The impact of educational background on the behavior of effective CIO’s

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ABSTRACT
This study explores the behavioral characteristics of effective CIO’s through the analysis of video observations during meetings with subordinates. CIO’s require skills in BA and IT. Currently CIO’s are employed both with IT and BA educational backgrounds. However, little is known about the impact of the education on the daily work of CIO’s. This study looks at the behavioral pattern of a CIO with a BA background and compares this to their counterparts with an IT education. The results give a better insight in the success factors of CIO’s and in the long run can help in recruitment and training. Results indicate that the CIO with a BA education gives his subordinates more freedom to interpret factual information themselves and form their own ideas. He also listens more to his employees. IT educated CIO’s spend more time structuring the conversation and verifying with their subordinates. It is concluded that more research needs to be done with a broader methodology, including surveys and interviews, to confirm these findings.

Keywords
Chief information officer, video observation, effective leadership, educational background

1. INTRODUCTION
Now at the end of the first decade of the 21st century IT is beginning to mature. IT departments are becoming more stable and IT is seen more and more as an important strategic asset in organizations. [16] Some companies, for which IT is a primary activity, have had an executive level CIO for a long time. But in most other companies, the CIO has joined the ranks of the executive level officers in the last couple of years, or hasn’t joined yet. [18]

The function of CIO is fairly young and still in flux. Research into CIO is still underdeveloped in some areas. There has been research into the skills a CIO needs to be successful, such as a study by Andriole [1], which gives an insight in effective IT leaders. There is much less to be found about the actual behavior and leadership styles of CIO’s during their work.

The role a Chief Information Officer fulfills in a company varies greatly on the primary activities of the organization and the strategic importance top-level management bestow on the IT-department.[11] Further, the way the responsibilities of the IT-department are handled also vary a great deal from one organization to another. For example, some companies prefer to keep most of their information systems in-house, while others rely far more on outsourcing their IT needs.

The educational and work experience background for IT-managers and CIO’s also varies greatly. Where some have had most of their education on the topic of IT and information systems and worked their way up the corporate ladder inside an IT department, others have had a non-technical management education and gained all the IT knowledge and skills they possess in their work environment. [22]

Therefore, the situation and background of CIO’s varies greatly and both factors may very well influence both performance of the CIO and the IT-department and the way the CIO behaves during his work.

This paper focuses on the educational background of CIO’s. Since the general consensus in the literature [6] [22] is that successful CIO’s need knowledge and skills both in managing and IT, it is interesting to explore differences in the behavior of CIO’s who enjoyed educations focused on one or the other aspect.

Through the use of advanced video analysis of CIO’s during their meetings with subordinates, this study explores what differences in behavior can be observed between CIO’s who have most of their educational background in IT and those who have had their education in the management domain. This may help to create a better understanding in the behavioral tendencies of CIO’s and this can help in recruitment and training of CIO’s.

2. RESEARCH QUESTIONS
The following problem statement, which will be addressed in the paper: “What is the impact of educational background on CIO behavior?”

To answer this problem statement, the following research questions need to be answered.

- Does existing literature offer any insight in the role educational background plays in the behavior of CIO’s?
- What are the main characteristics of CIO behavior?
- What is the impact of educational background on the behavior of CIO’s?

These research questions define a path for the research to take. First, a literature overview is presented to better define CIO’s, behavioral theory in general and the state of art in CIO behavior research. Next, a brief overview of the research methodology used in this study will be given.
Then, the results from the video-observations will be presented and compared to a larger sample of middle-managers, obtained by Van der Weide [26] to examine possible differences between CIO- and broader management behavior.

Finally, the influence of the educational background of the CIO’s will be examined by comparing the results from the CIO observed in this study to a sample of CIO’s with a more technical background. This sample was obtained by Gupta et. al. [12] and will be further expanded in this study.

The outcomes will be compared to the information found in the literature surveyed in chapter 3. This study is exploratory in nature, only one BA educated CIO is observed, it provides a sound basis for further research in the field of IT leadership and a better insight in possible educational influence on CIO behavior.

3. LITERATURE

In this section, the first research question is addressed. By reviewing literature on the evolving role of the CIO position, IT management in general and behavioral theories, an insight will be created on the impact educational background plays in the behavior of CIO’s.

These insights guide the analysis of the results found in the video observations and this provides guidance for future research into the educational background of CIO’s.

