IS/IT Leadership Roles

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Abstract

Information systems (IS) and information technology (IT) leadership roles have undergone fundamental changes over the past decade. Despite increased interest in recent years, little empirical research on IS/IT leadership roles has been done. This paper presents a literature review and results from a survey in Norway. The survey collected data on general leadership roles such as informational role, decisional role and interpersonal role, as well as on IS/IT leadership roles such as chief architect, change leader, product developer, technology provocateur, coach and chief operating strategist. The empirical analysis indicates that strategic responsibility as well as network stage of growth influence the extent of informational role, while the extent to which the chief executive uses IT influences the extent of decisional role, and the extent to which subordinates use IT influence the extent of interpersonal role. IS/IT managers with greater operating responsibility will be chief architects. The role of a change leader is positively influenced by the number of years in IT, the extent of IT use, the extent of strategic responsibility and the organization's revenue, while it is negatively influenced by the number of years in the current position. Product developer can be predicted by strategic responsibility and chief executive's IT use, while technology provocateur can be predicted by the extent of IT use, coach can be predicted by the extent of subordinates' IT use, and chief operating strategist can be predicted by the extent of strategic responsibility. Although several significant predictors of IS/IT leadership roles were identified in this research, the search for more significant predictors should continue in future research.

1. Introduction

Information systems (IS) leadership roles have undergone fundamental changes over the past decade [2, 16, 17, 65]. Despite increased interest in recent years [e.g., 3, 13, 22, 60], little empirical research on IS leadership roles has been done. This paper was motivated by the need for identification of IS leadership roles and their potential explanations. The research makes a contribution to the stream of studies which examine the characteristics and role of the IT director or Chief Information Officer (CIO) [56].

The paper presents a literature review on IS leadership roles and results from a survey conducted in Norway. Survey results are compared with previous empirical studies by Applegate and Elam (1992), CSC (1997) and Stephens et al. (1992).

2. Leadership roles

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., 57].

Describing the manager's work has been an ongoing pursuit of researchers and practitioners. The 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 [51]. Managers in organizations are continuously confronted by an array of ambiguous data and vaguely felt stimuli which they must somehow order, explicate and imbue with meaning before they decide on how to respond [46]. Kotter (1999) identified two main roles for executives: agenda setting and network building. While agenda setting is concerned with figuring out what to do despite uncertainty and an enormous amount of potentially relevant information, network building is concerned with getting things done through a large and diverse group of people despite having little direct control over most of them.

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. According to Mintzberg (1990), the manager's job can be described in terms of various roles:

1. **Informational Roles.** By virtue of interpersonal contacts, both with subordinates and with a network of contacts, the manager emerges as the nerve center of the organizational unit. The manager may not know everything but typically knows more than subordinates do. Processing information is a key part of the manager's job. As monitor, the manager is perpetually scanning the environment for information, interrogating liaison contacts and subordinates, and receiving unsolicited information, much of it as a result of the network of personal contacts. As a disseminator, the manager passes some privileged information directly to subordinates, who would otherwise have no access to it. As spokesperson, the manager sends some information to people outside the unit.

2. **Decisional Roles.** Information is not an end in itself; it is the basic input to decision making. The manager plays the major role in a unit's decision-making system. As its formal authority, only the manager can commit the unit to important new courses of action; and as its nerve center, only the manager has full and current information to make the set of decisions that determines the unit's strategy. As entrepreneur, the manager seeks to improve the unit, to adapt it to changing conditions in the environment. As disturbance handler, the manager responds to pressures from situations. As resource allocator, the manager is responsible for deciding who will get what. As negotiator, the manager commits organizational resources in real time.

3. **Interpersonal Roles.** As figurehead, every manager must perform some ceremonial duties. As leader, managers are responsible for the work of the people of their unit. As liaison, the manager makes contacts outside the vertical chain of command.

