

FUTURE ROLE
of the
INFORMATION SYSTEMS EXECUTIVE

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PREFACE

In November, 1981, the SMIS Executive Council voted to begin a research project to define a model of the information systems executive of the eighties. The purpose of the model would be to help SMIS take a proactive role with respect to membership professional development, and provide conferences, speakers, articles and future research consistent with the directions defined by the model. Richard G. H. Harris, Vice President of Information Systems at Colonial Gas & Energy and a member of the SMIS Executive Council and Leslie D. Ball, Associate Professor of Information Systems at Babson College, agreed to lead the research effort. In addition, John F. Rockart and Christine V. Bullen of the MIT Sloan School, Center for Information Systems Research and Leo Pipino of Babson College joined the team. The work was begun with the Executive Council approval in November, 1981 and completed in August, 1982.

A preliminary model coming out of an extensive literature search and based on several years of earlier research work done by the team members was distributed for review to fourteen noted practitioners and academics. Their valuable comments helped shape the interim model. On April 15, 1982, a day-long discussion group was held in Chicago with the research team and five respected practitioners. The interim model was reviewed, debated and revised during this lively and constructive session. The resulting version of the model was again distributed to the reviewers who returned further comments.

The final version is presented here. While this document directly represents the ideas of nearly two dozen SMIS members who participated in the project, readers should recognize that it expresses the collected thoughts of many other people as well. It is written as a final report to the SMIS Executive Council in the form of a position paper to eliminate the lengthy academic background and references normally associated with such papers. A separate annotated bibliography was produced which is a collection of the best articles found on the subject. It will serve as a base and a model for further research.

We hope the model described in this paper will serve both the SMIS Executive Council and the information systems executive directly as a set of guidelines for positioning themselves to meet the challenges of the information systems function in the coming years.

There is a significant amount of uncertainty (one might even say "confusion") about the role of the Chief Information Officer (CIO) in today's organizations. The information management function itself has expanded incredibly in the past two decades and appears on the verge of even greater development. From an earlier emphasis on handling historical accounting data only, computer-based systems today are intimately involved with almost all day-to-day operations of the organization. In addition, they have a rapidly growing role in the capturing, storing, processing, and communication of all information of the organization whether it be in numerical, graphical, text, or other form.

With this swift evolution and staggering growth of the function in the last decade, it is clear that the CIO's role has changed and will change further. Yet the relative newness of the function, and the uncertainty (if not turmoil) surrounding the development and implementation of computer-based technology in most firms over the past two decades has left unclear the exact role of the "chief information officer". Even the title of "CIO", or any other combination of letters or words, seems awkward. A clearer definition, therefore, of the role, and requisite personal and managerial attributes, of the person with corporate responsibility for this function would appear increasingly desirable.

It is for this reason that the Society for Management Information Systems commissioned this position paper on the "future role of the information systems executive". Our purpose is to present a "concept" of this executive role which we believe is emerging in the early '80's. It is hoped that this particular role definition can serve as a base for further discussion and clarification of the new, evolving, and increasingly important role of "chief information officer".

In the development of this paper, we have been influenced heavily by several authors whose works appear in the attached bibliography. An equal influence has been discussion and written input from several information executives and others closely connected with the field. To all these sources, we are grateful.*

* With the exception of this one, we omit footnotes. In retrospect, it is difficult to assign a particular idea or thought to any single source. Some of the ideas and conclusions we present have been voiced many times, either verbally or in print. Some represent an amalgam of thoughts. A few are ours alone. Moreover, the prime purpose of this paper is to present a useful conceptual role description, not a research treatise. We, therefore, eschew footnotes but list our sources at the end of this paper. We have also attempted to be terse, to facilitate a quickly readable "statement of position", rather than to be fully explanatory in academic terms. Although we use the male pronoun throughout, we recognize the fact that women, today, and increasingly in the future, will fill the CIO role. Participants in a "discussion session" on the CIO role and those who reviewed an earlier draft of this paper are noted at the end. We drew much from them.

