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Chief Information Officers and Industry Characteristics: Is Profiling Possible?

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ABSTRACT

The position of Chief Information Officer (CIO) continues to evolve into an executive position on par with the CEO and CFO. Beginning primarily as a technical position, the CIO now sits in an executive office analogous to the CEO and CFO. CIOS now supervise projects integrated with long-range strategic planning and advise senior managers about the future courses of their organizations. Our study sought to better understand how the CIO as an individual has evolved the job position. Collecting over 312 IT CIO profiles from IT announcements, we are using interpretive text analysis techniques to investigate personal characteristics of CIOs with the intention of noting differences in their professional demeanor overtime. Preliminary results are in work.

Keywords

Chief Information Officer, CATPAC, Upper Echelons (UE) Perspective, Managerial Characteristics

INTRODUCTION

It is essential to understand the characteristics of Chief Information Officers (CIOs) as there is a critical need to effectively manage Information Technology (IT) innovations. CIOs play a central role in not only managing the current IT needs of organizations but also in proactively using IT to fundamentally change the way in which businesses operate and compete. CIOs coordinate project management techniques with strategic planning initiatives to control costs, manage implementation timelines, improve product quality, and manage stakeholder value. Seminal theories of leadership and managerial styles have been used to describe how CIOs can play this vital role (Gottschalk, 1999, Gottschalk, 2002, Grover et al., 1993). The current study is based on the premise that further research specific to the IT context can provide a clearer understanding of what distinguishes successful CIOs. Are these characteristics the same for all organizations and do they hold equally useful under all sets of industry conditions? This leads us to explore a central research question: Have industry differences and immediate task responsibilities demanded specific leadership and administrative qualities from CIO's that required an evolution in the CIO job description? To respond to this question, our study employs a contingency analysis of profiles of CIO's and industry characteristics.

THEORETICAL FOUNDATIONS

The ways in which characteristics of top managers can influence organizational outcomes were explained by Hambrick and Mason (1984) who synthesized the previously fragmented management literature under a general theory referred to as the *upper echelons (UE) perspective* (Hambrick and Mason, 1984). This theory views organizational outcomes as partially determined by the values and cognitive biases of its powerful actors - its top management team. While our study does not consider the whole top management team but only its essential participant - the CIO, it is still grounded on the same foundations of the upper echelons perspective provided by March and Simon (1958) (March and Simon, 1958). A central premise of their contribution is that each decision maker brings to the decision context three preconceived notions: knowledge or assumptions about future events, knowledge of alternatives, and consequences of each alternative. They also reflect his/her principles for ordering alternatives. The usual emphasis is on the observable characteristics such as age, educational level, background, and socioeconomic roots while our inquiry also considers the managerial roles.

Hambrick and Mason anticipated the UE perspective to serve as an anchor for future theory building. True to that spirit, we apply the model to the IT context by making four changes to the classic model of UE as shown in Figure 1. First we deviate from the *team* concept which is grounded on the traditional *dominant coalition* notion, and instead just consider the CIO, not only an individual but, an important leader of the IT organization. In order to make this change, we draw support from the fact that there is a wide variance of team size as implemented in prior empirical studies (see Carpenter et al. 2004 for a detailed summary), and in addition, our research is concerned with just how the CIO drives the IT strategies of an organization. The CIO typically directs project managers who implement the strategic plans of the executive team. The team then, works together, regardless of size, to implement the details of the high level directions given by senior management.

The second change to the classic model is the unit of our analysis - the IT segment of an organization rather than the firm as a whole. The third change from the classic UE model is that our substitution of IT *managerial styles* for *cognitive base values* specified in the original model. This *cognitive base value* is implemented in a wide range of operational measures in prior studies including the stylized UE model of carpenter et al. (2004) (Carpenter et al., 2004). Managerial characteristics evolve over a career and while their can be alterations in style, the fundamental managerial style remains fairly stable over time. Finally, we replace the *strategic choices* of the original model with *IT task orientations*. By making these changes, we strive to bring the UE perspective, a well-established general management research theme, to the realm of IT without losing the integrity of the rationale for the original model. Thus, our conceptual model has four main constructs.

