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GETTING BEYOND
BUDGET
Dust
TO SUSTAINABLE
MODELS
FOR FUNDING
INFORMATION
TECHNOLOGY

Today's students and faculty expect—and demand—world-class access to electronic information technology (IT). At the core of a modern college or university IT infrastructure is its communications network and the literally millions of servers connected to it on campus and throughout the world, with associated applications, data resources, services, and online communities of colleagues. How to pay for these resources while providing the maximum benefit for the institution is the question we explore in this chapter.

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Generating adequate resources is a challenge because the use of IT in higher education has matured greatly in the past few decades, and IT expenditures are increasing faster than general operating budgets at many institutions. In 2001–2002, for example, the median per capita increase in IT budgets for the schools that participated in the COSTS project was 11% (Smallen & Leach, 2002). Which funding models will provide the sustainable foundation on which colleges and universities can build the information resource infrastructure they need?

“Budget dust” is a term sometimes used to describe the unplanned temporary budget surpluses that, in good years, remain unexpended at the close of fiscal accounting periods. In this chapter, we use the term more broadly to mean temporary funds from any source that are not expected to be available on an ongoing basis. Many IT organizations have depended on these unpredictable “dusty” windfalls as the primary source of funding for new initiatives or as a substitute for sustainable funding strategies.

IT organizations cannot thrive, or even remain viable, on budget dust. They need a scalable, long-term funding strategy that derives directly from the strategic objectives of the institution. This strategy must fit the campus management culture and its priorities, while encouraging efficient use of IT resources. We know of no single formula or template that fits the needs of all institutions. However, several common building blocks have been successful at many campuses.

Each institution needs to develop its own customized long-term IT funding strategy that will most likely be a blend of these basic components. In this chapter we outline several goals that should serve as guiding principles for this design process. We then describe a few key strategies and funding mechanisms that are common in higher education. We close with some cautions for those who are developing funding strategies.

Design Principles

We recommend the design principles discussed in the following subsections for developing sustainable IT funding processes.

Align IT Resources with Institutional Priorities

A successful funding model must ensure that technology infrastructure and services are able to support institutional priorities. For example, if a college or university encourages faculty to use technology to enhance the learning experience, the revenue stream for replacing desktop computers must be sufficient so that faculty who use technology in their courses can continue to use the latest versions of software and adequate hardware. Funding for technology should also take into account whether the campus leaders want the campus to be a pioneer, close follower, middle of the pack, or trailing institution with respect to the application of technology to its core processes.

Integrate IT with the Management Culture

IT is a strategic resource, and management at all levels should consider its priorities at the same time, and in similar ways, as it evaluates other strategic campus needs. If the campus must make a trade-off between a new wing on a building and a wireless network, for example, the same group should be setting priorities for both matters.

Promote Efficient Use of Institutional Resources

Charging for telephone services encourages people to find the least expensive way of making calls, for example, during evenings and weekends. Charging a monthly fee for each network access point can encourage departments to make wise

choices about the location of network outlets. It is important to recognize that the time it takes people to accomplish a task is a valuable resource. Centralized laser printing might save on the cost of laser printers but might also result in more time being spent by people going back and forth to the printer.

Support Institutional Technology Standards

To create a supportable and sustainable IT environment, the institution should promote standards to ensure interoperability of computer systems.

provide incentives through discounts to achieve adherence to standards. Note, however, that research activities often require nonstandard products.

Promote Effective Management of IT Resources

Issues such as security, reliability, and the quality and accuracy of information are central to managing IT resources effectively. Although general operating budgets may be allocated on a yearly basis, having multiyear fiscal plans and budgets for significant projects promotes stability and effective longer term management strategies.


When possible, special mechanisms should be in place to encourage innovative uses of technology throughout an organization. Good ideas spring up in the most unlikely places, and small grants or incentive funds as part of the yearly budget cycle can pay large dividends.

Facilitate Generating Additional Resources for IT

Colleges and universities have multiple income sources. Some IT charging processes make it feasible to tap more than one of these income streams while others make it more difficult. For example, if a particular service, such as e-mail, is provided freely to the general campus community, most government research grants cannot be charged directly for this service since it is free for general users. Additionally, some agencies and foundations will not support full overhead charges, but will pay directly for services used in grants and contracts.