This begins with an overview of the CIO position, from its formation in the 70s to the different roles CIO’s have nowadays in organizations. Finally, the behavioral framework of Van der Weide & Wilderom, [26] which forms the basis for the analysis of the CIO behavior, will be discussed to gain an understanding of what view on leadership styles and behavior is used in this study.

3.1 The CIO position

This section will give a brief historic overview of the position of the CIO and a short summation of the role CIO’s fulfill nowadays in most businesses.

The CIO position is fairly young in most business sectors and has evolved a great deal over the past decades. According to Ross and Feeney [18], three main eras can be defined in the development of IT in businesses: the mainframe era (60s and 70s), the distributed era (80s and early 90s) and the web-based era (late 90s-present)

In the mainframe era, only big companies and organizations specialized in information technology were using computers on a large scale. Therefore, only a small portion had an equipped IT-staff with a manager that can be compared to today’s CIO. [18] At the start of this era, the typical focus of a senior IT manager was operational: developing and maintaining systems which support the primary activity in the organization. [18] This manager reported to an established functional executive and the skill set of the senior IT manager was mostly technical.

Although, at the end of the era, the emphasis on business needs in the IT departments grew and effective management and communication skills became gradually more important.

During the distributed era, which began in the 80s, the computer made its way onto the desks of more employees and IT was increasingly seen as a strategically important asset by executive level officers. [18] The result of this was that the CIO’s had closer ties to the executive board and some even took place in those boards. Communication and managerial skills became more important and the CIO was asked to think more in terms of business goals and strategy. New CIO’s had mainly business or hybrid (business and IT) experience and were more often brought in externally than promoted from within [2]

At the end of the 90s the web-based era began; most business applications were enabled to run in a web-environment. The internet became one of the main interfaces between organizations and their suppliers and customers and computers became fully integrated in the daily work of most employees. The CIO now is counted on for his strategic vision to make the most of the opportunities these technological changes offer. IT has become a driver of strategy instead of a way to support business strategy. [18]

This overview shows that over the years, the business knowledge of CIO’s is becoming increasingly important. However, how does technical background fit in this picture? Most studies, such as [3] and [6] point out that CIO’s are best equipped to deal with the challenges of today’s environment if they have adequate knowledge and skills in both business and IT. However, what this mix consists of and how it is reached is unknown.

Most of the CIO’s who are active in the organizational landscape nowadays have experience with both management and IT in their work. However, the main focus in their education lies on one or the other in most cases. The main hypothesis in this study is that the educational antecedents will leave a permanent influence on the knowledge and skills of CIO. To research this, this study will try to find out if there are behavioral differences between CIO’s with a BA education and those with an IT education.

There has been little research into the antecedents of effective IT management. Chen et. al. [7] reported in 2007 on their research-in-progress towards finding antecedents of effective CIO’s, however, up until now, no follow-up work on this research has been published. Furthermore, there have been two major studies into CIO behavior, which will be discussed section 3.3.

3.2 Behavioral framework

3.2.1 Transformational and transactional leadership

In this section the two most common leadership styles are shortly discussed: transactional and transformational leadership. These styles are discussed in detail the work of Bass [4][5] among various other studies.

Transactional leadership is a traditional leadership style where the basis of the interaction between a manager and his subordinate stems from a transactional relationship. Managers make sure the subordinates are aware of their goals and objectives and the performance is paid off by reward or punishment.

Bass [4] distinguishes three dimensions of transactional leadership styles. The first one is “contingent reward” and in it, the manager gives a subordinate a direct relation between objective and reward. The other two dimensions, active and passive management by exception, managers anticipate on mistakes and errors in the employee’s work. In active management by exception, the manager closely monitors subordinates work and intervenes on mistakes. With the passive style, the manager has a less stringent control and only intervenes when problems arise.

A transformational leader is someone who uses emotional grounds and intellectual challenges to lead his subordinates and
presents his vision on the objectives and goals to them. With this, he attempts to motivate his employees to reach these goals.

Transformational leadership also has three dimensions [4]. An transformational leader often is an inspirational motivator in the sense that he motivates his subordinates by bringing his goals in an enthusiastic manner, contrary to the transactional style of ‘contingent reward’ where the emphasis lies on the reward. Furthermore, he gives individual attention to his subordinates and lays a focus on individual development. He is intellectual challenging in that he wants subordinates to actively voice their opinions and challenge them to help in the decision making process.

