IT funding strategies for the 21st Century: Building a comprehensive array of investment tools

A report to the Minnesota Legislature

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Executive Summary

For Minnesota to remain competitive, vibrant and prosperous, state government needs to modernize. Minnesota's obsolete government operations infrastructure can no longer meet the needs of citizens in today's 24/7/365 world, nor can it support agencies as they strive to accomplish policy goals in crucial arenas such as education, health, human services, energy, public safety and economic development.

The Governor's Drive To Excellence program created the foundation for transformation. The legislature, building on the Drive and on the Governor's Executive Order, made a compelling case for changing the face of government based on business process and technology innovation. The IT Master Plan, mandated by the legislature and submitted in January 2007, was the first major step in envisioning, building and implementing strategies to transform government operations.

To create a "Minnesota Advantage" for the 21st century, we must commit to changing not only the technologies that carry out government programs, but also the underlying business processes. Methods and philosophies that characterized "brick and mortar" operations for 150 years will clearly not be adequate for a digital age and a connected world.

Just as we make long-term investments in maintaining our physical infrastructure, the same sort of long-term investments in our information infrastructure will be necessary to transform government programs. The old model for funding technology is not sustainable in view of the challenges it faces. Flexible and creative approaches to funding business and technological change must be devised and deployed to supplement traditional funding methods. Vendor participation, innovation funding, bonding and user funding are among the new and flexible funding mechanisms that should be considered.

This paper seeks to inform the policy makers of the need to create IT funding strategies that are needed urgently to facilitate and manage this multi-year undertaking. By doing so, we will be able to create a culture of innovation, change and transformation in government. Accompanied by improvements in planning, governance, information sharing and systems delivery, advanced technology can be leveraged to transform the quality, impact and effectiveness of government services.

About this document

Under provisions of Minnesota Laws 2007, Chapter 148, Article 2, Section 82:

FINANCING OF ELECTRONIC LICENSING SYSTEM.

The state chief information officer shall study the feasibility of alternative financing options for the purpose of developing and maintaining an electronic system for business and occupational licenses. The chief information officer must report the results of the study to the chairs of the senate State Government Budget Division and the house of representatives State Government Finance Division by January 15, 2008.

In satisfying this requirement, the Office of Enterprise Technology conducted a study of current and potential funding mechanisms, evaluating their strengths, challenges and proper application for Minnesota. This document summarizes the results of the research and analysis project. Building on the results of this study, a separate recommendation for funding the completion and operation of the electronic licensing system has been prepared and distributed to the required legislative parties.

Over the past decade, a number of studies have documented and analyzed some or all of the options, discussing in non-specific settings the advantages and disadvantages of each, and their appropriateness in various circumstances. The bibliography lists the major published reports that informed and influenced the outcomes of this current study. The intent here is not to recreate these earlier documents, but update some of the practices to reflect the contemporary environment.

This effort is designed to give policymakers a condensed description of the most common variations of funding being used, proposed, or considered for use in state and local government. In the pages that follow, these major funding mechanisms are summarized, along with their advantages and issues, and the key steps to using them in Minnesota are outlined.

The document was prepared by a small working group of executive branch information management and budget experts and legislative staff members familiar with the theory and practice of public finance, and with outside resources versed in current methods for managing investments in technology. Their experience and insights were invaluable to the results of the study, although sole responsibility for the specific recommendations as to the use of these methods lies with the State CIO.

Introduction

Prior to World War II, the first tentative steps toward information management by use of computers began to change the business environment. Similar to the Industrial Revolution of the 17th and 18th centuries, the initial impetus for using computers was the realization of labor savings — in the modern case, through automation of repetitive data-processing tasks. The decision was often a classic cost-benefit analysis comparing the cost of implementation against the labor savings realized by laying off staff no longer needed to capture, review, store, retrieve and act on information entered on paper forms.

This simple approach has changed as more powerful computers became economical and ubiquitous in business and government. Instead of data processing, information processing is a more apt descriptor of the role of information technology, or IT. This goes well beyond automation, and uses the data management and computational capabilities of the computer to complement and extend human judgment and enhance worker productivity. The significant cost savings through sheer automation are, for the most part, now a relic of the mid-20th century investments in mainframe computing.

As a result, we now take a different approach to assessing the advisability of IT investments by considering three conditions of technology use:

- Does the technology add value, with or without direct savings?
- Do enterprise technology investments (as in complex systems) provide greater value than do the basic individual computing environments of the past?
- Does the fact that business functions and complex systems are highly integrated—increasing the risks of system failure — change the value equation underlying the business case for investment?

The change to information management strategies using computers in mainstream business processes has complicated decision-making about technology. While the cost of hardware has generally declined as a function of capacity and speed, the overall cost of systems has often increased as developers have added previously unavailable functionality, increased the speed and accuracy of business processes, and allowed for much greater efficiency in processing complex transactions. Value is now the primary test in comparison to the cost of development and implementation of new or replacement systems, and service levels have supplemented ROI as a measure of success.

Fundamental changes in the complexity of technology has increased the "churn rate" — the effective turnover time of specific technologies — and made constant renewal of hardware and software a business imperative. Business managers feel, often with justification, that the dependence on outside markets and technological developments drives their information technology budgets more than internal business needs.

The risk of system failure has also increased with the expanded degree of integration of computer systems with business functions. The response to a major computer meltdown is no longer to bring in temporary workers for manual processing of data. Business processes and mission-critical information management is so dependent on technology that even relatively minor interruptions in computer support can have devastating — and highly visible — impacts on customer satisfaction, data integrity and service levels, and therefore on public trust in government.

As systems have increased in complexity and importance, the cost and impact have increased significantly. In the case of major financial, manufacturing and

government systems, the implementation costs alone may run into hundreds of millions of dollars, dwarfing the costs of the buildings and other capital assets of the organizations they serve.

For state agencies, raising funds for a new or replacement system is a challenging task in a biennial budget environment. Some sources have identified the normal life expectancy of a major traditional private sector information system to be seven to ten years; in the past, mission-critical business systems in government have been used for 15 years, and often much longer. However, annual changes and new legislation can force the effective re-creation of a system throughout its useful life. Thus, the actual cost of owning a system is much more than the cost to build or procure it.

