Does Inclusion of CIO in Top Management Team Impact Firm Performance? Evidence from a Long-Term Event Analysis

Qing Hu  
Iowa State University  
qinghu@iastate.edu  

Ali Alper Yayla  
Binghamton University – SUNY  
ayayla@binghamton.edu  

Yu Lei  
Binghamton University – SUNY  
ylei1@binghamton.edu

Abstract

Inclusion of chief information officers (CIOs) in top management teams (TMTs) increases the functional and knowledge diversity of the teams, and elevates the role of IT in strategic business decisions. Considering that firms are increasingly relying on IT for operational efficiency and competitive advantage, TMTs with IT diversity can be expected to have superior performance compared to those without. While many studies have argued conceptually the importance of CIOs membership in TMTs, very few studies examined the performance effects of this membership. The goal of this study is to investigate this relationship. Moreover, we consider contingency factors that may have an effect on the focal relationship. Using firm-level secondary data and long-term event study methodology, we show that inclusion of CIO in TMT has a significant positive effect on firm performance, and this positive effect is larger for firms in dynamic environments and during the more recent years.

1. Introduction

Information systems (IS) studies have long been postulating the importance of the relationship between managers of the information technology (IT) function and executives of firms (e.g., [47][48][54][60]). As operational and strategic roles of IT in firms started to increase in the 1990s, chief information officers (CIOs) became essential parts of corporate governance [18][57]. Moreover, in recent years, firms’ reliance on IT increased significantly as technologies such as cloud computing, business intelligence, and social networking became part of daily business processes. These changes not only elevated the importance of CIOs in firms but also changed their role. Today, successful CIOs are considered to have the ability to translate technical requirements of IT into business language and find a way to transform current and emerging technologies into sustainable competitive advantage for their firms. Consequently, IT has increasing effect on firm governance as more CIOs report directly to Chief Executive Officers (CEOs), and many firms start considering IT executives as part of their top management teams (TMTs) in recent years [19][52].

The IS leadership literature has conceptually argued and empirically shown several benefits of CIO’s membership in TMT of a firm, such as having a positive effect on CIO’s role effectiveness [18][67], IT assimilation [2], and shared domain knowledge between CIO and business executives [60]. Though less explicitly, the strategic alignment literature also postulates that close relationships between IT executives and TMT would result in more frequent communication between IT and business executives [38][45] and better integration of IT and business plans [70], and consequently improved organizational performance as a result of better strategic alignment [16][64][65].

Moreover, a proper IT governance is considered critical for making IT-related strategic decisions [75][77]. As defined by the IT Government Institute [44], IT governance is the responsibility of the board of directors and executive management team of the firm. Parallel to this, previous research identified several important attributes of directors and TMTs which may influence effective IT governance mechanism. For example, Jewer & McKay [44] argue that a board’s IT competency is associated with the board IT governance which affects the contribution of IT to IT-business alignment and firm performance [22].

Although there seems to be a trending emphasis on and need for stronger IT governance in firms, as reflected in the increasing number of CIOs in TMTs and directly reporting to CEOs, there are still considerably fewer firms where CIOs are considered as members of their TMTs. Furthermore, while it is expected that even fewer CIOs are included in board of directors, it is surprising that IT related issues are still failing to draw the attention of many boards of directors [23][40]. This lack of attention to IT matters in corporate governance is troublesome considering...
that the level firms depend on IT creates significant strategic and operational risks. In fact, directors recognize the importance of IT in general [23], but the necessary insight to provide adequate oversight to IT risks and opportunities is often absent from the board [39]. For example, Weill & Ross [76] argue that the pervasiveness, complexity, and dynamic nature of IT have changed the traditionally required knowledge and technique to govern an organization. Besides, IT governance may require domain-specific knowledge from the boards in order to understand the impact of IT on their firms’ strategic goals. However, since only a small portion of CIOs sit on boards [10], this leads to IT attention deficit in the boards, insufficient communication, and lack of steering power for IT and IT governance [1][22][40]. Therefore, the first step to build the much needed bridge between corporate governance and IT would be accomplished with CIOs’ membership to TMTs of their firms.

