

Executive Summary

HIGHER EDUCATION - PRIVATE SECTOR LINKAGES

FOR ECONOMIC DEVELOPMENT

Report to the Task Force on Higher Education;
Legislative Commission on Kansas Economic Development

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PART B

HIGHER EDUCATION - PRIVATE SECTOR LINKAGES FOR ECONOMIC DEVELOPMENT

RATIONALE FOR HIGHER EDUCATION/INDUSTRY LINKAGES

The major push for cooperation between business and academia stems from the revolutionary shift from an industrial to an information economy. Knowledge now doubles every decade, transforming the marketplace and the workforce. As a result, our economy increasingly is built on knowledge.

This evolution necessitates that business access and utilize quickly new technological and managerial developments. The linkage between our higher education institutions and industry will facilitate the networking of information throughout our state economy. The success of this linkage depends upon tailoring this collaboration to fit the capabilities of our institutions with the needs of existing and potential Kansas businesses and industries.

SUMMARY OF REPORT

The following report from the Task Force on Higher Education is in two parts:

1. Overview of other state programs of higher education-business interaction to foster economic development.
2. Recommendations for specific action by the 1987 Kansas Legislature.

Our recommendations to the Commission deal with specific mechanisms and systems to enhance economic development by fostering a closer link between Kansas industry and higher education. In the ultimate, however, the most productive contribution that higher education can make to long run economic development is to undertake its basic mission of teaching and research at the highest quality level. It is evident that a large number of states have reiterated their basic funding commitment to higher education in recent years for this reason. As noted in the Kansas Economic Development Study, one of Kansas' few major strengths for building its economy lies in its excellent higher education system. We strongly urge that a commitment be made to insure this strength is maintained and strengthened.

OVERVIEW OF PROGRAMS IN OTHER STATES

Economic development in other states has involved a multiplicity of activities, mechanisms and programs designed to tap the expertise in state universities in the state's economic development effort. These have included the following:

- 1) Centers of Excellence in Basic and Applied Research
- 2) Research Matching Grants
- 3) Industrial Liaison Offices
- 4) Technology Transfer
- 5) State Technological Database of Research & Development Activity
- 6) Incubators
- 7) Equipment Matching Grants
- 8) Selective Management Education & Business Development
- 9) Research Professorships
- 10) Research Parks

Following are brief summaries of five state's efforts in this arena in order to illustrate the nature, direction, magnitude, and array of programs.

Arkansas

In 1983, the state legislature established the Arkansas Science and Technology Authority (illustrative of 2 and 3 from above list) with initial funding of \$250,000. The Authority was created to play a major role in the identification, development and application of advanced technologies for increased state economic growth. Its functions were broadened in the 1985 legislative session. The Authority's operating budget was increased to \$1,000,000 and three new programs were authorized and funded for an additional \$4,500,000. These programs were the Seed Capital Investment Fund (\$1.8 million), Business Incubator Program (\$1.9 million) and the Basic and Applied Research Grant Program (\$1.8 million) (representing 6 and 2 from above list).

Arkansas appropriated \$3.4 million in 1983 for institutional development funds to support economic development in the state (3, 4, and 8). An additional \$3.4 million was appropriated for each year of the 1985-87 biennium with a matching stipulation on this second round of funding. Examples of programs funded include technology transfer centers designed to provide businesses with assistance, economic assessments and special studies, and research for business development.

Illinois

Through the State Board of Higher Education, Illinois provides funds for 48 technology centers at six universities and one technology institute

(example of 1 from aforementioned list). As illustrations, The Beckman Institute for Advanced Science and Technology received \$10 million in construction monies to match the \$40 million gift from Arnold O. Beckman. The Center for Supercomputing Applications will receive \$2.0 million for FY 87 matched with a total federal appropriation of \$40 million.

The Department of Commerce and Community Affairs (DCCA) funds the state's industry liaisons through its \$3 million (FY 87) commitment to sixteen Technology Commercialization Centers (3 and 4). This funding represents 60 percent of each Center's total operating budget with the balance provided by the institution and/or users. These Centers make faculties, researchers, and facilities available to industry and encourage collaboration on technical and management problems.

Two new university-associated research parks are being developed in the Chicago area to nurture new high technology companies (6 and 10). The Evanston/University Research Park received \$9.0 million from the state and the Chicago Technology Park received a \$4.0-5.0 million state commitment.

