Chief Data Officer Appointment and Origin: A Theoretical Perspective

Full Paper

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Abstract

In an era of big data, organizations are undergoing a revolution in the ways in which data is being visualized and transformed. Successfully navigating this process and completing the transformation requires that organizations not only shift their systems, structures, and human resource, but they must also develop an organizational culture that shares their vision. In this study we bring in three theories: upper echelons, contingency, and organizational adaption, to discuss what conditions affect an organization’s decision to hire a Chief Data Officer (CDO), and where a CDO would be more likely to come from. In this research we pair and propose 12 propositions. We postulate that organization size, industry dynamism, diversification strategy, top management team (TMT) functional heterogeneity, Chief Executive Officer (CEO) tenure, and firm performance are six antecedents that have the greatest impact on CDO appointment and origin.

Keywords

Chief Data Officer, upper echelons theory, contingency theory, organizational adaptation theory, data quality, information quality

Introduction

In recent years, data has gradually come to be regarded as a strategic asset, but the problems associated with using data have become increasingly more complex. Data problems can reflect weaknesses in a business’s strategy and operations. In order to address the challenges and opportunities of big data, organizations need to determine who should manage the data. Traditionally, Information Technology (IT) department has been responsible for cleaning up data. But nowadays data problems, because of their complexity, involve more than ad hoc cleansing projects; therefore, problems encountered while using big data can no longer be solved by the IT department alone. The more data that top executives have to manage, the broader the range and complexity of the non-routine, strategic decisions that executives must make (Thompson, 1967). As the range and diversity of decision tasks increase, so does the amount of information that must be processed (Campbell, 1988), and quite often the Chief Information Officers (CIOs) run out of time or lack the ability to handle all aspects of data. What about data scientists? They do have the potential, but only if they have been assigned a leadership role to coordinate at the corporate level. Data governance committees, or councils, have also been developed to improve data policies and standards; however, such approaches raise accountability issues because of the potential conflict arising...
from holding two potentially contradictory responsibilities. An individual's title and position in the firm's hierarchy, e.g., CEO, president, or COO, represents an individual's structural power within the firm (Finkelstein, 1992). The greater the number of different titles/positions an executive has in a firm, the greater is their power. So, rather than relying on traditional roles or committees to manage big data, there must be someone who has both an in-depth understanding of data as well as the top managerial authority to make data-related decisions.

The CDO position is a recent organizational development. In 2003, the first recognized CDO was established at Capital One. Since then, a growing number of businesses and government institutions have been establishing CDO positions. For example, leading companies like IBM, Dell, Ford, GE, Bank of America, HSBC, J.P. Morgan, P&G, and Royal Bank of Scotland all have CDO positions. As far as government institutions are concerned, the U.S. Department of Defense, U.S. General Services Administration, U. S. Agency for International Development, and the U.S. Department of Transportation are pioneers in appointing CDOs. Internationally, countries such as the U.K., Germany, China, and Brazil all have well-established CDO positions; most of them are major corporations, such as China's E-commerce giant Alibaba.

CDO research is very limited because of the novelty of this emerging phenomenon. Previous research has typically focused on the role of CDO and its impact on organizational performance. The first academic paper on CDO was published in the MIS Quarterly Executive in 2014. Lee et al.’s (2014) seminal work proposed a three-dimensional cubic framework that describes the eight roles of CDO. Follow-up research revealed that companies with a CDO responsible for data management have better financial performances than their non-CDO counterparts (Xu et al., 2016).

The decision to hire a CDO represents a major structural choice and adds a new organizational layer. The options that organizational leaders have are restricted by both the organization's internal structure and its social milieu (Lieberson and O'Connor, 1972). We also notice that some CDOs are appointed from within the company while others are chosen from the outside. CDOs of different origins have different managerial skills and knowledge sets. For instance, CDOs appointed from outside the firm may have generic skills that may or may not be transferable across firms; whereas, CDOs promoted from inside the firm tend to have firm-specific knowledge and social networks already in place. Information about the origin of CDOs provides an array of different opportunities from an organizational learning perspective. But very little is known about what the CDO hiring process entails. In this paper we bring in a host of theory-driven rationales to address two questions: what affects the decision to hire a CDO, and where does CDO most typically originate? These questions have received no attention by previous researchers, and this presents a critical gap in the research literature from both a practical and theoretical standpoint.