Drawing on upper echelons theory [32] and strategic alignment theory [35][51], our study integrates the arguments of leadership and governance literature in an attempt to provide empirical evidence for the effect of CIO’s membership in TMT on firm performance using firm-level secondary data. One of the arguments of upper echelon theory is that diversity in TMT leads to better information processing and decision making, and consequently increases team performance and firm performance. Our study is inspired by Ranganathan and Jha’s [62] study and attempts to address the limitations of their findings by adopting a more rigorous long-term event study methodology that uses a longitudinal data set. In addition, we consider the moderating effect of contingency factors, thus significantly extending our understanding of the relationship with stronger theoretical rigor and more robust statistical evidence.

The main thesis of our study is that inclusion of CIO in TMT increases functional and knowledge diversity of the team, which leads to better alignment of IT with business functions and strategies and consequently to better firm performance. Furthermore, given the complex and dynamic nature of business environment, this effect is inevitably moderated by a number of contingency factors. The results of our event study analyses show that firms with CIOs in their TMTs indeed have superior performance compared to the control sample. This positive effect is moderated by the dynamism of the environment and the time period of the analysis. That is, the effect is larger for firms in dynamic environments compared to those in more stable environments, and the effect is larger in recent years compared to that in earlier years.

2. Theory and hypothesis development

One stream of research in upper echelons theory examines the relationship between TMT characteristics and firm performance. According to these studies, an organization is a reflection of its top managers, and these top managers play an important role in shaping organizational strategic choices and directing organizational objectives [32]. Thus, the performance of an organization can be considered a function of its TMT’s leadership [68]. One important feature of TMT is its diversity which focuses on the effect of team members’ heterogeneity on team performance [17]. The main theoretical argument from this perspective is that higher diversity of a team leads to better information processing, thus causing the team to suffer less from bounded rationality and make better decisions.

However, studies in the literature reported both positive and negative relationships between TMT diversity and firm performance [11][21][31][73]. These inconsistencies are partially due to the complex characteristics of TMT and varied conceptualization of TMT diversity. According to a recent meta-analysis [36], team diversity is examined from two dimensions in the literature: 1) homogeneity versus heterogeneity, and 2) task-related versus bio-demographic diversity. The findings of the meta-analysis indicate that heterogeneity and task-related diversity are positively associated to team performance. These findings are in accordance with earlier studies in which TMT heterogeneity was found to be positively related to firms’ competitive actions, and in turn, to firms’ relative performance [27].

Harrison and Klein [33] defined diversity as “the distribution of differences among the members of a unit with respect to a common attribute” (p.1200). They argued that diversity is attribute-specific, that is, a team is not diverse by itself, but instead diversity of the team is based on the features of its members. They classified diversity into three types: separation, variety, and disparity. Separation refers to the differences in value, belief, or attitude among team members. Variety is defined as heterogeneous functional background knowledge or experience. Disparity is characterized by the differences in socially valued assets or resources held by team members.

In this study, we focus on the second type of team diversity - variety - considering that CIO’s function is distinctively different from other TMT members due to the technical nature of IT. CIOs increase the heterogeneity of mostly business-oriented TMTs with their understanding of technical requirements of IT and by providing solutions on how to utilize IT to create competitive advantage. Higher levels of functional
heterogeneity provide organizations with broader knowledge, skills, and perspectives [36]. When making strategic decisions, TMT members with higher degrees of diversity in their functional backgrounds are likely to consider a broader range of alternatives collectively [14]. Moreover, variety of functional backgrounds increases the cognitive diversity of the group, which is an important resource for solving complex and non-routine problems [4]. However, mixed results are found in previous literature. For example, Barsade et al. [6] reported that functional heterogeneity is positively related to stock market returns while other studies failed to find a positive relationship [43][56]. One of the potential reasons of these conflicted findings is the use of different measures for performance. In their meta-analysis, Certo et al. [14] reported a positive relationship between functional heterogeneity and return on assets. Other studies that used financial indicators as a proxy for firm performance provided further statistical support to the positive effect of functional diversity.

The importance of CIOs and their partnerships with TMTs have been studied extensively in the IS literature [3][24][48][54][59][60]. As the operational and strategic roles of IT increase, IT executives, especially CIOs, not only play their managerial roles as IT leaders, but also act as entrepreneurs, resource allocators, or monitors [13][29][54], show business competence [7][48], and are politically savvy [67]. More importantly, CIOs need to have a strategic role supplemented with autonomy and structural power to gather required resources and support for IT related decisions and investments [53], especially in firms where IT is used for competitive advantage [13].