The State Board of Higher Education frequently requests monies for equipment deficiencies at its universities. For example, the University of Illinois at Urbana-Champaign received \$1.0 million in FY 86 for instructional equipment deficiencies (7).

The Illinois Resource Network (IRN) is a state-wide electronic directory of approximately 7000 university faculty members. FY 87 funding is \$230,000--\$150,000 from the Board of Higher Education's competitive Cooperation Act Grant Program and \$80,000 from a combination of DCCA funds and participant funds (5).

Iowa

In 1983, Iowa created the Iowa High Technology Council. The purpose of the Council is to encourage the development of high technology industries and research in Iowa to further economic development. The Council was funded \$50,000 for operations, \$50,000 for the creation of a system to get new research developments into the hands of Iowans who could use them and \$2 million was targeted to fund projects that would provide help to Iowa's economy within the next few years. Two of the projects receiving funding were incubators at the University of Iowa and Iowa State University.

The Iowa Program for Innovation at the Iowa Center for Industrial Research Service (CIRAS) serves as the arm of the Iowa State University Extension Service that assists owners and managers of manufacturing and processing firms. CIRAS' six field representatives travel the entire state in their efforts to support Iowa's industry. In 1984-85, the field representatives made a total of 6,524 calls upon Iowa industry. Faculty became involved in projects to either lend expertise or to gain exposure to and knowledge of an industry's particular challenges. (3)

The Iowa Development Commission has the responsibility for the administration of three programs designed to foster economic development-- Iowa Product Development Commission, Business Incubator Center Program and the Economic and Research and Development Grants. The Iowa Product Development Commission is the state's source of seed capital. FY 87 funding is \$2.0 million both to cover administrative costs and for providing seed capital. The Business Incubator Center Program received \$450,000 (FY 87) for funding of incubators. There are presently three incubator centers in Iowa, one each at Iowa State University, University of Iowa and Des Moines Area Community College (6). The Economic and Research and Development Grants are designed to encourage research within Iowa. FY 86 funding was \$5 million which was increased to \$7.4 million for FY 87 (2). \$3.5 million of the FY 86 funding was used to establish seven endowed chairs. Each chair received \$500,000 from the state with an equivalent match made by each university (9). To date, \$4.75 million of the FY 87 funding has been committed to two Centers of Excellence (1)--\$3.75 million to expand Iowa State University's agricultural biotechnology program and \$1.0 million for Iowa State University's Microelectronics Research Center.

Both Iowa State University and the University of Iowa are in the process of initiating research parks with the support of private developers.

Ohio

Ohio established the Thomas Edison Program in 1983 with the purpose of stimulating working partnerships between business and academia. Thus far, the legislature has committed a total of \$67.9 million to support the program. The program consists of three main components: the Edison Seed Development Fund, the Edison Technology Centers and the Edison Incubators.

The Edison Seed Development Fund matches state funds with those put up by the private sector to demonstrate the feasibility of new ideas for products, processes or systems. To date, this program has been budgeted \$7.8 million.

The Edison Technology Centers are located at universities and bring together corporate sponsors and university researchers to explore key areas of technological concern in manufacturing, agriculture and information processing. Seven Centers have been funded to date for a total of \$49.35 million (1).

Edison Incubators provide basic business services such as accounting, legal advice and secretarial help to support entrepreneurs in developing new technology-based companies. Six have been established to date for a total of \$1.615 million (6).

Two other programs within Ohio's Department of Economic Development which further information/technology transfer are the Ohio Technology Transfer Organization (OTTO) and the Technology Information Exchange-Innovative Network (TIE-IN). OTTO links four Ohio universities and 24

technical community colleges in a state-wide information networking system. This is accomplished through the placement of field agents in each of the institutions. OTTO is currently funded by the state at \$3.7 million per biennium (3 and 4). TIE-IN is a powerful database that links users throughout the state of Ohio. Information is available on patents, faculty research interests, venture opportunities, corporate R & D, etc. Initial funding of \$100,000 created the database (5).

In its 1983-85 state budget, Ohio supported nine eminent scholars under its new Eminent Scholars Program to be administered by the Ohio Board of Regents. These scholars serve to attract and retain outstanding faculty and students, bring new research grants and capability to Ohio's campuses and act as resource consultants for the state. State funds, matched dollar-for-dollar by institutional funds from private sources, create endowments of \$1 million each to fund distinguished professorships. The 1985-87 budget provides funding for nine additional eminent scholars (9). In order to stimulate new and expanded research efforts at its colleges and universities, Ohio established a Research Challenge Program also under the Regents. The 1985-87 budget for this program is \$28 million (2 and 8).