### 3. IS/IT leaders

The role of IT director in the UK and CIO in the US 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 [13]. As a manager of an often virtual information organization, the CIO has to coordinate sources of information services spread throughout and beyond the boundaries of the firm [36]. The CIO is thus concerned with a wider group of issues than are most managers [41]. Earl and Feeny (1994) concluded that the IT director's ability to add value is the biggest single factor in determining whether the organization views IT as an asset or a liability.

The earliest scientifically conducted research on the CIO position [14] examined 43 of the 50 top ranked Fortune 500 service organizations and noted that 23 (58%) of these organizations had the CIO position. Brum (1990) examined 200 largest Fortune 500 industrial and service organizations and found that 77% of the industrials had a CIO position as compared with 64% of the service organizations. It is likely that this number has increased in recent years [65].

Several studies have been devoted to examining the nature of the information system executive's work in the US [2, 63], in Australia [12, 67], and in the UK [25]. 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 [41], 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.

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 [4]. 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 [63].

### 4. IS/IT leadership roles

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 1. Although these roles were produced by the CSC consultancy firm without any scientific approach, they seem very well tailored for scientific investigation into IS leadership roles. 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.

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
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 [63], strategic management through participation in top management planning teams [65], strategic alignment of business and information systems plans [60], and interpretation of external IT success stories for potential applicability for the organization [22]. 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 [25], functional units/line managers [63], vendors [60] 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.

### Table 1: Six IS leadership roles (CSC, 1996)

1. **Chief architect.** The chief architect designs future possibilities for the business. The primary work of the chief architect is to design and evolve the IT infrastructure so that it will expand the range of future possibilities for the business, not define specific business outcomes. The infrastructure should provide not just today's technical services, such as networking, databases and desktop operating systems, but an increasing range of business-level services, such as workflow, portfolio management, scheduling, and specific business components or objects.

2. **Change leader.** The change leader orchestrates resources to achieve optimal implementation of the future. The essential role of the change leader is to orchestrate all those resources that will be needed to execute the change program. This includes providing new IT tools, but it also involves putting in the place teams of people who can redesign roles, jobs and workflow, who can change beliefs about the company and the work people do, and who understand human nature and can develop incentive systems to coax people into new and different behaviors.

3. **Product developer.** The product developer helps define the company’s place in the emerging digital economy. For example, a product developer might recognize the potential for performing key business processes (perhaps order fulfillment, purchasing or delivering customer support) over electronic linkages such as the Internet. The product developer must "sell" the idea to a business partner, and together they can set up and evaluate business experiments, which are initially operated out of IS. Whether the new methods are adopted or not, the company will learn from the experiments and so move closer to commercial success in emerging digital markets.

4. **Technology provocateur.** The technology provocateur embeds IT into the business strategy. The technology provocateur works with senior business executives to bring IT and realities of the IT marketplace to bear on the formation of strategy for the business. The technology provocateur is a senior business executive who understands both the business and IT at a deep enough level to integrate the two perspectives in discussions about the future course of the business. Technology provocateurs have a wealth of experience in IS disciplines, so they understand at a fundamental level the capabilities of IT and how IT impacts the business.

5. **Coach.** The coach teaches people to acquire the skillsets they will need for the future. Coaches have to basic responsibilities: teaching people how to learn, so that they can become self-sufficient, and providing team leaders with staff able to do the IT-related work of the business. A mechanism that assists both is the center of excellence - a small group of people with a particular competence or skill, with a coach responsible for their growth and development. Coaches are solid practitioners of the competence that they will be coaching, but need not be the best at it in the company.

6. **Chief operating strategist.** The chief operating strategist invents the future with senior management. The chief operating strategist is the top IS executive who is focused on the future agenda of the IS organization. The strategist has parallel responsibilities related to helping the business design the future, and then delivering it. The most important, and least understood, parts of the role have to do with the interpretation of new technologies and the IT marketplace, and the bringing of this understanding into the development of the digital business strategy for the organization.

