

LEGISLATIVE REFERENCE LIBRARY
JK6149.A8 I542 1996
- Information resources Investments

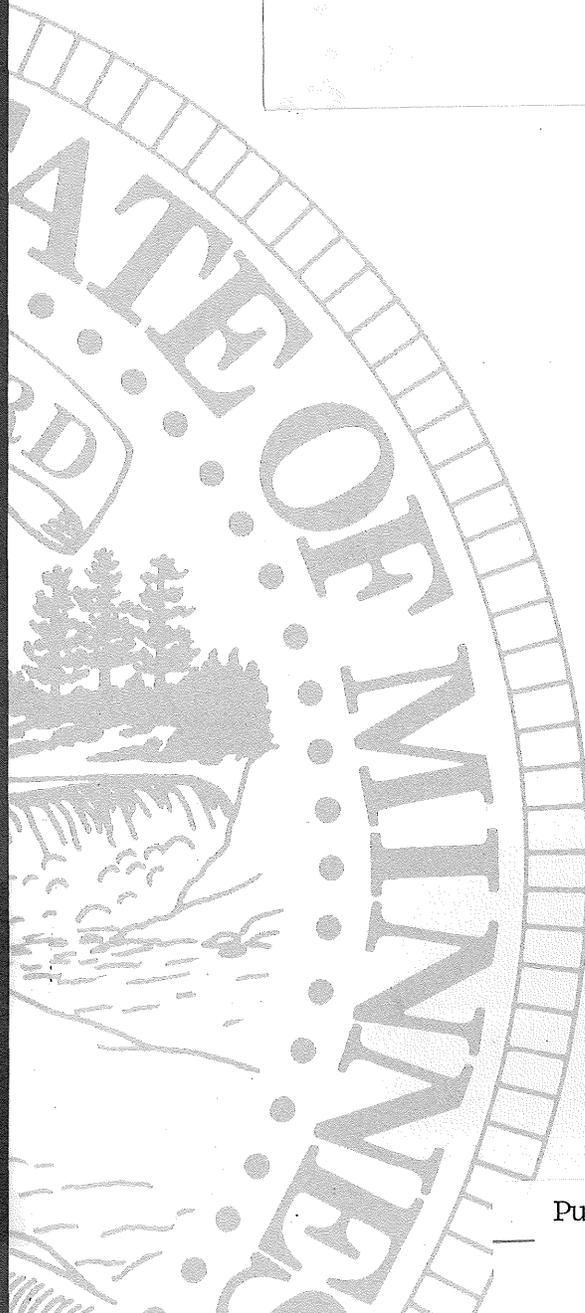


3 0307 00056 9262



INFORMATION
POLICY OFFICE

Information Policy Office
**Information Resources
Investments Review for
FY 1995**



JK
6149
.A8
I542
1996

Information Policy Office

**Information Resources
Investments Review for
FY 1995**

Minnesota Department of Administration
Information Policy Office
320 Centennial Office Building
658 Cedar Street
St. Paul, MN 55155
612-296-5643

January 1996

To obtain these materials in braille, audiotape, large print or other format, call:
Voice (612)296-5643, Fax (612)296-5800, TTY/TTD (612)282-5599

Information Resource Investments Review for FY 1995

January, 1996

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
INTRODUCTION	3
SCOPE	3
Measuring the Benefits of Information Resource Investments	3
Information Resource Investments	4
Use of Outside Sources	4
Information Resource Issues	4
MEASURING BENEFITS OF INFORMATION RESOURCE INVESTMENTS	4
Importance of Measuring Benefits	4
Types of Benefits Measured	5
Methods Used to Measure Investment Benefits	5
INFORMATION RESOURCE INVESTMENTS	6
Calculating the Costs	6
Methodology for Review	6
Minnesota's Information Resource Investment	7
Minnesota's Information Resource Investment by Category of Expenditure FY95 ..	8
Comparison with Other States and Private Organizations	8
USE OF OUTSIDE SOURCES	11
Understanding Outsourcing	11
Information Services Outsourced by Minnesota State Agencies	11
Deciding to Use Outside Sources	12
Comparison with Other States and Private Organizations	12
ISSUES	13
Skills	13
Management and organization	13
New applications	13
Infrastructure	14
Networks	14
Ongoing operations	14
Year 2000	14
Miscellaneous	15

Information Resource Investments Review for FY 1995

January, 1996

RISK/PERFORMANCE MANAGEMENT	15
Physical Security to Minimize Operational Risks	15
Strategic Information Resource Planning for Alignment with Agency Mission	15
State Standards to Minimize Development Project Risk	15
TRENDS	16
Increasing Investments in Information Resources	16
Growing Use of Outsourced Services	16
Changing Approaches to Procurement	17
Emerging Electronic Enterprise Environment	18
CONCLUSIONS AND RECOMMENDATIONS	19
BIBLIOGRAPHY	23
APPENDIX	24
APPENDIX A: Information Resource Project Funding Summary	24
APPENDIX B: Information Policy Office <i>Update</i> on Year 2000	26

Information Resource Investments

Review for FY 1995

January, 1996

EXECUTIVE SUMMARY

The Information Policy Office is required to conduct a comprehensive review of information systems investments made by state agencies and higher education systems at least every three years. This report is the result of a review of fiscal year (FY) 1995 investments in information systems.

IPO surveyed the Governor's 23 Cabinet agencies and the former state universities, community colleges and technical colleges now organized as MnSCU. Each organization was asked to provide information resource expenditure information as well as information on investment issues. The data provided by the agencies included expenditures for applications and services provided by outside sources. Expenditure data from the statewide accounting system for these 23 agencies and MnSCU was also reviewed.

The review found that the amount Minnesota state government invests in information resources is comparable to the investments made by other public sector and private sector organizations. The review also found that government agencies in Minnesota, like other private and public organizations, are using outside sources to provide systems and services.

A number of investment issues were identified during the course of this review. Addressing these issues is critical to protecting the state's investment in information systems.

Year 2000 - Without taking immediate action to modify or replace computer programs that currently use two digits to represent the date, the state could be facing major systems failures in the year 2000.

Funding information infrastructure investments - The state has made substantial investments in information systems. Agencies have limited resources to maintain and upgrade these systems, thus putting the investment at risk. There is no ongoing funding source for information infrastructure maintenance.