Utah

In FY 86, the state of Utah appropriated \$2.415 million to fund Centers of Excellence. A minimum of a 2:1 match was required with a resulting match of \$16 million realized. Fourteen Centers were funded as well as seven planning grants (small dollar allocations to develop programs with Center potential). An additional \$1.0-1.5 million will be available for FY 87 (1).

The nationally recognized University of Utah Research Park was established in the late 1960's to provide a site for private research and development activities, especially those that involve interaction with the University. Though no state monies are appropriated for the Park, several academic University departments are housed there. Collaborative interdepartmental research at the University has produced such bioengineering marvels as the artificial heart and the Utah arm. These innovations were licensed to private firms for further development and production via the Technology Transfer Office within the Research Park (4, 6 and 10).

RECOMMENDATIONS FOR SPECIFIC ACTION BY THE 1987 LEGISLATURE

The Task Force is making recommendations on the following:

1. Centers of Excellence
2. Research Matching Grant Program
3. Equipment Grant Program
4. Technology Transfer/Industrial Liaison
5. State Data Bases
6. Small Business Development Centers
7. Research Professorship Program
8. Incubators
9. Management and Entrepreneurship Development
10. Clean-up revisions to SB 755 and state purchasing provisions.

Funding for these recommendations should be administered by the newly created Kansas Technology Enterprise Corporation (KTEC). This will insure accountability over time and provide for a review point to facilitate the matching of program goals with state economic development goals. The exception to this funding mechanism will be those funds provided for the Small Business Development Centers (#6). This funding should be administered through the Kansas Department of Commerce.

CENTERS OF EXCELLENCE

The Centers of Excellence program in Kansas is designed to expand the Kansas economy by enhancing academic programs which are at the leading edge of research and which have the potential to underpin future business development. The objective of this long term program is to build upon existing strengths in areas of key scientific and technological importance for Kansas.

Centers of Excellence characterize one of three general thrusts: Basic Research, Applied Research or Technology Transfer. Though emphasis is frequently placed on one area, it is important to recognize the continuum of movement from basic to applied research to technology transfer. Basic research is undertaken to broaden the knowledge base and understanding in a particular field while applied research focuses on resolving problems/opportunities encountered within the economic environment as they relate to a particular base of knowledge. Technology Transfer is the movement of this knowledge "in mass" to industry for its use.

For FY 87, \$172,000 has been appropriated for each of the current Centers at KU, KSU and WSU matched by \$86,000 in private sector contributions. The 1986 Legislature authorized the Kansas Technology Enterprise Corporation to designate and fund (with matching) Centers of Excellence for basic research, applied research and for technology transfer.

The majority of states have a program of this generic nature in place. The levels of funding range from multi-million mega Institutes (Illinois, Michigan, Oklahoma) to \$3-10 million Centers/Institutes (Iowa, Ohio, Pennsylvania) to mini-Centers in the under \$1 million category (Kansas, some Illinois Centers). In general, the programs seek to enhance existing strengths, but some also are designed to develop new strengths.

Given the new legislative mandate (Senate Bill 755, Section 6), the authorized role and functions of the new instrumentality K-TEC, and the Kansas context, the Task Force recommends the following to ensure a viable and productive program:

- 1) Endorses the concept of small or mini-Centers of sufficient number to tap an array of strengths at Kansas universities rather than focus on one or two major Institutes.
- 2) Establish the following priorities in funding levels and sequence:
 - a) Bring existing Centers, after appropriate review, to viable funding levels.
 - b) Provide start-up funding for the approved Center for Technology Transfer at PSU.
 - c) Establish new Centers, through the external review competitive process, with a somewhat equal emphasis on the basic and applied research funds.
- 3) Recognize that in the ultimate basic research drives applied research and technology transfer, but that with respect to basic research, the scope for matching funding is more limited and the payoff longer term. Therefore, provide for a modest core budget for basic research Centers that would be exempt from the matching provision.

