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M. Sojer
University of Regensburg, manuel.sojer@gmx.de

Christian Schläger
Department of Information Systems, University of Regensburg, christian.schlaeger@wiwi.uni-regensburg.de

Christian Locher
University of Regensburg, christian.locher@wiwi.uni-regensburg.de

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Sojer, Manuel, University of Regensburg, Universitätsstraße 31, 93053 Regensburg, Germany, manuel.sojer@gmx.de

Schläger, Christian, University of Regensburg, Universitätsstraße 31, 93053 Regensburg, Germany, christian.schlaeger@wiwi.uni-regensburg.de

Locher, Christian, University of Regensburg, Universitätsstraße 31, 93053 Regensburg, Germany, christian.locher@wiwi.uni-regensburg.de

Abstract

Synnott and Gruber, as well as Stephens, have defined the role of the CIO initially in the early 1980s. Although major changes in the IS industry, society and IT services have taken place since then, theory and scientific work do not reflect this and still cling to more or less the same view as in the early days of CIO research. This work describes at first the state of CIO theory and then the CIO's actual field of work based on empirical findings. When the traditional theories were tested with a positivistic perspective differences became obvious. The misleading self-assessment of having an important strategic role or the obvious loss of influence of CIOs in the company hierarchy show the need for a changed view on the CIO's role. We propose a new role model for CIOs combining the objectives of the theoretical work with the empirical findings. This model classifies the CIO's position in today's corporate world with the help of two dimensions: strategic importance of running IT and strategic importance of changing IT. Based on these dimensions we identify four generic CIO roles: Enabler, Driver, Supporter and Cost Cutter/Project Manager.

Keywords: CIO, IT Management, Roles and Skills in Strategic Management, IS Strategy and Organization.

1   MOTIVATION

Since its inception in the early 1980s, the CIO role has often been portrayed as that of a "corporate savior who was to align the worlds of business and technology." (Grover & Jeong & Kettinger & Lee 1993) Synnott (1987) even described CIOs as "the new breed of information managers, [who] are businessmen first, managers second, and technologists third." During the 1990s, when information was becoming a more and more critical resource for companies, it was even postulated that the CIO may become the logical choice to succeed as CEO (Chatterjee & Richardson & Zmud 2001).

However, after the internet bubble burst, companies realized that IT alone cannot drive a business and it is very likely that the CIO's role and importance also suffered in the wake of these insights. This position can be backed up with data found by Chatterjee, Richardson and Zmud (2001). They point out that during the dot com years the number of CIO appointments kept increasing steadily and further indicate that stock markets had been showing positive reactions to CIO appointments in the years following 1995 while they did not respond at all in the years before.

Unfortunately, there has been very little recent work providing a holistic view on the CIO, his or her tasks and the competencies required therefore. Apparently, many authors feel that the definitions and findings from before 2000 are still accurate. Tagliavini, Moro, Ravarini and Guimaraes (2003) for example quote twenty different sources to describe a CIO's competencies. Yet, none of their references was published after 1999. The same is true for nearly all other recent publications, e.g. Enns, Huff and Higgins (2003) or Preston and Karahanna (2004).

The historically unique situation of the dot com crash and the fact that there is only limited recent literature leads to the question whether in 2005 theory and reality are still in synch? Has the internet hype backed up theory overcome reality or is reality still lagging behind and in the process of catching up? Moreover, if theory and reality have been decoupled, is there a need for a new CIO model and what could it look like?

2   THE CIO IN THEORY

2.1   Definition

During the first half of the 1980s, theory (Synnott & Gruber 1981) and practice (Diebold Research Group 1984) – in mutual agreement – realized that the shift in computer usage from pure accounting to more creative work also required new organizational concepts and thus the CIO was born. Initially the CIO was designed to be a "senior executive responsible for establishing corporate information policy, standards, and management control over all information resources." (Synnott & Gruber 1981)

For Stephens (1995) the main difference that came along with the introduction of the CIO concept was that - in contrast to its predecessor (Manager of Information Systems) - the CIO was not limited to a functional area, but was designed to be a general manager who also had the authority to initiate corporate change (Boyle & Burbridge 1991).

As already indicated in the last chapter, this definition of the CIO being an executive with a broad spectrum of corporate responsibilities has not been changed significantly until today and is still quoted in work regarding this topic.

2.2   Tasks

In scientific publications, there are two main approaches to derive and describe the tasks of a CIO. The first concept makes use of Mintzberg's work (1980) on "Managerial Roles" which extracted ten roles

for executive work out of Fayol's five general management tasks (planning, organizing, commanding, coordinating and controlling). Mintzberg claims that – with varying importance – these roles are common to all executive jobs regardless of their functional or hierarchical level. This position has been studied extensively and the findings confirm that Mintzberg's roles are exhibited across function and hierarchical levels (e.g. Martinko & Garnder 1990).

