

Information Technology Initiative

Summary of Targeted Research Area Goals, Objectives, Investments and Budgets

Objective & Goals: Developing a Competitive IT-driven Economy in Louisiana
Targeted Area: E. J. Ourso College of Business Administration
Institution: Louisiana State University and A & M College

SUMMARY OF RESEARCH AREA GOALS AND OBJECTIVES

Louisiana: Vision 2020, the State's master plan for economic development, presents a challenge to reinvent a newer and better Louisiana and provides a guide to economic renewal, growth, and diversification. A key goal of the *Vision 2020* is **“To have an economy driven by a diverse and thriving set of technology-intensive industries that actively utilize Louisiana's colleges and universities as a source of well-educated graduates as employees, a source of expertise for problem-solving, and a source of technology for commercialization.”¹**

Introduction

The revolution in information technology (IT) over the past two decades has resulted in a dramatically altered economic landscape. Advances in computing hardware, software, telecommunications, and services have spawned fundamental changes in the marketplace and in the very nature of competition itself. Cheap and reliable communications systems have virtually “shrunk” the world, forcing companies to compete globally on the basis of time, quality, flexibility, and cost competencies while at the same time significantly escalating the pace and complexity of business decision making. Within a given business enterprise, the impact of information technology upon business processes and practices has been pervasive. Development of sophisticated enterprise planning software and a shift to Internet-based transactions have afforded organizations new tools and solutions for effectively managing customer relations, streamlining production and manufacturing processes, and gaining efficiencies in areas of logistics and supply chains.

These changes are visible in almost all business sectors, including manufacturing, mining, transportation, financial services, health care, wholesale/retail trade, and agriculture. Even so-called “old” economy businesses have been rapid adopters of IT. Oil service giants Halliburton and Schlumberger, both major employers in Louisiana, have become dominant suppliers of exploration and production information systems that assist in finding, producing and managing oil and gas reservoirs. In April of this year, Schlumberger acquired Sema PLC, a major provider of IT services to the telecommunications, utility, finance, transport and the public sectors. Energy companies, such as Enron, Dynegey, and Williams, are major users and developers of sophisticated

¹ Louisiana Economic Development Council, *Louisiana: Vision 2020*, 1999.

information technologies that are needed in their securities analysis, trading, and risk management units. Once staid utilities, such as New Orleans based Entergy, are rapidly developing technologies to help efficiently manage their customers' consumption of electricity via the Internet.

The IT revolution is concomitantly reflected in the type of workforce required by contemporary businesses. The demand for low-skilled manual and production labor continues to fall while the demand for knowledge workers and skilled technicians continues to rise. Employment in IT occupations has grown substantially, increasing 32 percent between 1993 and 1999². Despite the demise of hundreds of dot.com businesses in 2000 and the accelerating general economic downturn of this year, demand for IT talent persists. A study by the Information Technology Association of America (ITAA) projects IT job growth at 900,000 for 2001 with nearly 50 percent of this total ultimately going unfilled because of a lack of requisite job skills³. The strength of the IT job market in the face of the collapse of the PC and telecommunications equipment sectors is explained in part by the fact that nearly 90% of IT employment in the U.S. is by non-high-tech companies⁴. Moreover, strong growth rates are projected for most IT occupations through 2008. As a consequence, there is a rapidly growing demand for college graduates who possess the necessary analytical and business skills to immediately contribute to the development and management of information systems and related technologies. Data released by the American Electronics Association (AEA) indicates that the business information systems area was the fastest growing IT field as measured by degrees granted⁵.

In Louisiana, however, growth in IT businesses and employment has not matched national norms. Louisiana ranked 33rd among states in the number of high tech establishments, 36th in IT employment and 42nd in terms of IT wages according to AEA's *Cyberstates* survey⁶. A recent study by The University of Minnesota's Humphrey Institute of Public Affairs found no Louisiana metropolitan area ranked among the top 30 in the U.S. in terms of IT employment or job growth⁷. In response, Governor M. J. "Mike" Foster's Information Technology Investment Initiative is targeted toward improving Louisiana's competitive position so that the State can attract and retain businesses that depend upon an adequate pool of skilled IT professionals. As a first step, Louisiana needs to educate and train a workforce that meets the demands of these enterprises.