**CDO appointment and origin**

Over the last several decades, management researchers have devoted considerable attention to the question of what affects top executive (i.e., corporate elites, corporate executives and directors) appointments. Much of this research has been grounded in several dominant theoretical perspectives, such as contingency theory, upper echelons theory, and organizational adaptation theory. Each perspective has inspired separate streams of research. The contingency perspective, for example, tends to emphasize the role of situational-based preferences and dispositions (Lawrence and Lorsch, 1967) The upper-echelons perspective largely stresses the role of demography-based preferences and dispositions (Hambrick and Mason, 1984). The organizational adaptation perspective tends to focus on the role of performance-based preferences and dispositions (Kimberly and Quinn, 1984). We suggest that an integrated insight from each of these streams may enhance our understanding of what factors affect CDO appointment and origin.

Origin is a critical variable in research of leadership transition (Kesner and Sebora, 1994). We draw upon two sources of CDO origin: intra-firm and outside-firm. Traditionally, origin from outside-firm refers to individuals who were not employed by the organization. Later research suggests that outsiders are not alike (Birnbaum, 1971). Particularly, in this paper a outside-firm refers to other similar or larger firms similarly situated. Hambrick and Cannella (2004) suggest that the advantages of hiring a top executive from a similar or larger firm include such things as enhancing visibility, legitimacy, and social networks.
We discuss from different theoretical perspectives the antecedents that associate with CDO origin. Table 1 presents the overarching propositions for this study.

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<th>Antecedences</th>
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<td>Intra-firm</td>
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<td>6. Firm performance</td>
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Note: “+” refers to positive relation, “-” refers to negative relation.

**Table 1. Propositions of CDO appointment and origin**

**Contingency theory perspective**

Originating from Lawrence and Lorsch (1967), contingency theory is based on the premise that the suitability of a structure depends on the situation (Donaldson, 2001), and decision-makers rationally strive to align their organizations with situational conditions such as environmental conditions (Pfeffer and Salancik, 1978), organizational size (Child, 1975), and strategy (Chandler, 1962). The decision whether to have a CDO is largely based on the contingency conditions. Our set of factors is jointly grounded in prior literature on contingency theory as well as in the specific and embedded aims articulated by the organization for the adoption of a CDO.

Firms in highly dynamic industries characterized by high rates of growth and uncertainty, and those that are technology intensive are more likely to reshape their strategies and organizational structures (Hamel and Prahalad, 1994). First, when industry growth is high, it generates an abundance of ambiguous information that must be processed quickly (Eisenhardt and Bourgeois, 1988), and hence the need for frequent strategic adjustments (Porter, 1980). Second, when an industry is faced with a high degree of uncertainty, demand swings widely; decision-making becomes difficult to program; and, market positions can shift considerably. Demand instability creates large, non-routine information-processing requirements (Karaevli, 2007). Third, technological intensity is associated with technological breakthroughs, new competitive developments, and new customer preferences, each of which is inherently disruptive to organizational routines (Henderson and Fredrickson, 1996). While operating in stable environments, top managers’ information and decision-making requirements are more standardized and routine, and problem solving is more systematic (Eisenhardt, 1989), so firms operating in these types of environments are more willing to rely on current personnel and standardized routines rather than appoint new executives. But companies operating in a tumultuous economic environment face a combination of extraordinary external and internal top management task demands.

There are two interrelated factors that provide the basis for organizations in highly-dynamic industries to turn to CDOs. For one thing, organizations operating in these types of environments are prone to creating large amounts of data--both structured and unstructured--that must be processed and acted upon. Examples of such data are transactional data in the financial industry, medical data in the healthcare industry, and Global Positioning Systems (GPS) collect geographic data for the logistics and...
transportation industries. Not only do these industries require large volumes of data, but they must also be able to perform real-time data processing and monitoring tasks. Being successful at these endeavors requires intensive coordination and the mutual adjustment of multiple functional areas. We suspect that the appointment of a CDO is a way for firms to deal with these pressures. Thus, firms in highly dynamic industries have the potential demand for CDOs. Indeed, many of the CDOs currently working are employed in highly dynamic industries such as finance, healthcare, and Information & Communications. We formally propose that:

**Proposition 1a: The degree of industry dynamism will be positively associated with the likelihood of CDO appointment.**

In highly dynamic industries, there is generally a high demand for firms to update their knowledge and technical skills, and looking outside of the organization for new talent is commonplace. This approach has proven to be an efficient and effective way of identifying qualified personnel who have new perspectives and knowledge sets unlike those of any prospective that may already be inside the organization. Scholars have argued that executives who have spent long periods of time within one organization may possess relatively limited perspectives, a restricted knowledge base and hence conduct a limited search for choice alternatives (Cyert and March, 1963). Hiring top executives from the outside is a useful way for firms to learn from other firms, and to learn how to change in response to shifting environmental demands (Pfeffer and Salancik, 1978; Thompson, 1967). And so, in highly dynamic environments, appointing an outside CDO is an effective way of enhancing the organizational learning process. We formally propose that:

**Proposition 1b: Firms in highly dynamic industries will be more likely than not to appoint a CDO from outside the firm.**

Organizational size has been found to be a conspicuous variable in prior contingency studies (Child, 1975). Size is typically associated with vested power interests and complexity in terms of structural elaboration and formalized planning, control, and resource allocation systems (Smith and Gannon, 1987). Size leads to complexity, which might necessitate managerial task division and specialization (Donaldson, 2001). And although large organizations are relatively secure in their environments, they are also highly visible, with attendant obligations and vulnerabilities to external constituencies. Large companies may carry the lion’s share of responsibility for lobbying, trade association leadership, and influencing public opinion (Pfeffer and Salancik, 1978). This abundance of explicitly external tasks, when coupled with the inherent scale and complexity of size, will prompt large firms to have CDOs. We formally propose that:

**Proposition 2a: Firm size will be positively associated with the likelihood of CDO appointment.**

Firm size is also associated with top executive origin. A number of studies have looked at whether organizational size is associated with the decision to select top executives from inside versus outside the firm. Promoting top executives from within tends to generate loyalty and boost morale, which ensures the continuity and stability of the TMT. When the supply of internal candidates is adequate, the organization is more likely to promote executives from within rather than from outside the firm (Finkelstein & Hambrick, 1996). The overall size of a firm is used to represent the size of the available pool of candidates (Zhang and Rajagopalan, 2003). Large organizations are more likely than small organizations to have a preexisting pool of qualified candidates. Dalton and Kesner (1983) found that large firms were more likely to experience intra-firm succession. Pfeffer and Moore (1980) argue that larger organizations are more likely than their smaller counterparts to have a diverse, qualified candidate pool of general management talent. Larger firms tend to promote CDOs from inside the firm because these types of firms tend to have larger internal labor markets and thus are able to find more internal candidates who appear to have the requisite ability to be a CDO. We formally propose that:

**Proposition 2b: Firm size will be positively associated with the likelihood of promoting a CDO from inside the firm.**

Strategy is also a well-established construct in the contingency literature. For example, diversification strategy has been found to influence the adoption and effectiveness of structural arrangements. In particular, it creates high executive task demands (Rumelt, 1974). Diversified organizations usually have several business units with different external constituents, such as customers, suppliers, and regulatory
Proposition 3a: The diversification strategy will be positively associated with the likelihood of CDO appointment.

From a strategic contingency perspective, diversification strategy may have a bearing on the origin of the CDO selected. Firms implementing a diversification strategy are more likely than not to consort with top executives who are able to foster creativity through a willingness to depart from previous practices. Executives with limited organizational tenure are likely to be viewed as being more willing to make such departures relative to those with extensive firm tenure and experience. This relationship was borne out in a study of hiring practices associated with general managers (Guthrie and Olian, 1991). In general, we expect firms in a diversified mode to more often than not appoint CDOs who have an external orientation. We formally propose that:

Proposition 3b: The diversification strategy will be positively associated with the likelihood of appointing a CDO from outside the firm.

Upper echelons theory perspective

Upper echelon research has consistently linked the demographic characteristics of the TMT to the effectiveness of information-processing work and suggests that some demographic qualities are useful for selecting and developing upper level executives (Hambrick and Mason, 1984). Prior work indicates that an increase in the size of a TMT is likely to reduce the information-processing load that confronts a firm’s top executive (Chandler, 1962).