Skills - Agencies are experiencing great difficulty in recruiting, hiring and retaining employees with required information resource skills. Inadequate skills will be a major stumbling block for the effective maintenance of information systems and the continued development of information resources.

Outsourcing - Using outside sources for information system services is critical to continuing development and maintenance of state information systems. Skills and resources needed by the state can frequently only be found through outside

Information Resource Investments Review for FY 1995

January, 1996

sources. Current state contracting and procurement requirements are cumbersome and lengthy and do not allow for innovative approaches to working with outside sources.

Minnesota has been recognized as a leader in managing and using technology. Legislators play a critical role in maintaining a leadership position and continuing to ensure the states economic viability in a rapidly changing economic and technological environment.

To protect the current investment in information systems, two immediate actions are recommended:

- Make funds available to address the year 2000 issue.
- Create an on-going revenue source for information resource infrastructure investments.

To realize the maximum benefit from current and future information systems investments, two additional immediate actions are recommended:

- Review and change, as appropriate, laws and labor practices that adversely affect the ability of the state to recruit and retain skilled information systems staff.
- Review and change, as appropriate, laws and rules relating to procurement and contracting that adversely affect the ability of the state to use outside sources to develop and maintain information systems.

It will be essential for state agencies to continue to use outside sources for information systems. In addition to the recommendations listed above, this report recommends that certain criteria be used in deciding to contract with outside sources.

The state's investment in information systems will continue to be critical to successful delivery of government services. Action is needed now to protect this investment for the future.

Information Resource Investments

Review for FY 1995

January, 1996

INTRODUCTION

M.S.16B 41, Subd. 3 (g) requires the Information Policy Office to conduct a comprehensive review (at least every three years) "of the information system investments that have been made by state agencies and higher education institutions. The review must include recommendations on any information systems applications that could be provided in a more cost beneficial manner by an outside source. The office must report the results of the review to the legislature and governor."

This report is the first prepared in fulfillment of the 1993 legislative mandate. This review provides baseline data and recommended actions to protect the current investment and maximize the benefits from this investment.

For this review the Information Policy Office collected and analyzed financial data about information systems investments made by selected state agencies and higher education institutions. Data sources included the statewide accounting system and responses to a survey sent to agencies. The time period covered was the state fiscal year 1995, July 1, 1994 - June 30, 1995. Data specific to new appropriations for information systems was also available (see Appendix A).

The state agencies and higher education institutions examined were 23 state agencies that make up the Governor's Cabinet¹, and the former state universities, community colleges and technical colleges now organized as MnSCU. The University of Minnesota was not included in this review.

SCOPE

This review summarizes the findings in four parts: measuring the benefits of investments in information resources; the range and categories of information resource investments; the use of outside sources; and major issues related to information resource investments. The report also reviews trends and provides conclusions and recommendations.

Measuring the Benefits of Information Resource Investments

Measuring benefits is critical to decision-making about information resource investments, including the decision to use outside sources. The first part of the findings discusses the importance of measuring benefits derived from investments in information resources. This

¹ Administration, Agriculture, Commerce, Corrections, Economic Security, Education, Employee Relations, Finance, Health, Housing Finance, Human Rights, Human Services, Labor and Industry, Natural Resources, Planning, Pollution Control, Public Safety, Public Service, Revenue, Trade and Economic Development, Transportation and Veterans Affairs. Military Affairs, also a Governor's Cabinet agency, was not included because their information systems investments are federally funded to support federal programs.

Information Resource Investments Review for FY 1995

January, 1996

part describes the types of benefits valued by both state agencies and private organizations and the methods use to quantify and measure the benefits.

Information Resource Investments

The second part profiles statewide financial data about the range of information resource investments made by state agencies and higher education institutions in FY 1995 and examines how Minnesota's investments compare to other states and industry averages.

Information resource investments were defined as expenditures of state general and other special funds and federal dollars for data, applications, computers, networks, services and employees. Expenditures examined included new one-time appropriations and base level expenditures for on-going operations of existing systems.

Use of Outside Sources

The third part describes the extent to which state agencies currently use outside sources to provide information services and the reasons agencies decide to use outside sources.

For the purpose of this review, the use of outside sources, or outsourcing, means contracting with a service provider for all or part of information system design, development, data storage, access, processing and support. Both existing applications and new application development might be potential outsourcing candidates.

Outsourcing includes agencies' purchase of services from external private vendors as well as from InterTechnologies Group, a bureau of the Department of Administration that charges agencies for computer processing, telecommunications and other information services.

Information Resource Issues

The fourth part summarizes agencies' identification of the major issues related to information resource investments that their organizations would be facing in the next three years.

MEASURING BENEFITS OF INFORMATION RESOURCE INVESTMENTS

Importance of Measuring Benefits

In the past, costs of information resources have been viewed as one-time expenditures. This has led to an unrealistic assumption that once development is complete no further costs will be incurred. As effective delivery of government services becomes increasingly dependent on the use of information resources and as technology continues to change, there is a greater need to view the expenditures as part of an on-going cycle of investment and reinvestment. In order to justify the continual investment, the benefits of deploying information resources must be made explicit, quantified and measured.

Information Resource Investments

Review for FY 1995

January, 1996

Types of Benefits Measured

There is wide variation in the way benefits from investments in information resources are measured. Revenue growth, personnel cost savings, productivity growth, quality improvements, reduced risk, lower process costs, lower materials costs, and asset management are some of the areas used by business executives to value information systems investments for their companies. State agencies that measure benefits focus on those related to an improved delivery of government services: providing services faster, more conveniently, with fewer errors or less expensively.

Minnesota agencies are grappling with the challenge of measuring benefits that are often intangible. Some agencies identify, measure and maximize benefit by ensuring that the information technology planning process is linked to overall agency planning processes. Others report the use of time required to carry out processes before and after system implementation or other efficiencies. Several agencies noted the use of customer satisfaction measurements and that value was added to agency data when it was made available to the public, especially through new electronic avenues such as the Internet. But most agencies acknowledge a need for formal methods of identifying, quantifying and measuring benefits.

Methods Used to Measure Investment Benefits

Minnesota state agencies reported using cost benefit analysis, customer feedback, post implementation audits, and user group or steering committee involvement as means to measure benefits. Most cost benefit risk analyses do not calculate the value of benefits consistently. Generally speaking, no single measure of benefit is used.

