

**Chapter 7**  
**Strategic and Financial Planning for**  
**Information Technology in Higher Education**

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## CHAPTER SEVEN

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# STRATEGIC AND FINANCIAL PLANNING FOR INFORMATION TECHNOLOGY IN HIGHER EDUCATION

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McRobbie and Palmer recognize the potential of technology to bring about major innovations in the entire teaching and learning process. They describe Indiana University's strategic plan for information technology, a comprehensive, university-wide effort that outlines the use of IT in research and academic computing, telecommunications, and administrative support, as well as in teaching and learning. The IT plan is accompanied by a detailed financial plan to help Indiana University meet the enormous fiscal challenges of an enhanced technological environment.

**I**nformation technology is fundamental to the teaching, learning, and research missions of modern universities. It is transforming the way universities do business; it is fueling major changes in research, creative activity, and scholarly communication; and it offers the potential for major innovation in the entire teaching and learning process. Information technology has become an essential tool for faculty, students, and staff who use it to organize their ideas, seek information, and communicate with one another and with the world.

“Architecture for the 21st Century: An Information Technology Strategic Plan for Indiana University,” published in 1998, outlines in detail Indiana University's strategy for information technology. That strategy for information

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technology must fit into the institution's broader strategic plan. Indiana University (IU) operates under a university-wide plan, The Strategic Directions Charter, comprising thirty major recommendations that address three broad themes:

- Establishing communities of learning
- Implementing methods of accountability and best practices
- Meeting the responsibilities of excellence

Established in 1994 under the leadership of IU President Myles Brand, this initiative has resulted in \$25 million allocated as seed funds for projects addressing the priorities outlined in the Charter.

In his 1997 State of the University address, President Brand set a challenge for Indiana University "to take the next step in institutional academic excellence and move into the very top tier of the nation's public universities." IU's strategy for information technology is a direct response to this challenge, to rise to a position of absolute leadership among public universities in the creative use and application of information technology (IT). The creation of new knowledge and the sharing of information are defining features of a modern university; thus the goal of excellence in the use of IT is an essential ingredient in achieving academic excellence for the institution as a whole.

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## Information Technology at Indiana University

Institutional leadership for information technology at Indiana University is the responsibility of the Office of the Vice President for Information Technology. The portfolio of this office includes University Information Technology Services (UITS) on the Bloomington and Indianapolis campuses, as well as the chief information officers positions on IU's five smaller campuses.

University Information Technology Services, with offices on the Bloomington and Indianapolis campuses, is responsible for the development of a modern information technology environment throughout the university in support of IU's vision for excellence in research, teaching, outreach, and lifelong learning. UITS comprises some 500 highly trained professionals with expertise that spans the field of information technology, plus 500 additional part-time employees. Many of the staff are nationally and internationally known for their accomplishments.

Central information technology services are supported with an annual budget of approximately \$70 million. These funds come from four chief sources: central university funds, the Bloomington campus, the Indianapolis campus, and the regional campuses. Above these base funds, there is in the current biennium direct

state funding to IU of approximately \$21 million per year designated for IT, with the intent on the part of the state to continue direct funding. There is also \$7 million in state funding dedicated to high-speed networking. Additionally, IU currently has external or grant funding for information technology in excess of \$40 million.

Information technology is central to a number of academic endeavors at IU: computer science, information science, engineering and technology; the physical, biological, and social sciences; medicine and the health sciences; and the arts and humanities. In the past year IU launched its first new academic school in over twenty-five years, the School of Informatics, and began enrolling students in its program in new media. Research at IU is conducted in artificial intelligence, cognitive science, robotics, high performance computing, logic and programming languages, and a number of fields that are influenced and enabled through information technology.

In 1999, IU received a gift of \$30 million from the Lilly Endowment to establish the Indiana Pervasive Computing Research (IPCRES) initiative, a major research and development effort focused on some of the fundamental technologies that will drive the twenty-first century information economy. This is the largest gift ever received by Indiana University.

The IPCRES initiative builds on IU's accomplishments in information technology in order to advance a program of basic research in software technologies and advanced telecommunications that will underlie pervasive computing. The overall strategy of IPCRES will be to significantly expand IT research in Indiana, specifically in pervasive computing, and leverage this research to expand the information economy in Indiana. Both activities—basic research and support for economic development—are fundamental to the mission of a public research university.