The budget implications are as follows (these numbers represent NET INCREASES OVER FY 87):

	Millions			
	<u>FY 88</u>		<u>FY 89 and FY90</u>	
	<u>Minimum</u>	<u>Preferred</u>	<u>Minimum</u>	<u>Preferred</u>
Existing Centers (\$500,000-\$750,000 average)	\$1.0	\$1.75	\$1.0	\$1.75
Approved Center for Technology Transfer	.2	.25	.2	.25
New Centers (total 4: 2-FY 88, 2-FY 89)	<u>1.0</u>	<u>1.5</u>	<u>2.0</u>	<u>3.0</u>
TOTAL	\$2.2	\$3.5	\$3.2	\$5.0

RESEARCH MATCHING GRANT PROGRAM

The Research Matching Grant Program is designed to make Kansas industry more competitive by stimulating the development of high-technology industry and technology transfer, and by encouraging university-industry collaboration and interaction in Kansas. The Kansas Advanced Technology Commission invests these funds as seed money for research projects that promise to create jobs. Industry's required contribution to the project of at least 60 percent of total cost ensures that the project is worthy from the industry's point of view. These provisions are maintained in Senate Bill 755, Section 7.

Many states have this program, and it has been quite successful. Levels of funding vary significantly from state to state:

Arkansas	.90 million per year
Missouri	1.43 million
Iowa	5.00 million for fiscal 1986
Wisconsin	2.00 million for 1983-1985
Michigan	21.7 million
Texas	17.5 million

The objective of research matching grants is not to subsidize university-industry projects, but to leverage them and to establish a pattern of the university and industry working together. The Kansas program is quite small by comparison and needs to be somewhat larger to achieve the desired objectives. Thus the Task Force recommends that the present level of funding should be increased from \$610,000 to \$1 million.

EQUIPMENT GRANT PROGRAM

The Kansas Board of Regents, in its recent *A Time for Renewal* emphasizes "the importance of maintaining a modern 'state-of-the-art' instructional equipment inventory to support the academic programs at the Regents universities," and describes the state of the instructional equipment as "inadequate and out-of-date." Similarly, reductions in the research capabilities of universities in high technology and scientific fields, they report, will seriously harm the state's efforts to train graduate students who can work with modern technology-driven industry. It notes that research instrumentation is crucial for the survival of a research base in the state. This report identifies an instructional equipment and research instrumentation deficiency of \$33 million.

As the *Kansas Economic Development* Study recommended, it is essential that Kansas maintain its education quality differential in order to support the quality of its labor force, one of its few comparative strengths for economic development.

Many states have realized the danger of allowing equipment to deteriorate and become out-of-date and have legislated programs to remedy this situation. For example, North Carolina has allocated \$1.6 million to four institutions for equipment in engineering and the sciences; Virginia has established a \$28.8 million equipment trust fund for higher education; and Pennsylvania has set aside \$3 million for an engineering school equipment grant matching program.

The Task Force recommends a program of equipment enhancement that would have a dual focus: a portion of the fund would be committed to equipment purchases for general research, and another portion would be earmarked for equipment that will upgrade research programs linked directly to economic development. The Task Force recommends a five-year program, because the need for new equipment is great and cannot be met in one year. Funding should be at a minimum level of \$2 million each year for five years with preferred funding at \$3 million each year for five years.

Further, the Task Force on Business Training is considering proposals for community colleges to become more involved in vocational/technical education. If such a proposal is accepted, a multi-year program to fund equipment for community colleges' new orientation will be necessary, e.g., a minimum of \$1.0 million a year for five years with an annual level of preferred funding of \$2.0 million.

TECHNOLOGY TRANSFER/INDUSTRIAL LIAISON

Technology transfer occurs when scientific, technological and other academic resources are applied to business opportunities leading to the commercialization or incorporation of a new product, process or idea into the economy. There are three types of technology transfer:

- 1) Industry assumes an active role by aggressively pursuing university help with some technological or management issue. Lines of communication into the university must facilitate this type of relationship.
- 2) The university structure affords an avenue wherein new products, processes or ideas may be reviewed for their commercial and patent potential. If deemed appropriate, the university seeks a link with the proper industry to commercialize this new university-developed knowledge.
- 3) Through an industrial extension service, field representatives "drop in" on state industries to market the available state resources that the firm may tap for solving technical and management problems. A complete networking system is usually facilitated by a central state database of research activities, patents, expertise, etc.