### 5. Research model

IS/IT leadership role is the dependent construct in this research as illustrated in figure 1. Based on the reviewed literature, three groups of predictors were identified. First, individual characteristics of the IS/IT leader consist of years worked in the organization, years worked in IT, years worked in the current position, years of higher education, extent of own IT use and relationship with chief executive [2, 9, 22, 25, 40, 62, 67]. Second, position characteristics consist of personnel reporting to IS/IT manager, reporting level, operating responsibility and strategic responsibility [1, 2, 3, 10, 12, 13, 16, 60, 64]. Third, organizational characteristics consist of revenue, persons in the organization, IT use by colleagues, IT use...
by chief executive, IT use by subordinates, extent of data processing stage, extent of information systems stage and extent of network stage [2, 43, 54, 55, 56].

6. IS/IT leaders in Norway

The top ranked IS/IT leader or CIO in Norway is typically called "IT-direktør" (IT director), "IT-sjef" (IT-manager) or "IS-leder" (IS-leader) [31]. The survey sample was comprised of 168 private and public member firms of the Norwegian Computing Society (NCS). The desired informants in this research were IS/IT managers to determine their own perceptions of roles and possible explanations of roles. Of the 168 surveys mailed, 101 were returned, providing a response rate of 60%. The sample included organizations from a broad range of industries as listed in table 2.

<table>
<thead>
<tr>
<th>Primary Activity</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>39</td>
</tr>
<tr>
<td>Service</td>
<td>21</td>
</tr>
<tr>
<td>Public administration</td>
<td>21</td>
</tr>
<tr>
<td>Trade</td>
<td>12</td>
</tr>
<tr>
<td>Finance</td>
<td>7</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2: Sample breakdown by industry

While Mintzberg (1994) defined three general leadership
roles, CSC (1996) defined six IS/IT leadership roles. A Likert scale from 1 to 6 was used to measure the extent of each role. Respondents reported most time spent in the decisional role, interpersonal role and change leader role as listed in table 3, but this is not significant since all roles get about the same average score except for product developer.

7. Research results

Multiple regression analysis [34] was applied between the three groups of independent variables (individual characteristics, position characteristics and organizational characteristics) and the two groups of dependent variables (general leadership roles and IS/IT leadership roles). Results are listed in tables 4a and 4b.

<table>
<thead>
<tr>
<th>Table 3: Leadership roles</th>
<th>Mean</th>
<th>St.dv.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informational Role</td>
<td>4.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Decisional Role</td>
<td>4.5</td>
<td>0.9</td>
</tr>
<tr>
<td>Interpersonal Role</td>
<td>4.4</td>
<td>1.1</td>
</tr>
<tr>
<td>Chief architect</td>
<td>4.3</td>
<td>1.3</td>
</tr>
<tr>
<td>Change leader</td>
<td>4.4</td>
<td>1.2</td>
</tr>
<tr>
<td>Product developer</td>
<td>3.5</td>
<td>1.2</td>
</tr>
<tr>
<td>Technology provocateur</td>
<td>4.3</td>
<td>1.2</td>
</tr>
<tr>
<td>Coach</td>
<td>4.2</td>
<td>1.0</td>
</tr>
<tr>
<td>Chief operating strategist</td>
<td>4.3</td>
<td>1.3</td>
</tr>
</tbody>
</table>