Key to this initiative will be establishment of six world-class research laboratories in areas fundamental to building the pervasive computing environment of the future. These IPCRES laboratories will be headed by researchers of the highest international standing, distinguished scientists recognized as leaders in their respective fields, who will attract highly talented young faculty and graduate students to join them.

As part of its overall strategy, IPCRES will leverage this research effort to expand the information economy in Indiana. Establishment of an economic development office will be central to these efforts. The goal of this office is to build on the technology developments and scientific discoveries of the IPCRES laboratories to create new businesses, to infuse new technologies into existing businesses, and to attract new companies to Indiana. It will also build on IU's involvement in national and international developments in advanced

telecommunications and software technologies that will underpin pervasive computing. IU is home to a number of world-class research programs in these areas, is centrally involved in Internet2 and a number of major international research networks, and has strong relationships with leading IT companies such as IBM, Microsoft, and Cisco.

IU's investments in information technology recognize and build on the strengths of IU as a multicampus institution with a formidable reputation in the arts, humanities, social sciences, basic sciences, and health sciences, and with an increasing emphasis on technology and applied science.

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## The Information Technology Strategic Plan

Indiana University's Information Technology Strategic Plan is the most comprehensive and far-reaching plan ever prepared for the development of information technology at IU. The plan is university-wide in scope, covering a period of six years, from 1998 to 2004.

The strategic plan outlines the use of IT in research and academic computing, teaching and learning, telecommunications, and administrative support. It recognizes the transformational power of IT in higher education and the pace of technological change, which call for flexibility and experimentation in every phase of IT planning and implementation.

The plan was developed through a five-month period of intensive effort, from January to May 1998, through the dedicated work of the University Information Technology Committee and four advisory task forces. Broad input was received from faculty, staff, and students across all IU campuses, including the campus IT councils at Bloomington and Indianapolis and the campus computing center directors.

Two major themes are woven throughout the ten major recommendations of the plan. The first is access. The plan should lead to improved access to information, computation, and communication for students, faculty, and staff. The second is life-cycle funding. The plan should put in place a reliable mechanism to sustain innovation through ongoing replacement and upgrading of information technology. The primacy of these themes is reflected in the strategic plan's recommendations.

### IT Strategic Plan Recommendations

1. Build a solid foundation of IT infrastructure and assure that sound fiscal planning permits maintenance of this infrastructure at state-of-the-art levels. A standard amount per year must be budgeted to support life-cycle replacement

of equipment and to assure appropriate levels of technical support for faculty, students, and staff.

2. Students, faculty, and staff should be provided with reliable access to computing and network services, on and off the campuses. The electronic borders between home, community, workplace, and campus should become invisible, at little or no additional cost over current telephone technology.
3. Incentives and support should be offered so that faculty and staff are encouraged in the creative use and application of information technology for teaching, research, and service. Tenure and promotion guidelines, merit reviews, fellowships, and grants all present means for helping faculty and staff move along the IT learning curve.
4. The university should assume a position of worldwide leadership in the use of IT to facilitate and enhance teaching and learning. There are numerous ways in which IT can enhance teaching and learning, particularly by increasing access to resources and increasing the quality of instructional methods.
5. To support research, the university should provide broad backing for basic collaboration technologies and begin implementing more advanced technologies. Advanced data storage and high-performance computing services, for example, are crucial to the ongoing support of university research.
6. Institutional information systems should be prioritized, so that they work together in a seamless manner and accommodate an ever-increasing number of users. Common interfaces and a common information delivery environment must be implemented to facilitate the integrated use of data.
7. Plans for a converged telecommunications infrastructure must be accelerated. The convergence of voice, video, and data technologies promise great savings and important new services if harnessed in a timely and effective manner.
8. The university must provide IT tools, infrastructure, and support services to students so that they may effectively engage in learning and research. This includes technology support centers and a seamless computing environment that crosses the borders between campus, home, and residence halls.
9. The digital library program should be expanded and a digital library infrastructure should be developed to support research, teaching, and learning. IT has transformed the availability of resources; state-of-the-art libraries and professional librarians will be invaluable in helping the university community manage and mine the unprecedented amounts of digital information accessible today.
10. Policies and procedures must be developed to protect the security of IT resources and data, safeguard personal privacy, and ensure that intellectual

property rights are respected. At the same time, traditional values associated with academic freedom, including access to information and freedom of discourse, must be preserved and promoted.