CIO focused research has identified the following roles to be of specific importance for CIOs: Leader, Spokesman, Monitor, Liaison, Entrepreneur and Resource Allocator (Grover & Jeong & Kettinger & Lee 1993, Karlsen & Gottschalk & Andersen 2002). These roles are displayed in their respective organizational context in Figure 1.
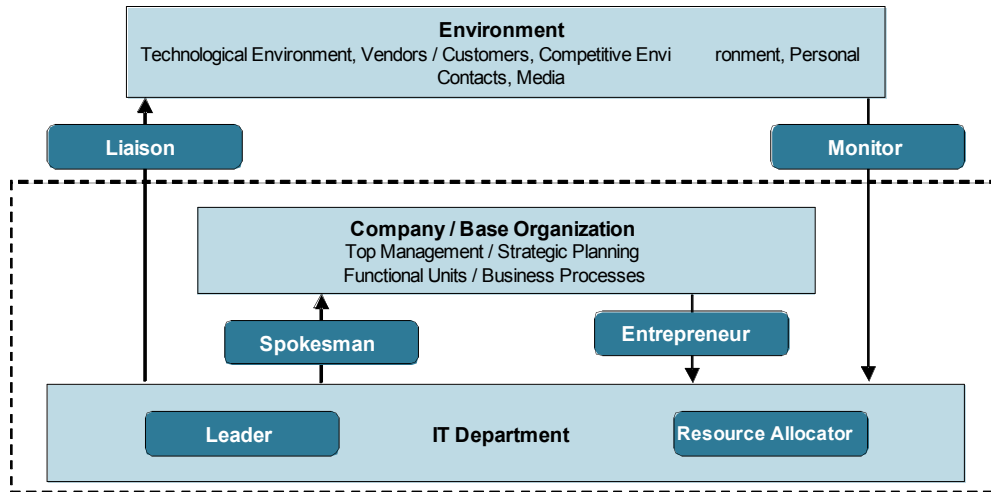

Figure 1.   CIO Roles in the Mintzberg Framework (modified from Grover & Jeong & Kettinger & Lee 1993, Karlsen & Gottschalk & Andersen 2002)

The second approach to develop a view on the CIO's tasks has been developed more recently and is driven from practitioners rather than academics. Here, the CIO's job is divided into two blocks (see Figure 2) which have been labeled "operational and strategic", "internal and external" or "supply and demand" (Mark & Monnoyer 2004, Gens & Melenovsky & Rogers & Turner 2004, Gomolski 2000, Barnett 2004).
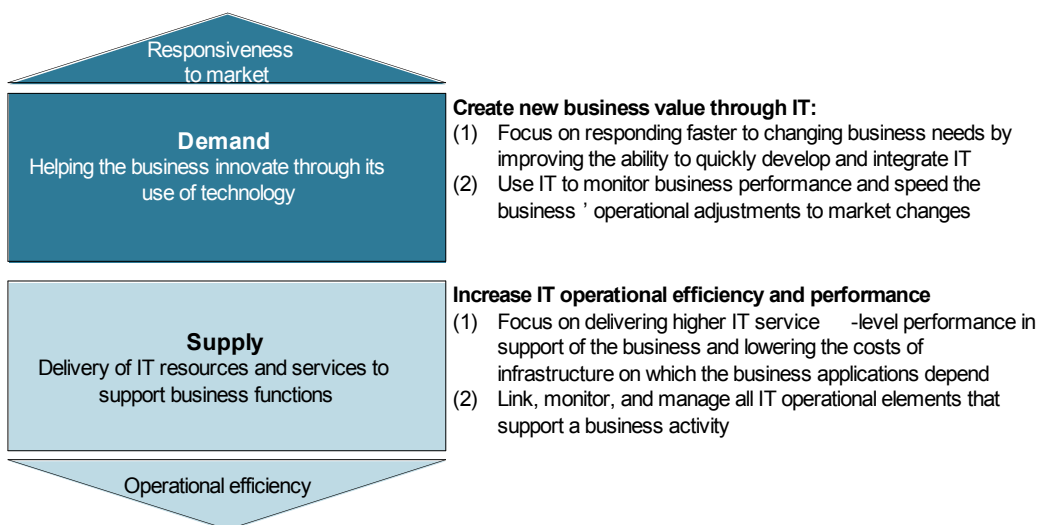

Figure 2.   "Supply & Demand" View on the CIO tasks (modified from Mark & Monnoyer 2004, Gens & Melenovsky & Rogers & Turner 2004)

In this model, the supply side aims at providing IT resources and services that support the business processes of the company. This is driven by the goal to increase the operational efficiency. A CIO who focuses primarily on this aspect of his or her job will spend most of his or her time with providing new IT resources, integrating, servicing and running them.

On the demand side, it is the CIO's job to create value for the company through technology and by delivering innovation while constantly coping with a changing market environment (Mark & Monnoyer 2004). In this scenario, the CIO creates new IT backed processes and optimizes ineffective ones.