Minnesota state government agencies are not alone in the struggle to find a satisfactory way of quantifying benefits and measuring their value to the organization. "An important part of this process is developing metrics for evaluating the effectiveness of IT spending. The problem, however, is that measurement systems for evaluating IT are still in their infancy."²

Currently businesses and government agencies use a variety of techniques to evaluate the benefit or business value of information systems investments. According to a survey conducted by Business Science International (BSI)³ 84 percent of 203 executives surveyed do attempt to evaluate the business value of their information technology systems, but only

² Measuring Effective Information Management. *Solutions, the Executive Management Magazine* from Unisys, Summer, 1995. (17)2:11

³ Standards needed for Evaluating Benefit of IT. *Solutions, the Executive Management Magazine* from Unisys, Summer, 1995. (17)2:2

Information Resource Investments

Review for FY 1995

January, 1996

23 percent use specific valuation criteria. Of the CIOs who evaluate benefit, "38 percent use cost/benefit analysis on an ad hoc case review basis, 25 percent use customer satisfaction surveys, 23 percent use audit and accounting procedures and 20 percent use special committees or review boards to measure returns on information technology spending."

INFORMATION RESOURCE INVESTMENTS

Calculating the Costs

Although hardware and software are often the most visible components of information systems, their costs are only a fraction of the total amount the state spends to develop, operate and maintain information systems. Costs of staff, supplies and facilities along with consulting and telecommunications services, have to be accounted for to get a complete picture of the state's annual investment in information technology.

States are increasingly dependent on the use of current information technology to deliver programs and services that result in public policy outcomes. The effective use of information technologies requires continued investment in infrastructure, including the categories of expenditures listed below.

Information about hardware and software as well as the other costs that make up the total state investment was collected and analyzed for this report. These costs were then compared to other states' investments and to industry averages in order to identify a baseline for Minnesota.

Methodology for Review

Agencies were asked to supply information about FY 1995 information resource costs in six categories. The categories include, but are not limited to, the items in the definitions below:

Hardware:

- computers;
- voice/data/video communications equipment; and
- network equipment.

Software:

- operating systems;
- "off-the shelf" applications products;
- tools, development software; and
- databases.

Facilities: computer room and office space as well as fixtures and furniture.

Services: contracted professional or technical services for planning, applications development or customizing, processing, support, and maintenance. Includes telecommunications services.

Information Resource Investments

Review for FY 1995

January, 1996

Supplies: disks, tapes and printer items.

Staff: employees assigned to development, maintenance, operations, technical and administrative support and management.

Because many of Minnesota's information technology expenditures are inextricably interwoven with program budgets, detailed data about Minnesota's information resource costs is not easy to find. The Information Policy Office cross-checked agency survey responses to statewide accounting data to arrive at conservative, minimum totals. This review of FY 1995 data can serve as a baseline for future years' analysis. Additional information for future analysis will be available from MN-ASSIST. In future years, it may also be possible to associate information resource investments with program goals and outcome measures.

Minnesota's Information Resource Investment

An analysis of the Information Policy Office survey data concluded that an estimated \$221.3 million was invested in information resources in FY 1995 by the agencies surveyed and MnSCU. This dollar amount is equivalent to 2.68 percent of the total budget for those agencies for FY 1995. Subtracting the amount reported by agencies as one-time appropriations, the figure drops to \$194 million, or 2.35 percent of the agencies' total budgets. Looking more closely at the data it is possible to identify categories of expenditure for information resources. For example, an estimated 26 percent of this investment was spent on hardware. The majority of the money, however, was spent on personnel and outsourced services to support the development and maintenance of information resources. The remaining expenditures included smaller amounts for supplies, software, and facilities. The following table shows the estimated dollar amounts and percentages for categories of information resource expenditures.

Information Resource Investments Review for FY 1995

January, 1996

Minnesota's Information Resource Investment by Category of Expenditure FY95

Data Source: Information Policy Office Survey 11/95

Category	\$ in millions	Percentage of expenditures
Hardware	56.7	26
Software	8.1	4
Facilities	3.6	1
Services	92.8	42
Supplies	4.5	2
Staff	55.6	25
<u>Total</u>	<u>\$221.3</u>	<u>100%</u>

Comparison with Other States and Private Organizations

Minnesota's investments for FY 1995 were compared with available data on investments by the private sector and by other states for a comparable time period. Data sources included Infovision International and Computer Economics Inc., two information management research firms, and NASIRE, the National Association of State Information Resource Executives.

It is a challenge to compare data from these sources because the definitions of categories of expenditures and the collection methods vary. From a data analysis perspective this makes it difficult to clearly establish "apples to apples" comparisons. However, at a summary level, these comparisons are useful in providing some assessment of how Minnesota state government expenditures compare to other government and private sector investments.

The following table, *Technology Spending by Industry Sectors*, shows a comparison of the percentage of total budget spent on technology by various industry sectors. Minnesota state agencies' investment in information resources as a percentage of the overall budget is below the government expenditure estimates in this table.

Information Resource Investments Review for FY 1995

January, 1996

Technology Spending by Industry Sectors

Data Source: Computer Economics Inc.

Industry sector	1994 Technology spending
Government	3.07%
Service	2.67%
Financial Services	3.71%
Industrial/Aerospace	2.97%
Manufacturing	1.35%
Wholesale /retail	.95%

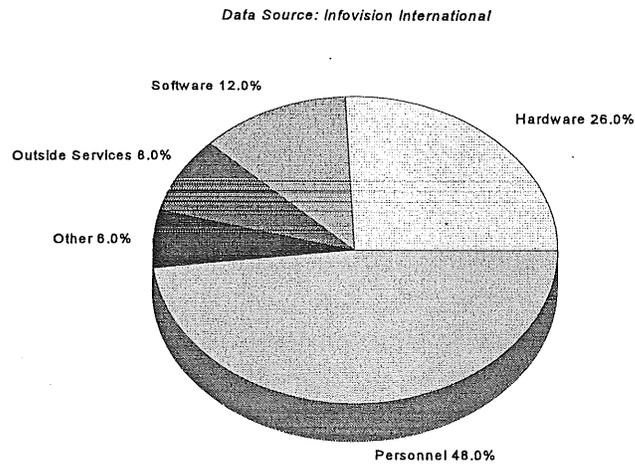
It is also possible to compare categories of information resource expenditure at a summary level. The following pie charts below provide two views of information resource category expenditures for industry. The two research firms that make this data available use different approaches to categorizing expenditures. One, for example, identifies maintenance as a separate category while the other includes maintenance in other categories. Minnesota's data is categorized in yet another way.