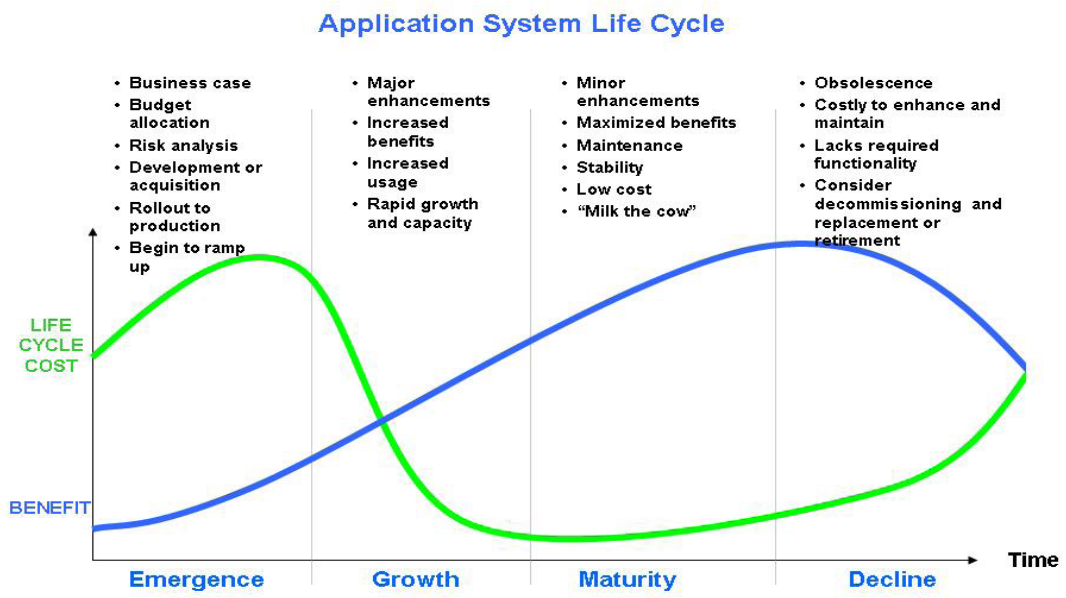
Given their complexity and integration, IT systems are costly and time-consuming to develop and manage, and are more like capital investments than regular operating expenses. While expenses such as payroll and grants are relatively predictable and grow steadily over time, IT systems have a life cycle with distinct phases. Each phase brings different management challenges and different levels of cost versus benefit. For systems to be implemented successfully, management must account and plan for the total cost of ownership—all of the costs and benefits that accrue across the system life cycle.

The combined implications of criticality, complexity and cost has forced management to be more aware of two characteristics of modern information management: the **systems life cycle** and **total cost of ownership.**

Systems Life Cycle

Like biological systems, information systems have a defined life cycle, from conception to expiration. This has been described in many models, but most share a common set of organizing concepts and vocabulary.

One way to define this life cycle is in terms of the OET systems model, which describes four discrete phases: **emergence, growth, maturity and decline.** The diagram below shows the phases and the general cost and benefit curves associated with each.



Phase 1: Emergence

The first phase of a system includes the identification of a business need and the development or acquisition of a technology solution that helps meet that business need. The emergence phase typically includes a structured approach to planning, design and implementation that incorporates a business case analysis, a risk analysis, identification of business requirements, a disciplined design process, and a testing and training phase leading up to the rollout of the production system. Real transformation in business processes through reengineering can only occur if it begins in this phase.

The development of any system normally uses a project management approach that incorporates "best practices" for each of these tasks. The project management methodology typically follows a governance process that provides oversight of project timelines, goals and deliverables, and a formal process for making the decision to proceed at each milestone. Failure to observe these best practices often results in project failure.

The extended timeframe and high costs for planning, development, and implementation can make the emergence phase very difficult to fund, because few discernible benefits are realized until after the system is substantially complete and available for use. A common

practice in the private sector is to allocate the planning and development budget on a milestone basis, postponing the final and full commitment until the value of the investment (and likely success of the project) is demonstrated as the milestones are achieved and goals are met. The term "value equation" is often used to compare the total benefits (financial, service, quality and security) with the net cost of the new system over the old methods and systems.

The most common problems in this phase are not technical, but stem from weak project leadership and failure to observe design discipline and sound project execution. The most effective preventative measures against project failure are sound governance, milestone funding, and good project management.

Phase 2: Growth

A period of adjustment and refinement of system components typically follows successful implementation of the new system. This growth phase gives the organization time to adjust to the new tool as the benefits of the system begin to be realized. Ideally, the system will bring significant enhancements to business processes, most often in the form of advanced functionality, increased throughput, improvements in quality and availability of information, and additional empowerment of staff. But these benefits may be accompanied by increased stress and cost as system functional anomalies ("bugs") are discovered and as workers learn new procedures.

One paradox of new systems can be a measure of too much success: the system works so well that usage increases and productivity gains tax other elements of the overall system and infrastructure, and may even exceed operating cost estimates.

Typical problems in this phase arise from lack of attention to training, user support and communications. As in an organic system, the relationships in the organization and in the supporting applications are dynamic and must be closely monitored so refinements and corrections do not interfere with the realization of benefits. Generally, the costs of the system after implementation are dramatically less than during development, although the operational costs may well increase over those of the system being replaced.

Phase 3: Maturity

This is a period of routine maintenance and generally of steady operation. The complications of the new system typically have been worked out and the workforce and customers are used to the characteristics and procedures in the new environment. Stability, reliability and efficiency should be expected.

However, this stable operating condition can only be maintained with regular reinvestment to keep program and environmental components up to date. These include routine upgrading and updating of the technological components — hardware, operating systems, security and so forth — as well as regular changes to program logic and output as dictated by changing business requirements.

Modern component design, good documentation, change management practices and application architecture can reduce the costs and burdens of maintenance and modification, and in the process extend the life expectancy of the system substantially. Generally not visible to either users or business managers, these activities are very crucial to the ongoing success of an application, and must be provided for as part of normal operating procedures.

Phase 4: Decline

As the system loses performance, efficiency or relevance, a decision must eventually be made to reinvest in the application, phase it out or retire it. This is not a function of simple chronological age; instead, it is a judgment that the system no longer meets the needs of the organization and has achieved the status of technical or functional obsolescence.

Technical obsolescence occurs when the necessary hardware and software components that support a system are no longer available, reliable or economical to maintain. **Functional obsolescence** is the condition where the programmatic aspects of the system no longer meet contemporary business needs at an acceptable level of performance for legislative requirements. The two do not necessarily coexist; it is common for a system that still meets business needs to be so technically obsolescent as to be too risky to use. More commonly, a system may still function technically but no longer meet critical business needs, particularly when additional legislative requirements, program needs or emergency developments arise during the course of the system's life cycle. These two states of obsolescence are distinguishable from an *obsolete* system, which is no longer either technically or functionally adequate.

Actual system failure — the complete breakdown of functionality — is relatively rare in well-run organizations. Instead, a kind of cybernetic entropy becomes the norm: the system gradually loses efficiency and effectiveness, and reductions in value are tolerated until they compromise the productivity and quality of operations.

Although many systems can be upgraded through major remodeling, the decision to replace or remodel is a crucial one, and should be based on the same compre-

hensive business case analysis as initial implementation. Avoiding short-term costs by relying on patches to a fundamentally obsolescent application may cost much more in the long run because of operational compromises and reinvestment costs. Operating for an extended period of time in a state of obsolescence can result in a series of compromises whose cumulative impact compromises the organization's ability to carry out is mission and exposes it to unnecessary risk of a system failure.

Because of the degree of integration of information systems with business processes, the replacement or retirement of a system can be highly risky for the organization. In most cases, prudent risk management requires that work begin on replacement or renewal well before the expected date for the new implementation, and that a robust regimen of testing for the new system.