It is important to note that these two leadership styles are not mutually exclusive. In every practical case, a manager will combine the two styles and their different types. [23]

3.2.2 Behavioral observation framework

The behavioral framework used in this study is developed by Van der Weide and Wilderom [26] and tested in this study on a sample of Dutch middle managers. The framework is detailed in appendix B and will be used to quantify and measure the behavior of the CIO’s during the observed meetings.

The framework defines eleven behavioral categories in three distinct categories: Self-Defending, Steering and Supporting. All these eleven behavioral categories fit into the leadership styles discussed in the previous section. Some behaviors are very typical for one of the two styles, such as ‘Professionally challenging’ fits right into the intellectual challenging dimension of transformational leadership.

The Self-Defending behaviors are ‘Being uninterested’, ‘Defending own position’ and ‘Providing negative feedback’, they all fall in the transactional leadership category. They don’t show interest in the opinion of subordinates and if an opinion is voiced, negative feedback will demotivate subordinates from doing so in the future.

The steering category is typical for transactional as well as transformational leadership. ‘Directing’ subordinates to do something and ‘Verifying’ progress and made agreements are both primarily transactional. Their basis lies in the steering, rewarding and controlling of subordinates. Giving employees factual information about goals, objectives, restrictions etc. and explaining them by putting work into perspective by bundling it to the bigger strategic goals, through visionary leadership on the other hand, is clearly transformational behavior. ‘Structuring the conversation’ is needed to smoothly run the meeting and is necessary in both styles.

Supporting behaviors consists mainly transformational leadership of ‘Listening’ what others have to say, ‘Giving positive attention’ to individuals who did a good job or providing them help with future development. ‘Professionally challenging’ is enticing subordinates to voice their opinion, think outside the box and stimulate co-workers to work together.

3.3 Previous research into CIO behavior

There have been two recent major studies into the behavior of upper IT management. One of them is the previously cited study by Gupta et. al. [12] of which this study is an extension: the results will be used in this study.

The methodology used in this study is therefore analogue to the method of CIO observation developed in the Gupta study: [12] the same behavioral framework is used, so that the results are compatible with each other.

Gupta et. al. [12] did an exploratory study into the characteristics of CIO behavior by observing two effective Dutch CIO’s during their meetings with subordinates. The CIO’s were spending most of their time listening, verifying, structuring the conversation or informing. Least shown behaviors were being uninterested, defending their own position and providing negative feedback: the three behaviors in the Self-Defending category.

They show a combination of transformational and transactional leadership, but transformational leadership is the focus. The main difference with the middle-management sample [26] which Gupta compared this with was that CIO’s defend their own position less.

The second study is by Wilcoxon and Chatham. [27] They used psychometric testing (presenting a hypothetical situation and let the subject choose from a limited set of responses) to profile the behavior of the IT manager. The results show the following six characteristics for IT managers. In parentheses: the corresponding behavior for the framework used in this study, as found by Gupta et. al. [12]:

- Focus on the task to be accomplished. (Verifying)
- Meet deadlines. (Verifying)
- Provide structure (Structuring the conversation)
- Give direction (Direction/Visionary Leadership)
- Stick firmly to final decisions. (-)
- Develop challenging goals. (Professionally challenging)
- Gain legitimacy through task skill and proficiency (-)

There are quite some similarities between these characteristics and the frequency the corresponding behaviors have been found in the video observations by Gupta et. al. [12]

In addition, the Wilcoxon and Chatham [27] study found that the senior IT managers varied greatly from other management in their orientation towards leadership and control. The results indicate a greater task than people orientation and a great willingness to follow orders and provide others with services. This could hinder strategic decision making. [27] This could be an indicator that on higher levels, managers with an IT background aren’t as well equipped, because of their lesser strategic capabilities.

4. METHODOLOGY

Most studies in the field of CIO effectiveness use traditional research methods, such as surveys and interviews [7] [20]

These are good methods to gather a lot of data quickly, but the reliability and objectivity of this data is not guaranteed. There are many papers on methodological issues, such as response bias, with survey research. [15] [28] When examining about human behavior, solid knowledge is hard to come by with surveys and interviews. [23]

Reliable quantitative data about CIO effectiveness poses a whole different set of problems. A lot of study has been done on the connection between investments and performance of the IT department and resulting performance of the organization [14] [19] This is very difficult by itself, as pointed out by [10], but it is almost impossible to determine the influence effectiveness of CIO behavior has on the organizational performance; too many variables play a role.