Even with the differences in categorization, it is possible to draw some conclusions from the three sets of data. It is clear that hardware expenditures are consistent across all three sets of data. Minnesota is in line with industry averages. If personnel, outside services and maintenance (primarily staff costs) are combined, it is possible to compare these combined numbers across the three sets of data. Again, Minnesota expenditures for staff and outside services are in line with the industry averages for these categories. Minnesota's combined staff, services and maintenance percentage is somewhat higher at 67 percent compared with 56 percent from Infovision and Computer Economics data. This difference might be due to the methods used to collect and categorize data.

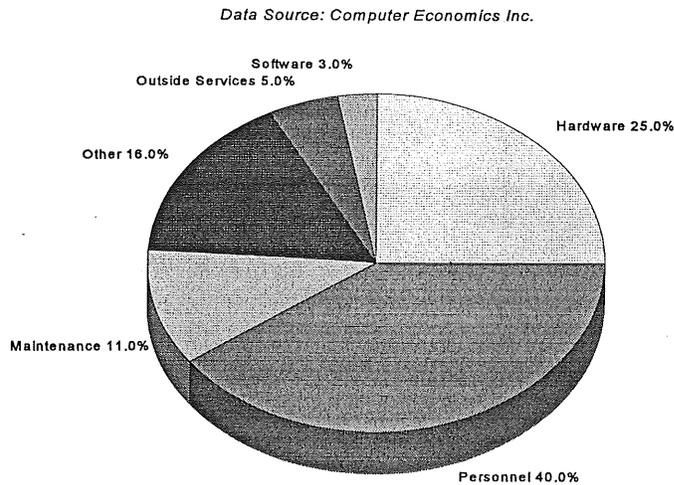
Information Resource Investments Review for FY 1995

January, 1996

1995 Allocation of Information Technology Budgets



1994 Allocation of Information Technology Budgets



Information Resource Investments

Review for FY 1995

January, 1996

Minnesota data was also compared to data from other states provided by National Association of State Information Resource Executives, NASIRE. Because of the inconsistency and incompleteness of the NASIRE data it was difficult to draw any conclusions from this comparison. There is a wide range of the percentages of total budget spent by states for information resource expenditures. Thirty five states responded to a NASIRE survey in 1994 with one reporting less than one percent and another reporting nine percent of total budget spent for information resources. Most states reported spending between one and three percent of total budget on information resources.

USE OF OUTSIDE SOURCES

Understanding Outsourcing

Outsourcing is a term that describes a variety of service provider relationships that organizations can use for information technology services. Outsourcing can include:

- engaging consultants to plan for, develop or customize application software that will run on state owned hardware;
- hiring contractors to manage projects, administer and operate state owned hardware; or
- contracting with provider services that use the provider's equipment to offer networks, telecommunications, data base management or computer processing services.

Government agencies outsource work to private vendors and to other state and local agencies.

Information Services Outsourced by Minnesota State Agencies

Outsourcing is the rule, not the exception. Most state agencies outsource some information systems services to private vendors or other government agencies. According to the Information Policy Office's information technology investments 1995 survey, agencies outsource the following services:

- Nineteen of 23 agencies reported outsourcing planning, developing or customizing of application software that will run on state owned hardware;
- Eleven agencies outsourced network, telecommunications, database management or computer processing services; and
- Five agencies also outsourced the administration and operation of state owned hardware and project management.

Information Resource Investments

Review for FY 1995

January, 1996

Deciding to Use Outside Sources

Agencies reported a variety of reasons for choosing to outsource parts of their information systems services. Fourteen agencies cited lack of skills. The following list of reasons is in order by frequency of responses:

- Lack of specialized skills or expertise available from in-house staff;
- Timing: temporary peaks and urgency to complete work within a time frame;
- Cost-effectiveness;
- More effective than developing the expertise in house; and
- Agencies also reported choosing to outsource mainframe computing and data communications services to InterTechnologies Group in the Department of Administration.

Comparison with Other States and Private Organizations

Private companies may decide to outsource all or part of their information services based on a clear profit factor, a strategic decision regarding divesting themselves of all but the unique core competencies of their business or a desire to have fewer employees. Many companies are careful to outsource only functions that the company knows how to perform but would rather not: "Contract out the familiar, but don't let the strategic aspects out of your sight."⁴ Once a decision to outsource an entire information service operation is made, there is no going back--the employees are gone, the machines are gone--there can only be a decision to find another outside service provider.

Risks inherent in outsourcing decisions can include loss of control of technology infrastructure and loss of control of strategic direction for information resource management. Governments and private organizations need to balance the risks with the expected beneficial outcomes. A 1994 study by NASIRE noted that states, unlike private organizations, must also "...deal with voter perception and other political factors when making major policy decisions. Cost vs. benefit, return on investment and the bottom line are not always the pivotal forces behind decisions to outsource in a government operation."⁵

The NASIRE study found that **no state had outsourced its entire information services**. Of the states that had considered outsourcing their entire operations and rejected it, cost-effectiveness and a loss of control of strategic direction of information management were cited as the reasons. On the other hand, more limited outsourcing of specific functions

⁴ Asbrand, Deborah, 1995. Managing Pieces of the Enterprise. *Information Week*. August 14, 1995

⁵ National Association of State Information Resource Executives. 1994. Outsourcing Information Services in the Public Sector. Lexington, KY

Information Resource Investments

Review for FY 1995

January, 1996

was much more prevalent: **29 states reported outsourcing particular functions.** Minnesota falls into this category.

ISSUES

Agencies were asked to identify the major issues they will face in the next three years related to information technology investments. Agencies identified a variety of issues, such as a need for specialized skills, replacement of infrastructure, the need for funding on-going operations, and the implications of expanded use of Internet. The issues reported by agencies have been grouped into the categories listed below. The issue cited most frequently was lack of skilled resources. The number in parentheses is the number of agencies that mentioned this as a major issue.

