ERP Contribution to Long-Term Financial Performance and the CIO’s Membership in the Top Management Team (TMT)

ABSTRACT
The difference in the contribution of Enterprise Resource Planning (ERP) systems to financial performance between firms that have a Chief Executive Officer (CIO) in the top management team (TMT) and those without a CIO in the TMT is investigated. A new and robust method to measure this contribution is proposed. Preliminary results showed that the mean contribution of ERP for firms with a CIO in the TMT is higher than those without a CIO but did not show any statistical significance.

INTRODUCTION
Although it is generally believed that the relationship between the CIO and the TMT is important, the literature is still not clear on its effectiveness. The effect of technology on business performance has not been researched. In addition, the close CEO-CIO relationship is key to getting the right technology to work effectively. Accordingly, the following hypothesis is proposed:

H1: organizations whose CIO is a member of the TMT will experience a higher ERP contribution to business performance than organizations whose CIO is not included in the TMT.

METHODOLOGY
Data Collection
Firms that already implemented any type of enterprise system in the period between 1995 and 2001 will be identified through media announcements using wired news from Lexis Nexis. Annual financial information for each firm will be pulled from Compustat. The composition of the TMT will be examined using the ExecutiveComp database, which includes the highest top five executives.

ANALYSIS
Previous research has used both market (Hayes, et al.[3], Ranganathan and Brown[12]) and accounting metrics (Hunton, et al.[4], Nicolaou[9], Poston and Grabski[11]) to measure the extent to which the ERP contributes to business value. However, few of these studies have controlled for important factors such as firm performance and industry. The studies that have used accounting metrics simply compare financial ratios before and after the ERP adoption. This study investigates the contribution of the ERP in two steps. First, an expected financial performance of the firm will be computed at the year t+3, being t the year when the firm finished the ERP implementation. The ERP business value literature has suggested that the ERP benefits are more likely to be observed after two or three years after the implementation (Poston and Grabski[11]). This estimate will be based on both past firm performance and past performance of companies from the same industry and similar size. To do this regression analysis using a composite score based on accounting fundamentals (Lev and Thiagarajan[7]) for t and t-1 will be used. The variable will be the financial performance at t+3 measured by return on assets (ROA). The method to compute this composite score will be the F-score version of Piotroski (2000) (see Appendix A). Components of this score include annual improvements of firm profitability, financial leverage, and inventory turnover. The F-score measure has been found to be significantly associated with future firm performance (Piotroski[10]).

In order to control for firm size, industry and industry tendency, the following regression model is proposed for each firm in the sample:

ROA (i) (j, t+3) = β0 (i) + β1(i) * FScore (i), (j, t) + β2(i) * FScore (i) (j, t-1) + ε(j)

Where:

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To compute the β parameters for the regression function i, one sub-sample composed of firms that are similar to the firm i in terms of size and industry will be extracted from Compustat, which is consistent with previous research that have used the matching sample method (Barber and Lyon[1]). The error term of the function i, which is the difference between the actual future ROA and the predicted future ROA, will be the ERP contribution to performance for firm i.

Finally, an ANOVA analysis will be performed to test which group has higher ERP contribution to long-term financial performance.

PRELIMINARY RESULTS
The following results are based on the period from 1995 to 1999. Descriptive sample statistics are shown in Table 1.

From 276 announcements, public firms with a CIO right after the implementation were reduced to 16. A matching sample of 16 cases was selected out of the remaining firms considering firm size, industry, and number of modules implemented. With these 32 cases, 32 sub-samples where constructed. Then, regression analysis was performed to calculate the ERP contribution to business performance using the error term of the regression for each sub-sample. Table 2 describes the mean differences between two groups.

Although the mean of ERP contribution for firms with CIO is higher than those without a CIO, this difference was not significant. We believe that it might be due to the small sample size. Once we include announcements from year 2000 to 2001, we can validate our findings.

APPENDIX A. CONSTRUCTION OF F-SCORE.
Piotroski (2000) considers nine accounting fundamentals posited to capture annual differences in firm’s profitability, financial leverage/liquidity and operational efficiency. The profitability fundamentals are ROA, cash flow from operations, change in ROA and accruals (Earnings – CFO). All variables are scaled by beginning of the year total assets. The financial leverage/liquidity variables are long-term debt to average total asset ratio, current assets to current liabilities ratio, and equity. The operational efficiency fundamentals are gross margin ratio and current year inventory turnover. For each component, if there is an improvement from one year to another, it is assign 1, and 0 otherwise. The composite score is the sum of these binary variables. FScore can range from 0 to 9.

REFERENCES

Table 1. Number of ES implementation announcements

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<tr>
<td># ES implementation announcements</td>
<td>24</td>
<td>20</td>
<td>30</td>
<td>55</td>
<td>147</td>
<td>276</td>
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<td># announcements related to public firms</td>
<td>5</td>
<td>5</td>
<td>19</td>
<td>33</td>
<td>88</td>
<td>150</td>
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<td># announcements of public firms with a CIO in the TMT during 1993-2005</td>
<td>2</td>
<td>1</td>
<td>8</td>
<td>6</td>
<td>18</td>
<td>35</td>
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<tr>
<td># announcements of public firms with a CIO right after the year of the implementation</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>10</td>
<td>16</td>
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Table 2. Mean difference statistics using a matching sample

<table>
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<th>Mean of ERP contribution</th>
<th>Std. Deviation</th>
<th>Significance of mean differences</th>
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<tr>
<td>Without CIO</td>
<td>-0.00445</td>
<td>0.04837</td>
<td>t-value -0.4</td>
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<tr>
<td>With CIO</td>
<td>0.01891</td>
<td>0.17633</td>
<td>Significance 0.71</td>
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Table 3. Mean difference statistics using all public firms

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<th>Std. Deviation</th>
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<td>Without CIO</td>
<td>.00139</td>
<td>.11710</td>
<td>t-value -0.42</td>
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<td>With CIO</td>
<td>.01891</td>
<td>.17633</td>
<td>Significance 0.67</td>
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Note: The sample size was reduced due to lack of data in Compustat