Table 4a: Multiple regression analysis for Mintzberg’s (1994) roles

<table>
<thead>
<tr>
<th>Predictor description</th>
<th>Predictor value</th>
<th>Informational</th>
<th>Decisional</th>
<th>Interpersonal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>St.dv.</td>
<td>Beta</td>
<td>t-test</td>
</tr>
<tr>
<td>Years in the organization</td>
<td>8.8</td>
<td>7.6</td>
<td>.071</td>
<td>.515</td>
</tr>
<tr>
<td>Years in IT</td>
<td>15.3</td>
<td>8.0</td>
<td>-0.032</td>
<td>-0.220</td>
</tr>
<tr>
<td>Years in current position</td>
<td>4.1</td>
<td>3.6</td>
<td>-0.147</td>
<td>-0.902</td>
</tr>
<tr>
<td>Years of higher education</td>
<td>4.5</td>
<td>2.3</td>
<td>-0.014</td>
<td>-0.119</td>
</tr>
<tr>
<td>IT use by respondent</td>
<td>5.6</td>
<td>0.7</td>
<td>0.03</td>
<td>0.092</td>
</tr>
<tr>
<td>Relationship to chief exec.</td>
<td>1.6</td>
<td>0.6</td>
<td>0.102</td>
<td>0.693</td>
</tr>
<tr>
<td>Persons reporting to resp.</td>
<td>19.7</td>
<td>39.5</td>
<td>0.100</td>
<td>0.768</td>
</tr>
<tr>
<td>Reporting level</td>
<td>0.9</td>
<td>0.8</td>
<td>0.173</td>
<td>1.382</td>
</tr>
<tr>
<td>Operating responsibility</td>
<td>5.0</td>
<td>1.3</td>
<td>-0.082</td>
<td>-0.657</td>
</tr>
<tr>
<td>Strategic responsibility</td>
<td>4.5</td>
<td>1.0</td>
<td>0.339</td>
<td>2.406*</td>
</tr>
<tr>
<td>Revenue of organization</td>
<td>2603</td>
<td>3576</td>
<td>0.011</td>
<td>0.078</td>
</tr>
<tr>
<td>Persons in organization</td>
<td>2161</td>
<td>4142</td>
<td>-0.235</td>
<td>-1.731</td>
</tr>
<tr>
<td>Colleagues use of IT</td>
<td>4.8</td>
<td>1.0</td>
<td>0.023</td>
<td>0.151</td>
</tr>
<tr>
<td>Chief executive's use of IT</td>
<td>3.7</td>
<td>1.5</td>
<td>-0.009</td>
<td>-0.069</td>
</tr>
<tr>
<td>Subordinates use of IT</td>
<td>5.5</td>
<td>0.7</td>
<td>0.018</td>
<td>0.137</td>
</tr>
<tr>
<td>Data processing stage</td>
<td>4.3</td>
<td>1.1</td>
<td>-0.130</td>
<td>-0.800</td>
</tr>
<tr>
<td>Information systems stage</td>
<td>3.8</td>
<td>1.4</td>
<td>-0.291</td>
<td>-1.574</td>
</tr>
<tr>
<td>Network stage</td>
<td>3.9</td>
<td>1.4</td>
<td>0.413</td>
<td>2.102*</td>
</tr>
</tbody>
</table>

** for p<.01 and * for p<.05 for statistical significance of t-values

Processing of information is a key part of the manager's job. On a scale from 1 (little extent) to 6 (great extent), the informational role scored 4.1 among the 101 IS/IT leaders in the survey. The set of predictor variables in the research model explained only 9.7% of the variation in informational role, i.e. the adjusted R-square was .097. With a low F-value of 1.473, the regression was not significant. In the regression equation, the only significant predictor was strategic responsibility.

7.2. Decisional role

The predictor set provided better explanation of this role with a significant adjusted R-square of .179. The only significant predictor was the chief executive's use of information technology. From a theoretical viewpoint, it may be hard to argue that the more the chief executive is a user of information technology, the more the IS/IT leader will spend time in the decisional role.

7.3. Interpersonal role

The predictor set provided even better explanation of this role with a significant adjusted R-square of .279. Three predictor variables were significant. First, when subordinates use IT more extensively, then the IS/IT leader will spend more time in the interpersonal role. Second, an improvement in the relationship between the IS/IT leader and the chief executive will cause the IS/IT leader to spend more time in the interpersonal role.
Finally, IS/IT leaders who use IT more extensively will also spend more time in the interpersonal role.

