

Strategic Management of IS/IT Functions: The Role of the CIO

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Abstract

Chief information officers (CIOs) have the difficult job of running a function that uses a lot of resources but offers little measurable evidence of its value. Line managers are increasingly assuming responsibility for planning, building, and running information systems that affect their operations. To respond to business and technological changes, CIOs now must build relationships with line managers and assume new and more strategic roles. The strategic role of the CIO is becoming ever more complex, requiring an expansion of the organizational and structural possibilities for filling that role. This paper presents an extensive literature review on the role of the CIO. The research examines CIO role in Norwegian organizations. In this paper, results from a survey of Norwegian CIOs are presented. Norwegian CIOs have on average worked in the current organization for eight years, have worked in information technology (IT) for twelve years, report mostly to the CEO or CFO, and have eleven people reporting to them. A large percentage has a master degree. Also, formal IS planning tended to be adopted by organizations with higher annual revenue, larger number of total employees, and broader span of control (i.e., the number of people reporting to the CIO). Higher CIO reporting level was also associated with greater extent of information systems plan implementation.

1. Introduction

Chief information officers (CIOs) have the difficult job of running a function that uses a large amount of resources but that offer little measurable evidence of its value [15]. At the same time, line managers are increasingly assuming responsibility for planning, building, and running information systems that affect their operations [4, 34], while the CIO role becomes more strategic in nature.

The strategic role of the CIO is becoming ever more complex, requiring an expansion of the organizational and structural possibilities for filling that role. This has prompted many firms to look outside the organization for

the right qualifications [1] as well as reshape the IS executive role itself [24]. Consequently, the CIO role varies dramatically among firms in terms of background, roles, and specific IT strategies.

This paper presents an extensive literature review on the role of the CIO. The research examines the characteristics of the CIO role in Norway and its relationship to strategic information systems planning in their organizations. The paper is organized as follows. First, literature on the role of the information systems department and the role of the CIO is reviewed. Then, research methodology and research results from a survey of Norwegian CIOs are presented. Finally, future research is discussed with focus on the role of these CIOs.

2. Literature Review

Strategic management is an important step in ensuring the long-term viability of an organization. It involves the reading of signs and portents of the future and interpreting them in order to choose an appropriate direction for the future development of the organization. Information technology is seen as a way of achieving these strategies in order to create competitive advantage. Strategic management of IS/IT functions is concerned with the formal organizational unit or function called an information systems department. Alignment of organizational and IS/IT strategies is a necessary step in achieving competitive advantage and has long been noted as a persistent problem [22].

2.1 The Role of the IS Department

The information systems department can be a powerful change agent. IS departments can effect changes in the organization by suggesting new business strategies and new information-based products and coordinating both development of technology and the planned changes in the organization. The IS function must also maintain a technology watch, looking for opportunities and threats from developing technology [26]. Ironically, while the power of IT in the information age is readily apparent in the growing use of such terms as cyberspace, electronic commerce and paperless society, the power of information system departments is not [21]. Yet, these are

the traditional entities within organizations with the expertise to control deployment of these very information resources.

IS departments also operate in an increasingly complex environment. IS departments have evolved from an era when they controlled information resources to an era when they must account for the growing user influence in IS investment decisions. These organizations deal with a growing and often bewildering array of technological choices, a more literate and more demanding user group, and pressure from executive levels to expeditiously deploy and support critical organizational needs [21]. Line managers are increasingly assuming responsibility for planning, building, and running information systems that affect their operations [4]. The transfer of management of the use of technology to line management requires the creation of a partnership between line and information technology management. This is forcing organizations to evaluate how they allocate IT decision-making responsibilities.

Severe economic environment and poor internal perceptions of IT performance are also forcing changes in many IT organizations [10]. IS leaders must "establish strong business/IT relationships at the executive level, and leverage those relationships to achieve a shared vision for IT" [17, p. 12]. Changes within the IS organization itself will also be necessary. For the new IT organizations to be successful, Rockart et al. (1996) suggest several IT imperatives including: achieving two-way strategic alignment and developing effective relationships with line management. Outsourcing has become an attractive option for many IT functions to be successful [30].