To work around this problem, only effective CIO’s will be selected to participate in this study. In section 4.1 this selection
process will be detailed. These effective CIO’s will then be videotaped while they conduct regularly scheduled meetings with their subordinates. The behavior of the CIO during the meeting will then be coded using a scheme used in other behavioral studies. [12] [26]

This way more insight can be gained in the behavioral characteristics of effective CIO’s and differences between the behavior of CIO’s with various educational backgrounds can be explored.

Video-observations pose their own problems and challenges, such as the reactivity of the participants to the camera [25] and the interpretation of the video by the researcher. In the following paragraphs, the methodology will be reviewed in detail and these problems will be addressed.

4.1 Selection of participants
For the purpose of this study, effective Dutch CIO’s are required, who have most of their educational background in business administration. This way the results of the behavioral observations can be compared to the results obtained in the Gupta-study. [12] The two participating CIO’s in this study both have an IT educational background. The results from these two CIO’s will be used in this study, augmented with one participant with a BA education.

The effectiveness of the CIO was measured in the same way as the Gupta study: [12] the CIO’s were nominated in the top 10 for the ‘CIO of the Year Award’ presented annually on the CIO Day, an event for Dutch CIO’s and higher IT management organized by ICT Media, publisher of CIO Magazine [13], in association with The CIO Platform [9], a Dutch association of CIO’s and IT Presidents.

The ‘CIO of the Year Award’ is awarded to the most outstanding CIO of a Dutch company. The top 10 nominees are determined by a selection round using web questionnaires by two independent research bureaus. [8] These nominees were then invited to participate in this study.

Since the results of the two observations of one of the CIO’s in the study by Gupta et. al. [12] showed significant variation, this CIO has agreed to a third observation. The result of this third meeting will be added to his other results to increase the representativeness and reliability of this CIO’s results.

4.2 Video observations and coding
The video observations of the CIO behavior will be made during regular scheduled meetings they have with their subordinates. These meetings will be of the same type as observed in the study by Gupta et. al. [12] to make sure the different samples are comparable. There will always be slight differences in the content and participants of these meetings between the different organizations, but this is unfortunately unavoidable.

A common problem with video observations in the reactivity the participants may show to the camera, as explained by Weick [25]. He argues that the observer, by definition, alters the event he is observing. The possible effect is that the CIO behavior that is being recorded for the purpose of this study is not representative for the typical behavior of the CIO.

Smith et. al. [21] studies different variables which influence reactivity during video observation, such as proximity of the camera. The further the camera is placed from the observed object, the lower the reactivity. This was employed in the observations made for this study. The camera was placed in the farthest corner of the room, stationary on a tripod.

To make sure that the data is representative, short questionnaires will be given to the participants in the meeting in which the influence of the camera is measured. Should there be a lot of influence from the camera, the video observation obviously cannot be used, since the data are not reliable. See appendix A for an example of the questionnaire used.

After the video recordings are made, the behavior of the CIO needs to be quantified to make it measureable. The coding scheme used to categorize the different behaviors the CIO shows during the meeting is the same one used by the Gupta study [12] and the middle management sample [26]. (See Appendix B) This scheme has a solid background in behavioral theory as shown in section two and by using it, our results can easily be compared to the results from Gupta et. al. [12] and Van der Weide [26].

The time the CIO engages in each behavioral category during the meeting is measured and when adding up these results for all the observed meetings of that CIO, a sort of behavioral profile arises, which can be compared to that of others.

The actual coding of the video recordings is done by using the software package ‘The Observer’ by Noldus [17]. With this program, one can classify the behavior of the subject into one of the behavioral classes from the coding scheme.

Since the coding of certain events during the meeting is subjective, it’s important that the video’s where coded twice: once by me and once by another coder with experience with ‘The Observer’ [17] Afterwards, the differences in the results will be discussed between the coders and when necessary recoded. This method of coding and verifying has resulted in an average inter-reliability of 93%.

4.3 Data analysis and conclusions
After the behavioral data is collected, coded and verified, the next step is to compile the data and answer the research questions posed in the introduction.

First, the data collection of the Gupta study [12] will be augmented with the data collected in this study. Then the results will be once again compared to the middle-management sample of the study by Van der Weide et. al. [26] The reasoning for this is that with a bigger and more varied sample the results may differ from those found by Gupta et. al. [12]

After this, the results of the CIO with the managerial educational background will be compared to the CIO’s from the Gupta study [12] with the IT education. Any differences will be presented and they will where possible be explained using the literature survey on behavioral theory and CIO’s from section two of this study.

