Examining the Compensation of Chief Information Officers: Do Firm Performance, Size and Industry Membership Matter?

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Examining the Compensation of Chief Information Officers: Do firm performance, size and industry membership matter?

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ABSTRACT

Increased uncertainty in the economic and business environments have placed IS function and IS leadership in a quandary today. In this paper, we empirically examine the remuneration of CIOs, and examine their association with firm performance, size and industry membership. Based on compensation data of 213 CIOs in 2002, we test several hypotheses linking the total, annual cash, and long term components of the CIO compensation with firm and industry variables. Our results indicate a strong relationship between CIO compensation and performance, firm size, and industry membership. Firm performance exhibited a strong positive association with all components of CIO pay. Firm size was found to have significant positive association with the total pay and the annual cash components. We also found support for association between specific industry memberships (finance and insurance, manufacturing, and professional services) and CIO pay.

Key words and phrases

Chief Information Officer, Compensation, firm performance, firm size, industry membership

INTRODUCTION

Since the IS organization’s inception in the 1960s, IS leadership has ascended up the organizational hierarchies to become a critical part of the top management teams. From technical and middle-management roles, IS leadership has evolved into a senior management position that shapes up and drives the business strategies of organizations. As technologies and systems permeated within and outside the firm boundaries, IT became an integral and critical component of the business. The rise in IT’s role was accompanied by an elevation in the position of the CIOs as organizations rewarded them with higher compensations, key responsibilities, inclusion in upper echelons of corporate management and other perquisites. A study by an executive search firm reported that in late 1990s, 15% of CIOs served in their company’s executive boards and 70% were a part of high-level management teams (Heller, 2000).

However, turn of the century and subsequent economic downswings have proved to be trying times for most CIOs. Pressure to prune IT costs, and increased efforts to outsource and offshore IT projects have placed a question mark on the future role of IS function and IS leadership in organizations. Questions have been raised about the strategic contributions of IT and the value of CIO function in organizations. A Harvard Business Review (HBR) article titled “Are CIOs obsolete?” (Maruca, 2000) sparked a wide-spread debate in industry and academic circles about the role of CIOs. More recently, another HBR article “IT Doesn’t Matter?” (Carr, 2003) questioned the strategic relevance of IT in business. Such debates have brought into focus the compensation paid to the CIOs.

Today, there is an increased interest in business circles about CIO compensation. Anecdotal evidence and business press reports suggest a decline in the compensation of CIOs in recent years, indicating a possible wane in the role of IS leaders. A study by the CIO magazine showed that the number of CIOs who report to CFOs (rather than the CEOs) doubled in 2003 from 11% in 2002, implying a reduction in the CIO clout and responsibility (Overby, 2003). A study by Janet Associates pointed to a 16% decrease in CIO salaries from 2001 to 2003 (Overby, 2003). Annual surveys of CIO compensation by Baseline magazine also point to similar trends (Baseline, 2003).

While industry circles are buzz with debates about CIO compensation, academic research in this area is almost nonexistent. IS researchers have focused their attention on the role of CIOs (Grover, Jeong, and Ketinger, 1993; Ross and Feeny, 1999),
CIO-CEO relationships (Feeny, Edwards and Simpson, 1992), and CIO’s influence behaviors (Enns, Huff and Higgins, 2003). Further, limited research has examined the compensation of IT workers (Ang, Slaughter and Ng, 2002) and IT industry executives (Anderson, Banker and Ravindran, 2000). However, little empirical knowledge exists on CIO compensation. Our study seeks to address this important gap. Our research has the following objectives:

(i) To understand the relationship between firm performance and CIO compensation
(ii) To assess the association between firm size and CIO compensation
(iii) To examine if there are industry-specific differences in CIO compensation.

THEORETICAL BACKGROUND AND HYPOTHESES

Agency theory has been used by economists to explain the rationale behind compensation awarded to executives and employees in an organization (Eisenhardt, 1989; Garen, 1994). According to this theory, a firm is seen as an arrangement of implicit and explicit contracts among multiple members such as owners, managers, employees and other stakeholders who contribute to the firm’s functioning and in return receive some compensation for it. Owners are principals who have contracts with managers (agents), where the contracts specify the agreement between the principal and agent on responsibilities, rights, duties and payoffs for the same. The costs of maintaining the principal-agent relationships and monitoring the agents are termed as agency costs. The duality of principals and agents leads to agency costs in two ways (Mangel and Singh, 1993). First, principals might incur some opportunity costs due to potential goal incongruence between the two parties. Principal may incur some losses when agents pursue objectives that are different. Second, information asymmetries between principal and agents might increase the monitoring costs as the agents who control the key organizational resources and are responsible for day-to-day organizational functioning have better knowledge about the tasks at hand. Agency theory suggests designing appropriate compensation contracts with some risks-sharing between the principal and agents to control the agency costs.