### **Implementing the IT Strategic Plan**

Each of the ten major recommendations in the Indiana University IT Strategic Plan, states an overarching goal and vision, accompanied by a number of specific actions intended to achieve that vision. Exhibit 7.1 expands on recommendation 4 related to teaching and learning, by listing several examples of supporting actions.

The IT Strategic Plan was presented to the university president and board of trustees in June 1998. There followed then a period of far-reaching consultation within the university. During the fall semester of 1998, more than fifty briefings on the plan were held for faculty councils, advisory committees, campus chancellors and their senior staffs, student organizations, and others. Input and comment were requested and advice as to priorities was particularly sought. The results of these briefings were overwhelmingly positive, and the recommendations and priorities of the IT Strategic Plan received the strongest possible endorsement from the IU community.

Also during the fall semester, senior staff in the Office of the Vice President for Information Technology developed a preliminary estimate of the budget required for full implementation of the IT Strategic Plan. Successive versions of this budget were reviewed by the Office of the Vice President and Chief Financial Officer who initiated the process of securing state funding for this undertaking. This budget estimated the cost of each individual action in the plan, identified onetime and ongoing expenses, determined how the expenditure of funds would be allocated among the campuses and across the major organizational divisions of research and academic computing, teaching and learning information technologies, telecommunications, and university information systems. Accompanying the budget was a preliminary implementation plan for each of the ten recommendations and sixty-eight actions in the IT Strategic Plan. This budget and implementation plan was presented to the IU president and board of trustees in December 1998. With their approval, implementation began in earnest in January 1999.

The implementation plan involved the continuation of many ongoing activities, the reshaping or refining of some existing activities and services, and the development of a number of new initiatives and programs. The plan did not presume that all funding needed for implementation would come from the central

### EXHIBIT 7.1. IT STRATEGIC PLANNING AND TEACHING AND LEARNING INFORMATION TECHNOLOGY

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RECOMMENDATION: It is a goal of the IT Strategic Plan that Indiana University should assume a position of worldwide leadership in the use of information technology to facilitate and enhance teaching and learning. Information technology will facilitate and enhance teaching and learning by

- Improving access to the teaching resources of Indiana University
- Eliminating or reducing constraints due to time, place, method of instruction, or format of traditional university calendars
- Supporting and promoting the preparation of quality instructional content for use with information technology
- Fostering greater teacher and student interaction and promoting active student engagement
- Supporting more varieties of instructional formats
- Increasing access to information resources through the library and World Wide Web
- Providing "help desk" services to support asynchronous learning
- Creating a seamless environment for the development of a genuine distributed learning community for both students and faculty

Some specific actions to support this recommendation include the following:

- The Teaching and Learning Technology Lab and the Center for Teaching and Learning should be expanded, and new services developed where needed, to offer standard-level teaching support services for all faculty at Bloomington, Indianapolis, and the regional campuses.
- To support course tools development and initiatives in distributed education, UITS (through its Advanced Information Technology Laboratory) should evaluate Web-based and other network-based learning environments and offer faculty a comprehensive set of options to easily create, edit, revise, and maintain on-line course material.
- The university should offer, on a selective basis, intensive help in developing instructional material for delivery to IU students, for eventual offering as a marketable IU product, or both.
- The university should provide overall guidelines and direct support to help facilitate relationships with publishers for the commercial development and marketing of technology-based instructional materials.
- UITS should evaluate the opportunities to partner with faculty in the sciences to experiment with simulation-based laboratory courses and should be alert to other possible partnerships for the enhancement of instruction through simulation and visualization.

*(continued)*

### EXHIBIT 7.1. IT STRATEGIC PLANNING AND TEACHING AND LEARNING INFORMATION TECHNOLOGY (*continued*)

- To support existing and emerging faculty initiatives in basic skills education, the university should explore the use of IT to aid in the teaching of these basic skills.
- UITS, with the new associate vice president for distributed education, should help coordinate initiatives in distributed education, by helping departments and schools implement new programs, without duplicating existing services. UITS should continue to assist programs of distributed education, helping to identify supported and supportable technologies that can satisfy their complex requirements.
- UITS should ensure an available and reliable infrastructure of networks, servers, storage, and applications for the support of on-line courses and other new learning experiences.
- UITS should initiate changes to university information systems that improve the quality of instruction, service to students, or manageability of the distributed education program itself.