2.2 The Role of the CIO

Managers undertake activities to achieve the objectives of the organization. Mintzberg (1994) notes a number of different and sometimes conflicting views of the manager's role. He finds that it is a curiosity of the management literature that its best-known writers all seem to emphasize one particular part of the manager's job to the exclusion of the others. Together, perhaps, they cover all the parts, but even that does not describe the whole job of managing. Mintzberg's role typology is frequently used in studies of managerial work [e.g., 32].

Describing the manager's work has been an ongoing pursuit of researchers and practitioners. The general manager's work is characterized by brevity, variety, and fragmentation of tasks, a preference for action (as opposed to reflection), and a preference for verbal communication over formal reports [31]. A number of models describing the manager's work have been proposed including functional descriptions such as planning, organizing, directing, controlling, coordinating, and innovating. Similarly, frameworks based on the methods used to accomplish these functions, for example,

Mintzberg's role typology, have been proposed.

The chief information officer (CIO) role emerged in the 70s as a result of increased importance placed on IT. As a manager of people, the CIO faces the usual human resource roles of recruiting, staff training and retention, and the financial roles of budget determination, forecasting and authorization. As the provider of technological services to user departments, there remains a significant amount of work in publicity, promotion, and internal relations with user management [7]. The CIO is thus concerned with a wider group of issues than are most managers [26].

The earliest scientifically conducted research on the CIO position [8] examined 43 of the 50 top ranked Fortune 500 service organizations and noted that 23 (58%) of these organizations had the CIO position. Brumm (1990) examined 200 largest Fortune 500 industrial and service organizations and found that 77 (77%) of the industrials had a CIO position as compared with 64 (64%) of the service organizations. It is likely that this number has increased in recent years [39].

Few studies have examined the reasons behind creation of the CIO position in firms. Creation of the position effectively increases the accountability by making a single executive responsible for corporate information processing needs [2]. In a sample of stable Fortune 500 firms, i.e., appearing on the list for four consecutive years, Karake (1995) compared 287 firms with CIOs to firms without CIOs on a number of variables hypothesized to predict creation of the position. She observed that a number of characteristics of the corporate board including the number of outside directors and equity ownership of the directors predicted the existence of the CIO position. A firm's information intensity is also positively related to the creation of the CIO position. Information intensive industries such as banking were among the earliest to establish the CIO position [3]. This study of 14 Fortune 1000 firms also noted the information intensity as a determining factor and showed that the CIO position is most likely to exist when IS functions are decentralized, and the CEO appreciates the strategic value and importance of IT.

Several studies have been devoted to examining the nature of the information system executive's work in the US [1, 32], in Australia [6, 41], and in the UK [16]. While information systems executives share several similarities with the general manager, notable differences are apparent. The information systems manager is not only concerned with a wider group of issues than most managers [26], but also, as the chief information systems strategist, has a set of responsibilities that must constantly evolve with the corporate information needs and with information technology itself.

The CIO title itself has become a source of confusion. The CIO label actually denotes a function rather than a title in the US. The actual title of the individuals filling

the CIO position is generally a Vice President with very few actually bearing the title of CIO [8]. Other common titles include executive vice president, senior vice president, and director of information services. The CIO label itself has been met with resistance, and some firms have replaced the title with alternative labels such as chief knowledge manager or chief technology officer.

The CIO role differs from the role typically referred to as MIS manager. The CIO operates as an executive rather than a functional manager, and often reports to either the CEO or one of the CEO's direct reports. The CIO's daily activities are also more reflective of executive work in that they engage in more numerous, shorter duration tasks and spend more time away from their office/organization (Table 1). CIOs and CEOs spend one third of their contact time in the office, while MIS managers spend most of his/her time there. MIS managers are seldom outside the organization, while CIOs to some extent and CEOs to a large extent spend time with customers and contacts outside the organization. MIS managers have more unscheduled meetings than CIOs and CEOs. In addition, the CIO plays an active role in strategic planning of information resources [37].