In collaboration with Gartner, Kitzis and Broadbent (2003) have come up with a perspective on the CIO's tasks which integrates the two different approaches on CIO tasks presented earlier in this paper. In doing so they have identified six primary CIO tasks that are closely related to those presented by Grover, Jeong, Kettinger and Lee (1993) in the Mintzberg framework and assigned these to either the supply or the demand side. This also points out that the conceptual ideas about the CIO which had been formulated in 1993 were still of relevance ten years later.
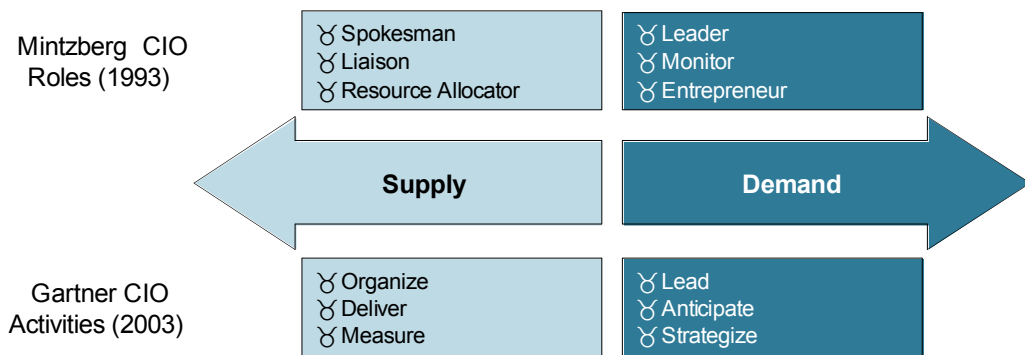

Figure 3.   *Integrated View on the CIO Roles and Activities (heavily modified from Kitzis & Broadbent 2003)*

In their work (Figure 3), Kitzis and Broadbent assign the respective tasks of the leader, monitor and entrepreneur role to the demand side. This is highly evident for monitor and entrepreneur, because both roles aim at delivering value for the company. As their definition of leader slightly extends Mintzberg's it is positioned on the demand side. Following the classic Mintzberg stance on leader, this would have to be positioned in between supply and demand.

The roles spokesman, liaison and resource allocator have been assigned to the supply side, because their primary task is to support business processes with IT or help to design these processes more efficiently, or – with regard to resource allocator – make efficient use of existing IT resources, all of which deal with increasing or maintaining operational efficiency.

2.3 Qualifications

The definition as a general executive whose primary goal is to create value for his or her company in contrast to a focused specialist is also reflected in the required qualifications of the CIO. Key to being a successful CIO is a deep understanding of IT and technology in general which can be acquired either by previous work experience in the IT area or extensive training (Rockart & Ball & Bullen 1982). This is especially of importance, because a CIO without this core competence will never find the respect of his or her executive peers and also because IT knowledge takes significantly longer to build up than other knowledge and thus should be already present in a candidate before he or she becomes CIO (Earl 1996).

In addition, Rockart, Ball and Bullen (1982) have identified other qualifications required by the tasks of a CIO: Communication Skills, Business Sense, Aggregation and Information Assessment Skills, Personnel Management Skills, Strategic Planning and Future Orientation, and Technology Sense.

In 1992, Feeny and Edwards added two other qualifications:

Commitment to Life-Long Learning: It is not sufficient anymore only to be well informed today, but the CIO must be committed to invest significant time and effort in staying current with IT trends also for the time to come.

Honesty, Integrity and Sincerity: As IT topics are often difficult to grasp for other executives, it is important for the CIO to openly address successes and failures in a comprehensible manner without hiding behind technical language.

2.4 Traditional role model

The theoretical view on the CIO involves both strategic and operational tasks, as described by Chatterjee, Richardson and Zmud (2001): "An effective CIO […] promises not only to increase the likelihood that IT strategy both influences and is aligned with business strategy but also to efficiently and effectively manage and leverage the firm's IT assets." Yet, the focus seems to be on the strategic side. This is especially reflected in the required qualifications where the rather operational understanding of IT and technology is surrounded by eight qualifications that are mainly relevant with regard to strategic tasks and for working in the upper executive echelons.

3 THE CIO AT WORK

3.1 The empirical analysis

As our sample we used the 2002, 2003 and 2004 versions of the "State of the CIO" survey (Prewitt 2002, 2003, 2004) which is conducted annually by CIO Magazine, a bimonthly U.S. publication being read by more than 140,000 CIOs and senior IT executives. This approach holds the benefit of working with answers that have been given, formulated and above all asked by practitioners. Because of the soundness of the data, we decided against a study of our own. A further advantage of this survey compared to the many others existing is that it represents the North American market while many others merely provide data for smaller countries (e.g. Gottschalk 1999 or Tagliavini & Moro & Ravarini & Guimaraes 2003).

Considered Companies by Revenue Size
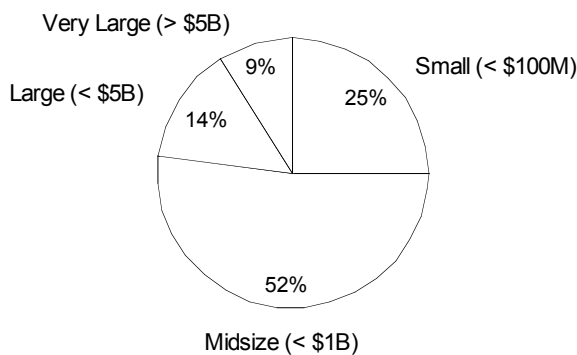
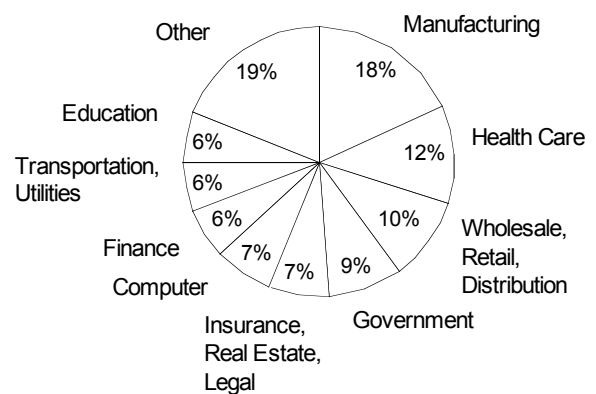**Considered Companies by Industry**

