



**A Citizens League
Research Report**

A Competitive Place in the Quality Race

**Putting the University of Minnesota
in the Nation's Top Five
Public Research Universities**

January 1998

*The Citizens League
promotes the public
interest in Minnesota
by involving citizens
in identifying and
framing critical public
policy choices, forging
recommendations
and advocating
their adoption.*

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in the Nation's Top Five
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January 1998

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Executive Summary

RECOMMENDATIONS

Research and advanced degree programs at the University of Minnesota make significant contributions to the state's economic and social well-being. However, the University must improve such programs if it hopes to lead the state into a high-tech, information-based economy. The University must establish clear priorities to improve graduate and professional education and research programs, and commit necessary resources to support those priorities. The Legislature and other stakeholders must provide appropriate support for priorities to come to fruition.

RECOMMENDATION #1: A new University-state-industry partnership, the Northstar Research Coalition, should be formed to finance and support significant investment in the four areas of research emphasis outlined by President Yudof: digital science, biology at molecular and cellular levels, multi-media and design.

Northstar would create and support a critical mass of world-class faculty in digital science, biology, multi-media and design. It would leverage public money (between \$20-\$30 million annually over a 3-5 year period) with private capital to build University and industry expertise in high-tech fields. Northstar's innovation stems from its high-tech research focus, its external control of decision-making and funding, and its administrative simplicity.

RECOMMENDATION #2: Evaluate the quality of graduate/professional programs and publish results of quality measures.

Along with National Research Council rankings, a measurement system should be

developed to evaluate quality in all programs. The University should then track long- and short-term results and publish a biennial report card for each graduate and professional program, which in turn should be used to reward programs for quality improvement.

RECOMMENDATION #3: Eliminate low-quality and low-priority programs, reallocating resources to higher priorities and meeting student and state needs through cooperative ventures.

Limited resources require the University to narrow its field of 165 graduate and professional programs. Program elimination should focus on low-quality and/or low-priority programs. One useful strategy is to aggressively pursue alliances with other universities to achieve higher overall program quality and to better meet student needs.

RECOMMENDATION #4: Strengthen graduate and professional programs by concentrating on areas that offer significant pay-offs for improved quality.

Some specific areas include:

- maintaining high admissions standards to graduate and professional programs;
- expanding the Grant-in-Aid program;
- expanding fellowship commitments;
- improving the University's physical plant;
- streamlining administrative processes with respect to fast-moving opportunities.

RECOMMENDATION #5: Improve human resource training and management to unleash human capital resources.

Quality improvements will be driven by faculty. As such, faculty must be involved, managed and rewarded for productivity. More specifically, the University should:

- re-evaluate traditional teaching-research-outreach duties for faculty, looking instead to maximize individual talents;
- reconfigure faculty rewards toward overlooked yet desirable activities, such as teaching and interdisciplinary research;
- provide better training for faculty in policy leadership positions, and transfer administrative functions to professional administrators.

THE PROBLEM, AND HOW IT HAPPENED

Evidence shows the University's research and advanced degree programs are not well-positioned for future leadership. Despite excellence in some areas, the collective national reputation of programs has gradually slipped, accompanied by a perception that quality in the University's education and research programs is not as rigorous as it should be. Some factors include:

- **Lack of programmatic focus:** 165 different doctoral, masters and professional programs have led to a diffusion of priorities and available resources.
- **Missed opportunities in new areas:** The University has failed in the past to capitalize on some emerging opportunities for research now considered critical to universities and state economies, including molecular biology and software programming.
- **Poor management structures and irrational policies:** The existing bureaucracy often has not provided good leadership and management. Policies have resulted that block both program and department innovation necessary to be the cutting edge of academia.
- **Salaries and departmental size:** Claims of uncompetitive salaries, and gradual but persistent faculty downsizing have had a negative affect on the University's perceived commitment to quality.
- **Competing agendas among many different stakeholders:** Numerous stakeholders impose different agendas on the University, which results in a multi-directional vision for the institution.
- **Midwestern culture, expectations and demographics:** In the past, breadth, access and quality were simultaneously achievable. But midwestern universities appear to have trouble adapting to the "new generation" of public research universities that are more focused and streamlined.