Implementation plans were developed for each individual action item above and for all sixty-eight actions recommended in the IT Plan.

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*Source: "Architecture for the 21st Century: An Information Technology Strategic Plan for Indiana University," available at <http://www.indiana.edu/~ovpit/strategic/>. For a recent progress report on accomplishments toward these and other actions in the IT Plan, see "UITS Accomplishments Report," 1999–2000, <http://www.indiana.edu/~uits/cpo/accomplish/>.*

IT organization or from any single source. Each action and recommendation in the IT Strategic Plan was evaluated to determine

Which had resources already committed to their accomplishment

Which offered partnership opportunities to pool central resources with campus or departmental resources

Which required new allocation or reallocation of resources, either centrally or across the campuses, schools and departments.

It was clear from this analysis that new funds, reallocation of existing funds, and continued investments in current initiatives would all be necessary.

The implementation plan developed by the Office of the Vice President for Information Technology proposed a number of strategies for allocating funds:

Central base funding of central services

Using central funds to match campus or departmental funds for distributed services

Onetime seed funding for the start-up of new services

Temporary “bridge” funding to allow for the transition to local base funding

In addition, some IT services may be funded through user fees or through direct funding at the individual campus level.

This implementation plan formed the basis for detailed logistical planning within the IT organization and across the schools and campuses, and for detailed financial planning with the Office of the Vice President and Chief Financial Officer and with the various campus financial officers.

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## Financial Planning Challenges

Planning for information technology presents universities and colleges with enormous financial challenges. Nearly every institutional program and office, both academic and administrative, has the potential to be affected by information technology. The rapidly changing pace of technological development intensifies the breadth of this impact. Without careful planning, an institution can quickly exceed its capacity to support the financial demands of this enhanced technological environment. Any IT strategic plan should be accompanied by sound fiscal analysis of the estimated expenditure requirements, time horizons for implementation, activity and funding priorities, and alternative resource support possibilities.

A sound financial plan will allow the institution to see that its IT goals are achievable, moving the discourse from a perception of dreams to the reality of achievements. A thoughtful and clearly stated financial plan with achievable goals will increase stakeholder interest and decrease anxieties about inequitable funding distributions and reallocation burdens. It will also assure that the institution recognizes the potential of leveraging new resources.

From a budgetary perspective, a successful IT funding plan will not only incorporate existing resource allocations for technology, but it also will address whether these dollars can be better leveraged by more centralized decision making about expenditures. An IT funding plan should also identify institutional reallocations that can result from improved utilization of technology, which will be most effective when combined with reengineering opportunities formulated to enhance performance and efficiencies. One of the important aspects of the institutional IT plan is the information systems (IS) component. The IS plan, with the full support of the IT infrastructure investments, provides the institution with the capability of reengineering its business activities. The technologies and institutional policies that contribute most are collaborative in nature: e-mail, transaction

processing portals, electronic documents, information databases, and the World Wide Web.

An example of how an institution can leverage a technology investment to achieve real workforce and process reengineering may be helpful to underscore the point. When Indiana University implemented its new financial information system in July 1994, the Financial Management Services Office undertook a significant reengineering effort designed to upgrade the skills of its workforce, while at the same time changing its actual activities from transaction processing functions to compliance monitoring and analysis. These changes required the staff to be more highly trained but smaller than the previous staff, which had performed a number of data input functions. Skill enhancement and administrative performance improvements were felt throughout the institution.

Simply improving the technology, however, was not sufficient in itself to fully justify the investment; it was also necessary to ensure that work patterns and skill sets were changed to reflect the enhanced processing and information system. The richness of the information environment and the timeliness of the data available served to upgrade overall institutional management. Finally, it was important to ensure customer satisfaction.