Figure 4.   Sample Composition

The survey from which we drew most of our data was the 2004 version of the "State of the CIO" survey that contains the responses of 544 heads of IT and covers companies of different sizes and all relevant industries (see Figure 4). In addition to the CIO questionnaire, the survey also included a CEO questionnaire that allows a more unbiased look on the CIO's tasks and qualifications.

3.2   Tasks

Very generally, we observed that CIOs think of themselves as strategy oriented. More than two thirds define "creating value" as the primary task of IT while only roughly a third sees support activities as the foremost duty of IT departments. However, CEOs have a slightly different opinion on this question and only 56% of them consider IT strategic (see Figure 5). Apparently, CIOs are too optimistic about their situation with regard to this question. This becomes even more evident, when most CIOs confessed that they did not see themselves on the same corporate level as their other C-level colleagues. As Mark & Monnoyer (2004) observe, many CIOs are so packed with operational tasks that there is simply no time for any strategic projects.
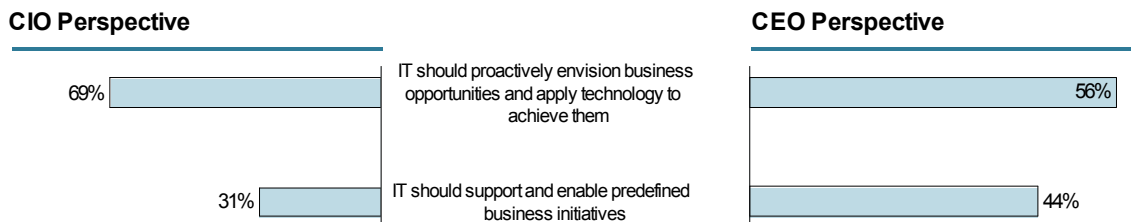
CIO Perspective

69%   IT should proactively envision business opportunities and apply technology to achieve them

31%   IT should support and enable predefined business initiatives

CEO Perspective

56%

44%

Figure 5.   IT's Core Activity from CIO and CEO Perspective

Considering this, it becomes evident that it depends on the CEO whether the CIO can become involved in strategic issues or not.

This already slightly evident tendency towards operational topics becomes even more obvious in the Top 10 list of the most important CIO tasks (see Figure 6). The very first item on this list is reducing costs which is a purely operational issue. Apparently, it is the CIO's most important task to deliver more performance with the IT systems already existing by increasing their efficiency. Furthermore, improving customer satisfaction (#5), regulatory compliance (#6), globalizing of IT (#8) and optimizing the supply chain (#9) are also issues from an operational spectrum.