CONVERGING FACTORS FOR CHANGE

- **Rapid shift toward a global and knowledge-based economy:** This widely-accepted shift places greater pressure for sophistication and competitive advantage on the University's research and advanced degree programs.
- **Demographic concentration and a diffuse higher education system:** The state's higher education infrastructure is spread out while the student-aged population becomes more concentrated in the greater Twin Cities metro region. As a result, resources are spent to support institutions where the students aren't.
- **Cost and revenue pressures:** Pressure on both the spending and revenue sides of the University budget — including state and federal research support, and rising tuition — will have to be addressed if the University expects to improve quality.
- **Public and legislative demand for spending accountability:** The level of state support — over \$500 million — and a perceived lack of responsiveness to the needs of business and the general public has encouraged ever-greater public scrutiny of University spending.

I. Introduction

The importance of research and advanced degree programs at the University of Minnesota

Citizens of Minnesota have long enjoyed one of the highest-quality standards of living in the country. Whether measured by traditional economic yardsticks like average income and unemployment, or by socially-oriented standards like crime rates, quality education and cultural attractions, Minnesota has a high quality of life.

Many factors contribute to this quality, *but often overlooked is the impact of research and graduate and professional education programs at the University of Minnesota.* The University has four campuses statewide — the Twin Cities, Duluth, Morris and Crookston — but a majority of research and advanced degree programs (doctoral, masters, and professional) are at the Twin Cities campus.

As a nationally respected research institution, the University acts as a magnet for talented faculty and graduate students. In 1996, 5,450 students came from outside Minnesota to study in graduate and professional programs, including 2,100 international students.¹

Once graduated, many students stay in the Twin Cities and greater Minnesota. Eighty percent of the state's dentists, 60 percent of pharmacists and 60 percent of veterinarians are graduates of the University.² About half of all Law School graduates practice law in the Twin Cities metro area, while another 10-15 percent do so in greater Minnesota. Likewise, approximately 60 percent of Medical School

graduates serve their residencies in the Twin Cities or greater Minnesota.³

Many graduates also start their own companies in Minnesota. Almost 1,000 companies — including the likes of Medtronic and Rosemount Engineering, have been founded by Institute of Technology alumni, including about 600 companies in Minnesota with 56,000 employees and sales of \$12 billion in 1993.⁴

University research makes state industries more competitive. For example, Minnesota farmers have been plagued by Fusarium head blight (a.k.a. scab), creating losses of about \$900 million in wheat and \$300 million in barley from 1993 to 1996. In response, the state appropriated \$1.5 million in 1994 to the University to come up with scab-resistant strains of wheat and barley. This funding has helped mobilize a partnership among four University departments, the USDA, and the wheat and barley industries to develop scab-resistant strains.⁵

University research helps address troubling social ills as well. For example, despite considerable research on both violence against

¹ Higher Education Services Office (HESO), *Basic Data Series 1996*, August 1997, p. 69. About 70 percent of students were from non-reciprocity states, showing the University has good draw beyond neighboring states.

² Minnesota High Technology Council, *Products of an Unheralded Industry*, April 1993.

³ Law School figures provided by Susan Gainen, Program Director of the Law School Admissions and Placement Office, personal communication; medical residency figures from "1997 Residency List," University of Minnesota Medical School.

⁴ Minnesota High Technology Council, *op. cit.* IT alumni figure includes graduates from both undergraduate and graduate programs.

⁵ Office of the Vice President for Research, *The Impact of University of Minnesota Research Activities on the State of Minnesota: A Case Statement* (working draft), University of Minnesota June 1997; Ruth Dill-Macky, Plant Pathology Department, personal communication. Significant progress is being made, but Dill-Macky said developing a resistant strain will take 8-10 years.

women and the maltreatment of children, very little is known about the relationship between the two abuses. With the help of significant non-state funding, two University researchers are studying 200 families in the Hennepin County child protection system to identify early intervention strategies.⁶

Put simply, the University has an enormous influence on Minnesota's well-being. This influence will become even more important in the rapidly-evolving global and knowledge-based economy, which emphasizes high-skilled jobs and workers. Improvements in economic output, for example, will occur through increased productivity — more knowledgeable managers and workers, and better, more efficient processes and products. This demand for cutting-edge sophistication requires the highest quality research and advanced degree programs at the University. Historically, the University has been up to the challenge — and then some.