The E. J. Ourso College of Business Administration has a demonstrated track record in preparing students to succeed in high-technology workplaces. Graduates of our College are in high demand with bachelor degree recipients in IT and related fields receiving job offers in the \$45,000-50,000 range while master's graduates are being offered over

² American Electronics Association, *Cyberstates 4.0*, 1999

³ Information Technology Association of America, "When Can You Start?," April 2001.

⁴ *Business Week*, August 20-27, 2001, p.122.

⁵ American Electronics Association, *CyberEducation*, 2001

⁶ American Electronics Association, *Cyberstates 4.0*, 1999

⁷ Markusen, A., K *et al.*, "High-Tech and I-Tech: How Metros Rank and Specialize," Humphrey Institute of Public Affairs, University of Minnesota, August 2001.

\$65,000. Accenture (former Andersen Consulting), Exxon/Mobil, Enron, Dynegy, Electronic Data Systems, Halliburton, IBM, and Microsoft are just a few of the many high-tech employers hiring our graduates. Over 203 different companies hired Ourso College graduates in 2000-2001. Placement of our IT doctoral students continues to be extremely robust.

The Ourso College is uniquely positioned to contribute significantly to the Governor's Information Technology Investment Initiative and to the goals of the *Louisiana: Vision 2020* plan in the following areas:

- Educating the current generation of Louisiana students to succeed in an increasingly information driven and information rich business environment and renewing Louisiana's existing workforce in a manner that will provide value added to employers,
- Enhancing faculty, graduate programs, and infrastructure to facilitate high quality interdisciplinary research and teaching in information technology; and,
- Providing an environment conducive to entrepreneurship and innovation in information technology applications and encouraging the creation and commercialization of high technology businesses and jobs via university-private sector alliances and partnerships.

In each of these three areas, the Ourso College will be able to show tangible and measurable progress within a short period of time.

SUMMARY OF INVESTMENTS AND BUDGET ALLOCATIONS

As a reflection of the interest in IT-related careers, senior college enrollments in the Ourso College have increased 104% since 1995 while enrollments in the Department of Information Systems and Decision Sciences (ISDS) have soared 390%. In five short years, ISDS has gone from being the College's smallest department to the largest, now accounting for nearly 27% of all majors. Enrollments in other departments with IT programs, such as financial information systems (Finance up 114%) and e-commerce (Marketing up 192%), have also experienced significant growth. Anecdotal evidence about LSU's Fall 2001 freshman class suggests that the proportion of new matriculates interested in a business major will be near an all time high, with a significant number likely to choose an IT field.

However, with the current resource base of the College, maintaining enrollments at these levels is simply not sustainable. During the Fall 2000 semester, for example, total Student Credit Hours generated in ISDS averaged over 800 per FTE tenure-track faculty. Our *Faculty Planning Model* indicates that we have a significant deficit of FTE tenure-track faculty in the College vis-à-vis recommended staffing guidelines of the AACSB, our national accrediting organization. In College strategic planning meetings conducted earlier in June, plans were adopted to downsize the College to approximately 1,850 senior college majors and to decrease the undergraduate major in ISDS from its current

level of 650 to approximately 420. Other departments, now well over capacity, would also be downsized.

Decreasing the size of the College and IT majors, however, would be clearly counterproductive to Governor Foster's Information Technology Investment Initiative, the *Vision 2020* plan, and is at variance with trends in business school enrollments nationwide. With incremental resources provided by the Information Technology Initiative we can expand our undergraduate IT enrollments and increase doctoral enrollments. We can also enhance and augment the infrastructure that will facilitate the formation of nascent information technology enterprises, increase the number of information-related jobs in the State, and provide opportunity for the next generation of our business leaders to remain in Louisiana instead of searching for employment elsewhere. To accomplish these goals, incremental funding in three primary areas would be required. These include: investments in human resources, investments in technology infrastructure, and investments in IT incubation and research activities.