Raghunathan and Raghunathan [63], for instance, noted that IS executive’s reporting structure has an influence on IS planning and its role in organizations. Similarly, Feeny et al. [26] indicated that CIOs who do not report to CEOs directly may have IS goals conflicting with business goals. More recently, Banker et al. [3] investigated the reporting structure of CIOs. They postulated that firms using cost leadership strategy should have their CIOs report to their Chief Financial Officers (CFOs), and firms using differentiation strategy should have their CIOs report directly to their CEOs. Their results showed firms that aligned this reporting structure correctly have superior performance to those with misaligned reporting structure. Carter et al. [13] and Peppard et al. [55] provided further support for the fit between the role of the CIO and the role of IT in firms.

In addition to providing functional diversity, CIO’s membership to TMT also ensures a better two-way communication between CIO and CEO [26]. An effective interaction between CIO and CEO reduces ambiguity, a major roadblock in IS strategic planning [74]. Similarly, a good relationship between CIO and TMT promotes more informal and personal contacts, which creates a “personal informal” style that is effective in exploring new IS applications [61] and benefits IT-business strategic alignment [38]. Moreover, a stronger relationship between CEO and CIO leads to greater influence of IS on top-level decisions and higher degree of IS strategic alignment [46].

Despite numerous conceptual studies emphasizing the positive effect of CIO’s TMT membership, there are only a limited number of empirical studies that investigated the effect of CIOs’ TMT memberships on firm performance. One early example is Chatterjee et al.’s [15] study that investigated the stock market reaction to the announcement of newly created CIO positions using event study methodology. Their results showed positive abnormal returns for companies that were in industries undergoing IT-driven transformation, for internal CIO candidates, and for more recent announcements (years 1995 to 1998). However, their study did not distinguish whether these new CIOs are part of the TMTs, and they only examined the market value change in a three-day event window.

The initial attempt to explicitly investigate the effect of CIO’s TMT membership on firm performance using secondary data was made by Ranganathan and Jha [62]. They identified CIOs through company filings and found that firms with CIOs in their TMTs outperform the firms in their control group. Although their attempt is novel in terms of providing empirical support with objective data, the findings provide only limited insight due to a number of reasons. First, because they identified firms with CIOs by looking at only one year (2002), their analyses did not consider the effect of CIOs’ tenure in TMT. That is, a number of CIOs in the sample may have been members of TMT for many years and others may have become members in 2002 for the first time, which consequently dilutes the positive effect and makes the findings unreliable. Secondly, it is not clear whether the authors excluded the firms in which the CIOs left the company or dropped out of TMT during the study period (2002-2004). Given CIOs’ usually short tenure, it is likely that CIOs who were TMT members in 2002 may not continue working in the same firms in the following years. Finally, a single-year sample, while providing a snapshot, may not be adequate for capturing the full effect of CIO’s membership in TMT for any given firm.

Extending the study of Ranganathan and Jha [62] and drawing on the arguments of upper echelons
theory, as well as conceptual and empirical evidence from the IS literature, we posit that:

**H1: Inclusion of CIO in the top management team of a firm leads to better firm performance in the subsequent years.**

However, firm performance is usually constrained by a number of contingency factors, especially the business environment. Similar business strategy and leadership may result in different performance in different industries, timing, and competitive landscape. Therefore, we further argue that the positive effect is moderated by two factors: environmental dynamism and time period. Environment is considered as one of the important contingency factors that affect the level of information processing needs of executives and the potency of business strategies. Several studies in the literature argued that uncertainty of the environment affects task interdependence [9][71] and therefore requires more intensive coordination among top executives. Similarly, Galbraith [28] postulated that task uncertainty affects the level of information processed by the decision makers. Within the context of top management teams, Eisenhardt and Bourgeois [25] posited that environmental change requires constant negotiations, adjustments and decisions by the executives. Likewise, according to Hambrick [30], dynamism demands executives to interact, collaborate, and process mutual information. These discussions are also valid for the arguments pertaining to the potential effect of CIO’s inclusion to TMT. Business executives view the impact of external factors, such as business environment, as one of the most difficult aspects of IS strategic planning [49]. While communication plays a significant role in aligning IT and business goals and strategies in firms [38], the need for it is exacerbated in highly dynamic environments since a high rate of environmental change challenges executives to adopt new requirements and strategies often. Thus, we posit:

**H2: The positive effect of CIO’s membership in the top management team is stronger in high dynamic environment compared to that in low dynamic environment.**

In addition, as discussed previously, changes in the role of IT in organizations during the last three decades have affected the role of IS executives significantly over time [18][19][41][69]. Early IS literature emphasized a rather passive role for IS leaders in IT planning [50], implementation [66], use [42], and overall IT effectiveness [72]. During the past decade, however, scholars have argued for more proactive responsibilities for IS leaders, such as inclusion of IS executives in TMT [19][48], better partnership between CIO and TMT [38][58][64], and more structural power and decision authority for the CIO [3][57]. These discussions, supported by recent industry surveys [20], suggest that IT executives have moved from functional managers to part of the strategic decision making process and corporate governance in more recent time. Therefore, we expect that the positive effect of CIO’s TMT membership on firm performance would be stronger in recent years compared to that in earlier years. Thus, we posit:

**H3: The positive effect of CIO in the top management team is stronger in recent years than in earlier years.**

### 3. Methodology

To test our hypotheses, we used the long-term event study methodology [5]. While most event studies capture the effect of an event over 1-3 days, long-term event studies are aimed at capturing the effect of the event over 1-3 years. Although not as common as traditional short-term event studies, long-term event studies have been used in the literature (e.g., [5][12][34][78]).

We used the ExecuComp database to identify firms with CIOs and Compustat database to collect the necessary data for firm and environment characteristics. ExecuComp provides executive compensation data as well as other individual data such as positions of the executives in the firm. ExecuComp gathers these data from proxy statements of the firms in the S&P 1500 index. As required by the Security and Exchange Commission, firms report CEO and CFO compensation as well as the next three highest compensated executives’ compensation information in their proxy statements. We made the assumption that highest paid executives would make up the highest ranking officers in the firm, and define these top 5 ranking executives as the top management team of the firm. When a CIO is one of the top 5 compensated executives, we count this as an indication that the CIO is part of the TMT. While this is an indirect measurement of CIOs’ membership, and it is possible that there are CIOs who are not compensated very high but still part of their firms’ TMT (which are not captured in our dataset), it is not likely that a CIO is one of the top compensated executives in the firm but not part of the TMT.

We defined event year \( t=0 \) as the first time a CIO appears as an executive in the Execucomp database, thus \( t=0 \) represents the first time CIOs become one of the top 5 executives in their respective firms. To examine the effect of a CIO in TMT on firm performance, we computed the abnormal change in firm performance between pre-event and post-event years. We define abnormal performance as the
difference between the actual post-event performance of the firm and its expected performance. The expected performance is calculated as the sum of the firm’s pre-event performance and the change in its control sample’s performance in the same period. We used Tobin’s q as our firm performance measure, considering that it is a good proxy for firms’ long-term performance compared to accounting based measures such as ROA, which can be susceptible to managerial manipulations. Tobin’s q is defined as the ratio of the market value of a firm to the replacement cost of its assets. It is considered as a forward-looking performance measure which takes into consideration firms’ existing assets and their intangible value such as R&D, advertising, and brand equity [8].

Following the literature, we matched sample firms with control firms based on three criteria [5][34]: 1) pre-event performance – within 90%-110% Tobin’s q; 2) size – within 33%-300% total assets; and 3) industry – the same 2 digit SIC code. At the end of the matching process, on average each firm in our sample matched with 8 control firms. Our initial sample satisfied the above criteria during the matching procedure, on average each firm in our sample matched with 8 control firms. Our initial sample consisted of 135 firms that have a CIO in their TMT for at least three years ([t-1, t, t+1]) between the years 1993 and 2006. However, due to a lack of control firms that satisfy the above criteria during the matching procedure, we dropped 19 firms, resulting in the final sample size of 116 firms. Table 1 summarizes the pre-event performance and size of our sample and control firms.