The functional heterogeneity of a TMT can be defined as the degree to which TMT members differ with respect to their functional backgrounds (Cannella, Park, and Lee, 2008). Functional heterogeneity captures the extent to which there is a heterogeneous mix of functional experience within the group. Functional heterogeneity fosters team cognitive conflict, which is generally believed to be beneficial for teams and organizations (Amason, 1996). Functional heterogeneity in teams can help firms overcome narrowly directed information-processing because individual members must actively reconcile the differences in their frames of reference. Previous research suggests that the presence of a COO will influence the social routines that executives use to make decisions, and it also decentralizes decision-making authority and potentially reduces power distances within the TMT (Zhang, 2006). We expect that firms with a functionally heterogeneous TMT are more likely than not to appoint a CDO. We formally propose that:

Proposition 4a: TMT functional heterogeneity will be positively associated with the likelihood of CDO appointment.

Senior executive team change affects both the composition of the team and team dynamics (Shen and Cannella, 2002). The functional backgrounds of members of homogeneous TMTs are quite similar. A CDO coming from outside the firm’s ranks may produce cognitive conflicts that could result in the breakdown of a harmonious balance previously established by the homogeneous team. Thus, an organization opting to select a CDO from outside the firm runs the risk of making a CDO selection that is contrary to the interests and continuity of the firm. And since a functionally heterogeneous TMT is likely to be associated with more new communication networks, they will likely be more open to the selection of someone from outside the firm than homogeneous TMTs. We formally propose that:

Proposition 4b: TMT functional heterogeneity will be positively associated with the likelihood of an outside-firm CDO appointment.

CEOs tend to have a heavy influence on the decision to appoint top executives (Levinson, 1993). For example, Cannella and Shen’s (2001) suggest that CEO power has a significant impact on the alternative tenure outcomes of a COO/president. CEO tenure is associated with their strategic choices (Miller, 1991). Major organizational change becomes apparent after a new CEO has been appointed (Miller and Friesen, 1980; Tushman, Virany, and Romanelli, 1987). CEOs with longer tenure are less likely to lead structure
change than their less-tenured counterparts (Miller, 1991). In addition, new CEOs must adjust to their new roles and quickly develop good working relationships with the other top executives, boards of directors, and powerful outside stakeholders (Vancil, 1987). At the same time, new CEOs are charged with specific strategic mandates that further increase the difficulty of their tasks (Hambrick and Fukutomi, 1991). New CEOs need time to establish their authority in the top position, and some new CEOs opt to appoint new executives who will be their allies in this process (Finkelstein & Hambrick, 1996). For example, Hambrick and Cannella (2004) found that CEOs are more likely to have COOs if their backgrounds were in finance/law, and if they had never served as COOs. In sum, considering that a new CEO does need the support and the helping hands of other executives, and because they tend to be more willing to change than established CDOs, we suspect that they are more likely to appoint a CDO. We formally propose that:

**Proposition 5a: CEO tenure will be negatively associated with the likelihood of CDO appointment.**

As discussed earlier, current senior executives who were appointed by the previous CEO often have a negative attitude toward a newly appointed CEO and tend to resist the significant changes initiated by the new CEO (Helmich and Brown, 1972). Fondas and Wiersema (1997) suggest that new CEOs' interactions with newly appointed team members will probably result in a more innovative response. Senior executive team change enabling a new CEO to establish credibility, and to gain the social and political support (Karaevli, 2007). Thus, newly appointed CEOs are more likely than not to appoint an outside CDO who serves as an ally to help the CEO establish their new authority. We formally propose that:

**Proposition 5b: New CEOs will be positively associated with the likelihood of appointing a CDO from outside the firm.**

**Organizational Adaptation theory perspective**

According to organizational adaptation theory, low firm performance will drive strategic change which is necessary for performance turnaround (Kimberly and Quinn, 1984). The change of top executives represents an important adaptation mechanism under conditions of low firm performance (Goodstein and Boeker, 1991). Changes in top management typically facilitate strategic change (Finkelstein & Hambrick, 1996). Top management selection decisions in poorly performing firms attempt to recruit individuals who have the ability to effect a “turn around” (Castogiovanni et al., 1992; Hofer, 1980).