Several studies on executive compensation draw upon the agency theory to understand the design of compensation and incentive structures for senior executives. In this study, we extend this line of enquiry by applying agency theory arguments to the compensation of CIOs. Based on a number of extant studies on executive compensation (Balkin, Markman, and Gomez-Mejia, 2000; Henderson and Fredrickson, 1996; Zajac and Westphal, 1995) and anecdotal reports on CIO pay (Baseline, 2003; CIO, 2000), we propose specific associations between CIO remuneration and three variables – firm performance, firm size and industry membership. In the following sections, we propose specific hypotheses for these associations and present our rationale for the hypotheses concerning CIO compensation.

**Firm performance and CIO compensation**

Two distinct, yet complementary theoretical perspectives - the human resources (HR) and agency theories - provide the fundamental grounding to understand the association between CIO compensation and firm performance (Zajac and Westphal 1995). The HR perspective is rooted in the belief that managerial talent is a scarce resource and organizations have to offer an attractive compensation package to lure and retain the best talents (Zajac and Westphal 1995). The compensation would serve as a primary motivation for these talented managers to lead the firm to higher growth and progress. Agency theory focuses on the duality of principal (shareholders) agent (manager or a CIO) relationship, suggesting execution of an outcome-based contract with the agent (Tosi, Werner, Katz and Gomez-Mejia, 2000) so that they justify the compensation received with desired performance outcomes. In addition to the above theories, Murphy (1985) argues that economic theories of efficient compensation mandate a positive relationship between executive compensation and corporate performance. In sum, the central idea behind these theories is a linkage between a firm’s performance and executive compensation. In line with the above theories, we argue that firms with better performance need to hire or retain CIOs with good pay, which may further enhance their business performance.

A number of researchers have empirically examined the association between firm performance and executive compensation. Murphy (1985) found strong association between executive compensation and firm performance measured by firm sales and shareholder return. Carr (1997) studied small firms to find a significant relationship between sales and CEO compensation. Rajagopalan and Prescott (1990) also found empirical evidence of the association between executive compensation and economic measures like firm performance and size. These studies did not explicitly examine CIOs. However, since most CIOs are members of senior executive team, the results from executive compensation literature could possibly be extended to the realm of CIOs as well. Therefore, we propose the following:

**Hypothesis 1:** A firm’s performance is likely to be positively related to its CIO compensation.
Firm size and CIO compensation

According to executive labor market perspective, the market performs the following three functions (Rosen, 1990). First, in equilibrium market environment, the most talented executives get efficiently allocated to the largest firms. Second, the executive contracts have provisions to make executives take decisions in the interests of the shareholders. Third, the executive labor markets look for new talent to replace the older generations. This provides the basic theoretical rationale to examine the association between firm size and executive compensation (Zhou, 2000). Extending the executive labor market arguments, we propose that more experienced and talented CIOs (who would command greater salaries) are likely to be assigned to larger firms by the labor markets. Larger organizations with significant computing and information-processing needs require IS leaderships with considerable talent and experience. The complexities in managing IS function and IT resources has been found to increase with firm size (DeLone, 1981). Higher the organization size, greater are likely to be its computing requirements, thus leading to more managerial responsibilities for managing the IS function. Given the increased complexity in leading IS function in large firms, CIOs need to be compensated adequately in return for their leadership. These arguments suggest a strong theoretical link between firm size and CIO compensation.

Firm size has been one of most consistent predictors of executive compensation (Deckop, 1988; Ghosh; Gray and Cannella, 1997). Tosi et al. (2000) did a meta-analysis of CEO pay studies to find that firm size accounted for more than 40% of variance in CEO pay. Eaton and Rosen (1983) used number of employees as a proxy for company size to explain patterns of executive compensation. Zhou (2000) examined Canadian firms over the period 1991-95 and found CEO pay to rise with firm size. The theoretical arguments based on executive labor markets and the empirical support linking firm size and executive compensation together suggests the following hypothesis:

Hypothesis 2: A firm’s size is likely to be positively related to its CIO compensation.