Table 1. Descriptive statistics of sample and control firms (N=116)

<table>
<thead>
<tr>
<th>Sample Firms</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size ($ million)</td>
<td>Market Value</td>
<td>3,850</td>
<td>1,302</td>
<td>7,203</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Total Assets</td>
<td>11,250</td>
<td>1,390</td>
<td>39,631</td>
<td>95</td>
</tr>
</tbody>
</table>

| Pre-event Performance | Tobin’s q(t) | 1.61 | 1.07 | 1.71 | 0.11 | 11.69 |
| | ROA_{obs(t)} | 0.03 | 0.04 | 0.17 | -1.67 | 0.31 |

<table>
<thead>
<tr>
<th>Control Firms</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size ($ million)</td>
<td>Market Value</td>
<td>2,996</td>
<td>944</td>
<td>9,563</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Total Assets</td>
<td>7,310</td>
<td>1,044</td>
<td>23,057</td>
<td>67</td>
</tr>
</tbody>
</table>

| Pre-event Performance | Tobin’s q(t) | 1.74 | 1.05 | 1.73 | 0.13 | 8.90 |
| | ROA_{obs(t)} | 0.01 | 0.02 | 0.10 | -0.48 | 0.22 |

We used parametric paired t-test and non-parametric Wilcoxon signed-rank (WSR) test to examine the abnormal changes in performance. While both tests are common in event studies and reported in our study, non-parametric tests are more appropriate due to small sample size and non-normal data. Considering our hypotheses are directional (i.e., firms with CIOs in TMT will outperform firms without CIOs in TMT), following the previous event studies, we reported one-tailed test for statistical significance. We tested the abnormal changes for the event windows [-1, 0], [0, 1], [1, 2], and [2, 3], and computed the cumulative abnormal change for the event windows [-1, 1], [-1, 2], and [-1, 3].

In order to investigate the moderating effects of environmental dynamism and time period, we created sub-samples and conducted t-tests and WSR tests. We used past five years’ industry sales growth as a proxy for dynamism of the environment and median-split the full sample to form high and low dynamism sub-samples. Similarly, for the time period effect, we split the full sample into two sub-samples; firms in years 1993-1999 and firms in years 2002-2006. We used these time periods for two reasons. First, these time periods created sub-samples with similar size. Second, the role of CIOs started to change around year 2000 as the Internet and e-commerce started to significantly shape organizations and industries. We left a three-year gap between the sub-samples to prevent any overlap of post and pre event performances in the sub-samples.

4. Results

Table 2 summarizes the findings of our initial analysis. The sample size gradually decreased for longer event windows due to the fact that few CIOs were reported as top 5 executives in Execucomp for two and three consecutive years. The [-1, 0] event window, which captures the first year of CIOs as part of TMT in their firms, has the largest yearly abnormal return (0.23; \( p=0.02 \)). The remaining yearly returns were not significant, yet positive for [1, 2] and [2, 3] event windows. When we look at the cumulative abnormal returns, both [-1, 1] and [-1, 2] were significant (0.20; \( p=0.02 \) and 0.38; \( p=0.02 \), respectively, lending support for H1 in (t+1) and (t+2) post-event years.

Table 2. The results of the event study analysis

<table>
<thead>
<tr>
<th>Time Period</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>( p ) value (t-test)</th>
<th>( p ) value (WSR test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yearly Abnormal Change</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[-1, 0]</td>
<td>116</td>
<td>0.23</td>
<td>1.75</td>
<td>0.08</td>
<td>0.02</td>
</tr>
<tr>
<td>[0, 1]</td>
<td>116</td>
<td>-0.03</td>
<td>1.40</td>
<td>0.42</td>
<td>0.27</td>
</tr>
<tr>
<td>[1, 2]</td>
<td>88</td>
<td>0.07</td>
<td>0.93</td>
<td>0.23</td>
<td>0.14</td>
</tr>
<tr>
<td>[2, 3]</td>
<td>48</td>
<td>0.05</td>
<td>0.49</td>
<td>0.24</td>
<td>0.32</td>
</tr>
<tr>
<td>Cumulative Abnormal Change</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[-1, 1]</td>
<td>116</td>
<td>0.20</td>
<td>1.43</td>
<td>0.06</td>
<td>0.02</td>
</tr>
<tr>
<td>[-1, 2]</td>
<td>88</td>
<td>0.38</td>
<td>1.97</td>
<td>0.04</td>
<td>0.02</td>
</tr>
<tr>
<td>[-1, 3]</td>
<td>48</td>
<td>0.04</td>
<td>0.98</td>
<td>0.38</td>
<td>0.26</td>
</tr>
</tbody>
</table>
Table 3 shows the result of the moderating analysis of environmental dynamism. During the [-1, 0] event window, firms in high dynamism environment have an abnormal change of 0.50, whereas firms in low dynamism have abnormal change of -0.04. The difference between the sub-samples is large (0.54) and significant ($p=0.03$). Similarly, the difference between the sub-samples for the cumulative abnormal change in [-1, 1] event window is significant ($p=0.01$). For the remaining event windows, the difference is not statistically significant for both yearly and cumulative abnormal change, lending support for H2 in only (t+1) post-event year.