Acknowledging the new energy and optimism of the Yudof administration, a number of problems must be addressed before the University's research and advanced degree programs will be adequately positioned to provide future leadership to the state. While the University is still a very strong institution, both anecdotal and statistical evidence show a relative decline in quality compared to other top research universities — an ominous sign for the state's future.

CONTEXT OF THIS REPORT

This report focuses exclusively on the quality of research and advanced degree programs at the University of Minnesota—Twin Cities campus. The report's purpose is to recommend changes that can stem the decline of the University's national stature, and boost it to a place among the top five public research universities in the country. This Citizens

League committee was charged to investigate the following questions:

- By what measures should "quality" be defined in graduate and professional education and research programs?
- What opportunities are present for improving University stature while simultaneously bolstering the state's quality of life and long-term economic health?
- What type of societal climate, institutional culture, and general incentives would realize greater University quality? What internal and external obstacles prevent quality improvement? What resources will it take to get the job done, and where will those resources come from?

Acknowledging the broad range of potential topics in any discussion of University "quality," this report chose to highlight programs that contribute tangibly to the economic health of Minnesota. This report also focuses on the Twin Cities campus because it is responsible for the great majority of research and advanced degree programs at the University.

The report understands, however, that overall quality of the University is defined in ways that reach well beyond the University's influence on the state's economic development. Indeed, the measure of a truly great University is its overall scholarly excellence — in the arts, humanities and social sciences as well as physical and biological sciences. For this reason, this report also addresses problems that affect overall quality throughout the University's many graduate and professional education programs.

Readers will likely notice a handful of topics that arguably are related but not addressed in this report, including the structure of the state's higher education system, the Board of Regents, the tenure issue, and quality of undergraduate programs. For the sake of focus and brevity these topics were not addressed by this committee.

⁶ Office of the Vice President for Research, *op. cit.*

II. Recommendations

How to improve quality in the University's graduate and professional education and research programs

It will take bold action to put the University of Minnesota in the ranks of the nation's top five public research universities. The University must establish clear priorities to improve graduate and professional education and research programs. It must then commit the resources necessary to support those priorities. The Legislature and other stakeholders must provide help too—through targeted funding and general cooperation — for priorities to be realized.

In fact, the University today is showing promising signs of improvement, many from efforts initiated during Nils Hasselmo's administration. The list of recent accomplishments is impressive: new buildings for the Carlson School of Management and Mechanical Engineering, a merger between Fairview Riverside and University Hospital, a wholesale revamping of biological science programs, and a record-breaking year of fundraising by the University Foundation. This summer, incoming President Mark Yudof announced a three-year, \$750 million building plan that includes both new buildings and badly-needed upgrades for buildings on Northrup Mall.

But more is needed than bricks and mortar. Improvements are needed in operations and resource management (both money and faculty). President Yudof's recently proposed cutbacks in administration are good first steps. He also quickly established a research vision for the University, proposing high-tech research in four new areas:

- digital science technology
- biology at molecular and cellular levels
- multi-media
- design

The Citizens League endorses President Yudof's proposal to give high priority to these high-tech areas. The following recommendations support President Yudof's initiatives but also address a variety of other issues that must be resolved to achieve greater quality in the University's many research and advanced degree programs — from the hard sciences to arts and humanities programs.

These recommendations are meant to complement on-going efforts at the University to reach out into bold new areas of research, to focus University programs, to streamline operations, and to unleash the productivity of all University faculty.

The result of such quality improvement will be a University that is better-equipped to help the state and its citizens improve and maintain their high quality of life.

RECOMMENDATION #1

A new University-state-industry partnership, called the Northstar Research Coalition, should be formed to channel significant investment into the four high-tech areas identified by President Yudof.