Industry membership and CIO compensation

According to information processing view advanced by Galbraith (1973), organizations are fundamentally information processing structures, and firms are designed to marshal adequate information processing and communication capabilities in order to cope up with the complexity and uncertainty in the external environment. Daft and Langel (1986) advanced the view that organizations process information in order to reduce task uncertainty and resolve equivocality. Depending on the industry environment, the amount of task uncertainty and equivocality might vary. Porter and Miller (1985) introduced the notion of “information intensity” and argued that the industry characteristics play a significant role in determining the information processing demands in organizations. Given the wide variation in information processing requirements across industries, researchers have found IT usage and IT roles to significantly vary across industries. Firms operating in more information-intensive industries are likely to place greater demands on the IS function and the IS leadership. Firms where technology plays a transformational role are likely to place greater emphasis on their IS leaderships than those firms where technology plays a mere automation or informating roles. This increased importance to IS leadership is likely to be manifested in the form of higher compensation to CIOs.

Research studies on executive compensation have reported differences in the pay structures across different industries (Rajagopalan and Prescott, 1990). Deckop’s (1988) study on the linkage between firm profitability and CEO compensation found significant inter-industry variations in CEO compensation. Further, Eaton and Rosen (1983) found that the level and type of executive remuneration varied significantly across industries. Chaterjee, Richardson and Zmud (2001) found creation of new CIO positions in industries with transformational IT role to generate more positive reactions from shareholders. This also suggests potential industry differences in the CIO function. Industries that are more competitive or information-intensive are likely to pose greater challenges for CIOs, which in turn would influence their compensation packages. Hence, we believe that CIO compensation would have an association with the firm’s industry membership.

Hypothesis 3: A firm’s industry membership is likely to be related to its CIO compensation.

RESEARCH METHODS

Data

We assembled a database of CIO compensation through an extensive search of public disclosures made by firms in their SEC filings. Securities and Exchange Commission (SEC) mandates all US public companies to disclose the executive
compensation paid to the top named executive officers in their annual proxy statements. We conducted detailed search on the EDGAR SEC filing database (available via the LexisNexis) and scanned the proxy statements of all the firms in the database to identify the compensation disclosures pertaining to senior IT executives. Our search resulted in a final usable dataset of compensation details of 213 CIOs in 2002.

**Measures**

*Components of CIO Compensation*

The primary dependent variable in our analysis is the CIO compensation. Prior research on executive pay has examined three components of executive compensation – annual cash compensation, incentive compensation, and total compensation (Henderson and Fredrickson, 1996; Westpal and Zajac, 1994). *Annual cash compensation* comprises salary, bonuses, and other annual compensation such as travel etc. This represents the short-term pay that is typically paid in cash annually to the executives (Balkin et al., 2000; Westpal and Zajac, 1994). *Incentive compensation* represents long-term elements such as stock options, performance unit or shares, restricted stock, and long-term management incentive plans. *Total compensation* is the sum of cash and long-term compensation.

We extracted all the three components of CIO compensation from the company proxy statements. Annual cash compensation computations were straightforward as proxy statements specify the exact dollar values of these components. Stock options were valued at 25 percent of their exercise price – This approach to valuing the stock options has been widely used in the literature. Further, this approach produces values in a range similar to more sophisticated methods such as the Black-Scholes approach (Henderson and Fredrickson, 1996; Lambert, Larcker, and Weigelt, 1993). Exercise price of each stock option was also identified from proxy statements. Consistent with prior research (e.g., Henderson and Fredrickson 1996; Lambert and Larcker, 1987), we use the natural logarithms of compensation components in order to minimize the heteroscedasticity in our analytical models.