In order to facilitate these linkages, university and state officials would need to:

- 1) Articulate a policy clearly supporting greater business-university interactions and identify institutional policies, such as tenure guidelines, that discourage business outreach efforts by professors and departments. Value should be placed on achieving corporate resource efficiency and commercial success.
- 2) Address the issue of proprietary information as it relates to applied research.
- 3) Develop patent and licensing policies before entering into collaborations (Include the collection and disbursement of royalties).

Funding for a wide variety of such programs in other states ranges from \$800,000/year for CIRAS (Center for Industrial Research and Service) in Iowa to the \$30 million commitment by Virginia to their Center for Innovative Technology. CIRAS is the arm of the Iowa State University Extension Service that assists owners and managers of manufacturing and processing firms. Its' six field representatives travel throughout the state of Iowa in an effort to provide technical assistance to industry. Faculty become involved in projects to either lend expertise or to gain exposure to and knowledge of an industry's particular challenges. Ohio's OTTO program, housed within the Department of Development, links four Ohio universities and 24 technical community colleges in a state-wide information networking system. The OTTO philosophy is demand driven with each agent visiting their local industries asking questions such as "Can we do it better, faster?" "What technology do you need access to?" Ohio's commitment to this program for FY 87 was \$1.4 million. The state of Illinois appropriated \$3.0 million for FY 87 for the operation of its sixteen Technology Commercialization Centers. These Centers help to identify and support emerging Illinois businesses and individuals working on high technology projects. These Centers make faculties, researchers and facilities available and encourage collaboration on technical and management problems.

The following initiatives were reviewed by the Task Force as the potential main elements of a Kanss program of technology transfer and liaison:

- 1) Industry Liaison Offices and Network (KATC)

Industry Liaison offices to be located in the three major universities, then expanded to other institutions and networked throughout post secondary institutions in the state.

- 2) Kansas Industrial Extension Service

This initiative stresses the development of a partnership between the Colleges of Engineering and the Kansas Department of Commerce (and KTEC) in order to provide assistance to Kansas industry through outreach and provide continuing education opportunities. This consortium would be linked to the industry liaison networks

and its emphasis would be on engineering and technology. State funds will be complemented by funds from other sources. This consortium would be administered at KSU, and be subject to KTEC oversight and liaison.

The Task Force recommends:

- 1) Funding support for the creation of industrial liaison positions at our state universities with KTEC serving as the focal point for coordination and facilitation of the state-wide networking efforts. Our community colleges must be included in this network as the initial contact point for business/education interaction. (Budget: \$400,000 in FY 88; \$600,000 in FY 89)
- 2) Funding support for the establishment of a working partnership between our state engineering and scientific schools to facilitate the access of this specialized knowledge to Kansas business. (Budget: \$400,000 in FY 88; \$500,000 in FY 89)

STATE DATA BASES

The Task Force recommends the establishment of a Kansas technological data base that will provide users with a comprehensive inventory of research and development activity in Kansas. This data base will eliminate barriers to innovation by allowing entrepreneurs efficient access to relevant information and by minimizing redundant efforts.

Many states have a centralized technological data base, but Kansas does not. These programs vary widely from state to state in the type of data compiled, in accessibility, and in how much they are actually used.

This program could be modeled on Ohio's successful TIE-IN program, which is administered by the Ohio Department of Development and includes campus-specific inventories of resources, programs and expertise. It maintains the following information:

1. a file of U.S. patents assigned to entities within the state;
2. information on research and development capabilities of companies in the state;
3. descriptions of faculty expertise and training capabilities;
4. data on sponsored university grants;
5. listing of technical publications of authors in the state; and
6. a system for matching business with appropriate federal, state or local assistance programs.

The Ohio data base also includes information about venture opportunities, an area we propose to leave to other data base systems in the state.

Ohio's system costs about \$100,000 per year. This figure includes salary for six part-time staff members, computer time, and the costs of survey mailings needed for gathering the information. Ohio uses the state's mainframe computer, so the cost of this equipment is not included. This is a useful program that can be built up over time, providing a good return on a relatively small investment.

The Task Force recommends the following funding levels for a technological data base:

	<u>Minimum</u>	<u>Preferred</u>	
fiscal 1988	\$75,000	\$100,000	development phase
fiscal 1989	\$75,000	\$100,000	implementation phase
fiscal 1990	\$60,000	\$ 75,000	maintenance phase

Similarly the state of Kansas does not have a statistical agency that collects and disseminates economic and social data. There is no focal unit to serve the multiple demands for data needed by state agencies and local communities for economic development. Yet experience elsewhere suggests the need for three types of data bases, and probably a preference for these to be separate rather than consolidated.