Table 1: The nature of CIO contacts (from Stephens et al., 1992)

Time allocation by Media	MIS	CIO	CEO
Telephone calls	13	12	8
Scheduled meetings	57	66	76
Unscheduled meetings	30	20	13
Tours	n.a.	2	3
	100	100	100
Time allocation by Location			
Manager's office	59	34	39
Other's office	7	6	8
Hall (or plant)	2	7	1
Conference/board room	26	26	14
Other (away from organization)	6	27	38
	100	100	100

Creation of the CIO role was driven in part by two organizational needs. First, accountability is increased making a single executive responsible for the organization's information processing needs [2]. Second, creation of the CIO position facilitates the closing of the "gap" between organizational and IT strategies which has long been cited as primary business concern [37]. Alignment of business and IT objectives is not only a matter of achieving competitive advantage [38], but is essential for the firm's very survival. Though the importance of IT in creating competitive advantage has been widely noted, achieving these gains has proven elusive. Sustained competitive advantage requires not the development of a single system, but the ability to consistently deploy IT faster, cheaper, and more strategically than one's competitors [35]. IS organizations play a critical role in realizing the potential of information

technology. The performance of IS organizations, in turn, often centers on the quality of IS leadership [33].

The CIO's pivotal responsibility of aligning business and technology direction presents a number of problems. "It is a common problem for the CIOs: they dream of creating innovative business applications to help the company gain competitive advantage but end up stuck spending most of their time putting out fires and grappling with legacy system maintenance" [24, p. 10]. Moreover, rapid changes in business and information environments have resulted in corresponding changes in the IS function helm [1]. This role has become increasingly complex, causing many firms to look outside the organization for the right qualifications [1]. Characteristics such as professional background, educational background, and current length of tenure have been examined in previous research [e.g., 1, 37].

In addition, some firms have sought to redefine the role itself. The nature of the CEO/CIO relationship is also seen as a major determinant of the CIO's strategic focus [25]. Issues in management also affect the role of managers, forcing them to prioritize activities and to set agendas based on these priorities [31]. Likewise, issues in information systems management are important determinants of the CIO role [20], representing a guidance for his/her work. As a result, CIOs vary greatly in terms of the information systems spending, organizational structure, and number of directly managed in order to achieve IS goals.

One of the most important of these issues is strategic IS planning. Strategic planning is consistently mentioned as one of the chief concerns of information systems executives [1, 39, 41]. These plans define a number of details including resources, user involvement, and management support for implementation [19]. The strategic planning process represents a time consuming development and implementation task for the CIO. Often, the CIO is responsible for the task of documenting the formal IT strategy in a strategic information systems plan [18]. The documentation work is a challenge for CIOs both because it is a time consuming effort to record and because the plan contents chosen influence the extent of plan implementation [29]. In spite of this, many firms opt not to develop formal strategic information systems plans [18].

Changes in both information technology and competition continue to change the role of the information systems executive. CSC (1996) has suggested six new IS leadership roles which are required to execute IS's future agenda: chief architect, change leader, product developer, technology provocateur, coach and chief operating strategist. These roles are described in table 2. People who fill these roles do not necessarily head up new departments or processes, but they exert influence and provide leadership across the organizational structure.

Table 2: Six IS leadership roles

1.	The chief architect designs future possibilities for the business.
2.	The change leader orchestrates resources to achieve optimal implementation of the future.
3.	The product developer helps define the company's place in the emerging digital economy.
4.	The technology provocateur embeds IT into the business strategy.
5.	The coach teaches people to acquire the skillsets they will need for the future.
6.	The chief operating strategist invents the future with senior management.

The magazine CIO surveyed 3,000 high-level IS executives in the US for their opinions of innovative IS organizations [23]. Respondents could nominate up to five companies, including their own, and were asked to rate their choices in each of five best practices categories: infrastructure management, internal customer support, internal operations, IT and business alignment, and innovation and learning. Based on the survey responses, the magazine produced their list of the top 100 CIOs.

CIOs are less frequently replaced in Europe than in North America and Asia/Pacific [13]. While European companies had replaced 26% of their CIOs in the past two years, North American companies had replaced 36% and Asia/Pacific companies had replaced 44%. Only 28% of the CIO replacements in Europe were recruited from outside the company, while the figures were 56% and 37% for North America and Asia/Pacific respectively.

When Stephens et al. (1992) selected CIOs for observation, they applied the following criteria:

- Highest ranking information technology executive
- Reports no more than two levels from CEO, i.e., either reports to the CEO or reports to one of the CEO's direct reports
- Areas of responsibility include information systems, computer operations, telecommunications, office automation, end-user computing/information center
- Responsibility for strategic planning of information resources.