THE INFORMATION EXECUTIVE OF THE MID-80's

In the researchers' view, the attributes that the information executive will need five years hence will be determined by the role that must be filled at that time. The role, in turn, will be shaped by the environment in which the CIO will exist, and that environmental scenario will result from the relevant trends which will influence the state of the business entity of the mid 1980s. As a result this paper is structured from causal forces to the necessary attributes of the evolving CIO role. In graphic form, the logic is as follows:

Relevant
Trends

Managerial
Environment
Scenario

Information Executive
Role

Necessary Information
Executive Attributes

RELEVANT TRENDS

Research in the field of forecasting suggests strongly that the most accurate forecasts derive from examining the probable directions of currently evident trends. One might take a wild leap into assuming a drastically different scenario as espoused by some futurist, but the odds are that one will be completely wrong. Moreover, the researchers feel that there is a set of evident trends today which appear to have a strong and continuing thrust. The only thing which might deter some of them would be a major depression, and even though this is written in August of 1982, this does not appear likely. Briefly listed below are some key trends which fall into the three categories of business environment, technology, and users. These trends are:

Business Environment

- o Continuing inflation widening the gap between people and hardware costs;
- o Increasingly aggressive national and international competition;
- o Shortage of talented personnel as a result of smaller graduating classes;
- o Capital shortage;
- o Higher than "normal" interest rates, causing assets to remain expensive;
- o Continued, sometimes extraordinary, changes in industry structure and methods of doing business as the "second industrial revolution" proceeds;
- o Pervasive changes in the workforce caused by the increasing impact of technology at factory, white collar, professional staff, and executive levels.

Increased managerial emphasis on planning, particularly strategic planning (to adapt to an increasingly volatile, competitive environment) by medium size and large organizations.

- o Emergence of the "remote worker" - individuals working in facilities independent of "company facilities" - home, temporary facilities, etc.

Rapidly Changing Technology

- o Ever more powerful and cost-effective hardware (of all types);
- o An increasing number of telecommunication innovations with regard to price, capability and availability;

- o More and vastly improved end user tools;
- o Improved application generators and other programmer productivity tools;
- o Rapidly expanding use of industrial robots and process control equipment capable of automatically generating production data.
- o Increased availability of purchasable data bases;
- o Upsurge in the use of the computer as a personal communication tool (e.g. electronic mail, conferencing, etc.);
- o Greatly increased use of "information data bases";
- o A vast, and growing, number of vendors of hardware, software, telecommunications, and other information-oriented products and services.

Increasingly Computer-knowledgeable and Demanding Users

- o More college graduates and others who believe the computer is a necessary tool;
- o Increased general understanding of computer capabilities caused in large part by home computers, increased media attention, etc.;
- o "Demonstration effects" as conference speakers increasingly illustrate the "latest computer-based approach";
- o Greater ability of users to buy their own hardware and software as they become more knowledgeable and dropping system prices increasingly fall within departmental capital spending limits;
- o Heightened awareness at all managerial ranks as a result of increased direct marketing to users by computer vendors, time-sharing organizations, software vendors, etc.
- o Ever better user education materials and usage guides.

MANAGEMENT ENVIRONMENT SCENARIO

The environment in which the information executive of 1985 will exist will be uniquely determined by the interaction of these trends. With respect to the information function, all organizations will be under pressure to:

- o Automate as much as possible to achieve critical productivity increases;

- o Utilize the flood of improved, diverse, and ever more capable hardware, software, and telecommunications technologies to improve business performance as well as efficiency.
- o Provide the newly sophisticated end users with the automated tools which they are ready for and willing to use;
- o Revamp and improve many ancient accounting and operational information systems to take advantage of the new technologies, to reduce ongoing maintenance costs, and to ensure continued operation.
- o Recognize that the "computer era" of the 70's has given way to the "telecommunication network era" of the 80's and to facilitate the convergence of many diverse formerly unrelated functions (process monitoring, data processing, communications, library, office systems, etc.) into a single "information function".
- o Carefully address the question of restructuring both the processes and the structure of the organization itself in line with the opportunities presented by a richer communications environment and the potential to make information more widely available to all employees, customers, vendors and other interested parties.