1. technological data base (see above)
2. agency specific data bases e.g. KDED information and data system (see recommendation #33, *Kansas Economic Development Study*).
3. economic and social statistics for use by local governmental units, the private sector, research units, and various organizations.

The Institute for Public Policy and Business Research at the University of Kansas collects data in order to publish the *Kansas Statistical Abstract* and the *Kansas Business Review*, to undertake economic, social and policy analysis, and to provide a service to Kansas organizations in need of data for diverse purposes. This data base is extensive, but it is not integrated in any way and it is not in a form suitable to support economic development needs e.g., local community's marketing to attract industry.

The Task Force recommends the following funding levels for an economic and social statistics data base to support state and local economic development activities.

FY 88	\$ 75,000	development phase
FY 89	\$ 75,000	implementation phase
FY 90	\$ 60,000	maintenance phase

SMALL BUSINESS DEVELOPMENT CENTERS

Small Business Development Centers provide free or low cost one-on-one business consulting, training, and research support for existing and potential small business owners and operators. Consulting includes feasibility studies, market research, analysis of new business ventures, development of business plans, financial analyses and development of personnel policies. Training programs can encompass business planning, financial management, and pre-business workshops. Small Business Development Centers also provide research to help the business owner with market, demographic, product, and competitor data. These services are provided by either the Center staff or private consultants hired by the Center. They are successful in increasing the probability of small business success through education and experienced advice.

The majority of funding for Kansas' Small Business Development Centers is received from the federal program with a match of these funds made by the institution housing the SBDC. The eight SBDCs within Kansas are located at seven universities and one community college. The State of Kansas made a \$250,000 appropriation to the SBDC program to help fund outreach initiatives in FY 87. As a result, these eight Centers have established ten associate centers in their efforts to service their regional area. Nine of these ten associate Centers involve a link with a community college. Additional funds to help support these associate centers are received from the institution housing the associate center as well as from the "main" SBDC's budget as needed.

Currently, forty-four states have SBDC programs with two-thirds of these receiving state funding. A 1985 study of 26 states, shows ten states committed more than \$250,000 to their SBDC program while seven states matched Kansas' commitment. Nine states appropriated fewer dollars than our state.

Given the progress made in outreach efforts, the Task Force recommends that the current level of annual state funding be increased to a minimum of \$325,000 for FY 88 and \$400,000 for FY 89 for the purpose of expanding the SBDC network in general and supporting community college and private college involvement in the SBDC program in particular. Preferred funding is \$350,000 (FY 88), \$450,000 (FY 89) and \$550,000 (FY 90). Funding for this program should be administered by the Department of Commerce.

RESEARCH PROFESSORSHIP PROGRAM

As an integral part in the achievement of a university's primary goal of creating and passing on a knowledge base, Research Professorship Programs are designed to foster national eminence of selected outstanding academic programs through the appointment of scholar-leaders. This program, known by a variety of phrases from Eminent Scholars to Distinguished Professorships, provides an opportunity for strengthening the essential relationship between public higher education and the private sector for addressing cooperatively

some of a state's most critical needs and for stimulating a new thrust toward academic excellence. Such a thrust should focus on already outstanding academic endeavors which, with the leadership of a Research Professor would likely gain a national reputation and would enhance the research underpinning of business development.

In the state of Kansas, the Regents Distinguished Professor Program is currently funded at an annual level of \$125,000 to support five of these professorships. Each professorship receives a \$25,000 award for either salary supplement or OOE. The professorships are distributed at the three major universities--two at the University of Kansas, two at Kansas State University, and one at Wichita State University. These professorships were not selected for their linkage to economic development. Ohio's commitment of \$9.1 million (4-year period) provides funding to create eighteen \$1 million endowments consisting of 50 percent state dollars matched equally with dollars from the private sector. Of Iowa's \$5.0 million Economic and Research and Development Grant dollars, \$3.5 million were appropriated for the creation of seven endowed chairs. These endowments also consisted of \$500,000 each in state funds matched with \$500,000 of private funds.

The Task Force recommends that the existing Regents Distinguished Professor Program be expanded to fund research professorships selected for their linkage to economic development. Adopting the approach of funding salary supplements and associated support for faculty positions. The cost for 5 such professorships added in each of FY 88 and FY 89 would be \$500,000 and \$1 million respectively.