Accurately estimating costs that may be expected in each phase is difficult, but some general numbers are available. The following table shows some of these likely numbers. As the chart notes, annual maintenance and operating costs — not including program modifications — make up a significant proportion of the life cycle costs. This is why the impact of a new system is so profound if the legacy application is not retired: its operating costs are not available to offset the costs of the new system. E-government systems in particular are prone to operational deficits if they add a service delivery channel instead of replacing an old one.

System life cycle costs

(Compiled from various authoritative sources)

Project phase	Percent of final cost
Planning/assessment/predesign	5–15%
Detail design	15–25%
Development programming	25–40%
Technical infrastructure and acquisition	5–20%
Testing and integration	5–20%
Implementation, training, acceptance	10–15%

Annual system maintenance and operating costs are typically 25%–35% of initial development costs.

Total Cost of Ownership

From a modern leadership perspective, a major step toward program improvement is providing accurate estimates for planning, acquisition, operational cost containment, reinvestment and replacement/migration. These elements comprise the Total Cost of Ownership (TCO) and life-cycle resource management, which has a planning and management horizon many times longer than the biennial budget framework.

A complete TCO for a project may be difficult to produce, given the high level of detail required. However, even if exact figures are not known, simply estimating TCO helps identify what costs can be reasonably expected given a particular set of assumptions, including list price discounts over a defined period of time, generally years. This is a far more useful number than conventional estimates based primarily on direct IT costs as reflected in budgets.

Lifetime costs need to be taken into consideration in order to build in adequate funding for their support and maintenance. The supplementary or indirect costs associated with technology investments are often substantially greater than their initial purchase price and can contribute as much as 60 percent to 80 percent of the overall TCO. Nearly half of these technology costs lie outside of the information technology department's budget. In the current era of e-business, client/server and peer-to-peer systems, the costs of owning, managing and maintaining computer systems often is much higher than the initial costs related to hardware and software purchases.

The Office of Enterprise Technology, working with the departments of Finance, Human Services, Revenue and Administration, developed a Total Cost of Ownership Model to help agencies and systems leaders identify these costs for existing systems.

TCO estimation is less useful when it comes to projecting life cycle costs for a new system, because there are so many variables in architecture, platform, data base, development and maintenance. These estimates, which are critical to funding decisions, are better informed by TCO data, but the budgeting process places far too much credence in cost figures based on general norms or historical data, particularly when they are prepared before planning and design of the actual system has commenced. This point of view supports a phased approval process that begins with a business case and continues throughout the project management process.

Funding IT in Minnesota

Since IT systems are long-term investments, raising funds for these systems in a biennial budget environment can be a challenging task. Normal life expectancy for a major IT system may be seven to ten years in the private sector, but in the public sector, a system may be used for upwards of 15 years. Therefore, planning for total life cycle costs is difficult within the standard two-year budget cycle and four-year planning horizon. Significant modifications may also occur during the life of a system due to new legislation, political management changes, and shifting citizen demands. Thus, the actual cost of a public sector IT system may vary dramatically from initial estimates.

Under current practices and statutes, planning for total life cycle costs and eventual retirement or replacement of an information system tends to be limited by the appropriation practices under the biennial budget process. The appropriation process and accounting rules have the effect of forcing long-term processes through an analysis and decision cycle that emphasizes short-term priorities. Although time tested and well understood, the process reflects limitations of applying a biennial planning cycle to an environment of continual change.

The "siloed" nature of Minnesota's budget process can also inhibit creative solutions across state government. The state has not yet found effective mechanisms to budget for IT investments across bienna, to share core technologies across agencies, or to capture and reinvest savings from operational improvements across legislative committee borders.

In recognition of these issues, the state IT Master Plan identifies better resource management as one of the eight key strategies for improving IT management. The cornerstone of better resource management is the development and deployment of funding strategies that reflect the full system life cycle. To be successful, this will require changes to both funding mechanisms and decision-making processes.

The overall environment and immediate political basis for decisions can also inhibit creative solutions within and across agencies, because there has been no effective mechanism for capturing and reinvesting savings from operational efficiencies or from reductions in purchase costs or total cost of ownership, and no effective means to set aside funds for planned investment across biennial borders. This has changed somewhat with the creation of the enterprise technology fund, but many of the mechanisms for data gathering and analysis are still in development.

The cost and the business value of information technology as an enabler for business operations makes it one of the most significant cost areas in the annual state budget — over a billion dollars each biennium — and one of the most important in terms of impact on policy and program outcomes. The same degree of structured and rigorous analysis that accompanies large Capital Budget items should be employed in large systems requests.

Best practices in both public and private sector entities also suggest that the state needs to take advantage of existing laws to create an effective investment pool, and to create agency incentives for cost savings. Allowing for more thoughtful commitment of resources for mission-critical processes is an essential component of good financial management. Characteristics of a good IT investment management process include the following:

- Systems proposals for funding can rely on funding for normal operation during the life cycle of the system.
- Systems owners can set aside dedicated funding from operational savings during the life of a system to facilitate their retirement, upgrade or replacement.
- Executive and legislative decision processes recognize the need for acknowledging the comprehensive costs of ownership in the planning process.

- An interagency investment pool operates for enterprise products and services outside the biennial budget process.
- Reporting on true costs of developing and operating systems is uniform, clear and accurate.

Although the financial environment and governance process is superficially different among levels of government and between public and private entities, the fundamentals of sound investment management are relatively similar. In all cases, the objective is to maximize the value of investments while delivering efficient systems. The ideal funding system to support this kind of investment environment will be:

Flexible — able to match funding tools to situation and needs across the enterprise.

Thoughtful — supporting long-term business and organizational needs without crisis.

Strategic — supporting long-term program and enterprise direction by sharing and leveraging assets.

Accountable —ensures effective controls, responsible governance and sound performance management.

Prudent — makes most effective use of state buying power and fiscal restraint.

The following sections outline a number of strategies used in Minnesota or elsewhere to fund technology systems. Each section describes a strategy (or category of related strategies), identifies benefits and problems, and briefly discusses what can be done to make the strategy viable for Minnesota. Currently, the state relies mostly on direct appropriations, rates or allocations, agency internal funding, and to some extent user fees. The remaining strategies represent new directions for Minnesota: technology investment fund, vendor participation, bonding, and lease-purchase.

It is important to recognize that no single strategy is ideal for all situations, and some systems may require a mixture of funding strategies. Since these strategies differ significantly in approach, it may be helpful to consider each strategy as it relates to three general categories: sources of funds, loan mechanisms, and decision-making strategies.

Sources of funds

As with other government expenditures, there are only two sources of funds for technology: new appropriations and reallocation of existing appropriations. New appropriations may be in the form of direct appropriations from the general or other funds, or statutory dedication of specific revenues. General obligation bonding may also be considered a new appropriation because the bond proceeds represent new money to individual agency budgets and the debt proceeds are paid by the state as a whole. Reallocation of existing appropriations occurs any time base appropriations are re-purposed through legislative or executive action—such as internal reallocation by agencies, charging rates for new systems, implementing statewide allocations, or pooling agency contributions.