5. RESULTS
All three video-observations conducted for the purpose of this study went as planned, although one of them was brutally interrupted by a fire drill. However, there is no indication from the questionnaires that this had any diminishing effect on the representativeness of CIO behavior during that meeting.

For all three observations, the participants felt little reactivity from the camera and they felt unanimously that the behavior of their CIO was representative in comparison to their other regular scheduled meetings.

Combined with the high inter-reliability ratings from the video-coding procedure, all that can be done to guarantee the validity of the data has been done and the results from all three observations plus those from the Gupta-study [12] are all
deemed trustworthy enough to answer the second and third research questions posed in section two.

5.1 Observation Results

In table 1, the combined observational results from all three CIO’s are given. The first 2 CIO’s in the table are the ones with an IT educational background, while the third CIO is the one with the BA education and therefore the main subject of this study.

The observations from the first CIO and two of the three of the second CIO where made by Gupta et. al. [12] This study added a third observation of CIO2 and the third CIO.

By looking at the data some major variations can be seen, especially in ‘Listening’, where the difference between the highest and lowest CIO is almost 24%. High variations can also be seen in categories as ‘Structuring the conversation’ and ‘Verifying’. However, that is to be expected, since each individual has their own way of handling a meeting and the contents, participants and setting of the meetings vary between the different companies the CIO’s are working at.

To put these outcomes into context and use them to tackle the research questions presented in section two, these results will now be analyzed and compared to another sample.

Table 1. Observational results

<table>
<thead>
<tr>
<th>Behaviors</th>
<th>CIO1 (IT)</th>
<th>CIO2 (IT)</th>
<th>CIO3 (BA)</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n=2)</td>
<td>(n=3)</td>
<td>(n=2)</td>
<td></td>
</tr>
<tr>
<td>TA/TF Providing negative feedback</td>
<td>0.23%</td>
<td>2.81%</td>
<td>0.56%</td>
<td>1.20%</td>
</tr>
<tr>
<td>TA/TF Structuring the conversation</td>
<td>13.49%</td>
<td>8.56%</td>
<td>5.59%</td>
<td>9.21%</td>
</tr>
<tr>
<td>TF/TA Visionary leadership</td>
<td>12.55%</td>
<td>7.96%</td>
<td>8.28%</td>
<td>9.60%</td>
</tr>
<tr>
<td>TF/TA Professionally challenging</td>
<td>2.00%</td>
<td>1.47%</td>
<td>1.83%</td>
<td>1.77%</td>
</tr>
<tr>
<td>TF/TA Giving positive attention</td>
<td>6.68%</td>
<td>5.14%</td>
<td>2.41%</td>
<td>4.74%</td>
</tr>
<tr>
<td>TF/TA/TF Listening</td>
<td>36.87%</td>
<td>40.75%</td>
<td>60.67%</td>
<td>46.10%</td>
</tr>
</tbody>
</table>

Table 2. Aggregated observational results

<table>
<thead>
<tr>
<th>Aggregates</th>
<th>CIO1</th>
<th>CIO2</th>
<th>CIO3</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Defending</td>
<td>0.44%</td>
<td>3.37%</td>
<td>0.90%</td>
<td>1.57%</td>
</tr>
<tr>
<td>Steering</td>
<td>54.00%</td>
<td>49.27%</td>
<td>34.19%</td>
<td>45.82%</td>
</tr>
<tr>
<td>Supporting</td>
<td>45.55%</td>
<td>47.36%</td>
<td>64.91%</td>
<td>52.61%</td>
</tr>
<tr>
<td>Transactional</td>
<td>6.61%</td>
<td>20.08%</td>
<td>5.23%</td>
<td>10.64%</td>
</tr>
<tr>
<td>Transformational</td>
<td>64.77%</td>
<td>61.98%</td>
<td>84.29%</td>
<td>70.34%</td>
</tr>
<tr>
<td>Combination</td>
<td>28.61%</td>
<td>17.93%</td>
<td>10.49%</td>
<td>19.01%</td>
</tr>
</tbody>
</table>

To get a better look at the behavioral pattern these CIO’s use in their meetings, table 2 presents the aggregated numbers of the observations in both the discussed leadership styles as in the main behavioral categories. From it can be concluded that all the observed CIO’s mainly show transformational leadership during their meetings and that there is an equal balance between steering and supporting behavior, while almost no time during the meeting is spent by the CIO with self-defending, as can be expected of effective managers.