I. Human Resource Investment

“To succeed in the competitive research environment in higher education nationally, we will have to not only recruit but also retain nationally competitive faculty in specific technology fields related to computer science, engineering, management information systems and information and decision sciences. Our aim is to bring over 150 new faculty in those fields to Louisiana over the next five years. Many of these faculty will be primarily engaged in teaching, not research, helping our universities produce the workforce required by the technology-intensive businesses locating in Louisiana.”

– Governor M. J. “Mike” Foster

As a first priority, we need additional resources to hire new faculty and to eliminate uncompetitive salary scales in order to prevent further attrition in our existing faculty base. For example, this year in ISDS, three senior faculty members and one instructor resigned. Two of the senior faculty, both with international reputations in their respective fields, took positions at other institutions at considerably higher salaries. Another ISDS senior faculty member, who is currently on-leave in the private sector, will likely not return because of a significantly higher salary offered to him. We also experienced the loss of two faculty members in Marketing, one with international stature, and three more in Accounting. Overall, the College lost 16% of its tenure-track faculty to other schools of business in 2001.

Table 1 compares the 75th percentile of faculty salaries (nine month) in the ISDS Department with the 75th percentile salaries at peer institutions; the data was compiled by the AACSB and is based on Fall 2000 salaries. Two sets of peer institutions are reported: the “top-twenty” public business schools as ranked by *U. S. News & World Report* and traditional “Southern” peer institutions⁸. The ratio of ISDS salaries to these two groups

⁸ Institutions included in each group are listed in Appendix 1.

is shown in the final two columns. Clearly, the salaries of ISDS faculty are well below those offered at institutions that we compete with in the marketplace for intellectual capital. Moreover, data published by the AACSB indicates that the information systems area experienced the most rapid increase in hiring of all business faculty. In 2000, information system faculty hires grew almost 18% year-over-year⁹. We expect this trend to continue to put upward pressures on faculty salaries. Until we remedy our salary situation, retention of faculty will continue to be a chronic problem¹⁰.

**Table 1
Comparative Salaries of ISDS Tenure-Track Faculty to Peer Groups (Fall 2000)**

Rank	Number	ISDS 75 th Percentile	Southern 75 th Percentile	“Top Twenty” 75 th Percentile	ISDS/ Southern	ISDS/ “Top Twenty”
Professor	4	\$88,649	\$127,500	\$136,600	70%	65%
Associate	1	\$91,143	\$100,000	\$105,400	91%	86%
Assistant	6	\$81,500	\$95,000	\$96,000	86%	85%

We propose adding ten new faculty positions (three in endowed chairs, two associate professors, and five assistant professors) and two technical support positions over the next four academic years. In Table 2, we estimate the timing and amount of human resource needs. The proposed additional faculty would enable the ISDS Department to continue serving about 650 undergraduate majors, with about 300-325 graduating and entering the workforce each year, and permit us to expand enrollments in the areas of accounting and financial information systems and e-commerce.

**Table 2
Human Resource Needs by Year – Incremental**

Category	FY 2001-2002		FY 2002-2003		FY 2003-2004		FY 2004-2005		FY 2005-2006	
Prof/Chair	1	\$132,000	2	\$300,000						
Assoc Prof			1	\$125,000	1	\$130,000				
Asst Prof			2	\$230,000	2	\$120,000	1	\$125,000		
Support	1	\$65,000	1	\$45,000						

⁹ AACSB *Newsline*, Vol. 31, No.2, p. 9.

¹⁰ Although Ourso College faculty received an average 6.8% raise effective for 2001-2002, nationally, salaries for schools of business have been rising at an average 5% rate, so the competitive gap has been only marginally reduced.