Ensure Reasonable Transaction Costs for Funding Mechanisms

Billing expenses can become a major cost component for an IT service. For example, telephone companies



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Some organizations are developing well-planned campus-wide information technology architectures and the IT funding process should support these designs. Selecting, reviewing, and managing preferred vendors for servers, desktop computers, and generic software (word processing, spreadsheet, presentation, etc.) simplifies technology support, often results in volume purchasing discounts, and encourages competition. Many institutions have centralized purchasing guidelines that encourage conformity to standards. Others

spend significant resources simply processing the information required to render a monthly bill. Some funding models are just too complex and too expensive to implement. When faced with this phenomenon, many organizations develop bulk rates for general classes of service rather than detailed usage charges. For example, most retail Internet service providers, including colleges and universities, charge a single monthly fee that is independent of how many times the customer dials into the service or how many bytes are transferred.

Build a Fair and Equitable Funding Process

If users believe that a funding or budgeting process is fair and equitable, they will cooperate with it. If they believe that it is arbitrary or pernicious, they will find ways to subvert it. The current confused and unworkable state of copyright regulations with respect to Internet usage of materials is an illustration. Until the music industry invents a way of charging for products that its customers believe is fair and equitable, we will continue to see wide-scale violations of copyright, bitter conflicts, and unworkable regulations.

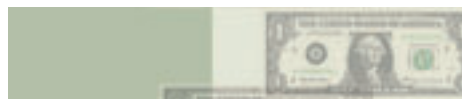
Strategies and Building Blocks

We consider here three primary sources of revenue for a college or university IT organization and four primary ways of obtaining funds from customers who control these funds. These sources must, in one way or another, cover the full costs of the IT operation.

The first, and most common, revenue source is general operating funds. This type of funding usually comes from the same source that supports faculty and staff salaries, the library, other academic services, and general campus operations.

A second source of IT funding is grants, contracts, and gifts. Government agencies, corporations, foundations, and individual benefactors provide these resources, usually on a restricted basis for specific activities, initiatives, and projects. The IT organization can be the direct recipient of such funding or a secondary recipient. In the first case, the IT organization is completely responsible for the project. In the second case, an individual researcher or another department gets the contract or grant and subcontracts work to the IT organization. Another way of generating

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funds from external organizations is through general campus overhead charges applied against contracts, grants, and gifts.

A third source of IT funding is direct charges to (1) individuals who use personal resources and (2) certain types of departments (for example, auxiliary services such as residential housing and parking) that pay directly for support services. Examples include telecommunications services to students in residence halls or apartments; computers, software, maintenance, and services purchased at cam-

pus technology stores; charges for remote access to the campus network; and technology fees charged to individual students. Most often these goods and services are available only to members of the campus community because of restrictions placed on the college or university.

Each of these three types of funding arrangements invites a different kind of input into decisions about the scale, variety, and beneficiaries of IT resources. As long as the IT organization pays attention to the needs of the group that is willing to pay, each funding arrangement can provide information from a different perspective.

To serve the needs of the broadest range of customers, the IT organization should have flexible charging models for services that fit the needs of the individuals who control these different funding sources. Again for simplicity, we limit our discussion to four fundamental models: centrally funded, usage based, taxed based, and combinations of the other three.

Centrally Funded Model

The centrally funded model (often called the *library model* because library services have traditionally been funded in this manner) assumes that the service is fully paid for by the institution directly through the operating budget of the IT department. The central administration, representing the campus community, is the primary customer, and users of a centrally funded service are not charged for their usage. This creates a need for some administrative mechanism to determine which services will be provided and who gets how much of a particular service. Advisory committees often provide input into these decisions.

This is the most common approach for allocating general operating funds. It is frequently used in institutions with

strong centralized decision-making processes. Many organizations use this method for activities that provide core services to wide audiences with relatively minor usage-dependent costs and in cases where the institution has an explicit strategy of encouraging access to specific resources. Illustrative services often include e-mail, web-based course management applications, course-related computing facilities, public access workstations, and base level network access.