### 7.4. Chief architect

The adjusted R-square was only .026, and the regression was not significant. The only single significant predictor was operating responsibility.

### 7.5. Change leader

This regression analysis was significant since it was able to explain 27% of the variance in the role. Five predictors were significant. First, IS/IT leaders spend more time as change leaders when they have more IT experience. Second, IS/IT leaders spend less time as change leaders when they have been in the current position for many years. Third, more use of IT by the IS/IT leader causes more time spent in the change leader role. Fourth, more strategic responsibility causes the IS/IT leader to spend more time in the change leader role. Finally, IS/IT leaders in larger organizations spend more time as change leaders.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beta</td>
<td>t-test</td>
<td>Beta</td>
<td>t-test</td>
<td>Beta</td>
<td>t-test</td>
</tr>
<tr>
<td>Years in the organization</td>
<td>.035</td>
<td>.238</td>
<td>.120</td>
<td>.957</td>
<td>.140</td>
<td>1.037</td>
</tr>
<tr>
<td>Years in IT</td>
<td>.268</td>
<td>1.727</td>
<td>.283</td>
<td>2.163*</td>
<td>.101</td>
<td>.718</td>
</tr>
<tr>
<td>Years in current position</td>
<td>-.109</td>
<td>-.636</td>
<td>-.369</td>
<td>-2.500*</td>
<td>.033</td>
<td>.207</td>
</tr>
<tr>
<td>Years of higher education</td>
<td>.095</td>
<td>.757</td>
<td>-.170</td>
<td>1.560</td>
<td>.028</td>
<td>.242</td>
</tr>
<tr>
<td>IT use by respondent</td>
<td>-.075</td>
<td>-.508</td>
<td>.264</td>
<td>2.077*</td>
<td>.034</td>
<td>.251</td>
</tr>
<tr>
<td>Relationship to chief exec.</td>
<td>-.033</td>
<td>-.215</td>
<td>-.064</td>
<td>-.479</td>
<td>-.250</td>
<td>1.734</td>
</tr>
<tr>
<td>Persons reporting to resp.</td>
<td>.075</td>
<td>.555</td>
<td>-.004</td>
<td>-.034</td>
<td>.085</td>
<td>.571</td>
</tr>
<tr>
<td>Reporting level</td>
<td>-.017</td>
<td>-.130</td>
<td>.114</td>
<td>1.007</td>
<td>.034</td>
<td>.278</td>
</tr>
<tr>
<td>Operating responsibility</td>
<td>.319</td>
<td>2.434*</td>
<td>-.138</td>
<td>1.215</td>
<td>.034</td>
<td>.279</td>
</tr>
<tr>
<td>Strategic responsibility</td>
<td>.039</td>
<td>.264</td>
<td>.308</td>
<td>2.408*</td>
<td>.420</td>
<td>3.053**</td>
</tr>
<tr>
<td>Revenue of organization</td>
<td>-.065</td>
<td>-.443</td>
<td>.267</td>
<td>2.099</td>
<td>-.19</td>
<td>-.137</td>
</tr>
<tr>
<td>Persons in organization</td>
<td>-.263</td>
<td>1.854</td>
<td>.021</td>
<td>-.169</td>
<td>-.134</td>
<td>1.010</td>
</tr>
<tr>
<td>Colleagues use of IT</td>
<td>.135</td>
<td>.851</td>
<td>-.211</td>
<td>1.537</td>
<td>-.015</td>
<td>1.02</td>
</tr>
<tr>
<td>Chief executive's use of IT</td>
<td>.007</td>
<td>.048</td>
<td>-.001</td>
<td>-.006</td>
<td>.321</td>
<td>2.442*</td>
</tr>
<tr>
<td>Subordinates use of IT</td>
<td>-.164</td>
<td>1.200</td>
<td>-.003</td>
<td>-.023</td>
<td>.124</td>
<td>.971</td>
</tr>
<tr>
<td>Data processing stage</td>
<td>-.082</td>
<td>.360</td>
<td>.138</td>
<td>.920</td>
<td>.048</td>
<td>.297</td>
</tr>
<tr>
<td>Information systems stage</td>
<td>.148</td>
<td>.767</td>
<td>.146</td>
<td>.870</td>
<td>.126</td>
<td>.701</td>
</tr>
<tr>
<td>Network stage</td>
<td>-.073</td>
<td>-.356</td>
<td>.023</td>
<td>.132</td>
<td>-.116</td>
<td>-.612</td>
</tr>
</tbody>
</table>