CIO Tasks ranked by Importance

Reduce Costs through Efficiency / Increased Productivity

Enable / Drive Business Innovation

Create of Enable Competitive Advantage

Enable Growth

Improve External Customer Satisfaction

Enable Regulatory Compliance

Generate / Enable New Revenue Streams

Enable Global Operations

Streamline the Supply Chain

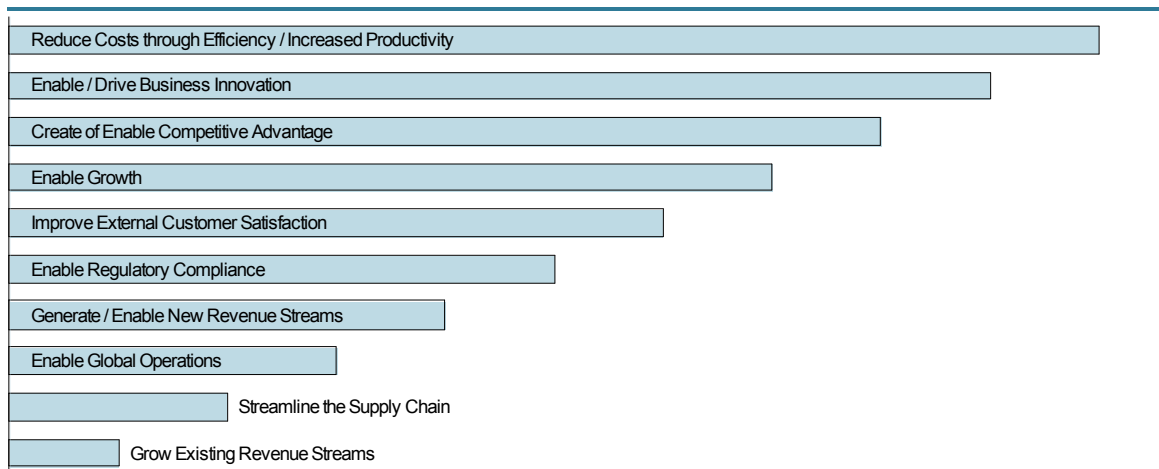Grow Existing Revenue Streams

Figure 6.   2004 Top 10 of CIO Tasks

Admittedly, innovations (#2), competitive advantage (#3) and growth (#4) are in the first half of the task ranking. However, all three of them are intangible catchwords and creating value through new ideas (#7) and improvements in existing concepts (#10) are listed behind them even though they are the logical results of innovation, competitive advantages and growth.
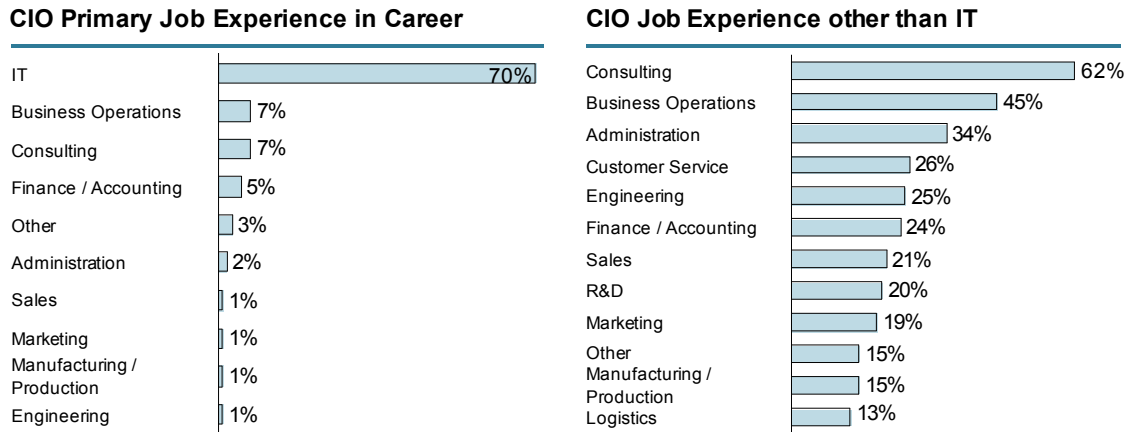
CIO Primary Job Experience in Career

IT	70%
Business Operations	7%
Consulting	7%
Finance / Accounting	5%
Other	3%
Administration	2%
Sales	1%
Marketing	1%
Manufacturing / Production	1%
Engineering	1%

CIO Job Experience other than IT

Consulting	62%
Business Operations	45%
Administration	34%
Customer Service	26%
Engineering	25%
Finance / Accounting	24%
Sales	21%
R&D	20%
Marketing	19%
Other	15%
Manufacturing / Production	15%
Logistics	13%

Figure 7.   CIO Professional Experience

A major reason for this rather operational focus of CIOs in reality is rooted in the fact that CEOs do not put much confidence in their CIOs mastering strategic tasks. Only 55% of all CEOs think their CIOs collaborate effectively with their C-level peers which, however, is an absolute necessity to strategize within the company. Furthermore, two thirds of all CEOs think that their CIOs are not capable of assessing investment decisions correctly. Finally, many other company executives complain about CIO propositions with strategic relevance not being thought through well (Mark & Monnoyer 2004).

3.3   Qualifications

Apparently, operational skills are a major criterion when it comes to hiring CIOs. This is reflected in the fact, that 70% of all CIOs were primarily engaged in the IT department prior to their career as CIO. However, IT skills alone do not suffice, because a majority of all CIOs has also experience in other areas, such as consulting, operations or administration (see Figure 7).
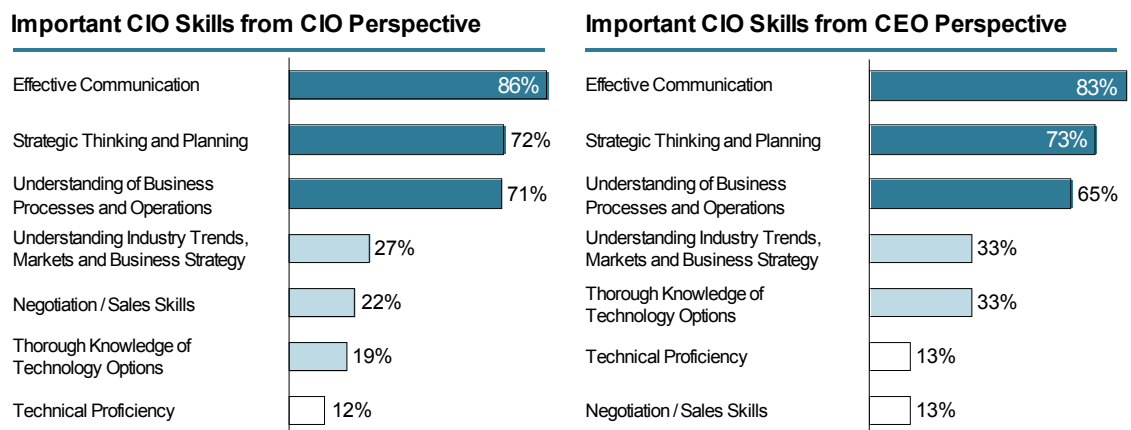
Important CIO Skills from CIO Perspective