Loan mechanisms

If the full cost of a system cannot be paid up front, the state may use loan mechanisms to spread out the cost or to delay the cost until after the system is built. The principal and interest on a loan would then be repaid from new or existing appropriations. States use a variety of loan mechanisms, including vendor participation, revenue bonds, lease-purchase, or technology-specific loan funds.

Budgeting strategies

Budgeting strategies change how the state makes decisions about IT investments. Changes might include allowing for better coordination or consolidation across agencies, making IT investments more transparent, or better aligning decision-making with the pace of technological development. The governance changes associated with a technology investment fund could be considered a budgeting strategy.

Direct Appropriation

Appropriation by legislative committee action to agencies through the biennial budget process is perhaps the most common form of new systems funding. Agencies request funding for new systems or modifications, and if approval is given, the funding is made available for the specific purpose identified in law. The language or subsequent budgets may provide for ongoing operating expenses across the life cycle, but this is not the norm.

Benefits

The same well-understood process is used for most spending decisions.

IT requests are handled as part of the general agency budget, tying systems expenses to the business initiatives they support.

The committee processes tend to balance options for spending against one another in a fairly transparent process.

Challenges

The regular appropriations process is not set up to facilitate critical analysis of highly technical proposals.

The process does not provide time or funding for adequate project planning. Agencies are expected to have fully conceived projects and realistic cost estimates before requesting appropriations, when in fact systems projects require technical predesign and design processes similar to capital projects before seeking funds for implementation.

The two-year budget cycle and four-year planning horizon are generally too short to plan for the full life cycle of an IT system.

The process discourages coordination across agencies or committees, making enterprise-wide investments difficult.

Systems projects are often not scalable, limiting the usefulness of political compromises for lesser appropriation amounts.

IT systems commonly generate unanticipated funding needs that do not fit in the rigid biennial budget schedule.

Attempts to conduct ongoing research and development (R&D) and continuous quality improvement initiatives are usually lost in the press of new programs and systems.

Assessment

The clarity and accountability inherent in the regular appropriations process suggest it will always be the dominant funding method for technology. This process works adequately for smaller, self-contained systems requests it but does not work well for large, highly complex, or urgent systems requests. The recommendations at the end of this document will address needed systemic changes.

Rates or Allocation

The principle behind the rate system in its various forms, such as fees and allocation, is simple: the consumers of a service pay for that service. Purchase of rate-based services is usually voluntary, but where an enterprise approach makes the best business sense, the service may be mandated.

In Minnesota, an elaborate and highly complex rate-setting process overseen by the Department of Finance is used to determine the rates for each service, based generally on the unit cost for the activity and the volume of consumption. During this process, rates are generally calculated to make each service self-sustaining without any subsidy. When it isn't possible to match specific services with a specific rate, as with security, desktop support and similar global services, allocating the costs across the organization on a per-seat basis may be more appropriate.

For services of value to the overall organization, such as architecture, planning or financial services, the preferred choice is to allocate the costs across the entire organization on a basis such as per-employee or percent of budget. In some cases, a Service Level Agreement (SLA) covering an array of support services for a flat, contracted fee will be drawn up between the service provider and customer agency. The funds for paying the rates are from the regular operating funds of agencies.

Benefits

- Clients pay only for specific services rendered, ensuring a direct connection between the benefit received and the cost of the service.
- Since rates are usually charged for optional services where there are alternative service providers, market pressures serve to keep rates competitive.
- Customer input, federal audits, and Department of Finance oversight help ensure that rates are set at break-even levels without covering unrelated expenses.

Challenges

Federal regulations require systems investments be amortized over several years and that excess earnings attributable to federal accounts be repaid. For this reason, it is difficult to accommodate long-term initiatives like research and development (R&D) and continuous quality improvement efforts. Similarly, investments in improved operation that benefit multiple customers and programs can be difficult to accommodate.

Break-even rates are predicated on customer estimates of future consumption, which are often inaccurate.

Due to the long lead time required to produce a schedule of rates, there is a high risk that environmental changes will cause over- or under-charging; that, in turn, leads to federal liability.

Governing regulations and political realities restrict the meaningful use of retained earnings for capacity investments and renewal, which can create situations of overcapacity and shortages in the same year.

Assessment

This is a substantial, well-defined and appropriate mechanism for funding ongoing operations, with good accountability and generally stable sources of revenue. It is not useful for funding system development or major modification because of the lengthy rate-setting processes and the limitations of the method in providing large infusions of capital for project funding.

Agency Internal Funding

Many agencies use reassignment of existing resources to fund needed system development, modification or upgrades. This represents everyday management choices relating to priorities within the agency, and normally provides for needed low-visibility projects like agency infrastructure, small applications and renewal that would not otherwise rise to the level of overall executive branch priorities, nor get appropriate attention in the legislative process.

Benefits

- Agencies can respond to changing needs and provide for long-term health of their systems by utilizing temporary funding from position vacancies, internal savings and other intermittent sources of agency funds.
- This method allows for efficient use of agency human resources and promotes operational stability at reasonable risk.

Challenges

Without a clear IT plan and internal governance process, funding may go to less-critical projects within the agency.

Funding is subject to considerable variability due to economic cycles, unpredictable agency costs and shifts in priorities.

Agency choices may not reflect overall state priorities, and may result in systems created without outside monitoring and use of tools inconsistent with the state architecture.

Assessment

This will continue to be a mainstay of normal maintenance for many agencies, but the proper project discipline and observance of state architecture needs to be ensured. Agency internal funding does not provide for enterprise coordination of core technologies.

User fees

This strategy involves charging individuals or businesses directly for a state service in order to finance technology required to deliver the service. The underlying principle is that only those who benefit from the technology pay for it. This approach is gaining currency in many state and local jurisdictions.

User fees can be structured in a variety of ways:

- Legacy system user fees: charged for use of outdated technology to fund and encourage transition to new technology
- Broad user fee: a single rate charged for all transactions with a new or existing system
- Short-term surcharge: charged for a specific time to finance system start-up costs
- Targeted user fee: charged to specific populations of users who can most easily bear the cost (often in conjunction with a subscription/premium service fee)
- Subscription/premium service fee: charged for the higher quality service or greater access provided by a new system
- Indirect user fee: an allocated or transactional charge billed to agencies for use of an enterprise system, which agencies then pass on in varying ways to their customers

Many state agencies charge fees to cover the cost of government services—which may include technology used to deliver the service. Fewer agencies charge fees specifically to develop or replace technology systems associated with these services.

Benefits

System costs are paid by those who benefit from the system, rather than all taxpayers.

This method removes IT systems from direct competition with more public priorities like education and health care.

User fees follow the current trend toward "unbundling" services; they keep costs from being subsumed within operating budgets.

Challenges

Higher fees for licensing or regulation activities may discourage compliance.

Annual fee revenue may not be sufficient to pay high up front costs of system development.

It is administratively difficult to implement surcharges on a variety of fees because most fees are set in law and would need to be amended individually—unless the legislature provides authority for fee changes without its review.

Under current law, fees classified as departmental earnings must not significantly over- or under-recover the actual cost of providing a service over a two-year period, which does not match the typical life cycle.