*Independent variables*

We had three independent variables - firm performance, firm size, and industry membership. For assessing performance, we used firm sales as the operational measure. This is in accordance with similar treatments in the literature (Henderson and Fredrickson, 1996). Given the information-processing arguments stated earlier, the number of employees was chosen as the appropriate measure of firm size. The basic rationale is that the higher number of employees represent greater number of end-users, thus leading to increased demands on IS leadership. This measure has also been used in prior studies on compensation (Eaton and Rosen, 1983; Rajagopalan and Prescott, 1990). We gathered the data on firm performance and firm size from COMPSTAT database. Similar to CIO compensation data, we used the natural logarithms of firm sales and number of employees. Industry memberships formed the third independent variable of our study. We used the two-digit Standard Industrial Classification (SIC) codes to identify the industry membership of firms in our dataset. We had five industry groups represented in our sample: manufacturing, transportation communication and utilities, wholesale and retail, finance and insurance and business services.

**DATA ANALYSIS AND RESULTS**

Descriptive statistics and demographics of our dataset are provided in Tables 1A and 1B. As can be seen from Table 1B, we had a heterogeneous set with wide representation from diverse industries. To examine our research hypotheses, the following model was specified and estimated:

\[
COMP_i = \beta_0 + \beta_1 \text{PERF} + \beta_2 \text{SIZE} + \sum_{j=1}^{n} \beta_j \text{IND}_j + \epsilon
\]

We estimated three OLS regression models, one for each component of CIO compensation \(COMP_i\). We regressed compensation against performance (PERF), firm size (SIZE) and dummy variables (IND\(_ j \)) for industry groups. The results of our analyses are provided in Table 2.
<table>
<thead>
<tr>
<th></th>
<th>Mean ($)</th>
<th>S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Cash Compensation</td>
<td>408774</td>
<td>351479</td>
</tr>
<tr>
<td>Incentive Compensation</td>
<td>286373</td>
<td>655161</td>
</tr>
<tr>
<td>Total Compensation</td>
<td>695148</td>
<td>932339</td>
</tr>
<tr>
<td>Performance (Sales)</td>
<td>3,849,817,192</td>
<td>9,006,062,535</td>
</tr>
<tr>
<td>Size (No of Employees)</td>
<td>15570</td>
<td>37595</td>
</tr>
</tbody>
</table>

Table 1A. Descriptive Statistics

<table>
<thead>
<tr>
<th>Industry</th>
<th>No of CIOs (#)</th>
<th>Average Cash Compensation ($)</th>
<th>Average Incentive Compensation ($)</th>
<th>Average Total Compensation ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing Related</td>
<td>37</td>
<td>403172</td>
<td>294910</td>
<td>698082</td>
</tr>
<tr>
<td>Transportation, Communication &amp; Utilities</td>
<td>18</td>
<td>496361</td>
<td>509437</td>
<td>1005798</td>
</tr>
<tr>
<td>Wholesale and Retail</td>
<td>59</td>
<td>434217</td>
<td>351420</td>
<td>785637</td>
</tr>
<tr>
<td>Finance &amp; Insurance</td>
<td>46</td>
<td>496848</td>
<td>533847</td>
<td>1030695</td>
</tr>
<tr>
<td>Business, professional services &amp; real estate</td>
<td>54</td>
<td>336773</td>
<td>185281</td>
<td>522054</td>
</tr>
</tbody>
</table>

Table 1B. Demographics

<table>
<thead>
<tr>
<th></th>
<th>Cash Compensation</th>
<th>Incentive Compensation</th>
<th>Total Compensation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERF (Annual Sales)</td>
<td>0.634**</td>
<td>0.358*</td>
<td>0.686**</td>
</tr>
<tr>
<td>SIZE (No. of Employees)</td>
<td>0.212*</td>
<td>0.150</td>
<td>0.194*</td>
</tr>
<tr>
<td>IND - Finance and Insurance</td>
<td>0.209**</td>
<td>0.103</td>
<td>0.212**</td>
</tr>
<tr>
<td>IND - Business, Professional Services &amp; Real Estate</td>
<td>0.202**</td>
<td>0.095</td>
<td>0.244**</td>
</tr>
<tr>
<td>IND - Transportation, Communication &amp; Utilities</td>
<td>0.041</td>
<td>0.035</td>
<td>0.038</td>
</tr>
<tr>
<td>IND - Manufacturing related industries</td>
<td>0.056</td>
<td>0.080</td>
<td>0.101*</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.62**</td>
<td>0.21**</td>
<td>0.67**</td>
</tr>
<tr>
<td>F Statistic</td>
<td>58.74**</td>
<td>10.40**</td>
<td>71.52**</td>
</tr>
</tbody>
</table>

Table 2. Results of OLS Regression Analysis

Note: N = 213; standardized regression coefficients are shown in the table; *p < .05 **p < .001
From the R-squared values displayed in Table 2, it can be seen that all the three models explained significant amount of variance in CIO compensation components. Performance had a positive and significant association with all the three components of CIO compensation, lending support for Hypothesis 1. Size had a significant positive association with cash and total compensation (p < 0.05). We did not find any significant association between size and long term compensation. Our third hypotheses linking industry membership and CIO compensation also sound strong support. Membership of firms in information-intensive industries such as finance & insurance, and business & professional services had a significant positive association with cash and total CIO compensation.