With the advancing pace of automation, the rate of increase in the use of computer-based technologies is going to grow. Over the next several years the disparity in computer hardware and telecommunication price declines will lead, in an increasingly on-line world, to more widely distributed processors, data storage, and systems people. Computer usage will become vastly more widespread throughout the corporation. The ultimate result will be that almost everyone in the corporation will be a direct user of technology. Ever-more-important telecommunication networks will provide vital links between the individual user at his microprocessor-based workstation and a growing number of libraries of corporate data. The challenge of managing the information function in this ever changing, ever expanding distributed processing, distributed user, distributed support staff world will continue to escalate in its complexity.

As computer-based technology pervades the business, line managers will be forced to become much more knowledgeable concerning it. They will increasingly be involved in decision making with regard to computer use. They will have to do this since both the percentage of their budget allocated to computer-based systems will increase, and their opportunity to positively affect operating results will become more highly dependent upon new computer and communication technologies. They will no longer be able to "sit on the sidelines and let the computer people do it." More effective information systems planning, education, and communication processes will be necessary to facilitate this involvement.

THE INFORMATION EXECUTIVE ROLE

The information executive's role will be shaped by this increasingly technology-dominated, user management-involved environment. Several aspects of this role are increasingly significant. These are the CIO's:

- o Diminishing direct line responsibilities,
- o Increasing staff orientation, and
- o Corporate responsibility for information resource policy and strategy.

Diminishing Direct Line Responsibilities. It will be impossible for the corporate information executive to maintain direct line management control over computer-based technology throughout the company. Line management of local hardware and much of the software development will be thrust into divisions and departments. The role of the information executive will thus become one of a corporate general manager with increasing emphasis in his function on staff-oriented activities.

Increasing Staff Orientation. The need for the CIO to concentrate on staff-oriented activities will be dictated by the need, in all organizations, to have a "focal point" for the planning and facilitating of the organization's move into the "information era". As a result, the role of the CIO will be heavily oriented toward ensuring the appropriate development of information systems strategies and long-range planning, toward the facilitating and promoting of change through expanded communication and education processes, and toward the development of standards of all types, most particularly for data, for communication, and for ensuring privacy and security in a total-access world. The CIO will serve as the corporate "gate-keeper" for new technology and the evaluation of this technology. To find time for these increasingly important functions, he will need to be strongly proactive in transferring accountability for line management of hardware and, where applicable, software development to divisions and departments.

Corporate Responsibility for Information Resource Policy and Strategy. The CIO will have the responsibility of assuring that new opportunities presented by the technology are seized and that capital expenditures for information resources are ranked according to business need. In order to do this, the CIO must, in most organizations, be a member of the top management team. The CIO will become not simply the "custodian" of the data but more importantly, the corporate officer who truly understands the interconnection between the information flow and the business. Ultimately, we believe, the CIO will fill a role similar to that of the Chief Financial Officer (CFO).

Despite all of the above, the CIO's role will not be exclusively staff-oriented. Although it will be a decreasing part of the CIO portfolio,

the CIO will maintain direct "line" responsibility in a few areas. These include the network, corporate data management, and, in most cases, the corporate computing facility, common software development, and a changing array of new "start-up" development projects.

INFORMATION EXECUTIVE ATTRIBUTES

The above trends, resulting scenario, and role(s) for the CIO, in turn determine the skills and attributes an individual executive will need in order to succeed in the mid-eighties. Many of these attributes are not different from those needed by the information executive of yesterday and today. However, the scope of impact of the information executive will be greater, his role more broadly influential in the future, making the mastery of several of these skills even more critical for survival.