Assessment

Whether user fees are appropriate for a particular project depends largely on how the fee is structured. User fees work well when the technology will benefit a particular population that is large enough to support the system and can afford to pay for it. User fees may also work well in conjunction with loan mechanisms. For example, the state can take out a loan to build a new system, and then leverage the system to generate fees to repay the loan. Or, if annual fee revenue is insufficient to pay high upfront costs, the state may use a loan mechanism to spread out the cost.

Technology Investment Fund

A technology investment fund is designed to provide a funding source for state systems initiatives that do not fit well into the traditional appropriation cycle. To set up a technology investment fund, decision-makers must determine uses for the fund, designate a funding source, and create a governance structure.

There are three primary uses of such a fund:

- enterprise "venture capital" seed money for enterprise-wide development projects.
- accumulation of funds for replacement of systems over the period of their life cycle.
- loans to agencies for planning and predesign projects, or for development or modification efforts in emergency situations.

Money may be directly appropriated to the fund, or come from savings due to operational efficiencies such as leveraging enterprise purchasing power or business process improvements. Agencies could also deposit end-of-year funds, funds made available by internal reprioritization, or from external sources such as grants, settlements and cancelled activities, or carry-forward funds earmarked for specific agency life cycle investments. Finally, the fund could receive contributed funding — grants or voluntary transfers from other public and private entities for enterprise infrastructure betterment.

Funding decisions could be made by the legislative or executive branches, or a combination of the two.

Benefits

Savings could be placed in a new fund or in the information and telecommunications technology systems and services account in furtherance of strategic IT objectives.

Savings or other funds can be dedicated for large replacement projects beginning well in advance of the need.

Depending on how the fund is structured, it could encourage mid- to long-term planning of systems.

A technology fund could be used to encourage pilot projects, research and development efforts and creative new approaches to improving business processes.

The fund approach encourages cooperation, innovation and a culture of continuous improvement.

Challenges

Decision-makers could choose to reallocate the funds at any time, endangering long-term investment plans.

Decision-makers must be committed to enterprise coordination of technology investments. For example, captured savings may occur in one area of the budget, but the IT needs may be in a different area; funds would have to be shifted between agencies and committees.

Strong enterprise governance, guidelines and recovery mechanisms need to be in place.

Assessment

Setting aside funds for technology requires political commitment, especially during tight budget times. Protection for captured or contributed funds needs to be granted, and a long-term perspective on transformational change must be encouraged.

Strong commitment must come from both the executive and legislative branches to make a technology fund work. To justify dedicated funds for technology, governance structures, accountability measures, and project results must be clear. If the fund is used to capture savings, the state must develop a standard method to measure and capture the savings.

The success of this approach requires discipline in allowing a long-term accumulation and payback cycle without redirecting funds to short-term priorities. A 10-year planning horizon is generally accepted as necessary for this purpose.

Vendor participation—public-private partnerships

Vendor participation funding can create a mutually beneficial public-private partnership between the state and a private company. Unlike traditional purchaser-vendor arrangements, where the state receives a product or benefit for a set price, vendor participation partners share risks and rewards from cost savings or revenue increases.

This partnership can take several forms. For example, in shared product development, the state and its partner jointly develop a product, such as application software. The state has rights to use the software, and the private partner has the right to exploit its commercial potential. Another form is developer/benefits funding, where the state gets new equipment or systems, and the vendor gets some of the savings or revenue that those new systems make possible. Yet another mechanism is for the vendor to advance the funding for the new system when other sources are inadequate or unavailable.

Benefits

An upfront state appropriation may not be necessary for system development, depending on how the partnership is structured.

The vendor shares risks, and thus has a vested stake in success of the system.

The vendor can bring additional planning resources to the project that the state might not be able to access.

Vendor financing agreements require meticulous detailed development, which places a premium on accountability and design discipline.

Challenges

This form of financing is typically more expensive than state financing, because of the need to cover the higher cost of private capital, plus interest on the vendor's costs and profit.

Because vendor financing is mutually beneficial, it is essential to avoid even the appearance of conflicts of interest in choosing vendors.

Since operational savings and new fees are dedicated to repaying vendor financing of startup costs, this may not be a suitable way to fund life-cycle costs.

Public distrust of outsourcing may play a factor in design of a vendor financing agreement.

Vendor financing agreements require meticulous, detailed development, particularly in those contracts involving cost or benefit sharing. Therefore, they can be difficult to develop and manage.

These agreements require very strong project management and control to avoid expensive delays and changes, or overdependence on the vendor.

There is less opportunity to develop in-house expertise, and a mechanism for knowledge transfer (training of state staff by vendor) is necessary for future system operations.

Assessment

This is a useful tool in the right situations, but it is also one that carries significant risk and costs for the state if not properly managed. It requires strong system and financial analysis, and close collaboration among executive branch agencies to see that an appropriate agreement is in place; this is a crucial requirement for a successful public/private partnership.

A strong set of guidelines to direct the investment discussion is also critical. The vendor must be as committed to the success of the project as is the state. A balance of power is necessary, and the benefit to the state in the partnership must be ensured by means of contractual provisions such as performance measures, knowledge transfer mechanisms, future refinancing options, shared risk, and the ability to end the partnership with little cost to the state. Transparency, communication, and trust are crucial.

Bonding

Bonding has been used by several states and local governments, most often for very large-scale or enterprise-level systems with a projected long life expectancy. It generally covers development/purchase and implementation, including hardware; typically the bonded amounts exclude operating costs and future modifications/updates.

There are two different types of bonding available to Minnesota state government: general obligation (GO) bonds, which are repaid from the state's general resources, and revenue bonds, which are repaid from a specific, dedicated revenue source. The two types of bonds also differ in permitted uses, marketability, and cost.

When it comes to financing technology investments, the difference in permitted uses is key. While revenue bonds can be used for most purposes, the Minnesota Constitution limits the use of GO bond proceeds "to acquire and to better public buildings and other public improvements of a capital nature." Although technology systems are generally considered to be capital investments, they do not fall under the strict definition of public improvements according to the high legal standards required by the bond market. Interest in using GO bonds for technology systems has waxed and waned in state government, but the state's independent bond counsel (appointed by the Attorney General) has consistently found that the constitution does not permit it. Without an unqualified opinion from bond counsel, the state could not sell GO bonds in the market.*

Even if Minnesota policymakers could overcome the constitutional issue, GO bonding for technology would still present financial challenges. Since technology systems projects usually require large upfront appropriations for complex back-office functions, they often have difficulty competing in the operating budget process. Although policymakers look to the capital budget process as an alternative, the financial constraints inherent in the operating budget process are actually magnified in the capital budget process. Bonding for technology projects would spread the cash outlay over time, but would not eliminate the challenge of appropriating large amounts in a single biennial target. If technology projects cannot compete in the operating budget of over $30 billion, they likely will not fare much better in a capital budget of closer to $1 billion.