Skills (14)

Agencies emphasized the critical importance and the continuing difficulty in attracting and keeping a skilled workforce. Other issues mentioned included:

- Information resource classifications and compensation
- Learning new technology
- Project management
- Future staffing needs.

Management and organization (11)

Aligning agency and information system goals is a critical issue. This includes developing a Business Systems plan that supports the long and short term strategic objectives of the agency and assuring that the information systems function closely support overall agency business goals. Other issues mentioned included:

- Organizations of IS services to a department structure to support cross division sharing
- Reengineering issues
- Telecommuting
- Measurement standards.

New applications(10)

Among the most critical issues for some agencies will be the continuous need for new applications. The applications range from simply customizing tasks now done manually to reengineering work processes entirely to take advantage of the benefits of new technology. Several agencies anticipated new applications that will be shared across multiple agencies and jurisdictions including a clearing house for geographic information and unique identifiers for businesses. Other applications mentioned included:

- Computerizing field inspection reports

Information Resource Investments Review for FY 1995

January, 1996

- Use of new technologies to support the staffing hiring and recruitment function
- Electronic filing of regulatory issues
- Investments needed for MN spatial information clearinghouse
- Two development projects: uniform business identifier and workforce development centers
- Providing faculty with adequate technology; providing the campuses with modern student registration and support systems
- Document imaging
- EDI (Electronic data interchange).

Infrastructure (9)

The ability to deploy and replace equipment to keep up with rapidly changing technology and the demands of department and statewide systems were identified as critical issues of infrastructure. Other issues mentioned included:

- Implementation of client server technology
- Connectivity related to telecommuting
- Cost of replacing or upgrading obsolete systems.

Networks (9)

Agencies reported that they will be facing issues related to increasing emphasis on providing electronic access and Internet connectivity and usage. Other issues mentioned included:

- Connectivity of field locations to network
- Access to agency data
- Successful electronic linkages with business partners--banks, services, local government non-profits.

Ongoing operations (7)

Many agencies identified a concern for funding on-going operations and maintenance needs, especially for major statewide systems and funding support for multi year projects.

Year 2000 (1)

Although the approaching millennium will affect virtually every computer program that calculates dates, only one of 23 agencies surveyed identified the year 2000 as a major issue. Historically many computer programs represent dates with only two digits. As an example the year is represented as "95" rather than "1995." This causes programs to give incorrect results when working with years outside of the range of 1900 - 1999. This will impact critical government applications such as

Information Resource Investments

Review for FY 1995

January, 1996

revenue collections, taxes, welfare benefits, medical insurance, criminal records, licensing, education aid and many others.

Miscellaneous

The need to coordinate activities and collaborate with other public organizations, as well as health care reform, welfare reform, block grant funding, federal funding cutbacks and disaster recovery were also mentioned as issues.

RISK/PERFORMANCE MANAGEMENT

IPO's survey of agencies addressed the issues related to risk and performance management by asking agencies what actions they take to identify and minimize risks associated with information resource investments. Agencies reported taking a variety of actions. Although some addressed only risks related to physical security, most demonstrated awareness of a need to minimize risks encountered during design and development phases.

Physical Security to Minimize Operational Risks

Some agencies identified actions related to minimizing physical operational risks: passwords, backup, disaster recovery and security policies including secured facilities and off-site backup of major databases, and new and well maintained equipment.

Strategic Information Resource Planning for Alignment with Agency Mission

Other agencies identified strategic information resource planning activities they use to minimize risk. Senior staff oversight, project champions, consolidation of responsibilities and authority for managing information systems were cited as ways of ensuring critical executive involvement and leadership. Committees, including user involvement and multi-agency structures, were identified as a means to ensure that projects satisfy multiple interests. One agency noted that effective application development is achieved when projects are kept small, quickly completed and under the control of program managers who have the understanding of the program's business that is necessary before solutions are developed.

State Standards to Minimize Development Project Risk

Following state standards for information resource development, formal project planning using common system development methodologies, implementing projects with well-defined scopes based on models and requiring a project manager for major projects are some of the tactics used by agencies to minimize project risk. Cost benefit analysis, third party reviews of development projects, exploration of alternatives, pilot projects and feasibility reviews were also reported

Information Resource Investments Review for FY 1995

January, 1996

TRENDS

Increasing Investments in Information Resources

Infovision International expects expenditures for information technology to increase as a portion of total budget, rising to 4.5 - 5 percent by 2005.⁶ The information technology dollars will be invested differently than they are today. Personnel expenditures will decrease with most of the drop resulting from decreasing in-house support of production environments. The support will be provided in the future by outside sources or intelligent self managing systems/networks. Outside service expenditures are expected to increase with outside servicers playing a larger role in applications development. Software expenditures will increase as more off the shelf software is purchased to support applications and manage systems and networks.

The trend toward migration of applications to client/server technology will result in better access to information, faster processing and shorter development cycles but is not likely to save government agencies computing costs. Government Technology magazine reported in November, 1995, "One of the hard lessons learned in the early days of client/server is that lower costs are more of an illusion than reality."⁷ A recent Gartner Group survey showed that hardware and software expenses make up only 18 percent of the costs of client/server, with the remaining 71 percent "buried in personnel costs, process disruption, and training that many organizations don't anticipate."⁸

Growing Use of Outsourced Services

Infovision International projects that over the next 10 years outsourcing will increase as a percentage of an organization's information technology budget allocation. The company expects much of the increase in that category resulting from the outsourcing of utility applications. Utility applications are the "can't do without" applications that are as common to doing business as providing telephones.

"In the 1970s information technology was an integral part of less than 20 percent of core business processes. By 2005, information technology will be embedded in more than 80

⁶ IT Management in 2005: Are you investing for the future? *Infovision International Revisioning IT Executive Service*. June 1995

⁷ Newcombe, Tod. 1995. Lessons in Migration. *Government Technology*. (8:11)1

⁸ Freeman, Thomas J., 1995. Manage the Migration to Client Server. *Solutions, the Executive Management Magazine from Unisys*, Fall, 1995. (17)3:1

Information Resource Investments

Review for FY 1995

January, 1996

percent of products and services"⁹ Infovision's projections suggest that information technology organizations will focus on delivering direct value to the core mission and divest themselves of marginal activities. This will require a realignment of information technology priorities, away from that of an internal/staff servicer to one of a developer of externally focussed value-added products and services.