INCUBATORS

Incubators act as funding catalysts in the formation of academic/business partnerships focusing on the special needs of newly formed, technology-driven small businesses. Through incubators, entrepreneurs receive an array of business services to improve their potential to be significant job-creators in and economic contributors to the state's future.

Incubators are frequently a joint venture between universities, industry and community developers. Ohio has committed \$1.615 to help fund operating expenses for six such partnerships at its universities. Incubator policies are established separately by each community with an average tenancy of two years. Three incubator programs exist in the state of Iowa; two at its research universities, and one at a community college. The Center at the University of Iowa is operated as an administrative arm of the University, housed on its Oakdale campus. This Center received \$100,000 in state monies for FY 87. The Center at Iowa State University, established in February 1986, is working now on obtaining state and private funding. The Incubator Center at Des Moines Area Community College reports to the Economic Development Department of the college even though it is a separate not-for-profit corporation. They, too, are attempting to obtain a portion of the \$450,000 state funds committed to incubators for FY 87.

The state of Kansas could make a commitment of funds which will allow its institutions to join partnerships to form incubators as part of the institution and community's economic development thrust. Funding should help with initial set-up costs through cash or in-kind contributions (i.e., use of a university building). Business tenants should be encouraged to link with University resources as applicable with each incubator eventually becoming self-sufficient through tenant fees.

Consequently, the Task Force recommends the establishment of a minimum pool of \$600,000 funded over 3 years (\$200,000 committed each year beginning with FY 88 and subject to review) to allow universities to become involved in incubators if they so choose. A pool of \$1.0 million funded over 3 years (\$300,000-FY 88; \$400,000-FY 89; and \$300,000 FY 90) is the recommended preferred funding level.

MANAGEMENT AND ENTREPRENEURSHIP DEVELOPMENT

University based outreach and development programs based on engineering and science (see Technology Transfer) are productive in that they shorten the time lag from knowledge development to application, and this is crucial in the global competitive environment of today's industrial world. But the deficiencies and shortcomings of firms in the modern competitive world are not only technological, but also managerial in nature. This is particularly true with respect to small- to medium-size firms, the backbone of the Kansas economy.

The *Kansas Economic Development Study* recommended (#13, p. 15, Executive Report) that the state "selectively enhance university programs in management and associated areas crucial to economic development."

As noted in that study, economic development is a long-term exercise. In order to make long-lasting and profound changes in the Kansas economy, future business managers must evolve from a cutting-edge curriculum. To become and remain competitive in the international market place, business schools and other academic units should place additional emphasis on areas such as small business management, international business, advanced production and operations management, entrepreneurship, organizational change and modern information systems. These management areas have been given emphasis in other states. If Kansas does not develop programs in these areas, the quality of management in Kansas will decline and Kansas's firms will not be competitive in world markets. Because the major business schools in the state are barely able to support basic quality education with current funding, the addition and enhancement of programs will require the funding of additional faculty and related operating expenses.

In essence, long-term economic progress will be enhanced (a) by a funding commitment to excellence in our Schools of Business and (b) by funding support for new thrusts in Business School curriculums.

In addition, ways have to be devised to bring the expertise of university management and related programs to bear on current business. The notion of outreach is equally relevant to the management as to the technological sphere. The capacity and infrastructure to develop this outreach and consultancy role could involve a variety of initiatives, of which the following are illustrative:

- i) Proposed Rural Business Development Institute at Kansas State University to utilize the knowledge base and expertise of that institution to support rural based economic development initiatives (\$200,000).
- ii) Proposed statewide program of services and activities linking international expertise in the Regents system to the support of Kansas industry now unavoidably competing in the global context (\$150,000) (Center for International Programs, University of Kansas).
- iii) Proposed outreach oriented Centers of Business Development in our Schools of Business, analogous to or based upon the nationally recognized Center for Entrepreneurship at Wichita State University and the newly established Bicknell Center for Entrepreneurship at Pittsburg State University.

The Task Force recommends as follows:

1. Support for new program improvements and other initiatives designed to enhance the quality of the state's Schools of Business that have or will be recommended by the Regents.
2. Funding support for program development (following the illustrations in i), ii), and iii) above) in the universities designed to bring management and related (e.g., international) expertise into interaction with the Kansas business sector. (\$550,000 for FY 88, \$750,000 for FY 89).