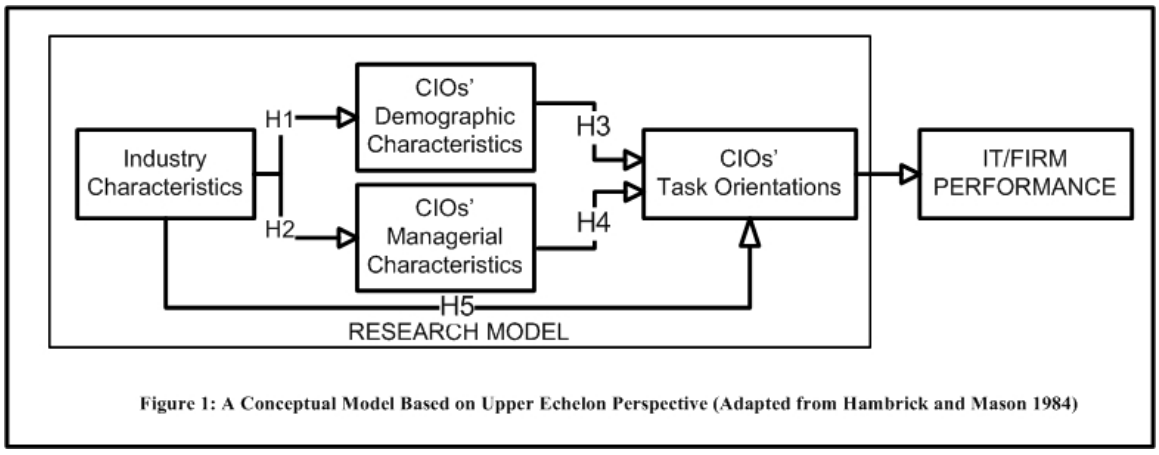

Figure 1: A Conceptual Model Based on Upper Echelon Perspective (Adapted from Hambrick and Mason 1984)

The need to bring the UE perspective to an IT context has already been espoused by other researchers, and the question of whether a positive view of a CEO about IT can lead to progressive uses of IT has also already been raised (Jarvenpaa and Ives, 1991). In the current study, we directly modify the classic UE model to fit the IT context, and verify whether the industry characteristics as well as the demographic and managerial characteristics of CIOs really influence the IT strategic choices, referred to here as task orientations. In undertaking this research, we first discern from the published profiles of CIOs an adapted form of Mintzberg's managerial roles. We then match the coded profiles to both public industry characteristics and published task orientations of CIOs.

INDUSTRY AND FIRM CHARACTERISTICS

The UE model defines the "objective situation," as being both internal and external. In applying this model to the IT context, we substitute industry and firm characteristics – the industry being the external component and the firm being the internal context. We consider industry dynamism, and the type of industry based on the SIC code as the industry characteristics, and firm size as the firm characteristic.

CIO DEMOGRAPHIC CHARACTERISTICS

The original UE perspective model refers to this as the "objective situation," and defines it as being both internal and external. We retain the spirit of the original UE perspective model and retain the age, tenure, education, and other career experiences as the demographic characteristics. Not all these values were available for all firms.

TASK ORIENTATION

The significant IT projects that a firm undertakes are predisposed by industry characteristics or the personal characteristics of its IT leader, the CIO. *Task orientation* refers to the significant IT direction that a firm embarks on, and is similar to the strategic choices conceptualized in the UL perspective. An IT project is the result of a strategic decision to meet an operational need. The type and characteristics of an IT task can infer the strategy being fulfilled either implicit or explicit in the IT announcements we have collected.

While there has been a general interest in knowing what CIOs actually do (Benjamin et al., 1985, Brancheau and Wetherbe, 1987), we focus on the single IT task that a CIO is entrusted with. A CIO is often a unique manager who must possess functional knowledge and, at the same time, shoulder broader business responsibilities. Unlike other functional managers, CIOs are expected to strategically manage IT resources by providing strong leadership but also successfully manage significant technology projects that give a firm strong strategic direction. Clearly, personal characteristics will influence how

projects are managed. Some of the tasks that a modern CIO typically undertakes are: business continuity and recovery planning, infrastructure development and management, security, managing outsourcing relationships, significant IT projects management such as ERP and CRM systems, and knowledge management. Smaltz et al. (2006) refer to this as CIO's role expectations but the listing of expectations they provide is particular to the health care industry they were studying (Smaltz, 1999, Smaltz et al., 2006). Rather than role expectation, we are studying role orientation which refers to the predominant role a CIO plays for the organization. Table 1 lists these orientations. Although we started with a preliminary list developed by the authors of the roles described above we discerned from CIO profiles any additional roles that were not included in the original list.

CIO Task Orientations
Tasks
Major System Implementations (Such as ERP/CRM)
Infrastructure Management; Disaster Recovery/Planning; ITIL
Security/Taking Control of E-mail;
Outsourcing/off shore relationships
Knowledge Management
Increasing Efficiency/Productivity; Cost savings
Liaison with Business units; customers
Realize business value from IT investments
New Technology Adaption

Table 1: CIO Role Orientations

PRELIMINARY RESULTS

To get some sense of the data before we started interpreting the data, we used CATPAC, a self-organizing artificial neural network computer program used for analyzing text (http://www.galileo.com). CATPAC reads and translates text by analyzing the inter-relationships among words and phrases in the text. There is no pre-coding of text nor is it necessary for the researcher to pre-determine any categories in advance. CATPAC allows categories to emerge from the data by allowing the data to develop into meaningful conceptual groupings that can be interpreted by the researcher. The most fundamental output of the program is a matrix containing the mean response computed for every pair of concepts. CATPAC assigns a neuron to each major word in the text and then runs a scanning window. Neurons representing each word are paired with other neurons creating word-by-word paired comparisons resulting in a Dendogram (cluster analysis) which shows the pattern of relationships between key words and further identifies clusters of key symbols (concepts) (http://www.galileo.com).