Effective Communication	86%
Strategic Thinking and Planning	72%
Understanding of Business Processes and Operations	71%
Understanding Industry Trends, Markets and Business Strategy	27%
Negotiation / Sales Skills	22%
Thorough Knowledge of Technology Options	19%
Technical Proficiency	12%

Important CIO Skills from CEO Perspective

Effective Communication	83%
Strategic Thinking and Planning	73%
Understanding of Business Processes and Operations	65%
Understanding Industry Trends, Markets and Business Strategy	33%
Thorough Knowledge of Technology Options	33%
Technical Proficiency	13%
Negotiation / Sales Skills	13%

Figure 8.   Critical CIO Skills from CIO and CEO Perspective

CIOs and CEOs agree that next to IT skills and experience in other business areas, CIOs need to posses extensive communications skills. Furthermore, they should be able to think and plan

strategically and understand the business processes within their company. In addition to that, experience in the use of technology, technical skills and knowledge, negotiations skills and general business sense are important qualifications to be a good CIO (see Figure 8). Yet, these are lower-ranking criteria compared to those mentioned before.

4   FORMING A NEW ROLE CONCEPT

4.1   Differences with theory

In order to compare the CIO tasks in theory with those in reality we will divide the reality tasks from Figure 7 in supply and demand tasks. In the result, (see Figure 9) the tasks "Enable Growth", "Enable / Drive Business Innovation" and "Create / Enable Competitive Advantage" are not shown due to the reasons discussed above. This leaves a picture of a CIO who in reality is highly focused on supply side and thus on operational tasks.
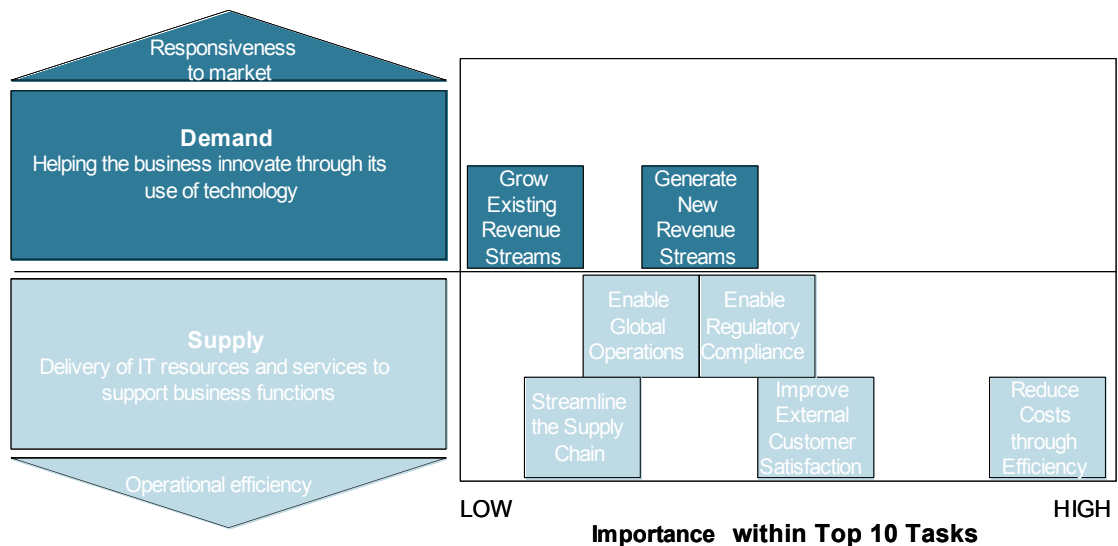

Figure 9.   CIO's Task Comparison between Theory and Reality

This result is quite contrary to the theoretical view on the CIO's tasks which with three supply and three demand roles seems a lot more balanced than reality.

With regard to the CIO qualifications, there is a high compliance between theory and reality as five of the qualifications mentioned in theory are also mentioned in reality and are even the five most important ones there (see Figure 10).

The four qualifications that were mentioned in theory but are missing in reality (Personnel Management Skills, Honesty, Integrity and Sincerity, Commitment to Life-Long Learning and Aggregation and Information Assessment Skills) are very general management qualifications that are a necessity for any executive and most likely due to that were not explicitly mentioned in the survey.

Among the qualifications mentioned in reality yet not in theory are "Sales Skills" and "Technical Proficiency". However, these skills are considered to be the two least important ones.