**Table 3. Moderating effect of environmental dynamism**

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>$p$ value (t-test)</th>
<th>$p$ value (WSR test)</th>
</tr>
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<tbody>
<tr>
<td>Yearly Abnormal Change</td>
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<td>[-1, 0]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Dynamism</td>
<td>58</td>
<td>0.50</td>
<td>1.89</td>
<td>0.05</td>
<td>0.03</td>
</tr>
<tr>
<td>Low Dynamism</td>
<td>58</td>
<td>-0.04</td>
<td>1.57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumulative Abnormal Change</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>[-1, 1]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Dynamism</td>
<td>58</td>
<td>0.43</td>
<td>1.27</td>
<td>0.05</td>
<td>0.01</td>
</tr>
<tr>
<td>Low Dynamism</td>
<td>58</td>
<td>-0.02</td>
<td>1.55</td>
<td></td>
<td></td>
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</table>

Table 4 presents the moderating effect of the time period. The difference between the sub-samples for the yearly abnormal change in [-1, 0] event window is considerably small (0.13) and in [0, 1] event window, this difference is relatively large (0.39) in the hypothesized direction, and both yearly abnormal changes are weakly significant ($p<0.10$). On the other hand, for the [-1, 1] cumulative abnormal change, the difference was rather large (0.53) and statistically significant ($p=0.01$). In the remaining event windows, the difference is not statistically significant for both yearly and cumulative abnormal change, lending support for H2 in only (t+1) post-event year.

**Table 4. Moderating effect of time period**

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
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<tr>
<td>[-1, 0]</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2002-2006</td>
<td>48</td>
<td>0.23</td>
<td>0.73</td>
<td>0.35</td>
<td>0.08</td>
</tr>
<tr>
<td>1993-1999</td>
<td>41</td>
<td>0.10</td>
<td>2.47</td>
<td></td>
<td></td>
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<tr>
<td>[0, 1]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002-2006</td>
<td>48</td>
<td>0.08</td>
<td>0.52</td>
<td>0.11</td>
<td>0.10</td>
</tr>
<tr>
<td>1993-1999</td>
<td>41</td>
<td>-0.31</td>
<td>2.19</td>
<td></td>
<td></td>
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<tr>
<td>Cumulative Abnormal Change</td>
<td></td>
<td></td>
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<td></td>
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<td>[-1, 1]</td>
<td></td>
<td></td>
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<tr>
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<td>0.32</td>
<td>0.73</td>
<td>0.03</td>
<td>0.01</td>
</tr>
<tr>
<td>1993-1999</td>
<td>41</td>
<td>-0.21</td>
<td>1.71</td>
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Figure 1 illustrates the effect of dynamism and time period on the cumulative abnormal change of sample and control firms. We see similar effect of the moderators. That is, while in low dynamism environment and in earlier time period, the cumulative abnormal change is negative for both sample and control firms, in high dynamism environment and recent time period, only the firms in our sample - firms that have a CIO in their TMT - have positive cumulative abnormal change.

**Figure 1. Sub-sample analyses of cumulative abnormal change**

5. Discussion

In this study, we investigated the effect of CIO’s membership in TMT on firm performance. Drawing on the upper echelons literature and strategic alignment theory, we postulated that CIOs increase the diversity of TMTs and add the much needed IT functional knowledge to TMTs by creating a bridge between technical IT requirements and business-oriented TMTs. In turn, this diversity improves the chances of IT-business alignment and leads to better firm performance. We further argued that inclusion of CIO in TMT has a stronger positive effect on firm performance in highly dynamic environment and in more recent years. This is because dynamic environment requires more information processing, and it is more difficult to achieve alignment in such environment; and in recent years IT started to play a more strategic role in firms.
We tested our hypotheses using secondary data and long-term event study methodology. The results provided support for the hypothesized positive effect of inclusion of CIOs in TMT on firm performance in the subsequent one and two years. Moreover, we found support for the moderating effect of dynamism and time period. This moderating effect was significant only in the subsequent one year after CIOs were included in the TMTs of their firms and was insignificant in the subsequent two and three years. These results reflect the highly dynamic business environment and increased utilization of current and emerging technologies to transform business, and highlight the importance and changing role of CIOs in firms.