Revenue bonds are not subject to the same constitutional constraints, even though there are similar practical considerations such as bond market desirability. With revenue bonds, a dedicated revenue stream such as user fees, surcharges or similar dependable source is used to repay the bonds. Since the general resources of the state are not committed to repayment, the bond holders rather than Minnesota taxpayers bear the risk of default. Although the risk is legally shifted to bond holders, political leaders can still feel intense pressure to compensate bond holders if the state fails to pay its debts. Given the higher risk facing bond buyers, revenue bonds usually fetch higher interest rates and are therefore more costly for the state.

Benefits

This method avoids the situation when operating funds are in competition with the generally large upfront costs of enterprise systems, and spreads those costs over the life cycle of the technology.

Bonding leverages the state's low cost of capital for major systems investments.

Bonding also recognizes the strategic nature of major information systems as a virtual venue for service delivery. The bricks-and-mortar office with a walk-up service desk—a traditional capital investment—is being replaced by online customer service offerings, and the state will be moving even further in this direction for both agency and shared applications in the future.

Decision-making processes for bonding emphasize pre-design and design before full implementation—a better match for the life cycle of IT systems projects.

The state has high credit ratings, well-established laws and guidelines for bonding, and long experience in selling bonds.

Revenue bonds are not subject to the state's 3 percent GO bond debt limit guideline.

Challenges

Although public IT systems may last up to 12 to 15 years, IRS guidelines for the useful life of technology are typically three to five years. The market will demand higher interest or simply not buy bonds where the length far exceeds the useful life of the system.

In order to secure lower interest rates on revenue bonds, the state must pledge revenues in excess of the actual annual debt service (generally at least one-and-one-half times the annual debt service).

* The state constitution does permit the purchase of technology-related equipment necessary to prepare a new or substantially renovated public building for its initial intended purpose. For example, when bonding to construct a building, a portion of the proceeds can be used to install wiring and cabling, outfit server rooms, and purchase some personal computing equipment.

Debt service payments take precedence over all other spending including salaries, which can jeopardize state program that take on revenue bonds.

Bond buyers expect there to be tangible assets ("security") that can be seized in the case of default. Modern systems investments include few tangible assets, with most of the cost going to software and vendor services. With less security to back the bonds, the market will demand higher interest rates.

The additional interest cost must be carefully weighed against the foregone benefits and opportunity costs, particularly for major systems.

Revenue bonds are currently subject to two state debt limit policies: total state agency debt (revenue bonds and lease purchase) must not exceed 3.5 percent of personal income in the state, and total state government debt (agency debt plus GO debt) must not exceed 5 percent of personal income in the state.

Assessment

Since revenue bonding is not subject to the same constitutional constraints as general obligation bonds, it may represent an option for IT funding, specifically, for systems that have a fee structure or other dependable revenue source to sustain them. The short repayment schedule and high amount of pledged revenue required for revenue bonds to be marketable may make this option too costly for most systems projects.

However, while in concept the intellectual property value of major software creations is analogous to land or building value, it represents a more volatile, even ephemeral, value proposition as security for financing. There could and should be a multi-part test for eligibility for bond funding that takes into consideration these elements:

- **Significant, if arbitrary, value threshold.** Why a threshold? The state wouldn't bond for a single $5,000 server, or go through the cost and inconvenience for the bond process for office software. This method should be reserved for substantial programs that are either mission-critical, enterprise-level or broadly applicable, and require some minimum level of investment.
- **Life expectancy.** By the same cost-to-bond logic, a longer life cycle (with normal maintenance and upgrades to ensure proper functioning) would be desirable for bonding. Most commercial business software has a functional life of about seven years, with major enterprise systems (ERP, production control, CRM) going longer. In government, life cycles more than twice that long are normal, with systems over 30 years old not uncommon.
- **Scope of benefits.** Just as the legislature and governor judge the benefit of a construction project to customers, constituents or other stakeholders in deciding to build and bond for a physical structure, bond financing could be limited to systems serving the enterprise or substantial stakeholder populations.

Lease or lease-purchase of systems

Lease-purchase arrangements allow the state to spread out the cost of its systems purchases over a set period of time. Lease-purchase payments are applied to the purchase price of the hardware, software, service or equipment, meaning that once all payments and interest have been paid, the equipment becomes state property. The state currently negotiates a capital lease arrangement annually for major equipment purchases. Minnesota does not currently employ lease-purchase financing for systems development.

As the price of hardware decreases, and the amount of hardware power increases, leasing and lease-purchasing makes more sense. Because of near-constant improvements and enhancements, equipment now tends to have a shorter life cycle, but is relatively inexpensive compared to prices of a decade ago.

Historically, leasing authority for application software and other intellectual property has been limited to "bundling" situations where the price of software is no more than 20 percent of the total cost of a turnkey package of hardware and software, and there is a significant threshold to be met before the lease arrangement can be implemented.

Benefits

Upfront costs are avoided by spreading payment over time, which prevents "sticker shock," or, in the case of the enterprise technology fund, helps keep rates stable.

This arrangement leverages the state's low cost of capital for equipment purchases.

Because no upfront funds are needed, projects can be started quickly (although sufficient funds must be available to make scheduled payments).

More of the projected risk is shifted to the private vendor; contracts can include low-cost "out" clauses for the state that permit early termination if necessary.

Currently, it is a buyer's market, meaning low interest rates for the state and vendors offering flexible options.

Challenges

Based on industry standards for marketability, the current limit for "soft" costs (software, vendor services, or maintenance contracts) can be no more than 20 percent of the total financing package.

The terms of lease-purchase contracts must be less than the useful life of the equipment as defined by IRS guidelines, and therefore must be repaid in three to five years.

Debt service payments take precedence over all other spending including salaries, which can jeopardize state program that take on lease-purchase contracts.

Lease-purchase contracts are subject to two state debt limit policies: total state agency debt (revenue bonds and lease purchase) must not exceed 3.5 percent of personal incomes in the state, and total state government debt (agency debt plus GO debt) must not exceed 5 percent of personal incomes in the state.

Assessment

The state's capital lease arrangement works well for equipment purchases, supplying low-cost equipment for regular service delivery and systems development projects. Since the program is structured to meet market demands for a high level of hard costs and short repayment schedules, it could not be used as currently structured to finance full systems projects. It is unclear whether the market would bear longer-term leases with higher levels of soft costs at an interest rate the state is willing to pay. The state should explore whether lease-purchasing could be a viable option for systems projects by talking with market experts and surveying other state's experiences.

If lease-purchase is used to finance systems projects, the contracts must be well planned by the state to ensure low risk. Performance measures must be defined. A mechanism to ensure knowledge transfer from the vendor to IT employees is key to the maintenance of the system.

Outsourcing

Outsourcing—contracting for organizational support services from a provider outside the organization—is a common, and growing, business practice in the private sector, and is becoming increasingly important in government as well. While outsourcing can yield important benefits if carefully planned and implemented, it also has limits and significant requirements if it is to be cost-effective.

IT outsourcing typically is of two kinds: management of a category of technology services, such as infrastructure, data center, hosting or desktop support; and provision of actual business services and supporting applications such as a lockbox, data collection, or communications together with enabling technologies.

Outsourcing differs from contracting for specific project deliverables or for staff augmentation in that it relies on the external vendor to manage one or more routine operational support processes. (A general principle of outsourcing is that you should not outsource mission-critical or core-competency activities.)