3. Research Methodology

The objective of this study was to examine the role of the CIO and the use of strategic information systems planning. A CIO in Norway is typically called "IT-sjef" (IT-chief). The sample was comprised of the 1207 private and public member firms of the Norwegian Computing Society (NCS). A data diskette was obtained from the

society containing organization address, telephone number and name of contact person of the member firms. The contact person could be the CIO, but an initial test call of the first twenty firms showed that only one-third of the contact people were actually CIOs.

Since the desired informant in this research was the CIO, telephone calls were made to all the 1207 organizations to get the names of the CIOs. It was possible to obtain the names of the CIOs in 945 of the organizations which represents seventy-eight percent of the original population. In addition to the 945 CIOs identified from the corporate database, 163 CIOs were added to the sample. These CIOs were themselves members of the NCS but their respective organizations were not. This yielded a total sample of 1108. The NCS membership criteria might have biased the sample towards organizations which have an active attitude towards information technology.

Of the 1108 surveys mailed, 471 questionnaires were returned providing a satisfactory response rate of 43%. The sample included organizations from a broad range of industries (Table 3).

Table 3: Sample breakdown by industry

Primary Activity	Percent
Service	16.6
Industry	14.6
Public administration	12.7
Trade	12.5
Bank/finance/insurance	8.7
Transport	2.8
Other	31.0
Not Reported	1.1
TOTAL	100.0

4. Research Results

A number of descriptive data were collected. A variety of titles surfaced describing the highest ranking information systems executive in these firms. Several of the titles may be classified as that of CIO or equivalent, while many others indicate that the person has either greater or lesser responsibility than a CIO (which is a different issue than the issue of CIO reporting level). The breakdown of these responses is illustrated in table 4. Compared with previous CIO research, this research is concerned with small and medium-sized organizations. The responding organizations had an average annual revenue of 1610 million Norwegian kroner (approximately 179 million

EUROs or 230 million US dollars). These organizations had on average 818 people employed. On average, 11 people were reporting to the respondents.

Table 4: Responses by executive responsibility

Responsibility	Titles	Respondents	Percent
CIO	IT-manager (59), IT-chief (37), IT-responsible (7), IT-leader (6) etc.	195	41.4
Less than CIO	Project manager (4), IT-consultant (4), DP-consultant (4) etc.	134	28.5
More than CIO	Managing director (25), director (6), senior executive officer (5) etc.	115	24.4
Missing		27	5.7
TOTAL		471	100.0

Note: Respondents replied using a variety of titles which were grouped into those indicating the CIO position, those indicating a position with less responsibility than a CIO, and those indicating a position with more responsibility than a CIO.

Among the respondents, 34 percent had a master’s degree as their highest education completed, while 24 percent had a bachelor’s degree, and 35 percent had other education (7 percent did not provide information on education level). Education, though examined in previous studies, seems to be a less important factor because of the amount of time that has passed since obtaining the degree [1].

In this survey, the respondent had been in the organization an average of 8 years, but not necessarily as senior IS professional all the time. These results differ from those obtained from other regions. CSC (1997) found that the average reported tenure of a company’s senior IS professional was 4.74 years world-wide, ranging from 5.00 years in North America, via 4.95 years in Europe, to 4.01 in Asia Pacific. Among a sample of so-called high productivity firms in the US, the average tenure was observed to be only three years compared to eight years for the low productivity group [33]. This is particularly interesting since the respondents in this survey had also been with the organization on average for eight years, suggesting either differences due to region (US vs. Norway) or organizational size (large vs. mid-sized).

Among the respondents, 48 percent reported to the managing director, while 21 percent reported to the financial director, and 31 percent reported to others. Similar results have been noted elsewhere. CSC (1997) found that a plurality of senior IS respondents (43 percent) now report to a CEO or president. Among the CIOs reporting to a CEO’s direct report, the number of

senior-most IS executives reporting to the top finance officer was 32 percent. Compared to earlier studies (see Table 5), the CIO position, and consequently strategic information systems planning, seems to be gaining importance among firms.