Advantages of a centrally funded model include the following:

- *Conformity with organizational goals.* Core values and institutional goals are most easily promoted by centrally funding IT services that support these ideals.
- *Uniformity of services.* It is easier to ensure a consistent level of service for centrally funded IT initiatives than it is for services that depend on different departmental revenue streams. For example, at Hamilton College, replacement of desktop hardware and software, network servers and electronics, and data projectors are all funded centrally to ensure a consistent, supportable level of services.
- *Ease of enforcing standards.* Central funding can provide the carrot that enhances, or enforces, standardization.
- *Ease of embarking on new initiatives.* The most expeditious way to move forward on a new initiative is to fund it centrally.

Disadvantages of a centrally funded model include these:

- *Difficult to balance supply and demand.* Without accurate market feedback, it is very difficult to judge

what the appropriate budget for a service should be.

- *Difficult to stop services.* Users soon view centrally funded services as entitlements. With the growth in use of the Internet, institutions that provide centrally funded modem pools find it difficult to maintain service quality. At the same time, users of the service view it as an entitlement and are loath to switch to a commercial Internet service provider.
- *Hard to measure value of competing services.* It is very hard to determine the value of support services from the administrative center of a



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complex organization without market feedback.

Usage-Based Model

Usage charges can equitably recover some or all of the cost of a service, with those using more of the service paying more of the cost of providing it. Basic economic logic says that as long as we live in a world of scarcity, it is a waste of resources to produce services for which consumers will not pay. The test of this comes by setting price equal to the marginal cost of producing more

service and seeing what happens. Such usage charges really have two benefits. They discourage truly frivolous uses while providing valid feedback about whether service needs to be cut back or expanded. After all, if a shortage exists when the usage-charge equals marginal cost, then surely more service should be produced until no more can be sold at a price that covers marginal cost.

The case of IT may be a bit complicated, however. IT has many of the properties of a business that produces joint products—such as milk and cream—in which it is the sum of disparate consumers' payments that should cover the marginal cost of the service. Moreover, it must be possible to divide the service into controllable units (for example, cost per minute of a telephone call, or rent per year for a building).

Examples of areas in which colleges and universities commonly apply direct charges are voice telephony and goods and services supplied from a campus technology store including hardware support, application development, network connections and services, desktop support, and printing.

Advantages of a usage-based model are as follows:

- *Charges for services.* Charging for a service provides valuable information about the need for that service while at the same time providing mechanisms both to pay for the service and to discourage frivolous usage. For example, central IT organizations often charge hourly rates to provide system administration services for departments or to recover costs of "excess" data storage.
- *Generation of additional income.* A robust charging structure enables an

IT organization to charge customers for the IT resources they use.

- *Measurement of success.* A usage-based system generates considerable information that can be used to inform decision making.

Disadvantages of a usage-based model include these:

- *Hard-to-achieve strategic objectives.* Decentralized decisions made by independent departments and individuals will not necessarily be in alignment with strategic institutional objectives.
- *Promotion of "have" and "have not" departments and individuals.* Ensuring equal access to core IT services requires complex subsidies or "scholarships."
- *High overhead.* Usage-based models require significant administrative overhead.

Tax-Based Model

In tax-based IT funding mechanisms, a specific group that will benefit from a service is identified and individuals are charged a fee, or tax, because of their membership in the group regardless of how much they consume. The most common example of this approach is the *student technology fee* used by a great many colleges and universities, with the typical model being a course-based or term-based fee (Mallette, 2002). To allocate several administrative costs, not just IT expenses, Duke University uses a comprehensive allocation methodology based on the number of people in various units. Another example of a tax-based approach is the process of adding a monthly fixed charge to telephone bills to cover data networking expenses.

Advantages of a tax-based model are as follows:

- *Easy to explain, implement, and maintain.* Tax-based models are much easier to manage and to maintain than usage-based systems.
- *Generation of incremental resources.* To the extent that the tax applies to students, the revenue generated is incremental to the general operating budget of the campus.

Disadvantages of a tax-based model include these:

- *Opposition to fees.* There may be substantial opposition to the fee, especially among those who use the service less than the average, or not at all, because they feel they are taxed unfairly.
- *Scalability.* It is often difficult to generate the increased funding required to increase the scale of a successful service.
- *Demonstrable results.* If a tax-based

fee is advertised to support a specific service, specific results related to that service must be quickly demonstrated.

