by IT or crises in which IT has a major role. The examination of IT in crisis times is unexplored and therefore, there is an opportunity for this kind of research – in private firms, publicly listed corporations, and government. Although the Y2K issue is somewhat behind us, it is still relevant, and IT issues will persist into the digital future. It is relevant because we are interested in how the market reacts to IT phenomena which demands worldwide attention and Y2K is a prime example. Moreover IT issues will continue into the future. Consider that just recently, a computer glitch saw US markets plunge on the New York Stock Exchange (Bowley 2010). The Y2.01k problem was another issue found with the date fields in IT systems. For example, the Bank of Queensland (Australia) EFTPOS terminals malfunctioned ticking over to 1 January, 2016 instead of 2010 (CRN 2010). Windows Mobile was also susceptible to the issue, with its text messaging function sometimes attaching 2016 as the sent date (Fried 2010).

Therefore, this type of study tells us the nature and extent that the market places value on these types of compliance issues. Also it will help us increase our understanding about the impact of IT on a digital economy - Y2K for many people was the start of the bubble that ended in March 2000 (Brunnermeier and Nagel 2004, p. 2017). We also want to know how the market rewards or disciplines the different ways firms respond and react to such events. This information is extremely valuable to publicly listed entities and business practitioners in the management of their stock market announcements. The results will allow companies to better tailor their announcements to achieve the best effect for their shareholder’s value, and will allow them to better understand what company and compliance project attributes the stock market rewards. Finally, these results may have policy and strategy implications for appropriate regulation during IT crises and provide information on better governance during future crises.

Conclusion and Further Research

The results of this research in progress improve our understanding of how IT investment project announcements in a regulatory compliance context affect the market value of publicly listed firms in Australia from 1998 to 1999. We find that there was a negative effect for both mean abnormal and cumulative abnormal returns when adjusted for market-wide impacts. The market wide measure used the Australian All Ordinaries Index of the largest 500 firms on the Australian Securities Exchange.

Further research will analyze the many company and announcement characteristics already coded. Firstly, the research will continue to capture the effect of lower level differences between firms via cross sectional analysis (e.g., firm size, industry, market capitalization, and Y2K spend as a function of company size). This will be completed via an event study method similar to the process completed thus far. It is expected that many of these variables will have a significant impact on the market value of announcing firms.

Secondly, the research will also examine the impact of various announcement characteristics. For example, various phases of compliance completion, the timing of announcements, timing of completion, impact of compliance when over- or under-budget, third party compliance confirmation from audit to implementation, and non-compliance firms. This will be completed using multivariate regression analysis to identify significant variables. It is expected that some of these variables will be significant (e.g., timing of completion) whilst others will not be significant.

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