Table 5: IS executive reporting relationship

Reporting Relationship of Respondents	Applegate and Elam (1992)	CSC (1997)	Gottschalk (1998)
Reports directly to CEO	39%	43%	48%
Reports to CFO	44%	32%	21%
Reports to other officer	17%	25%	31%

As previously noted, some firms operate without a formal IT strategy. Several distinctions can be seen between organizations with a formal IT strategy (Yes-Cases) and organizations without a formal IT strategy (No-Cases) [19]. On average, Yes-cases have higher annual revenue, a larger number of people in the organization, and a larger number of people reporting to the respondent than the No-cases (Table 6). Two possible explanations for this are offered. First, strategic information systems planning positively impacted these firms, leading to larger, higher revenue firms. Conversely, this larger size in terms of revenues and number of people may have necessitated the need for formalized planning methods.

Content characteristics of formal IS/IT strategy has been previously shown to correlate with extent of strategy implementation [19]. The most important implementation predictor of IS/IT strategy was responsibility. If responsibility for implementation of the strategy on time and within budget is defined, then the extent of implementation increases. Of the CIO characteristics examined, only one was significantly related to extent of implementation. Firms with a higher CIO reporting level (i.e., fewer levels between the CIO and the CEO) had greater extent of implementation (p=.001, R=-0.206). These agrees with previous research showing that closer reporting relationship between the CEO and CIO encourages direct two-way relationship between the CEO and the CIO, which in turn elevated the attention to information systems planning in the organization [40].

5. Discussion

The CIO function is a continuously evolving role [36]. The present research provides a snapshot in this progression. Identifying these trends in information systems leadership has implications for both research and practice. First, educators can use this information to develop management programs. Second, these roles and trends represent important guidelines for practicing CIOs. The senior IS executives must be able to bring both a business and IT perspective to the position. More definitive role expectations could also help reduce the

relatively high turnover rate among CIOs and aid in career planning [1]. Finally, clarifying the CIO role also has implications for office technology design and use. Studies continue to show the executives' preference toward verbal communications [36]. These studies also point to relatively limited use of the technologies that these managers purvey. One possibility is that this limited technology use is due in part to limitations in the technologies themselves. Identifying these limitations could improve executive acceptance of these systems. However, the survey data do not show us what technology the CIOs use.

Table 6: Characteristics of organizations and respondents with and without formal IT strategies

Respondent Characteristics	Formal IT Plan	
	Yes (190)	No (281)
Annual revenue	370	60
People in the organization	1653	292
Reporting structure		
People reporting to respondent	16	7
Reports to managing director	43%	52%
Reports to financial director	25%	17%
Reporting to other title	32%	31%
Professional background		
Years in the organization	9	8
Years in IT	12	12
Educational background		
Bachelors	24%	27%
Masters	45%	31%
Other	31%	42%

Note: The annual revenues are stated in ECU millions

Of general interest is which findings from previous research (if any) are still applicable in this volatile environment. Previous research on the role of the CIO has either focused on the "micro" level - examining the executive's activities and contacts or at a "macro" level - analyzing the issues, strategies and objectives of these executives. Micro level activities can further be divided into desk work and coordination activities [1, 37]. Deskwork includes activities performed in relative isolation such as resume reviews, environmental scanning, and email [26, 40]. Coordination activities include activities conducted with one or more other individuals by means such as phone calls, scheduled meetings, unscheduled meetings, or tours [38]. The second aspect of coordination activities are the activities completed by interfacing with a number of groups including superiors (corporate), subordinates (IS group), clients (business units), suppliers (consultants, vendors, etc.), and peers (other information system executives). At the macro level, there exists a need to look at strategies

that distinguish higher and lower performing firms, organizational structures used to achieve strategic goals, and issues associated with these strategies and the technologies used to achieve these goals.

Individual characteristics are also potential areas of future research. Individual characteristics such as CIO educational and career backgrounds and relationship with the CEO have been shown to influence perceptions [37] which in turn affect strategy. CEOs often do not understand the CIOs' contribution well enough to properly evaluate the IS function's performance [15]. Brancheau and Wetherbe (1987) found that CEOs are much more concerned about measuring information systems effectiveness than CIOs. An essential element to a good CEO/CIO relationship is a common understanding of business critical success factors and the role and importance of IT in the organization [16]. The CIO's perception of key issues are influenced by the relationship with the CEO [40]. National culture may also prove to have a bearing on issue perceptions. Future research will concentrate on further clarifying the role of the CIO.