There are some notable differences in the behavior of the CIO’s. First of all, the second CIO is more of a transactional leader than the other two. However, transformational leadership still prevails hardly over the other two categories combined. The third CIO spends more time supporting than the other two and is more of a transformational leader than the other two. However, it should be noted that the high amount of listening with this CIO is a main contributor in both these outcomes.

5.2 Comparison to middle management sample

To answer the second research questions, which reads: ‘What are the main characteristics of CIO behavior?’ this study compares this sample of three CIO’s to a more general and bigger sample of middle managers compiled by Van der Weide [26]. This way, differences can be discovered and those will give an insight in the particular characteristics of CIO behavior.

Table 3 on the next page provides a comparison between the sample of CIO’s and the middle management sample from Van der Weide [26]. The aggregated data are included in this table.

This same comparison was made in the Gupta study [12], only now the sample of CIO’s is bigger and more varied than before.

However, most of the conclusions found by Gupta are confirmed in this study. The results show that CIO’s spend significantly less time on all the behaviors in the Self-Defending category, most notably on ‘Defending their own position’. This could be explained by the higher position in the hierarchy the CIO’s occupy. [12]

In addition, CIO’s spend less time on ‘Visionary leadership’ and more time ‘Informing’ their subordinates. This indicates that CIO’s put less emphasis on their own opinion during the meetings and instead give factual information on which the subordinates can build their own opinion. This is supported by the fact that CIO’s spend more time ‘Listening’ to their subordinates and lay more emphasis on ‘Structuring the conversation’.

Looking at the two leadership styles discussed earlier, it is clear CIO’s utilize more transformational and less transactional leadership than their middle management counterparts. Both groups employ a mix of both styles. This difference mainly comes from the big difference in the behaviors in the Self-Defending category.
When looking at the characteristics of CIO behavior as found by Willcoxson and Chatman [27], some similarities can be seen as well. They argue CIO’s main characteristics are ‘Providing structure’, which complements the high rate of ‘Structuring the conversation’ in this study. They place an emphasis on ‘meeting deadlines’ and ‘employ a task focus’, supported by the good portion CIO’s spend on ‘Verifying’. There is also some support for the ‘Give direction’ characteristic, although this is considerably less than for the first three.

However, one of the characteristics is not supported at all. According to Willcoxson and Chatman [27], CIO’s ‘develop challenging goals’ for their employees. In this study, CIO’s show little time spend on the ‘Professionally challenging’ category. It might be that the CIO’s in this study use different (implicit) methods to challenge their subordinates, however this can’t be deduced from these results.

5.3 The role of educational backgrounds

In this paragraph the observational data will be split up towards the educational backgrounds of the CIO’s. By this, the third research question will be examined. The two participants of the Gupta-study [12] both had their educational roots in the IT, while the main participant of this study enjoyed an education in BA.

Table 4 shows the observational results as presented in paragraph 5.1, split up between similar educational backgrounds. The aggregates towards behavioral categories and leadership styles are included.

The most glaring difference is the amount of time the participants spend on ‘Listening’. This is almost 22% higher for the BA educated CIO than for the other two. This may be circumstantial, but it could also be an indication of this CIO’s style: to allow for more dialogue between his subordinates or grant them more room during the meetings to come up with own ideas.

The results show BA educated CIO’s practice more transformational leadership than their counterparts and that they spend more time ‘supporting’ their subordinates and less time on the ‘steering’ behaviors.

However, the difference in ‘Listening’ makes it very difficult to draw conclusions from the aggregated data, since the listening clearly favors the ‘supporting’ and ‘transformational’ aggregated categories and distorts the view on the rest of the behaviors. It’s also harder to analyze the other behavioral categories, since all categories are counted relative to one another.

To counter this, in table 5 are the results with the ‘Listening’ category left out. This gives an overview about what the behavior of the CIO is only during the time when he is talking. No conclusions can be drawn about the characteristics of CIO behavior, because ‘Listening’ is instrumental for every manager. This is done to facilitate the comparison of the results from both groups.

The comparison reveals some interesting differences. First off, the division in the three main behavioral categories is very similar for both groups. However, there are quite some differences in the behavioral pattern and with this an apparent difference in leadership styles. The two CIO’s with an IT education show far more transactional and far less transformational leadership than the BA educated CIO.
The BA educated CIO lays a heavy emphasis on ‘Informing’ his subordinates and spends more time ‘Professionally challenging’ them than CIO’s with an IT education. Another thing that can be seen is that the ‘Visionary leadership’ is more common with the BA educated CIO. This means he spends more time voicing his own opinion in the meeting. This seems counter-intuitive since one of the main assumptions is that CIO’s with an IT education have more knowledge about the IT projects and infrastructure in the organization. It should be noted that in table 4, with the ‘Listening’ still in the equation, the amount of ‘Visionary leadership’ is higher in IT educated CIO’s.