To manage successfully in the mid-1980's, the CIO will have to be first, and foremost, a business-oriented general manager. However, he will also need considerable understanding of the technology. This will be acquired either through a span of years in the trenches of the information systems function or in a thorough education program if the CIO "moves in" from another corporate function. The CIO will be viewed as the technological guru in an era when technology is imbedded in virtually all aspects of the business. To carry out the joint general manager/technology authority role, the CIO must have the following attributes and skills:

- o Most important, the CIO must possess considerable political, organizational, and communication skills. These are the hallmark of top executives and without both these managerial skills and the desire to exercise them, the CIO will be ineffective.
- o Since the CIO must be part of the top management team to effectively manage the information function, the CIO must be involved in, understand, and have had experience in the overall management of the business. To facilitate this, line management experience in sales or production aspects of the business will be extremely useful and, increasingly, a prerequisite for the job. In short, the CIO will have acquired requisite general management attributes through the varied set of job experiences defined for all potential members of the top executive ranks. Just as the CFO and the Vice President of R&D are candidates for the Presidency, so should be the CIO.
- o Since it will be beyond a single human's capacity to be expert in all the significant technologies, the CIO must understand and be able to manage technological experts.
- o The CIO must view himself as a manager of managers (not of things) and have developed the appropriate human resource management skills.

- o The CIO must be heavily concerned with the medium-term and the long-run. Key investments in hardware and software infrastructure today have several-year lead times before they can be put in place and be matured to a useful state. The CIO must, therefore, be a planner and place particular emphasis on strategic planning and the management of change.
- o Finally, the CIO must be increasingly sensitive to the human, organizational, and social impacts of the new technology. The pace of technological change is very great today. Sensitivity to the pace of assimilation of these changes which is feasible in the organization is necessary. So is sensitivity to (and proactive planning for) appropriate methods of managing the individual and organizational impacts of the "second industrial revolution".

EVOLUTIONARY PROCESS

It is important to note that we are describing one point in an evolutionary process. The role of the CIO is undoubtedly changing faster than that of any other top functional manager. Yet the pace of evolution differs significantly from company to company, as well it should, because of several factors which include:

- o the economy,
- o the industry(ies) the organization serves,
- o company size and organization structure,
- o organizational objectives,
- o political forces within the organization,
- o the organization's stage of I/S growth, and
- o the personal and managerial attributes and skills of the current incumbent of the CIO position

In short, the exact role of a particular CIO in a particular company at a particular point is contingent upon the above and other factors. Each of these differentiating factors could be discussed at length. Each has a direct impact on the role of the CIO. As one example, the current economy is causing centralizing, cost-cutting efforts in companies in a number of hard-hit industries. This has hampered innovation in these companies and virtually eliminated investments affecting anything more than this year's financial results. In these companies the "status quo" (whatever it may be) for the I/S function and the CIO will tend to linger on. In general, most role changes will be aimed at facilitating greater cost control.

As a second example, the size of the company clearly affects the

amount of direct control an information executive can exert over a particular machine choice or application design decision which needs to be made. And so on. There is undoubtedly a very lengthy list of organization-specific "contingencies" which do, and will, affect the exact shape of the CIO's role in each organization. Yet we believe that a progression toward the role noted above is inevitable for most organizations.

CONCLUSION

The authors recognize that the above description of the role of the information executive is arguable. There are those who argue that the information systems executive role will dissolve into a relatively minor one of data administration and guardian of data integrity. There are also those who argue that the I/S function will "disappear", being absorbed into each organizational subunit. While the latter may occur in the 90's, the profusion of technology, the infant state of the information discipline, the state of user knowledge, and the need for planning and standards to facilitate effective implementation of the new information capabilities, argues for a much stronger, proactive role such as we have described in most companies in the mid and late 1980's.

The CIO role described above appears to us to be the logical result of an ongoing set of technical, organizational, and environmental trends. In fact, the CIO role in a very few major companies has most of the characteristics described above at present. Many other CIO's are quite far along in the evolutionary process of converting their previous roles to the one described.

The "future role" of the information executive described above will not apply to all organizations today. Yet, as a generality, we believe evolutionary forces are driving this role in the directions indicated. If this is so, the attributes and skills of the CIO must evolve in conjunction with the evolving role.