Involvement with several other administrative operations from across the university was crucial during the transition. To assist university deans and administrative directors in improving their financial and operational performance, the output quality of the unit was reviewed and assessed, along with a cost analysis and overall financial evaluation. Once this step in the process is completed, there is a much higher likelihood that the visioning and planning processes can lead to meaningful policy changes and cost revisions. At Indiana University, we call this process the “Economic Model,” but it has its roots in activity-based costing principles. By examining our changing economic environment and exploring new frameworks for decision making, we have been successful in using our new IT tools in helping schools and campuses adapt to changing expectations. We have been careful to include those responsible for internal and external auditing—auditors were fully integrated into the team to ensure that appropriate control and separation of duties standards were maintained in the new system as well as in the new workforce arrangements.

The tendency for technological changes to be viewed as simply new applications or additions to existing operations must be recognized and countered. The tendency often becomes evident when the cost of operations after the implementation of a new system is estimated. When a unit’s financial analysis projects significant increases in staffing requirements as a result of new technologies, it may be a signal that the unit is not taking full advantage of the technology to change the way that work is managed.

It is important to be realistic in the cost saving expectations associated with a new information technology investment. At least two benchmarks can be used to measure results. The first is to quantify any actual reductions in costs for a specific process or function. Most likely this will be measured in terms of the number of people involved in accomplishing a certain task, although there may be areas where an actual process or portion thereof may be eliminated completely. Second, the use of technology often will accomplish the same objective with less human capital investment. Many good examples of the latter can be cited in the development of e-commerce or e-business opportunities. In these instances, savings accrue from technological investments even though the activity levels associated with the function may not expand.

This review process also allows the university to measure potential financial benefits accruing from the implementation of new systems and technologies. Focusing for a moment on the information systems side of IT—though the techniques apply equally well to some academic processes—we have discovered that activity-based costing techniques often reveal hidden expenses associated with administrative procedures, thus providing management with a better understanding of the true costs associated with a specific activity. This is a logical first step in determining the current actual cost, so that an accurate measurement of cost savings from new technology systems can be calculated. Of course, it is difficult to track and measure productivity gains. As is the case with most universities, Indiana University struggles with how to measure performance and compare its operations with those of similar institutions. We continue to work toward defining credible productivity metrics so that the university can properly evaluate its investments and performance.

The benefits of IT and other reengineering investments take a long time, perhaps a year or more, to manifest themselves. Further, some investments in information technology may result in short-term cost increases resulting from a number of factors, including the expense of developmental efforts. However, it is important to monitor and manage these effectively so that the long-term results are beneficial to the overall financial condition of the institution. Rather than assuming that technology will result in decreased base costs for all activities, the IT plan should focus on the ability of technology to restrain future long-term costs of the institutions. Although we have just begun, the information technology investments have already enabled Indiana University to improve the integration of decentralized operations and minimize the effects of organizational fragmentation.

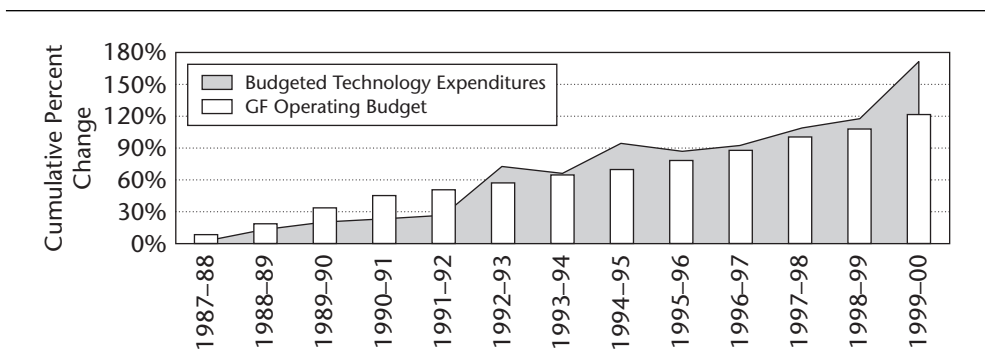
New technology can help to control costs in growth areas. For example, the successful implementation of the university's new financial information system enabled the office performing post-award contract and grant compliance to

reduce its staff by nearly 18 percent during a time when grant and contract activity increased more than 38 percent. Effective use of technology, process reengineering, and professional staff development resulted in a significant increase in overall productivity in this area.

In all likelihood a broad based information technology plan will require additional support in the form of onetime initial outlays, as well as ongoing base cost increases. It is important to distinguish between these two expenses; only then will an institution be able to design a strategy that most appropriately meets its needs and seek additional support for technology investments. For public institutions additional support may require working with appropriate governmental agencies to secure additional public support. For both public and independent institutions, other possible funding initiatives might include increasing efforts to secure endowments, gifts, and grants; consideration of increases in student fees; and enhancing partnership activities with corporations and other institutions and agencies.