IT educated CIO’s spend more time ‘Structuring the conversation’, ‘Directing’ and ‘Verifying’. This result is more intuitive, since these CIO’s presumably had a lower emphasis during their education on management skills and are therefore spend more time structuring the meeting and are more inclined towards the simpler to understand and implement transactional leadership. [4]

6. CONCLUSION
An improved insight in the characteristics of effective CIO behavior may help improving today’s and future CIO. It gives an indication for success factors to look for in a CIO and can help with recruitment and give direction for specific training. This study tried to contribute towards this goal by analyzing CIO behavior during meetings with subordinates. CIO’s need both management and IT knowledge and skills and the basis for this is laid in education. To explore the impact of different education has on these skills, this study examines differences in the behavioral pattern between CIO’s with a BA and IT education.

The results show that CIO’s practice more transformational leadership and less transactional than middle managers in other departments and spend less time defending their own position. They spend less time voicing their own opinion and instead provide their subordinates with more factual information. This could indicate an increased freedom for subordinates to interpret this information and come up with own ideas.

The comparison between BA and IT educated CIO’s shows some interesting results. First off, the CIO with a BA education listened way more to his employees than his IT educated counterparts. This CIO’s leadership style was more transformational and less transactional than the IT educated CIO’s. This difference is however mostly in the steering category. IT educated CIO’s spend a lot of time verifying and directing while BA educated CIO’s spend more time informing and with visionary leadership.

7. LIMITATIONS AND FURTHER RESEARCH
This exploratory study has yielded some results, however, the limitations of the methodology and scope of this study should be taken into account with regard to the conclusions. Secondly, the results combined with the limitations make form a research agenda for the field of CIO leadership. To begin this section, the methodological limitations will be discussed and improvements suggested and after that, the future research options will be discussed.

7.1 Methodological limitations and improvements
The most obvious limitation to the results of this study is the sample size. Only one CIO with a BA education participated in this study and two meetings of this CIO were filmed. Effort was made to ensure the representativeness of this meetings. However, much more variables can play a role in the behavior of the CIO during a meeting, such as the amount of participants, the contents of the meeting and the role IT plays in the organization and the way it is structured.

The sample of IT educated CIO’s was somewhat larger, however not large enough for stable results. The first recommendation for further research is therefore enlarging this study with more participants. This is easier said than done, since the videotaping and subsequent coding of enough CIO’s and meetings to make the results statistically significant takes a lot of time and effort.

An additional method to enhance the reliability of the results is adding other research methods, such as surveys and interviews with both the CIO and his subordinates, to the observational data. This may help in making sense out of the observational results and help confirm any conclusions drawn from the observational results. A technique that might be especially helpful for this purpose is the ‘360 degree feedback process’ as described by Ward [24] This feedback process gathers its input from all the sources around the subject, such as subordinates, co-workers, supervisors, customers and suppliers, to get a comprehensive view of the subject’s performance and characteristics.

At this moment, the entire dataset of video observations made using this methodology in all kinds of different studies is beginning to grow quite large. Another methodological improvement to this and future studies could be made if all data is quantified and organized so variables which are commonly present in all sectors such as gender, age, type of meeting and number of participants could be quantified. This could help explain differences in the results found.
7.2 Future research agenda

The first research topic that seems of great interest is the ‘Listening’ category from the behavioral framework used in this study. ‘Listening’ is a very large category in all the results, in the CIO sample as well as the middle-management sample from Van der Weide [26] used for comparison in this study.

The ‘Listening’ category gets aggregated in the supporting and transformational leadership categories. However, since the results seem to vary a lot between the individual participants, this may cause an overestimation in these aggregations and color the results as can be seen in paragraph 5.3.

To gain a better insight in the behavioral characteristics of the CIO, it may be wise to explore this category more to gain deeper insight in the ‘Listening’ category. Some questions to ask in this regard could be: why does a CIO listen during a meeting? What does he try to accomplish with listening? And how is listening perceived by other participants in the meeting?