This realignment will cause a shift from an emphasis on executing implementations to envisioning and enabling innovative applications. This will mean farming out utility functions to outside sources and shifting personnel costs from the support of production environments to data management, business modeling and managing relationships with outside servicers.

Changing Approaches to Procurement

Technology solutions, essential to the business of the state, tend to be both innovative and complex in order to respond to the rapidly changing state and national environment. Procurement for both information resource services, such as outsourced services, and information resource products must have processes in place that respond quickly and effectively to the needs of agencies.

The current procurement process is slow and cumbersome, requiring many steps and lengthy delays for reviews and approvals. Current specification requirements are so rigid that agencies have very limited flexibility to respond to rapidly changing environments. Requiring all specifications to be known in advance, for example, makes it difficult to discover better solutions and discourages innovation.

Current procurement processes do not place enough emphasis on vendor performance. Performance of vendors and vendor products is critical to the success of agency programs. Procurement processes need to incorporate performance measures along with rewards for excellent performance and remedies for non-performance.

Minnesota is not alone in facing procurement issues. Many states are recognizing and beginning to address procurement issues related to information resources. In 1994, NASIRE identified information technology procurement reform as a top priority.

A 1995 report from the Program on Strategic Computing and Telecommunications in the Public Sector at the John F. Kennedy School of Government, "Information Technology and Government Procurement", recognizes the need for a new mix of procurement controls and

⁹ IT Management in 2005: Are you investing for the future? *Infovision International Revisioning IT Executive Service*. June 1995

Information Resource Investments

Review for FY 1995

January, 1996

offers four recommendations. The report's first recommendation is to distinguish between commodities and non-commodities and develop different approaches for each.

"To deal with the problem of non-commodities, procurement systems should be segmented, with new and different procurement approaches explored for non-commodity segments....In today's world, buying everything through traditional and rigidly homogenized procurement systems is a major mistake." The report goes on to state: "To encourage evolutionary development, new procurement approaches are needed to make it easier to gain approval for projects developed under an evolutionary plan, and to move from one phase of an evolutionary plan to the next. In a similar fashion, maintaining links between a government's planning, budgeting and procurement procedures is needed so that agencies with good IT planning are rewarded with easier approvals during the budgeting and procurement phases of their projects."¹⁰

Emerging Electronic Enterprise Environment

Every day, Minnesota state agencies are becoming more involved in using electronic tools to conduct business and deliver service and information to customers. Public expectations and business necessity are driving this trend. For example, popular media coverage of the Internet has contributed to public expectations that government services and information be made available electronically throughout the state. Businesses that provide services to state agencies are doing business electronically and expect the state to have electronic capabilities. Companies doing business in the state expect that an electronic infrastructure will be available.

The Government Information Access Council (GIAC) was formed in 1994 to improve public access to government information and democratic processes and to help government become more efficient, effective, and responsive to the public through the use of information technology. Included in "Interim Statements of Direction" to the Council's working groups are strategies to implement the Council's adopted principles. One of the strategies is a recommendation that the "legislature act to ensure that the state takes a leadership role in the development of an electronic enterprise environment."

An electronic enterprise environment includes statewide electronic access for citizens to government services and information; a statewide electronic network infrastructure; services to support government agencies to do business electronically; electronic commerce capabilities for all government agencies; and statewide "management" of the electronic enterprise.

¹⁰ Mechling, Jerry. 1995. (Draft) Information Technology and Government Procurement: Priorities for Reform. Cambridge, MA. The Program on Strategic Computing and Telecommunications in the Public Sector, John F. Kennedy School of Government, Harvard University.

Information Resource Investments

Review for FY 1995

January, 1996

Issues regarding access to information must be addressed, including security and privacy issues. Gartner Group notes¹¹ that "...the big issue for all enterprises contemplating use of the Internet ...for electronic commerce is whether or not messages, documents, inquiries or transactions traveling over the Internet will be safe."

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

This review found that the amount Minnesota state government invests in information resources is comparable to the information resources investments made by private sector organizations and other public sector organizations. A more detailed review of the categories of information resource investments also found that Minnesota's investments for hardware, staff and outside services are consistent with investments made by private sector companies. A review of Minnesota's use of outsourcing found Minnesota at the leading edge of a national trend to invest in outside sources to provide and support information resources.

This review also identified several investment issues that need immediate attention. Addressing these issues is critical to protecting the state's investment in information resources.

Year 2000

The year 2000 is a critical issue facing state government. Historically many computer programs use dates represented by only two digits. This causes programs to give incorrect results when working with years outside of the range of 1900 - 1999. This will impact critical government applications such as revenue collections, taxes, welfare benefits, medical insurance, criminal records, licensing, education aid and many others.

Fixing this problem has the potential to cost the state millions of dollars over the next few years.

Agencies are aware of the problem but lack the resources and skills to address the problem. The state needs to start now to assess the extent of the problem and move forward with solutions or face major systems failures. The sooner that the process is started the more options are available.

Funding Information Infrastructure Investments

Current practice is to fund infrastructure investments either through agency base budget allocations or through requests to the legislature for new funding. This practice

¹¹ The Business Value of Electronic Commerce, Part 3: Using the Internet. *InSide Gartner Group This Week*. October 18, 1995

Information Resource Investments

Review for FY 1995

January, 1996

discourages long term planning and encourages piecemeal development. This results in continual problems funding on-going systems operations, and eliminates the ability of the state to use new technology capabilities to respond quickly to rapidly changing economic and business needs.

Without a funding mechanism, information resource appropriations will not be viewed as anything but expenditures. Changes are needed to support the state's continuing leadership in the use of technology and to support the economic future of the state. An on-going source for funding infrastructure must be established and the costs for infrastructure must be recognized as investments that provide the state with the ability to do business.

Shortage of IT Skills

The demand for new information resource related skills has outpaced the state's ability to attract and retain employees with the technical skills required. Inadequate skills will be a major stumbling block for the effective implementation of technology. Agencies are having great difficulty recruiting, hiring and retaining employees with required skills. Classifications and salaries, for example, are not competitive with the private sector, thus leaving the state unable to hire and retain enough people with skills in areas such as client server, repository, LAN management, and other rapidly changing technical information resource areas.