Currently there is a severe shortage of doctoral-qualified faculty in information systems and related disciplines. Consequently, it is now possible for a well-trained graduate from our doctoral programs to receive an appointment at a peer or higher-level institution. Within the last few years, we have placed ISDS Ph.D.s at Cornell, Florida State, Indiana University, Georgetown University, and Florida International University; two e-commerce Ph.D.s received appointments at the University of Virginia – Charlottesville. The demand for information systems faculty shows no near-term likelihood of slowing while the supply remains flat. Thus we believe we have an excellent window of opportunity to create a cadre of doctoral alumni who are well placed academically – an essential network if we are to build our reputation in information systems research.

Given our existing resource base, however, we are limited to small, essentially “apprenticeship”-style doctoral programs. However, with adequate and consistent funding, opportunity exists to expand the Ph.D. program in ISDS by 16 students and to add 8 new Ph.D. students in financial information systems and e-commerce. We believe that matriculating six quality Ph.D. students per year is quite possible. By 2005-2006, we would be graduating an average of about five more IT Ph.D. students per year. Assuming continued success in placing these students in peer institutions, this would soon give us very active and visible alumni.

A competitive nine-month stipend to attract outstanding Ph.D. candidates is now about \$20,000. With an overall increase in the doctoral programs of 24 students, the annual incremental cost would be approximately \$480,000. In recent years we have met increased student demand for undergraduate courses by hiring full or part-time instructors. However, with additional funding of the doctoral programs, some of the instructional burden could be shifted to graduate teaching assistants. We propose to use graduate students to facilitate larger sections of service courses and to teach some selected 3XXX-level courses. For instance, enrollment in a service course taught by a full-time faculty member could be effectively doubled if accompanied by appropriate graduate assistant support. This could result in considerable instructional cost savings per section and in part defray the additional costs associated with expansion of the doctoral program.

II. Electronic Infrastructure

The quality of infrastructure is an equally important antecedent to developing an outstanding academic program. We propose establishing an electronic laboratory for the analysis of security transactions, pricing, and risk management and further expansion of the Center for Virtual Organization and Commerce by creating a student research facility with 24 workstations dedicated to the IT Ph.D. program.

□ ***Electronic Trading Laboratory***

Advances in information technology are transforming financial markets as investment information becomes more widely and rapidly available and advances in electronics and telecommunications bring significant computing power to the desktop. Indeed, the financial services industry is the single biggest consumer of IT products and services, spending over \$70 billion in 1999¹¹. New and complex securities are emerging to help financial executives and portfolio managers cope with market risks. Success in this extremely competitive arena demands an understanding of highly sophisticated financial investment technology and analytical methods for the pricing of risky assets. The leading colleges of business now provide student access to financial information technologies through on-campus electronic “trading rooms.” The proposed project provides the resources required for effective education in financial information technology. These resources will be in the form of specialized financial hardware and software, market data feeds to provide real-time and simulated market transactions data, and guidance from experts in the field. The Lab will combine academic theory with hands-on experience in advanced financial information technologies.

The goal of this project is to provide students in the College with the skills and knowledge necessary to succeed in careers in technologically complex financial markets. The economy of the State of Louisiana is largely based on natural resources, financial services, and international trade. This industrial base is highly sensitive to commodity prices, interest rates, and foreign exchange rates, exactly the types of risks for which derivative contracts are best suited. This project will enhance the economic development of the State and enhance the professional reputation of the College by producing graduates specifically prepared for careers in risk management and investments.

The Lab will accomplish four objectives:

1. To augment existing courses with hands-on experience. The experience students will gain in the Lab greatly enhances traditional classroom lecture and discussion. With the Lab, students will be able to develop and test investment strategies and to access appropriate financial information for those investment decisions.
2. To offer new courses designed to exploit the capabilities of the Lab. The Lab must be part of an integrated program. Thus modeling the stochastic processes of derivative securities becomes part of an advanced finance course and managing high frequency data becomes part of an advanced information systems course.
3. To enhance executive education through specialized courses in investments, portfolio management, and risk management. The Lab can provide the ability to develop executive education short courses aimed at providing insight into the

¹¹ The Precursor Group, April 11, 2001

tools and techniques of designing and valuing the appropriate contracts and derivative securities.