Table 3 summaries the process needed to create, correct, and organize a CATPAC text file.

Table 4 is the Dendogram of 312 CIO profiles. The Dendogram should be reviewed to look for clusters but the height of the clusters is not meaningful. It is just the way the program separates the cluster from each other. Clearly there are several grouping reading from left to right; Business, CIO and Information, Something related to the company, people and technology management, financial and customer, global database, Insurance by itself, Data Organization Services, System Work, and Personal profiles. These results suggest we are on track with our model and that a much more thorough analysis of the data will allow us to test the model in Figure 1. There seems to be information related to personal profiles. Information related to tasks related to the work of a CIO and management of people is also evident. Insurance is interesting because many of our CIOs come from an Insurance backgrounds and this may represent a larger number of firms in that industry. It is interesting that Global database pops out and that data organization services are important concepts. We always teach that data is important and that databases are the backbone of IS. Here is some validation that CIOs say the same things publicly. It is also clear that this sample of CIOs thinks globally.

<u>Step 1</u>	Gather data collected from articles, books, pamphlets and internet sources.
<u>Step 2</u>	Consolidate data into a text file for analysis by CATPAC software (http://www.galileo.com). Develop initial analysis including word frequency, key word grouping, and relationships.
<u>Step 3</u>	Words are changed in the raw data when a plural form of the word or an abbreviation of a word could skew the analysis. For example "system" and "Systems", "CIO" and "Chief Information Officer" or "New York" which we changed to "NewYork". In a situation like "New York", we combined two words into one word to maintain the meaning of the two words together, and keeping the word "York" from being grouped with the individual word "New", which would have a different meaning for the checklist.
<u>Step 4</u>	Create an exclude file that eliminates unnecessary and redundant words. Words are systematically eliminated one at a time until a text file remains that can be interpreted clearly. Most excluded words are direct or indirect articles, such as *a*, *an* and *the*, as well as conjunctions, *and* and *or*, or other common words. We also excluded vague or meaningless words within the context of the checklists. Excluding words is an interactive process requiring words to be excluded in differing orders to assure a consistent result.

Table 3: Checklist Analysis Methodology

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B C I S D C P T M Y F T C F D G I D O S G S W P P
U I N Y O O E E A E I I U I A L N A R E R Y O E R
S O F S C M O C N A R M S N T O S T G R O S R R O
I . O T U P P H A R S E T A A B U A A V U T K S F
N . R E M A L N G S T . O N B A R . N I P E . O I
E . M M E N E O E . . . M C A L A . I C . M . N L
S . A S N Y . L M . . . E I S . N . Z E . . . A E
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Table 4: Dendogram of CIO Profiles

NEXT STEPS

Further analyses of the data will be necessary. We collected 312 IT announcements from various sources that provide significant information about the CIO. In many cases, these announcements are made by the CIO and contain facts about the project was started, why it was started, the outcome, and future directions. Sometimes, these announcements also contain demographic information about the CIO as part of the IT announcement release. We will be using qualitative tools to seek text that identifies CIO managerial style, characteristics, etc. We will be organizing demographic details of each CIO in our

sample to look for patterns and compare industry patterns with task orientations. Further, this analysis will allow structuring of the data in a way that will allow testing of our hypotheses'. The next step is to test our hypotheses. We posit that:

H1: Industry Characteristics positively affect CIO Demographic Characteristics.

H2: Industry Characteristics positively affect CIO Managerial Characteristics.

H3: CIO Demographic Characteristics positively affect CIO Task Orientations.

H4: CIO Managerial Characteristics positively affect CIO Task Orientations.

H5: Industry Characteristics positively affect CIO Task Orientations.

Testing of the hypotheses will allow us to discuss results and formation of conclusions.

CONCLUSION

The purpose of this research is to understand the characteristics of CIOs. We chose to adapt the upper echelons perspective theory because we believe that industry characteristics shape the CIO which in turn shapes the tasks the CIO performs. Previous research focused on the tasks CIOs perform. We think it important to understand the fundamentals or characteristics of CIOs so we can better understand how they do their jobs and why they choose specific courses of action. The underlying idea is that if we understand the CIO we can predict which technologies from a particular industry they might choose. It would also be interesting to consider what CIO characteristics are associated with each industry.

As a research in progress, we feel we have a workable theory with testable constructs. Thus, we are using qualitative techniques to assess variables that are hard to quantify. Qualitative techniques are useful in that they add more color and insight to previous studies and broaden are view of the CIO position.

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