"CLEAN-UP" PROPOSALS FOR LEGISLATIVE CONSIDERATION

Following are the recommended amendments to SB 755 (Section 6). These changes afford recognition that basic research, applied research or technology transfer activities may overlap to some extent, and should be perceived as definitional in nature.

Sec. 6

(b) Centers of excellence for basic research will primarily undertake ongoing basic research with a particular focus that will have long-run potential for commercial development....

(1) The Kansas technology enterprise basic research fund is hereby created to which shall be credited any state funds specifically so designated. The fund is not to be used for applied research, technology transfer, technical assistance or training except as it is incidental to the basic research intended to be benefitted by this section.

(2) The corporation may use the Kansas technology enterprise basic research fund to carry out the purposes of this act by awarding funds to establish new centers of excellence for basic research or to increase funding to such already established centers of excellence so long as those centers are determined to be (only) primarily carrying out basic research and to meet the standards of excellence required by this act....

REPEAT FOR SEC. 6 (c) AND (d) RE APPLIED RESEARCH AND TECHNOLOGY TRANSFER.

STATE PURCHASING PROVISIONS

The Task Force discussed the impact of current state purchasing provisions on higher education/business interaction. A consensus was reached that the current limitation of \$2,000 for equipment acquisition be increased to \$10,000 in the following three situations.

- 1) Centers of Excellence purchases,
- 2) Purchases under the Research Matching Grant Program, and
- 3) Purchases from sponsored research funds.

Report of the Task Force on Higher Education
to the Legislative Commission on Kansas Economic Development

Program Name	Purpose	Fiscal Implications Over Fiscal Year 1987 Budget (Millions of Dollars)		
		FY 88	FY 89	FY 90
Centers of Excellence	Expansion of economic development by enhancing academic programs which are at the leading edge of research and which have the potential to underpin future business development.	\$2.2	\$3.2	\$3.2 minimum
		(\$3.5)	(\$5.0)	(\$5.0) (preferred)
Research Matching Grants	Stimulate high technology development and cultivate a greater degree of business/university/interaction in general.	\$.39	\$.39	\$.39
Equipment Grant Program	Remedy present deficiencies in research equipment at our state universities.	\$2.0	\$2.0	\$2.0 minimum
		(\$3.0)	(\$3.0)	(\$3.0) (preferred)
-Community College Job Training Equipment Funds	Provide appropriate equipment for job training efforts	\$1.0	\$1.0	\$1.0 minimum
		(\$2.0)	(\$2.0)	(\$2.0) (preferred)
Industrial Liaison	Facilitate the transfer of scientific, technological and other academic knowledge to industry.	\$.4	\$.6	\$.6
Kansas Industrial Extension Service	Development of a partnership between the Kansas Colleges of Engineering and the Department of Commerce to provide engineering and scientific outreach services	\$.4	\$.5	\$.5
State Data Bases				
Technological Data Base	Provide users with a comprehensive inventory of research and development activity in Kansas	\$.075	\$.075	\$.06 minimum
		(\$.1)	(\$.1)	(\$.075) (preferred)

Program Name	Purpose	Fiscal Implications Over Fiscal Year 1987 Budget		
		(Millions of Dollars)		
		FY 88	FY 89	FY 90
Economic & Social Statistics Data Base	Provide users with a comprehensive inventory of Kansas social and economic data.	\$.075	\$.075	\$.06
Extension of Small Business Development Centers	Provide free or low cost one-on-one business con- sulting training and research support for small business owners and operators.	\$.075 (\$.1)	\$.15 (\$.2)	\$.15 minimum (\$.3) (preferred)
Research Professorship Program	Foster national eminence of selected outstanding academic programs important to economic development.	\$.5	\$1.0	\$1.0
Incubators	Funding catalyst in the formation of academic/ business partnerships focusing on the special needs of newly formed technology-driven small businesses.	\$.2 (\$.3)	\$.2 (\$.4)	\$.2 minimum (\$.3) (preferred)
Management and Entrepreneurship Development	Creation or extension of research and outreach programs for enhancing areas crucial to economic development.	\$.55 (\$.7)	\$.75 (\$.9)	\$.75 minimum (\$.9) (preferred)
	Total Net Increase from FY 87 Appropriations	\$7.865 (\$11.465)	\$9.815 (\$14.165)	\$9.785 minimum (\$14.125) (preferred)