4. To enhance the research opportunities of the faculty of the College. At present, historical data is the basis for all empirical studies in finance. Access to real-time data will expand the envelope and permit innovative research of more immediate interest to practitioners. Access to these data streams also allows research involving the techniques of experimental economics.
5. To facilitate establishing public/private alliances. Commitment of these funds to the Lab will facilitate obtaining future support from corporate partners and business leaders who recognize the value of higher education.

Estimated non-recurring costs for establishing and equipping an electronic trading laboratory are \$470,000; thereafter, recurring operations and maintenance costs are estimated to be about \$355,000 annually.

□ ***Ph.D. Program Research Facility***

In addition to the quality of faculty, convenient, fast, and reliable access to information resources, computing, and software is an imperative consideration for most students evaluating an information technology doctoral program. Universities have belatedly recognized the need to upgrade dormitory facilities to meet the more discerning requirements of potential freshmen. Similarly, while having largely gone unnoticed, the adequacy of infrastructure is a major selling point in recruiting business doctoral students. It is essential for IT doctoral students to have adequate office space, preferably near other students and faculty, and to have access to high speed computing, high bandwidth connections to the Internet, and appropriate software tools and applications. In the long run, there must be infrastructure available to attract high quality students and these needs must be factored into the support budget. Such a lab with 24 workstations is estimated to cost about \$125,000 inclusive of renovations.

III. Information Technology Incubator and Research Initiative

“Our technology initiative will focus on developing technologies at our research universities that can be spun-off into the private sector to create new companies....we want to use this investment to build the technology, research and communications infrastructure necessary for Louisiana’s higher education institutions to effectively perform in today’s high-tech research environment. That research can then be spun-off into private sector companies by entrepreneurs who will grow good jobs for our citizens.”

-- Governor M. J. “Mike” Foster

□ ***Enhanced Incubation Program***



The Louisiana Business & Technology Center (LBTC), a department of the E. J. Ourso College of Business Administration, is a small business incubator with a particular focus on technology companies. The Center endeavors to enhance economic development in Louisiana through the support of existing small businesses and the development of new businesses. The LBTC assists entrepreneurs and small businesses by providing access to the resources that they need to grow and attain long-term success and by functioning as a proving ground for technology development, refinement, and commercialization. From its start in one small building the center has grown to occupy four buildings on the LSU campus.

Since inception, LBTC has served over 100 tenants. Over 62 “graduating” companies are still in business, an 80% success rate. Well over 2,000 new jobs have been created. Recent “graduates” in the information technology field include Ramsey Enterprises (telecommunications consulting), dataConstructors (web-based solutions for information management), Internet Business Solutions (commercial web design and portal management), Mayer & Associates (communication and data management), Praecedo, Inc. (data management and storage), Wincup Group (process reengineering, supply chain and materials management). The LBTC plays a crucial role in Louisiana’s economic development future by promoting the formation and growth of new businesses, economic diversification, job cultivation, and commercialization of emerging technologies.

The LBTC can be expanded to accommodate from 10 – 15plus additional tenants. The cost for renovating space (lighting, HVAC, ADA code modifications, new elevator, etc.) and providing requisite equipment (computing, telecommunications, and high speed digital access, etc) is estimated to be approximately \$225,000. ISDS masters program graduate assistants would serve as technical consultants. Annual stipends to support 10 students in this capacity would be \$100,000.

□ ***Decision Support Room and Laboratory for Research and Executive Education***

A decision-support room and research laboratory with 30 workstations with high-speed digital access (\$150,000) would be used for research in the area of dispersed digital decision environments and by the Executive Education Program to provide IT training for executives and state employees. There are three major objectives of the facility:

- Improve the decision making ability of managers in business

and government,

- Train highly employable students in the technologies and structure of this rapidly evolving field, and;
- Develop a research initiative within the Center for Virtual Organizations and Commerce that will attract the top faculty in the area to LSU.