People with state-of-the-art skill sets in information technology, meaning technical IT skills in combination with communications, facilitation, negotiating and project management skills, will continue to be in short supply. Salaries for these people will continue to be high, in most cases, higher than the state is able to pay.¹² Private sector IT recruiters and managers indicate that the Twin Cities has an unemployment rate in the IT field of less than one half of one percent, with very little lag time between jobs for individuals. This means that the most skilled IT people are currently employed, necessitating aggressive recruiting techniques to seek them out. For the most part, state agencies do not recruit employees other than to advertise openings.

Given the high salaries and the low unemployment rate for people with IT skills, it can be expected that the state will continue for the foreseeable future to have difficulty recruiting and retaining employees with these skills.

¹² Nancy Johnson in a 1995 report, *The Challenge of Staffing Information Resource Management Skills in the State of Minnesota* cited Computerworld's February 13, 1995 annual survey of salaries for the following: \$57-72,000 for network administrators, \$72-80,000 for object oriented programmers, \$60-72,000 for C++ programmers, \$63-77,000 for Sybase and Oracle designers.

Information Resource Investments

Review for FY 1995

January, 1996

Outsourcing

Outsourcing will continue to be critical to state agencies. The continued inability of the state to recruit and retain staff with information resource skills will mean that significant portions of the information system development and maintenance for the state will need to be done by outside sources. Private sector consultants have salaries that attract the limited number of skilled IT professionals.

Agencies find that the current state procurement and contracting rules and processes are cumbersome and time consuming. They also find that the rules and processes do not allow for innovative approaches to working with outside sources. More flexibility in contracting for information resources, including the ability to establish new types of contractual relationships with outside sources, is needed. Flexible rules related to contract changes over the life of a contract will be very important. Both the business and technology environments changes rapidly over the life of a contract and the state and the consultant must have the flexibility to respond quickly to these changes.

Statewide guidelines for deciding when to use outside services are needed. These should include at a minimum the following:

- an outside source is required in legislation; or
- skills do not exist internally;
- temporary resource needs due to workload and timeliness require the use of an outside source; or
- a cost/benefit/risk assessment of alternatives has been completed that indicates outsourcing is a reasonable alternative.

Information Resource Investments

Review for FY 1995

January, 1996

RECOMMENDATIONS

To protect the current investment in information systems, two immediate actions are recommended:

- **Make funds available to address the Year 2000 issue.** Funds are needed to support a statewide effort to determine the extent of the Year 2000 problem within state government; develop a statewide strategy to address the problem; and implement a solution. Criteria should be developed for determining eligibility to receive funds and for measuring success in using the funds.
- **Create an on-going revenue source for information resource infrastructure investments.** A new fund should be established from an on-going revenue source such as an added charge on telephone service or network service. This fund should be designated for state government information resource infrastructure maintenance and development. Criteria need to be developed for use of the funds. A portion of the funds should be designated for statewide infrastructure needs that cross agency boundaries.

To realize the maximum benefit from current and future information systems investments, two additional immediate actions are recommended:

- **Examine civil service laws and labor practices for changes needed related to recruiting and retaining skilled information resource professionals.** Laws and rules that currently govern recruiting and retaining employees need to be continually reviewed and updated for applicability to current and future information resource environments.
- **Support flexibility in procurement and contracting with outside services to provide information resources.** Contracting and procurement requirements and laws need to be reengineered to meet the state's need for greater flexibility in using outside services. Lengthy RFP processes and complicated contracting requirements, for example, make it difficult to make the most effective use of contract resources. New ways of working with vendors that allow both the state and the vendor to explore new approaches and tools during the course of a contract need to be incorporated into the procurement process. Specifications may need to change multiple times during the course of a contract as new technology becomes available and new needs surface. Methods for accommodating flexibility within the contract must be developed.

It will be essential for state agencies to continue to use outside sources for information systems. In addition to the recommendation listed above, this report recommends that certain criteria be used in deciding to contract with outside sources.

Information Resource Investments Review for FY 1995

January, 1996

BIBLIOGRAPHY

Boerner, Roberta D. 1995. Effective Budgeting and Oversight for Technology Expenditures. Denver, CO. National Conference of State Legislatures

Johnson, Nancy. 1995. The Challenge Of Staffing Information Resource Management Skills In the State Of Minnesota

McFarlan, F. Warren and Nolan, Richard L. 1995. How to Manage an IT Outsourcing Alliance. Sloan Management Review. Winter 1995.

McKenna, Dennis, 1995, Point of View. *Government Technology* (8)12:6

Mechling, Jerry. 1995. (Draft) Information Technology and Government Procurement: Priorities for Reform. Cambridge, MA. The Program on Strategic Computing and Telecommunications in the Public Sector, John F. Kennedy School of Government, Harvard University.

National Association of State Information Resource Executives. 1994. State Information Resource Management Organizational Structures. Lexington, KY

The Second Age of IT: Increasing the Return on Technology. *InSide Gartner Group This Week*, October 11, 1995

Singer, Larry. 1995. IT Outsourcing-Wisconsin and Indiana Compared. *Government Technology* (8)12:105.

APPENDIX A:

Information Resource Project Funding Summary

Agency	FY 94/95 Dollars Appropriated by Legislature	FY 96/97 Dollars Appropriated by Legislature
Administration		
<i>MNet Telecommunications Infrastructure Project</i>		10,500,000
<i>Electronic Data Interchange</i>	757,800	
<i>MNet</i>	3,450,000	
Administrative Hearings Office		
<i>Calendaring and Scheduling System</i>		125,000
Arts Board		
<i>Networking and Information Sharing</i>		100,000
Attorney General		
<i>Integrated Information Systems Project</i>		700,000
Corrections		
<i>Minicomputer Upgrade</i>	500,000	
Board of Electricity		
<i>Licensing System Expansion</i>	50,000	
Finance		
<i>Statewide Systems Project</i>	15,000,000	2,800,000
<i>Accounts Receivable</i>	8,509,000	
Health		
<i>Vital Records Re-engineering and Automation</i>		590,000
Higher Education Coordinating Board		
<i>Video Network</i>	1,670,000	
Historical Society		
<i>Chief Information Officer Project</i>		47,000
Human Rights		
<i>Information System Enhancement</i>	40,000	423,000
Human Services		
<i>Child Support Enforcement</i>	6,401,000	
<i>Electronic Benefit Transfer</i>	3,000,000	
<i>MAXIS Operations</i>	30,472,000	
<i>Medical Management Systems</i>	4,800,000	
<i>Social Services Information</i>	250,000	
Labor and Industry		
<i>Daedalus Project</i>	5,000,000	2,500,000
Municipal Board		
<i>Local Area Network & Database</i>	40,000	
Natural Resources		
<i>Revenue Accounting</i>		63,000
<i>Training Program, Regional Networks, Automation</i>	810,000	
Nursing, Board of		
<i>Disciplinary and Licensing System Project</i>		843,000
Peace Officer Standards Training		
<i>Technology Upgrade and Database Creation</i>		60,000
Pollution Control Agency		
<i>DELTA Project</i>	3,700,000	2,487,000
Public Safety		
<i>Criminal Justice Data Model</i>	125,000	

APPENDIX A:

Information Resource Project Funding Summary

Public Service		
<i>Document Imaging System</i>	84,000	
Public Utilities Commission		
<i>Local Area Network & Document Imaging System</i>	317,000	
Trade and Economic Development		
<i>Network Operations and Information Management</i>		990,000
<i>Community Profile Database</i>	100,000	
Transportation		
<i>IRM Implementation</i>		7,000,000
<i>Administrative Information</i>	1,500,000	
<i>Geographic Information</i>	1,500,000	
<i>Planning, Architecture & Standards</i>	660,000	
Veterans Home Board		
<i>Home & Central Office Informatin System</i>	100,000	
Zoo, Minnesota		
<i>IRM Environment, Technology Upgrade and Systems</i>		200,000
Total	88,835,800	29,428,000



APPENDIX B:

Information Policy Office

Update**Wake up call...Inevitable Changes Loom to Deal With Year 2000**

It is estimated that 90 percent of business applications will fail in the year 2000 if they cannot recognize the new millennium. This estimate is provided by Gartner Group, a well-known technology research firm. Gartner indicates an 80 percent chance that this will occur. This problem will affect every aspect of our lives from credit cards to retirement benefits.

Will this affect governments?

Absolutely! Government applications will also experience failures if corrective measures are not taken. Computer systems that support critical government applications such as revenue collections, taxes, welfare benefits, medical insurance, criminal records, licensing, educational aids and many others may not be ready to deal with the year 2000.

Agencies must act now to determine the effect the year 2000 change will have on all

applications and take action to correct the problems immediately!

What exactly is the year 2000 problem?

In the late 1950s through the 70s, computer memory that was needed to store data and computer programs, and to do the many computations required to support government and business, was costly. Programmers looked for ways to use memory efficiently. For example, expressing dates as six-digit combinations (e.g., 01-01-95), with only two digits for the year, was a good way to save considerable computer memory. It also saved time when the date was entered and ultimately saved money.

This was not a problem until businesses, such as insurance companies, needed to express the year 2000. Without an additional digit for the century indicator, Jan. 1, 2000 would be entered in

the computer as 01-01-00. The computer program interprets the "00" as 1900, rather than 2000.

Another example is when the computer calculates your age in the current year. If you were born in 1952, the computer takes 95 (the current year), subtracts 52 and the answer is 43. However, the same question in the year 2000 will force the computer to take 00 and subtract 52, which will make you -52 (not born yet). Clearly this could cause problems for agencies who rely on computers to do age computations.

What can be done to address this problem?

In order to correct the problem, agencies need to review every computer program used to support agency business functions. All programs that use dates will likely need to be corrected.

Please turn the page...

Welcome to Update

Welcome to the return issue of IPO's *Update*. It will be published periodically to inform agencies of IPO's activities, and to facilitate a two-way dialogue with our stakeholders. We hope you find it useful -- please call us with your suggestions.

November 1995

Problem needs immediate attention to prevent further escalation

Steps to follow in addressing this issue are:

1. Form an agency task force with representatives from various functional application areas. The task force should be charged with determining the extent of the problem within the agency, exploring alternative solutions and recommending a strategic approach to solving the problem.

2. Inventory agency computer systems and identify the computer programs that support agency functions and activities. Include information on platforms, databases, and operating systems programming languages.

3. Determine the resources (dollars and people) available to address the year 2000 problem. Resource availability will be an important driver for setting the scope and priority for resolving the year 2000 problem.

4. Identify programs (from #2 above) that have data problems and provide detailed specifications for these programs. Analyze and identify the use and location of date-oriented calculations in these applications.

5. Consider options for addressing the problem. Determine whether it is feasible to replace entire programs,

correct databases and specific applications, or correct only selected parts of computer programs.

6. Select appropriate options and implement. In selecting options, think strategically about how each program supports the overall business plan for the organization.

Computerized tools are available to help locate and fix date problems. Many consultants and vendors provide tools and/or consulting services to assist in addressing the year 2000 problem.

How long will it take, and how much will it cost, to fix the problem?

This depends on how far into the future or the past application systems are projecting computations, and how many programs use dates for computations and reporting.

Costs will vary depending on the severity of the problem and the number of programs affected. Agencies need to assess the extent of the problem within their programs before costs and time to fix can be estimated.

Who can help you?

Gartner Group and Forrester

(another technology research firm) have information on addressing the year 2000 problem. A number of vendors and consultants have software tools and methodologies available that will help with the difficult task of locating date problem areas within programs. Some of these consultants and vendors are listed below. Agencies need to work together to address this issue.

The IPO office has some reference material on this issue that you might find helpful. Please contact us at (612) 296-5643.

Some consultants/vendors available to help with the year 2000 problem:

Adpac/System Vision 2000
Cap Gemini
Compuware/Xpediter Xchange
Computer Horizons/Signature
2000 (COBOL and PL/1)
Coopers and Lybrand
Data Dimensions
IBM ISSC & LE/370
Isogon/Tic Toc
James Martin & Co.
Micro Focus/Revolve
Peat Marwick
Quintick
SPR
TransCentury
Viasoft/Enterprises 2000
Hardware & 4GL vendors