Vacant CIO positions advertised in newspapers represent a valuable information source. On average, a new vacant CIO position is advertised once a week in Norway. In August and September 1998, we collected information from nine vacant positions as illustrated in figure 1. Some positions focus on the technology aspect of the job, while others focus on the business aspect. Some positions are oriented towards IT operations, while others focus on IT strategy.

One of the largest law firms in Norway, Thommessen Krefting Greve Lund (TKGL), had a newspaper advertisement on November 28, 1998. The advertisement had the heading "Knowledge Manager" (see table 7). Another large law firm, Schjødt, had a newspaper advertisement one month later, on December 22, 1998 (see table 8). While TKGL received 53 applications, out of which 10 were very well qualified, Schjødt received only 11 applications, none of which were really qualified. When comparing the two advertisements, some explanations emerge. First, the title "Knowledge Manager" created curiosity. Second, TKGL focused on the CIO responsibilities, while Schjødt focused on technical competencies of candidates. While TKGL ended up recruiting a CIO as planned, Schjødt changed its mind and used head-hunting to find a CIO and an IT support person. The CIO hired by TKGL was 37 years old and has a Master of Science degree in computer and information science from Ohio State University in the US. She has worked with Norsk Data, IBM and Sybase. The CIO hired by Schjødt was 30 years old and has a Master of Science degree in information systems from Norway. He has worked with a local municipality and with a consulting firm.

	<i>Operations</i>	<i>Strategy</i>
<i>Business</i>	*Vinmonopol *Havforsk	*Istad *SiO *Etat
<i>*Bentec Technology</i>	*Trondheim *Hoechst	*Oslo

Figure 1: Vacant CIO Positions

Table 7: Text in TKGL Newspaper Advertisement

<p>CIO - Knowledge Manager The CIO will be responsible for our information systems and for enhancing these systems in accordance with our business strategy. With three capable IT-persons, your management responsibility will include:</p> <ul style="list-style-type: none"> • Development and implementation of IT strategy and information architecture for knowledge management • Improvement of technical infrastructure • Enhancement of access to databases • Applications procurement • User training and support • You should have higher IT-education or IT-related education from university or college, experience from management of IT projects, preferably from an knowledge firm, experience from office support systems and databases, and you should have creative and pedagogical abilities.

Both Schjødt and TKGL made the decision to hire IT personnel. This decision was not obvious. Historically, both firms had relied on external software vendors and consultants. Only two and three persons respectively were full-time employed IT personnel in the firms. Some of the firm partners got excited about the idea of outsourcing, but management in both firms decided against. In TKGL, this was partly based on an analysis as illustrated in figure 2 [14]. The firm identified its position at X.

Table 8: Text in Schjødt Newspaper Advertisement

<p>IT coordinator You will be responsible for improving our IT strategy, enhancing database access, network operations etc. You should have higher education and experience from IT-related projects. Other desired qualifications include:</p> <ul style="list-style-type: none"> • Experience from operations of NT network • Good knowledge of Office applications such as Word, Excel, PowerPoint and Access • Knowledge of routers and datacom generally • Ability to work structured and independent • Creative and pedagogical abilities.

6. Future Research

This research has primarily reviewed CIO literature and conducted a survey to collect factual information on CIOs in Norway. The complexity of the role of the CIO has not yet been explored. However, the presented research represents a solid foundation for the future research model presented in figure 3. The CIO role is defined as the dependent construct in the model, represented by two perspectives. The first perspective is Mintzberg's role typology consisting of informational, decisional and interpersonal roles [32]. The second perspective is CSC's role typology consisting of the main roles product developer, chief architect and chief operating strategist [11].

		IT FUNCTION	
		Bad	Good
APPLICATIONS	Tailor-made	BENCHMARKING	INSOURCING
	Standard	OUTSOURCING	RESOURCING

Figure 2: Decision Matrix in TKGL

Three independent constructs are defined. First, the stage of growth to which the organization belongs. The data processing stage is characterized by initiation, contagion and control; the information systems stage is characterized by integration, architecture and demassing; and the networks stage is characterized by functional infrastructure, tailored growth and rapid reaction [28].