Governmental entities have historically been slow to move to outsourcing for mainstream processes. The reasons include cumbersome contracting processes, absence of good measures for benchmarking, labor objections, political sensitivity and lack of cost incentives.

However, IT services are commonly outsourced in both public and private organizations. In the right settings, and with proper planning and service level agreements, it has been a successful strategy in many situations. However, there are both successful and unsuccessful examples of both kinds in public and private sector organizations, with the attention to detail and clarity of performance measures usually the best predictors of the results of outsourcing.

Benefits

The goal of outsourcing is to enable an organization to focus on mission-critical, core-competency activities by offloading the operational or financial burden of support services to an outside vendor, in the least obtrusive manner at minimal cost. Outsourcing can:

- Control costs for services and skills such as data entry, coding, cabling, telephone services and content migration. Whether one-time or recurring, these labor-intensive tasks typically offer the best financial benefits for outsourcing vendors.
- Spread the high cost of capital-intensive operations, such as a mainframe data center, across multiple users. Each agency then pays only for what it uses, not for the full cost of a single-user installation.
- Enable agencies to respond quickly to changes in the business environment without having to make a major investment or experience loss of service.
- Compensate for lack of a workforce with specific skill sets. For some organizations, the cost of recruiting, training and retaining a technology workforce may make it worthwhile to offload the work to a service provider.
- Avoid the need to replace a legacy environment. Organizations facing significant hardware and software upgrade costs for migration may choose instead to contract with a service provider who has, or can, spread the capital investment over a broader customer array or longer financing arrangement.
- Manage finances over time. One positive aspect of a long-term service contract can be the predictability of maintenance and operational costs over an extended period of time. This reduced exposure to short-term budget cycle or IT market instability is one of the advantages of outsourcing in a reasonably static technological environment and may be valuable where cash flow management is critical.

Challenges

Costs can be a major issue. While in some situations savings are possible, the economics of outsourcing need be carefully examined on a case-by-case basis. For example:

Transition costs from in-house to outsource operations can be considerable, as can the cost of oversight and contract management.

Operating costs for routine, simple transactions and activities may be cheaper when performed by a vendor using less expensive labor, but complex tasks generally are cheaper when done in-house. Realizing cost savings requires careful attention to the details of actual costs and the schedule of services performed by the outsourcing vendor.

Costs of modifications and maintenance can be as high or higher, depending on the resources and rates available for vendor talent and the nature of the technical and operational environment.

Difficulty in crafting comprehensive service level agreements that specify enforceable quality, service, performance and cost benchmarks with appropriate mechanisms for compensation, redress of grievances and exit points.

Loss of control is a major issue in outsourcing, as the cost of shifting vendors can be very traumatic to an operation.

Rapid changes in markets, vendors and product sets can leave outsourcing agencies vulnerable where transition costs, contract regulations and vendor selection produce conflicting and potentially expensive complications.

Pressure from responding vendors to standardize or adapt to vendor offerings may prevent changes in operations that may benefit the state or its customers.

Commitments to vendors or to their proprietary products and services may limit future agency choices or impose financial penalties for change over time.

Disengagement from an unsatisfactory vendor or upon change of vendor for contractual or takeover reasons can be very difficult and very expensive. This is particularly true in the case of a vendor going out of business and unable to cooperate in the transition.

Depending on the nature of the contract, difficulties in controlling subcontractors, contractors' employees and compliance of vendors with other government requirements (such as tax status, immigration laws and labor laws) may cause embarrassment or additional liability to the contracting agency.

Unless tightly controlled by both contract and oversight, issues of data and system security have additional complications and legal ramifications once organizational boundaries are crossed.

Workforce issues abound in outsourcing either new or existing functions:

- Knowledge transfer (both ways) and workforce renewal become significant issues in outsourcing, particularly as dependence on the outsource vendor increases over time.
- Union issues of opportunity, loyalty, seniority and employee rights can cause major internal and external friction and political complications. The current legal restrictions against outsourcing existing activities also act as constraints on agency freedom to act.

Assessment

Outsourcing has been and should continue to be one of the management tools available for us to use in optimizing the application of our resources to our mission. It is not a panacea, nor is it even appropriate for many situations. But properly employed, it offers significant advantages in specific applications. The choice of this approach, however, must follow a comprehensive assessment of the benefits and costs, must incorporate a thorough and well-conceived service level agreement, and must be done in an intentionally restrictive legal environment.

Matching life cycle and funding method

While almost any funding mechanism can work, certain approaches are better for different phases of the life cycle, and for different applications based on size, complexity, cost, purpose and user community. For this reason, the optimal match of method and situation is not likely to happen by chance.

To provide the right combination of solutions, the state needs to incorporate into the decision-making processes activities that

- Define funding criteria and controls for each approach
- Define an overall review process
- Impose rigorous financial analysis and systems planning disciplines
- Obtain OET, DOF approval prior to committing to an approach
- Establish working relationships among agencies, budget and technology leaders and legislative bodies to ensure that an optimal mix of revenue stream matches up with priorities, and that meaningful performance measures are present.

The following table shows which funding mechanisms are the most likely to be appropriate for each phase of the systems life cycle. The circumstances of each system, availability of resources and solutions and the current financial conditions of the state all affect the solutions analysis.

Even the very general picture painted by this table needs some qualifications. Consideration of any funding approach should be based on sound fiscal analysis as part of the business case approval process. With the exception of general obligation bonding, the impediments to utilizing these approaches are generally matters of administrative policy, contracting rules, or, at most, legislative practice. When the situation arises and the institution's comfort level with creative financing permits, the funding options process can readily provide an appropriate solution.

	SYSTEMS LIFE CYCLE			
	EMERGING (Design, Development)	GROWTH (Implementation, Operation)	MATURITY (Maintenance, Enhancement)	DECLINE (Obsolesence, Entropy)
Appropriation	✖	✖	✖	✖
Rate-based			✖	✖
Internal Funding	✖			✖
Investment Fund	✖			
Vendor Participation	✖	✖		
Bonding	✖	✖		
User Fees		✖	✖	✖
Lease	✖		✖	✖
Outsourcing	✖	✖	✖	✖

Recommendations

Taking all of the information considered in preparing this study, several clear indicators emerge for the need to fundamentally change the ways we plan for, approve and implement IT investments. The following proposals are based on both public and private sector experiences.

It is important to note that although many of the constraints on the utilization of these methods are imposed by policy and are not statutory or constitutional, changing them without careful study of the reasoning behind them and the consequences of changing them is not advisable.

Recommendation: The state needs to take **a long-term investment approach** to funding technology projects.

The state should recognize the long-term nature of IT investments, the correlation between business and systems success, and the implications of inadequately providing for the total costs of ownership across the systems' life cycle.

IT funding plans should include not only system purchase, but also cover necessary improvements in business practices and supporting technologies, regular operating and maintenance expenses, and end of life costs.

Long-term IT funding plans should be insulated as much as possible from short-term shifts in the state's financial or political context.

Recommendation: The state must **supplement its historic methods for funding** enabling technologies.