Summing up the empirical evidence, it is interesting that CIOs like to see themselves as strategists, yet realistically are more concerned with operational tasks (Mark & Monnoyer 2004). One reason for this mismatch could be the fact that CIOs who are perceived as strategic have a higher budget. Interestingly, there is a discrepancy between theory and reality with regard to the CIO's tasks, yet not when looking at the required qualifications.
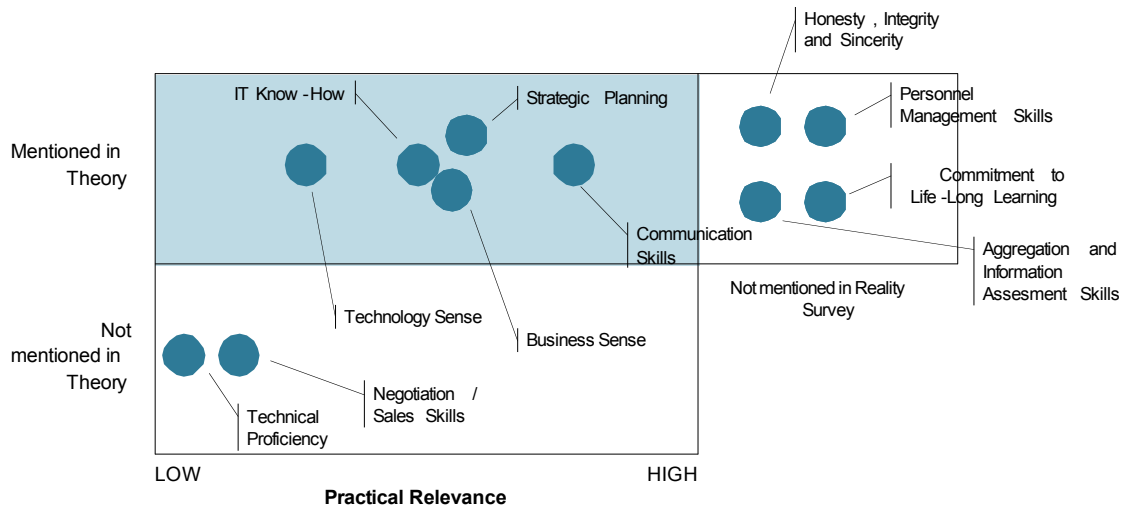
Figure 10.   *CIO Qualification Comparison between Theory and Reality*

In addition to this inconsistency there is another interesting trend that suggests that CIOs and their role had been overestimate in the dot com years and the early time following: In 2002, slightly more than 50% of all CIOs reported directly to the CEO. In 2004, this number dropped to 40% (see Figure 11). In addition to that, the number of CIOs reporting to the CFO has nearly tripled in the same period of time and it is very likely that these CIOs are primarily concerned with operational efficiency. Furthermore, the title "CIO" seems to be on the decline itself. While in 2002 and 2003 about two thirds of all IT directors held the title CIO this figure dropped to roughly 50% in 2004 (see Figure 12).
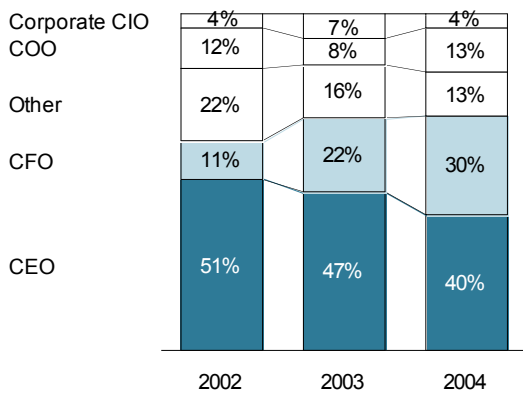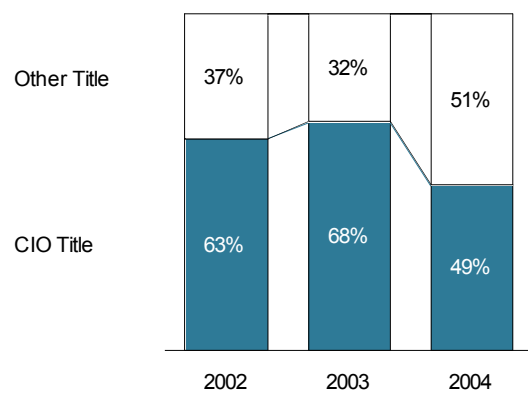

Figure 11.   *CIO Loss of Influence*

4.2   The new CIO role model

Due to the fact, that the CIO's role varies significantly throughout different companies (Gottschalk 1999) and that there are only few CIOs in reality that really match the theoretical definition of the job, it is legit to either consider a new definition of the CIO or discuss whether there should be additional role models for IT directors next to CIO. These two approaches to solve the gap between theory and reality have also already been brought forward, both from the academic (Maruca 2000) as well as the corporate (Schneider Traylor 2001) world. However, despite pointing out the problem, none of these authors has developed a new model to solve the issues identified.

This paper will pursue the latter way and develop several roles for IT executives to cover the majority of situations currently found in the corporate world. Gupta (1991) proposed to align the CIO's role with McFarlan's Strategic Grid. This framework classifies companies according to the strategic impact of current and future information systems on them.

Figure 12 displays our approach to use McFarlan's grid to assign roles and titles to IT directors taking into account the company's position on the use of IT. The nouns we use to describe the respective roles are borrowed from Polansky, Inuganti und Wiggins (2003) which used exactly these expressions to display the CIO's historical development from operational to strategic tasks.

In a company in which neither current nor future IT has any significant impact, the IT director's role can be described as a **Supporter**. His or her primary task is to support existing business processes with IT.

In case of companies for which their current IT is of strategic relevance, but future IT systems are not expected to have any significant impact, the IT director assumes the role of an **Enabler**.