Under conditions of high firm performance, firms and their dominant coalitions are not receptive to change, and this will likely hinder a firm’s adoption of a strategic reorientation strategy. Empirical evidence supports the success-persistence causal link. One explanation of this causal link is rooted in the reinforcement-expectancy model of learning, which means organizations tend to repeat actions that are associated with positive outcomes (Boeker and Goodstein, 1991). High firm performance suggests that a CEO’s competencies are well aligned with environmental conditions and therefore his or her power should be well established within the firm (Miller, 1991). CEOs tend to be committed to the status quo in strategy and repeat actions that have made the firm successful in the past (Hambrick, Geletkanycz, and Fredrickson, 1993). Hannan and Freeman (1984) argue that organizational success promotes the development of internal forces for stability and inertia, which leads to resistance to organizational change.

CDOs are usually actively involved in strategic decision-making, and the skills and competencies they bring to the table can facilitate strategic change when low firm performance makes strategic change necessary. Poor performance sends a relatively clear signal to the executive that the organization needs to change, while high performance is a sign of correctness of current approaches. Thus, in this case there is no urgent demand for CDOs. We formally propose that:

**Proposition 6a: Low firm performance will be positively associated with the likelihood of CDO appointment.**

Using pre-appointment performance as an antecedent of top executive origin has been a tradition (Kesnerand Sebora, 1994). Outsider selection is widely used as an adaptive mechanism. For example, Cannella and Lubatkin (1993) found that low-performing firms consistently experience greater rates of outside CEO succession. Schwartz and Menon (1985) conclude from their studies that firms performing relatively poorly are more likely to hire outsiders. Also consistent with the adaptive view is the argument
that when performance is poor, directors will favor outside candidates because outsiders are perceived to be more capable of changing the mission, objectives, and strategy of an organization than insiders are (Cannella and Lubatkin, 1993). Poor performance increases the likelihood that a CDO will be selected from outside an organization because they are perceived as being more able than insiders of initiating and implementing change. We formally propose that:

Proposition 6b: Low firm performance will be positively associated with outside CDO appointments.

Conclusion

In an era of big data, making key changes in personnel is one of many responses that organizations have made. New chief executives who are less hesitant to deliberate can take an organization to new heights in a short period of time. The appointment of a CDO represents a formal structural change by top management and should be a part-and-parcel consequence of a data-driven vision. More important, organizational changes need to be directed by a focal actor or by some broader team acting through consensus. The CDO seems to be the heir apparent leading the data-driven transition. The CDO role is an organizational structure that can represent data in a way that not only shares, but transforms and benefits the long-term visions of firms caught up in the throes of learning how to benefit from the synergies forged from the big data revolution. It is this C-level executive who has the power and resources available to get organizations to become more centered around overall data strategies and goals. The CDO is the person best poised to lead the charge for data-driven change, and it is the CDO who programs change through a planning process that can shift an entire organization one step forward. Once the CDO is appointed, significant changes throughout the organization can be expected to occur. As people are hired into the office of the CDO, a data-driven strategic vision is shared that addresses all of the “why” and “how” questions that will surely arise. As a result, the organization’s mission and vision are confirmed and affirmed top-down, and a data-driven culture is created which saturates the entire organization and moves it onward.

However, due to various reasons such as bureaucratic control, internal political, cultural constraints, and external restrictions, there are still many organizations that have difficulty changing at the same rate as their environments, or keeping in lockstep. These internal and external restrictions are the by-products of organizational inertia and are common phenomena (Hannan and Freeman, 1977). There are also important causal forces in organizations that increase resistance to CDO appointment and make CDO adaptations problematic. And all of these “inertia factors” hampering CDO appointment should be discussed further. For example, from a political resistance perspective, future research might lead to our finding out how the prevailing distribution of power in an organization affects CDO appointment.

The main goal of this paper is to review the organizational literature and develop 12 propositions regarding the need and origin of hiring a CDO. The insights gained from this study may help boards, executive search firms, and others involved in CDO selection better understand what affects a decision to hire a CDO, and where a CDO would probably come from. Future research should empirically examine the 12 propositions as proposed, which would further improve our understanding of the antecedents of CDO appointment.

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