** for p<.01 and * for p<.05 for statistical significance of t-values

### 7.6. Product developer

A significant explanation is provided with an adjusted R-square of .155. Two predictors are significant. First, increased strategic responsibility causes IS/IT leaders to spend more time as product developers. Second, increased IT use by the chief executive causes the IS/IT leader to spend more time as a product developer.

### 7.7. Technology provocateur

This regression was not significant, and the only significant predictor was the extent to which the respondent used IT.

### 7.8. Coach

Again, the regression was not significant, and the only significant predictor was the extent to which subordinates used IT.

### 7.9 Chief operating strategist

In this very significant regression with an adjusted R-square of .319, a very significant relationship existed between strategic responsibility and the extent of chief operating strategist role.

### 8. Discussion

Many potential predictors have little or no impact on leadership roles. The stages of growth will serve as an example in this section since many authors have argued that computing evolution in organizations will impact IS leaders [e.g., 43, 44].

Richard Nolan’s (1973, 1979) stage model is the best
known and most widely cited model of computing evolution in organizations [44]. The stages theory provides an insight into the way IT evolves, and offers IT management the possibility of managing this complex phenomenon [43]. The model does not appear in the literature as a single model, but rather as a number of versions of the same model which have developed over time.

Nolan (1993) suggested that planning, organizing, and controlling activities associated with managing the computer resource will change in character over time, and will evolve in patterns roughly correlated to four stages of the computer budget: Stage I - computer acquisition, Stage II - intense system development, Stage III - proliferation of controls, and Stage IV - user/service orientation. Some years later, Nolan (1979) introduced a set of six stages: Stage I - initiation, Stage II - contagion, Stage III - control, Stage IV - integration, Stage V - data administration, and Stage VI - maturity.

In this research, the number of stages has increased to nine based on Khandelwal and Ferguson (1999). Stages are assigned to eras, where each era consists of three stages. The stages theory then identifies three eras, data processing (DP) era, information systems (IS) era, and network (NW) era, that an organization will pass through in its information technology growth.

Nolan's (1973, 1979) stages of growth model has been criticized by academics. An analysis of the model's logical and empirical structure reveals a number of problems in formulation that help to account for the fact that its principal tenets have not been independently validated [44]. With this limitation in mind, the eras were applied in this research.

However, only one IS leadership role was influenced by stages of growth. It was the informational role which was influenced by the network stage in addition to strategic responsibility.

Many potential predictors have little or no impact on leadership roles, leading to possible lack of confidence in the logic of the current research model. It is argued that individual characteristics, position characteristics and organizational characteristics should drive leadership roles. However, it could be argued that data on job descriptions, achievements etc. should have been collected.

This study is based on work in Norway, but most of the literature is from the US. CIO is not a term commonly used in Europe. In Britain, for example, IT director is also used. The relevance of applied literature to companies in Norway can be questioned and should be explored in future research.

9. Comparison of survey results

Among the respondents, 44 percent reported to the managing director (CEO), while 23 percent reported to the financial director, and 33 percent reported to others (technical director, staff director, or other). As illustrated in table 5, these results are in line with recent previous studies.