The second topic that could use further research is the conflict in results between the Willcoxson-study [27] and this study on the subject of challenging employees. Willcoxson and Chatman identified this as one of the key characteristics of CIO behavior, while this study shows the CIO’s laid limited emphasis on the ‘Professionally challenging’ behavior.

It could be that this does not happen during meetings, but during other interactions between CIO and subordinate. Or it could be that the manner in which CIO’s challenge their employees is not picked up by the analysis of the video observations. Perhaps because the challenges are presented implicit, in the form of information and/or visionary leadership, or because the behavioral framework isn’t adequately adjusted towards measuring the setting of challenging goals.

The next issue warranting further research is the ‘Visionary leadership’ result in the comparison between BA and IT educated CIO’s as seen in paragraph 5.3. This category indicated that BA educated CIO’s are more inclined to voice their own opinion than their IT educated counterparts. This contradicts one of the main assumptions which is that IT educated CIO’s have more knowledge about the work being performed in the IT department.

This could well be one of the main differences in the behavioral pattern of the CIO’s. But to further investigate the causes and effects of this difference more research is needed, most likely in the form of surveys and interviews.

The results from the separate meetings of each CIO are quite similar, pointing to a representative sample. There is however one notable exception: The second CIO in tables 1 and 2 was filmed twice in 2007 for the Gupta-study [12] and once in 2009 for this study. His behavioral pattern from the observation made for this study shows less transformational leadership and more transformational leadership compared to the observations made in 2007. Therefore, his behavior has moved closer to the BA educated CIO in the 2.5 years between observations.

This could indicate that this CIO has improved his management skills and therefore the behavioral patterns of him and the BA educated CIO are more similar than they were before. It would be interesting to research this in the future and explore how behavioral patterns in both CIO categories change over time.

8. REFERENCES


## APPENDIX A: MEETING PARTICIPANT QUESTIONNAIRE

<table>
<thead>
<tr>
<th>Question</th>
<th>Not at all</th>
<th>Probably not</th>
<th>A little</th>
<th>A lot</th>
<th>Very much</th>
</tr>
</thead>
<tbody>
<tr>
<td>How much was your own behavior influenced by the presence of the video camera?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>In your assessment, how much was the behavior of your CIO influenced by the presence of the video camera?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

| Do you judge the behavior of your CIO during this meeting as representative for other meetings of this kind? | O Yes | O No |
### APPENDIX B: CODING SCHEME

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Definition</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Defending</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TA</td>
<td>Being uninterested</td>
<td>Keeping distance, not showing any interest, not taking problems of co-workers seriously.</td>
</tr>
<tr>
<td>TA</td>
<td>Defending own position</td>
<td>Defending own position or opinion, blaming others, emphasizing own importance.</td>
</tr>
<tr>
<td>TA</td>
<td>Providing negative feedback</td>
<td>Giving negative feedback on the behavior of a co-worker.</td>
</tr>
<tr>
<td>TA/TF</td>
<td>Directing</td>
<td>Contradicting: disagreeing with a co-worker. Enforcing a co-worker to (not) do something, pointing something out. Interrupting Delegating</td>
</tr>
<tr>
<td>TA</td>
<td>Verifying</td>
<td>Coming back on previously made agreements, formulated (learning) goals, vision, etc. Confirming, asking what someone just said. Reacting surprised, (indirectly) asking for a reaction from co-workers.</td>
</tr>
<tr>
<td>TA/TF</td>
<td>Structuring the conversation</td>
<td>Structuring the meeting.</td>
</tr>
<tr>
<td>TF</td>
<td>Informing</td>
<td>Giving factual information to co-workers.</td>
</tr>
<tr>
<td>TF</td>
<td>Visionary leadership</td>
<td>Determining the course. Giving own opinion about business related issues and/or future goals. Explaining future goals.</td>
</tr>
<tr>
<td>TF</td>
<td>Professionally challenging</td>
<td>Asking co-workers for ideas, stimulating them to think along, organizing brainstorm sessions, inviting for discussion. Working together with co-workers properly, increasing mutual trust.</td>
</tr>
<tr>
<td>TA/TF</td>
<td>Giving positive attention</td>
<td>Positively reinforcing co-workers’ behavior, giving compliment. Encouraging, positively stimulating co-workers’ behavior, enthusing. Agreeing Being friendly, showing sympathy, welcoming. Showing personal interest, showing empathy</td>
</tr>
<tr>
<td>Supporting</td>
<td>TF</td>
<td>Listening</td>
</tr>
</tbody>
</table>

TA: Transactional leadership; TF: Transformational leadership