**DISCUSSION**

This study focused on three critical variables viz. performance, size and industry memberships and their associations with CIO compensation. Based on our results, we found significant associations between all the three variables and different components of CIO compensation. Cash compensation and total compensation awarded to CIOs seem to be influenced by performance, size as well as industry membership. However, incentive compensation in the form of stock options and long term incentives seem to be associated only with firm performance.

Our analysis indicated a strong and significant association of firm performance on all the three components of CIO compensation. In fact, based on the regression coefficients, performance seem to be exhibit stronger associations with CIO compensation than the other independent variables. This strong association between firm performance and CIO compensation components could be interpreted in two ways. First, greater firm performance could be attributed partly to successful IS leadership in these organizations and higher cash compensation could be construed as a reward for the work of the CIOs in contributing to the firm performance. Second, a firm performing well is likely to be under significant pressure to sustain and further enhance its revenues. This pressure is likely to place greater demands on the IS leadership over a longer term. Long term incentives in the form of stock options could motivate CIOs to continue their managerial functioning and work harder to generate additional performance improvements.

Our results indicate a positive and significant association between firm size (measured by the number of employees) and cash and total pay awarded to CIOs. Lack of support for a size – incentive compensation relationship implies that the rewards for managing a large base of end-users is likely to manifest as higher annual cash compensations awarded to CIOs, rather than through long term incentives.

Our results linking industry memberships and CIO cash compensation lends support to the notion that the information-intensity in industries, and the resultant complexities in managing an IS function is likely to help CIOs get better cash compensation, than long term incentives. CIOs operating in industries such as finance, insurance and business services get higher cash remuneration than those in other industries such as manufacturing, communication and utilities. This could be explained by the increased complexity of CIO function in information-intensive industries.

In summary our study shows that CIOs managing a larger base of end-users and more complex IS function in highly information-intensive industries are likely to receive greater cash compensation in return for their work. However, CIOs operating in high performing firms who get challenged to further enhance and sustain such high business performance tend to get rewarded in the form of long term incentive plans, in addition to high cash compensations.

**CONTRIBUTIONS, LIMITATIONS, AND CONCLUSIONS**

Dynamic changes in business and IT environments have placed IS leadership at a critical inflexion point. Despite the increased attention on CIO positions and CIO roles, little empirical research has been conducted to examine CIO compensation. Our study addresses this void and throws light on the associations between firm performance, size, industry memberships and CIO compensation. One of the significant contributions of our study lies in delineating specific variables that affect the cash and long term incentive compensation of CIOs. Another important contribution is further validation of industry-specific differences in CIO pay.

By examining an important and yet under-researched area of CIO compensation, we believe our study has laid some foundations for further rigorous empirical research in this area. Research on CIO compensation is not only important, but will also be timely. We have also extended the extant literature of IT personnel compensation by providing some insights into CIO compensation. The findings of this research can be of use to existing, potential CIOs as well as senior executives in
charge of framing and designing CIO compensations structures. Our findings could serve as inputs for devising compensation packages for CIOs and other senior IS executives in organizations.

Our research has several limitations that need to be kept in mind while interpreting the results of this study. Our dataset is restricted to a time period of one year only. Further, our sample consists of only those firms who have included CIOs among the named executive officers – these named officers are the highest paid executives in the organization. Moreover, our analysis was restricted to three key variables. Components of CIO compensation are likely to be associated with other firm-specific, industry as well as CIO-specific characteristics as well. For instance, market capitalization has been found to have strong association with long term incentive compensation of executives. CIO-specific characteristics such as their education and expertise are likely to affect their compensation as well. A fruitful extension of this study would be to examine such additional factors. Lastly, future researchers may also like to examine our industry groupings and analyze each industry more closely in light of our findings.

REFERENCES