It should recognize the need for flexibility in appropriately matching opportunities, solutions and funding mechanisms.

The state should improve use of existing tools such as direct appropriations, user fees, and agency internal funding. Examples include improving the use of agency internal funding by providing agencies more flexibility in carrying forward funds for system replacement and renewal. Improving the use of direct appropriations for technology would involve implementing a phased approval process for major systems and better coordinating technology funding decisions across agencies and legislative committees, as discussed below.

The state should continue to explore the opportunities and limitations of new financing tools such as revenue bonding, lease-purchase, and vendor participation, and for those that are viable, develop policies for their use.

Recommendation: The state needs to further **develop budget policies and practices that promote enterprise decision-making** on technology.

For the state to implement enterprise decision-making on technology, it must develop effective mechanisms to budget for IT investments across biennia, to share core technologies across agencies, and to capture and reinvest savings from operational improvements across legislative committee borders.

Except in cases of emergency, IT investment proposals should be subjected to rigorous and independent review within the executive branch prior to consideration by executive and legislative decision-makers in the budget process. The review should include analysis of the business case, IT architecture, planning and project management, and risk and security assessments.

Recommendation: The state should **adopt a phased-approval process** for major systems where continued funding is tied to completion of milestones in the design, planning and implementation phases of a project.

In a phased approval process, as in the capital budget process, full project funding would be made available or planned for up front but dollars would flow as certain milestones are achieved.

To ensure continued funding, projects would need to demonstrate:

- a sound business case that is tied to agency and state goals
- proper planning and project management
- consistency with state architectural standards
- a feasible financial plan (submitted for analysis in advance of putting a formal budget request before executive and legislative decision-makers)
- key deliverables produced during implementation
- a well-integrated and continuous oversight process involving the executive branch IT governance process and legislative review processes.

Recommendation: The state should encourage innovation and collaboration by creating and maintaining a **"Venture Capital" fund.** This fund can capture savings and contributions for use in modernization or replacement of aging systems.

The fund should encourage agencies to explore business process reengineering, technology innovation and truly innovative business practices built on empowering technologies.

The fund should be protected against withdrawals for short-term budget fixes by a commitment to a 10-year planning horizon.

The fund can also provide resources for formal research and development.

The fund should have clear approval and reporting processes and a full array of metrics for mission-critical systems.

Appendices

A. Summary table of states utilizing various funding options

B. Master Plan resource management language

C. Bibliography

A. Summary table of states utilizing various funding options

	Direct legislative appropriation	Rate-based funding	ETF–Investment Fund	Vendor participation	User fees*	Lease or lease-purchase	Bonding – Revenue or G.O.
Alabama		X			X		
Alaska		X			X	X	
Arizona	X			X	X		
Arkansas	X			X		X	
California	X	X		X	X	X	X
Colorado					X		
Connecticut	X					X	X
Delaware	X			X			X
D.C.	X						
Florida		X			X		
Georgia	X			X			X
Hawaii	X					X	
Idaho		X				X	
Illinois					X		
Indiana		X			X		
Iowa	X					X	
Kansas	X				X		
Kentucky	X				X	X	
Louisiana	X	X			X		
Maine		X					
Maryland	X		X			X	
Massachusetts		X				X	X
Michigan		X					
Mississippi		X			X	X	
Missouri	X	X	X				
Montana						X	
Nebraska		X			X	X	
Nevada						X	X
New Hampshire			X		X		
New Jersey	X				X		
New Mexico	X	X				X	X
New York		X					
North Carolina	X						
North Dakota	X	X			X	X	X
Ohio	X			X		X	
Oklahoma	X						
Oregon					X		
Pennsylvania	X				X		
Rhode Island					X		
South Carolina	X	X	X		X	X	
South Dakota	X		X			X	
Tennessee		X	X		X	X	X
Texas	X	X		X	X	X	
Utah	X	X	X		X	X	
Vermont		X					
Virginia	X	X	X	X	X	X	X
Washington	X	X			X	X	
West Virginia					X		
Wisconsin		X			X	X	
Wyoming	X						

Major sources used for this data include NASCIO, "Innovative Funding for Innovative State IT," 2003, and the individual websites of state IT and CIO offices. This table was updated in October 2007, based on telephone and electronic surveys of the states, but may not be comprehensive due to differences in reporting.

B. Master Plan resource management language

The state's *Information and Telecommunications Technology Systems and Services Master Plan, 2007,* commonly called the "Master Plan," laid out eight strategies for improving information management. Strategy 8, below, deals with effective management of resources—money and people.

Strategy 8: Resource Management

We will promote effective stewardship of the state's primary resources—people and money.

Context

Building and maintaining a stable and secure computing environment requires commitment of both large amounts of money and of significant numbers of highly skilled workers—and the obligation to obtain maximum value from the tax dollars provided by citizens.

Managing resources requires a thoughtful approach to identifying the outcomes to be achieved by the business process and the value that can be added by enabling technology. Instead of spending on technology, stakeholders should invest in key business processes supporting the agency mission.

The two resource areas affect this relationship in distinctly different ways.

Funding

A coherent, realistic funding process for IT life-cycle expenditure must provide for planning, acquisition, operational cost containment, reinvestment and replacement/migration. These elements comprise the Total Cost of Ownership (TCO).

Nearly two dozen states—Minnesota among them—have identified various strategies for tracking and creatively managing the full funding cycle for systems. Approaches include software lease-purchase, performance-based contracting, bonding, outsourcing, and benefits funding (paying suppliers out of BPR-caused savings, contingent on actually realizing those savings). No single approach is ideal for all situations, but together they represent a valuable range of options for systems modernization funding, and these options should be explored.

Workforce

State employees are the state's most valuable—and expensive—information assets. A generational handoff is coming as large numbers of key employees reach retirement age. These employees take with them a wealth of institutional history and practical experience that will be difficult to replace. Simply recruiting new employees will be difficult enough because of the financial challenges facing government and the competition for talent from the private sector.

The state must invest in staff to help them keep their skills current and their work challenging. Beyond skill identification, the state must improve its support for employee development, for recognizing and rewarding high-demand skills, if it is to compete with other areas of the public and private sector. Specialties like project management, reengineering, information security and emerging technologies are in high demand, and the state should expand its efforts to attract, develop and retain employees, and to deploy them to greatest effect across agencies.

Initiatives

- Expand and mandate the use of standards-based purchasing to keep procurement costs to a minimum and reduce life-cycle costs through cost-effective maintenance programs.
- Provide adequate funding to modernize all state hardware and infrastructure.
- Develop new approaches for funding to provide for life-cycle total cost of ownership for software development with a significant projected life span.
- Expand the existing enterprise technology fund to provide initial seed capital.
- Institute a program for ongoing, rigorous analysis of investments, values and business processes for both existing applications and for proposals for new development.
- Create partnerships with educational institutions to pilot new technologies.
- Reflect market conditions affecting competition for specialized skills in reengineering, security, project management and emerging technology.
- Develop a "virtual consultation center" to enable knowledge gained through one agency's experience to be captured and shared across the enterprise.

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