In the opposite case, where the current IT is not of major importance, but the impact of future IT is considered high, the IT director is either a **Cost Cutter** or a **Project Manager** who drives the future oriented measures within the IT department.

The situation in which both the current and the future IT are of major strategic importance makes the IT director a **Driver** within the company. He or she will have significant impact well beyond the organizational boundaries of the IT department.
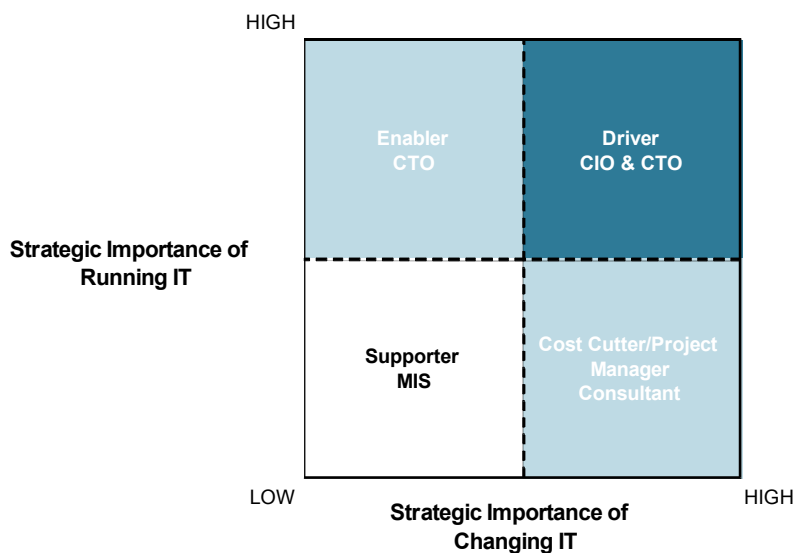

Figure 12.   Role and Title Assignment for IT Executives

This concept also corresponds with the line of thought of McLean and Smits (1998) who have developed four IS manager roles that depend on the current climate the company is facing. Furthermore, as Chatterjee, Richardson and Zmud (2001) have shown in their paper, the stock market only positively reacts to CIO appointments if the company in question can be linked to a high strategic relevance of IT. This means that only Drivers are truly recognized by the stock market.

An appropriate title for the Supporter would be **Manager of Information Systems (MIS)**. This was the title from which the CIO movement originated and CIOs were back then differentiated from MISes by their strategic focus (Romanczuk & Pemberton 1997). Thus, it would only be fair to reintroduce the MIS title for IT directors without any strategic relevance, as is the case for Supporters. Because the Enabler role does include strategic relevance, it qualifies for a C-title. A good choice for this would be **Chief Technology Officer (CTO)**, because this role is responsible for the reliable operation of the current corporate IT (Gomolski 2000). As Cost Cutter and Project Manager roles in most situations are only staffed temporarily, an external **Consultant** can very well fill this role for the duration of the

project**.** Finally, the role of the Driver would still be staffed with a **Chief Information Officer (CIO)**. Yet, it might be worthwhile, especially for larger companies, to consider backing up this CIO with an additional CTO in order to release the CIO from operative duties (Schneider Traylor 2001). This would allow the CIO to become a true „organizational architect" (Sauer & Willcocks 2002) who exclusively deals with strategic long-term issues.

5   CONCLUSION

In this paper we have done an exhaustive study on the work CIO theory is based on until today. Starting with Synnott, Gruber and Stephens and also considering the popular Mintzberg approach towards management roles we have shown the common definition of the CIO role together with its tasks and the qualifications needed therefore. We have integrated these related models into a holistic view. It is striking that the CIO is seen as a highly valuable and strategic part of the company's board. However, the empirical data does not support this traditional view. We have put emphasis on how the CIO is viewed by his superiors (usually the CEO) and the actual tasks in his or her job. In corporate reality, the majority of the tasks the CIO has to deal with are operational. The comparison shows, that although CIOs would like to think of themselves as strategic innovators the truth is closer to a manager of information systems. Looking at the CIO's role historically, we see a decline in the company's hierarchy.

In our approach to develop a new role model for the CIO, we have identified two important dimensions. The role of a CIO can be defined by looking at the strategic importance of running IT on the one hand and the strategic importance of changing IT on the other. If the strategic importance of both is high, the CIO appears as a Driver of technology influencing all aspects of the value chain. On the contrary, if both are low the role of the CIO is that of a Manager of Information Systems mainly supporting and maintaining existing IT infrastructure. Taking into consideration the differing view of CIOs and CEOs, our role model could be used as a check for the strategic level of the CIO. If a CIO is occupied with operational tasks only and can be categorized as a Supporter, the CEO has to check whether this is in line with the company's position on strategic IT usage.

Our new role model serves two purposes. First, we want to propose a more up-to-date model to classify CIOs and second we want to highlight paths of development for CIOs that allow them to become more aligned with the company's IT strategy than in the traditional role model.

The next steps for our research will encompass a fine-tuning of the role model in various industries. As the role of IT differs so should the strategic role of the CIO (Gottschalk 1999). The advanced model should show that the importance of IT in a specific industry is reflected in the strength, the influence and the leadership of the CIOs in this sector. Cases in which this coherence fails must be analyzed for particular positioning in the industry.

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