It is imperative for institutions to begin to think differently about their finance and budget planning with respect to information technology. For example, in order to assure life-cycle funding, the barriers of existing financial structures must be significantly altered to guarantee that necessary funding will be available. It is likely that some new procedures will need to be developed to facilitate internal matching opportunities between existing unit budgets. Certainly it is expected that overall investments in technology will increase significantly and, in most institutions, it is expected that technology expenditures will grow more rapidly than overall budgets generally. Figure 7.1 graphically displays this phenomenon for Indiana University's general fund operating budget.

**FIGURE 7.1. INDIANA UNIVERSITY INVESTMENTS IN TECHNOLOGY: COMPARISON OF CHANGES IN TECHNOLOGY EXPENDITURES AND OPERATING BUDGET**

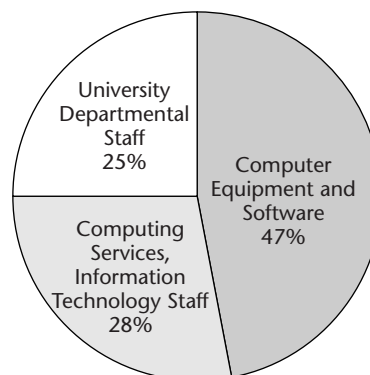


Moreover, institutions need to develop budget and expenditure tracking systems to assist decision makers in determining how an institution is expending its technology investment and where such expenditures are occurring. Figure 7.2 is a snapshot of Indiana University's current investments in technology. With the increasing pressure on hiring and retaining staff skilled in the technological fields, it can be assumed that a larger share of the budget will soon be devoted to human resource needs.

The human resource shortage in IT presents a challenge that threatens the most thorough planning. Higher salaries, greater incentives, and bonus structures are needed to attract and retain high quality IT staff; such incentives may be necessary even though they are outside broader institutional compensation plans. One element of a plan for human resources is to grow and retain IT talent internally, but even then retention of these staff will remain problematic.

Finally, even though institutions will make every effort to accommodate the needs of technology within normal budgeting and financing strategies, it is reasonable to assume that many institutions will have to seek outside longer term financing opportunities, particularly as needs for significant up-front investments in systems are required. Traditional capital financing markets do not lend themselves to short- and medium-term financing for most institutions. The effective asset life for many technological investments falls far short of the traditional asset life definition. As evidence of the complexity of categorizing technological investments, it is increasingly difficult to assign these investments to the standard operating and capital classifications. It may be necessary for higher education

**FIGURE 7.2. INDIANA UNIVERSITY INVESTMENTS IN TECHNOLOGY: ALLOCATIONS FY 2000**



institutions and capital financing organizations to come together to consider possible strategies that would allow for the amortization of these costs. Just as institutions are being asked to think differently about the way they perform their work, we may need to ask the greater financial community to consider new strategies with regard to financing technological development.

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## Conclusion

Colleges and universities must recognize the transforming influence of information technology. IT permeates every aspect of the university, from ubiquitous desktop computers, to the intricate web of fiber optic cables that link these computers to the world of digital information, to the wired classrooms, dormitories, and laboratories that have become critical components of the processes of education and research.

To most effectively harness the possibilities IT presents, institutions will best be served by articulating their unique identities and building on their strengths, so that their IT strategic plans align with their institutional visions and missions. Strategic plans should reflect institutional priorities; colleges and universities should thoughtfully consider IT needs in light of their institutional missions and should engage the academic community throughout the planning process. While the strategic paths chosen today will vary across institutions, the choice of these paths will be critical in setting the direction and trajectory for technological change in the decades to come.

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## Resources

- “Architecture for the 21st Century: An Information Technology Strategic Plan for Indiana University.” [<http://www.indiana.edu/~ovpit/strategic/>], May 1998.
- IPCRES: Indiana Pervasive Computing Research Initiative.  
[<http://www.indiana.edu/~ovpit/ipcres/>], September 1999.
- Office of the Vice President and Chief Financial Officer.  
[<http://www.indiana.edu/~vpcfo/>].
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