The conducted survey also collected data on the three roles defined by Mintzberg (1990). Stephens found that the five CIOs which she studied, spent most of their time in the decisional roles (60%), less of their time in the informational roles (36%) and very little time in the interpersonal roles (4%). This research suggests that Norwegian CIOs, on a scale from 1 (little extent) to 6 (great extent), have the same decision roles ranked on top (4.5), but they spend much more time on interpersonal roles (4.4) and informational roles (4.1) than the CIOs in the Stephens study.

Table 5: Information Systems Executive Reporting Relationship

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>Reports directly to managing director (CEO)</td>
<td>27%</td>
<td>43%</td>
<td>48%</td>
<td>44%</td>
</tr>
<tr>
<td>Reports to financial director (CFO)</td>
<td>44%</td>
<td>32%</td>
<td>21%</td>
<td>23%</td>
</tr>
<tr>
<td>Reports to other officer</td>
<td>29%</td>
<td>25%</td>
<td>31%</td>
<td>33%</td>
</tr>
</tbody>
</table>

In this survey, respondents had been in the current position for the last 4.1 years. This is slightly less than the results obtained by CSC (1997) who found that the average reported tenure of a company’s senior IS professional was 4.7 years world wide, ranging from 5.0 years in North America via 4.9 years in Europe to 4.0 years in Asia Pacific.

Seven years ago, Boynton et al. (1992) posed the question: Whose responsibility is IT management? They claimed that line managers were increasingly assuming...
responsibility for planning, building, and running information systems that affect their operations. In this perspective, it is interesting to study results from this survey. For example, realization of benefits is not a large responsibility of IS leaders as illustrated in table 4a. A possible explanation is that this responsibility is assumed by line managers.

This study was based on work in Norway. Given that much of the literature used is not from Norway, comparisons of results have to be treated with caution.

10. Implications and future research

The CIO function is a continuously evolving role [62]. 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 aid in career planning [2]. Finally, clarifying the CIO role also has implications for office technology design and use. Studies continue to show the executives' preference toward verbal communications [62].

Table 5 compares four studies which include samples from very different organizational and cultural backgrounds. IS leadership roles in the Norwegian culture may be different from other studies done in the US and UK or around the globe. For example, Norwegian organizations tend to be much smaller than surveyed organizations in the US [28], and hierarchies in Norway tend to be flatter than in most other countries. Such aspects can lead to implications for management practice and future research. According to the Scandinavian research on information systems development, Scandinavia has high living standards and educational levels, an advanced technology infrastructure, an open community and key innovative leaders [8]. This research tradition seems different from research in other countries such as the UK with control structures [66] and Mexico with economic development [49], which may imply different IS leadership roles. In future research, eight cultural dimensions can be investigated: power distance, uncertainty avoidance, individualism, masculinity, time orientation, monocracy and polymorphy, context, and polymorphic and monomorphic [35].

11. Conclusions

The empirical analysis indicated that strategic responsibility as well as network stage of growth influenced the extent of informational role, while the extent to which the chief executive used IT influenced the extent of decisional role, and the extent to which subordinates used IT influenced the extent of interpersonal role. IS/IT managers with greater operating responsibility were chief architects. The role of a change leader was positively influenced by the number of years in IT, the extent of IT use, the extent of strategic responsibility and the organization's revenue, while it was negatively influenced by the number of years in the current position. Product developer could be predicted by strategic responsibility and chief executive's IT use, while technology provocateur could be predicted by the extent of IT use, coach could be predicted by the extent of subordinates' IT use, and chief operating strategist could be predicted by the extent of strategic responsibility. Although several significant predictors of IS/IT leadership roles were identified in this research, the search for more significant predictors should continue in future research.

The data provided in this research will hopefully stimulate similar research in other nations and regions. Just like key IS management issues research has enabled global comparisons [68], future IS leadership research may gain from global comparisons as indicated in the section on survey comparisons. Practicing IS leaders will gain from this research my balancing leadership roles according to individual characteristics, organizational characteristics and stages of growth.

12. References


Information Management, 13 (4), 249-259.