Our findings make important contributions to IS literature. First, we extend the mostly conceptual literature by showing the positive effect of CIOs in TMT using a longitudinal data set that spans over thirteen years. Second, to the extent of our knowledge, this study is the first to show that the positive effect of CIO in TMT is significantly larger in highly dynamic environment as well as in more recent years. These findings highlight the importance of including IT in firm’s governance structure, rather than treating IT governance separately. CIOs will be able to form the necessary bridge between the IT function of the firm and corporate governance more effectively as a member of the TMT. When firms have IT functional knowledge in their TMTs with CIO membership, they have superior performance compared to their peers that lack the IT functional knowledge in their governance structure.

Our findings are also valuable for practitioners. In the past, the role of IT executives was considered highly technical and mostly functional. However, during the last decade firms continuously invest in and increasingly rely on IT for operational efficiency and competitive advantage. In this type of environment, our results suggest that members of TMT need to consider the CIO as their peer and include him/her in their ranks in order to achieve above normal performance. This is especially important for firms operating in dynamic business environment where substitution threats are high and consumer demand can shift quickly.

While providing important insights on corporate governance theory and practice, our study has limitations as well. First, we considered CIOs in TMTs only if they are one of the top five executives in their firms as reported in annual regulatory filings. Thus, our sample excludes firms where CIOs are member of the TMTs but are not one of the top five compensated executives. Similarly, our event year is the year a CIO becomes one of the top five compensated executives in a firm. This approach disregards the possibility that a CIO is already a member of TMT before becoming one of the top five compensated executives. Second, we were not able to measure the actual role, responsibilities, and power of the CIOs in their firms due to the nature of secondary data. The effect of CIO in TMT on firm performance may also vary because of other moderating factors such as firm’s strategic orientation, IT intensity of the industry, CIO tenure and experience, etc. These factors are not considered in this study due to time and space constraints. The insignificant results of the longer event windows may be attributable to these factors. Finally, our sample size decreased as the event window length increased because fewer CIOs were in TMT in consecutive years. While this may be because of using compensation as a proxy for TMT membership, it may also be due to the exclusion of CIO from TMT as a result of a number of other reasons.

These limitations, on the other hand, open several venues for future research. For instance, future studies can control for the industry effect since the membership of CIO in TMT and its effect on firm performance may be in fact industry specific. In high IT intensity industries, strong IT governance supported by CIO’s membership in TMT is likely to create a positive effect on firm performance whereas this effect may not be significant in low IT intensity industries. Similarly, CIOs’ tenure in their firms and experience as a CIO, as well as experience in a particular industry, can influence how the CIOs’ TMT membership affects firm performance. Investigation of these individual characteristics would provide more rigorous and in-depth understanding of the focal effect.

6. Conclusion

The question whether IT matters [12] or CIO matters [62] has attracted significant interests and debates from scholars and practitioners alike, ironically in the context of significant IT investments made by firms each year and increasing reliance on IT by firms for operations and competition in the global economy. This study attempts to provide more rigorous evidence to the debate by showing that not only does the CIO matter, but how the CIO is treated in a firm matters even more. Our statistical tests using long-term event study methodology demonstrate that when firms put CIOs as one of their top 5 executives, on average their Tobin’s q increases by 0.20 (0.38) over a two year (three year) period from a base of 1.61, an increase of 12.4% (23.6%). Depending on the market value of a firm, this increase could be worth up to billions of dollars to shareholders. Notwithstanding the identified limitations, this study advances the literature on both
corporate governance theory and role of IT and CIO in organizations. It also calls for more rigorous testing of the impact of IT and CIO on firm performance with larger data sets, while considering the moderating effects of timing and other organizational and environmental contingency factors.

7. References