Second, individual characteristics of the CIO are identified, such as reporting level, educational background, years in the current position, years in the organization, years in IT, management of personnel, and relationship with CEO. Third, the organization is characterized by industry type and size measured by revenues and employees.

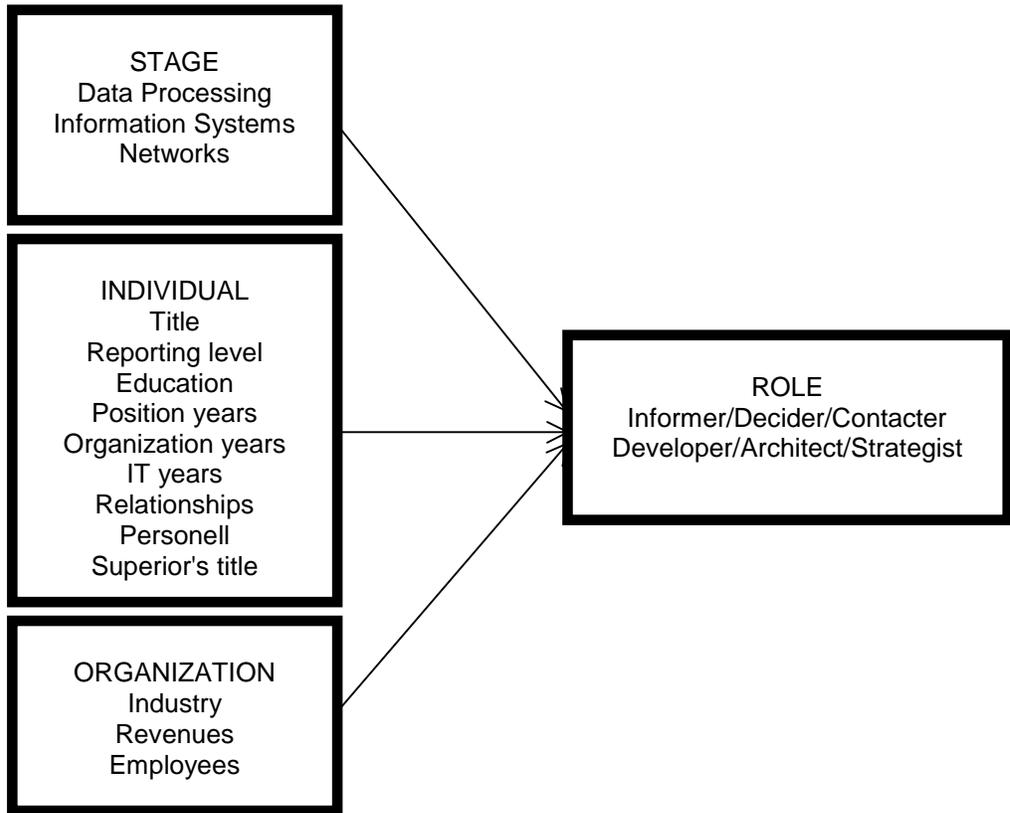


Figure 3: Future Research Model

It is important to identify correct respondents. As originally conceived, the chief information officer's responsibility would include all corporate information, not just information on computers. Historically, however, the focus of the CIO's job was predominantly information technology. This involves a number of roles including strategic information system roles, the most critical of these being strategic information systems planning [37], strategic management through participation in top management planning teams [39], strategic alignment of business and information systems plans [34], and interpretation of external IT success stories for potential applicability for the organization [15]. In addition to strategic planning, the CIO's responsibilities also include a number of tactical IT roles. These include architecture planning, development, and management; fostering relationships between the information systems department and including the superiors [16], functional units/line managers [37], vendors [34] and end users; and technology champion - gaining support and commitment of top management during the implementation of new technology. In this research, we will use the same selection criteria as Stephens et al. (1992): the highest ranking information technology executive, areas of responsibility include information systems and computer operations, and responsibility for strategic planning of information resources.

7. Conclusions

Chief information officers have the difficult job of running a function that uses a lot of resources but offers little measurable evidence of its value. This paper discussed the CIO role, and the conducted survey sheds some light on the role by providing descriptive data. For example, the most frequent reporting relation for the CIO is to the CEO in Norwegian organizations. However, the greater complexity of the role of the CIO will be investigated in future research.

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