Mixed Models: Blends of the Basic Building Blocks

Many managers discover that a combination of the basic funding mechanisms produces the most appropriate design for a particular campus. Variables such as size, management culture, amount of research volume, current level of IT expenditure, type of IT service, and history combine and interact in complex ways on every campus. What seems completely natural in one environment may not work in another. On many campuses, one finds some services (like voice telephone and the technology store) that operate in full cost-recovery charging mode while services like basic e-mail and course-related computing are fully paid for

by the central administration.

Another common mixture is to utilize different models to support a single service. The common form of this mechanism is for the administration to fund centrally a substantial fixed cost (like space, utility charges, or the core campus backbone network) and then for the IT organization to charge the users directly for the marginal costs of their use. An interesting example of this approach is the *scalable network funding model* developed at the University of California, Berkeley (see cns-pao.berkeley.edu/netfunding/). The central administration pays for the campus backbone and base-level services for academic departments such as Internet connectivity and building wiring. Departments must pay for future incremental growth in these services and for unique advanced service requirements.

A major advantage of using a blend of models is that the overall process can fit well with the culture of the institution. A disadvantage is that the resulting process is complex and users are often confused as to why certain services are fully or partially funded centrally while others are priced at market rates. The reality is that most management processes in higher education evolve slowly over time. Rarely do we have an opportunity to design with a clean slate. Of course, when we mix models we bring along some of the advantages and the disadvantages of each of the components. The goal is clearly to develop a funding process that will ensure a consistent high level of IT services for the campus.

Six Sure Ways to Fail

Experience shows that despite the best of intentions, many management teams repeatedly make similar

mistakes as they strive to build a strong IT function and implement new projects. We now turn to a discussion of the most common of these pitfalls.

Starting Long-Term Projects without Funding

A common practice is to solicit grant or vendor funding for a developing infrastructure without having a strategy for the long-term maintenance, support, or replacement of these services. The publicity surrounding the creation of a new state-of-the-art computer laboratory fades away, to be replaced by outdated equipment and disappointed faculty and students. The old saying, "Be wary of gifts that eat" is appropriate in this context.

Equally common is the practice of beginning a new IT initiative with "budget dust" and hoping for long-term funding after demonstrating the project's success. In good years, or up-cycles, this strategy often works. However, in down-cycles it causes significant problems. Decaying infrastructure, overworked staff, and disillusioned users can be the result.

Focusing on Implementation and Neglecting Ongoing Expenses

Underestimating the full life-cycle costs of a project is a way of unintentionally making mistake number one. Even if the project is successful, the budget officer will be unhappy. The best way to avoid this pitfall is to get good advice from colleagues who have completed similar projects. Be wary of cost figures from vendors who are selling a solution. If you are an early adopter for a new service, build in a significant contingency fund at the beginning.

Charging for a Service That Was Free at One Time

If you intend to charge for a service in the long term, begin charging as early as possible. Taking away a perceived entitlement is much harder than adjusting a price, or modifying the form of a charging mechanism, that has already been in place.

Using a Secretive Top-Down Planning Approach

In higher education process is paramount. Involving the user community in the development of a funding model will result in a more acceptable result as well as widespread

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understanding of the costs of supporting technology investments. Both are important for a successful implementation. The significant upfront investment in education and persuasion is worth the time, although your patience may be stretched to the limit.

Neglecting to Test Funding Assumptions

A common implementation practice is to develop a prototype to test the feasibility of an innovative IT application or service. If you choose this

route, do not forget to develop a long-term funding model as part of the pilot project. Having an appropriate funding mechanism is a key ingredient to the success of most projects. Early in the process begin developing a model that has the capability of scaling with the expansion of the service.

Being Rigid

Developing appropriate IT funding models remains more of an art than a science. Recognize the value of retaining flexibility while experimenting with different funding models. Be careful, but not timid, in trying different approaches when you don't get it exactly right the first time.

Conclusion

Having a solid, well-designed set of funding mechanisms in place enables IT managers to plan for and execute longer range plans and strategies than would be possible in an environment where funding new initiatives depends on "budget dust." Today's high-priority challenges such as recruitment and retention of valuable employees, system and network security, wireless initiatives, high-performance networking, enterprise-level administrative initiatives, course management systems, portals, and general e-strategies to help transform the campus all depend on creative funding processes that will provide long-term support for these initiatives. Developing an appropriate funding model to support an IT initiative may be as important to its long range success as the quality of the implementation. *e*

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