Purpose of the Northstar Research Coalition: *To create, manage and leverage a pool of external funds for research in emerging high-tech fields that hold significant opportunities for future economic development in the state.*

Northstar's focus should be economic growth, using the University's research capacity as the strategic link for growth in new and existing high-tech industries, and hiring world-renowned faculty to jump-start research in emerging fields. Northstar's goals should be to:

- strengthen University research and advanced degree programs, and the University's national reputation, by creating a critical mass of world-class faculty in emerging high-tech fields;
- build University expertise in new high-tech research areas in hopes of creating new industry clusters, and providing improved research expertise and accelerated transfer of new technologies to existing regional and state industry clusters;
- create an environment that produces more company start-ups, helps existing companies expand, and entices companies nationwide to move to the region for the specialization created in part by Northstar.

This model consciously seeks to build synergy between the research needs of business, the economic development needs of the state, and the research capacity of the University — and does so through a tangible, long-term partnership that benefits all three parties: the University receives additional research revenue; the business community gains greater access to market-sensitive research and high-tech expertise that will support existing businesses and help new ones grow; and the state receives more and better opportunities for economic growth.

The high-tech research focus of Northstar is intentional because it is the foundation of the future economy.⁷ As such, President Yudof's

⁷ According to William T. Archey, president of the American Electronics Association:

- the high-tech industry is close behind health care as the nation's leading sector for output;
- the high-tech industry is now Minnesota's second largest employment sector with 115,000

emphasis in digital science, molecular and cellular biology, multi-media and design will help the region and state build new industry clusters, while providing badly-needed high-tech support for existing industry clusters like printing and publishing, medical devices, software and manufacturing in general. Digital science, for example, offers new productivity opportunities in virtually every sector — many say it represents the very underpinnings of the new economy. As such, the University, the state, and the business community can ill-afford to lag in this and other high-tech areas.

Operation: Northstar's initial task would be to assess faculty needs in the four targeted research areas, and assist the University in assembling and retaining world-class faculty in these areas. Northstar would then help recruit, attract, and endow chairs as needed.

Partnerships would be sought with all external funders — foundations, the federal government, and particularly private industry — that have an interest in this research. Northstar would pay start-up costs for new University research projects — lab set-up and research operations — over a 1-2 year period with the expectation that successful projects would attract private funding soon thereafter from external sources for continued operation.

By doing so, Northstar's initial investment would act as start-up capital for research projects that will later attract external research funding and possibly even venture capital for new company or product start-ups. Research programs that fail to secure

jobs, adding about 11,000 jobs from 1990 to 1996;

- average annual high-tech wages are \$45,000 in Minnesota, compared with \$29,000 for all other jobs; from 1990 to 1996, high-tech wages also increased by 8 percent — a rate almost triple for all other jobs during the same period;
- high-tech products and services now make up more than half (\$5.2 billion) of Minnesota's 1996 exports (\$9.8 billion). (Source: "Cyberstates, Cybernations," Digital Technology Summit, Hyatt Regency Hotel, Minneapolis, October 22, 1997.)

external funding would be eliminated or continued by the University using internal resources. University departments also would negotiate for the right to house individual research projects in their start-up phase.

Structure: This partnership model is significantly different from existing outreach and technology transfer models. It would use its funding to enhance the University's high-tech research specialization, which in turn would support new and existing high-tech industry clusters more directly. Decision-making and resource control would lie with a board of directors comprised mostly of CEOs (or other high-level executives) together with key University representatives.

The League proposes a separate organization controlled from outside the University for two reasons. First, it would bring the business community and the University into a formal partnership and give the private sector the opportunity to help shape University research and ultimately invest in it. Second, it would speed up decision-making and bypass the internal bureaucracy and in-fighting common with resource allocation decisions at the University, which can prevent even the best proposals from being implemented in a timely fashion.

This external Board would control resource distribution to research projects using a model similar to that of the National Science Foundation: a clearly-defined research agenda, with grant awards going to the best proposals. The Board, or a related sub-committee, would also act as a "foresight committee," looking for new long-term research opportunities for the University to pursue.

Funding and research focus: Initial start-up funding for Northstar should come from the state and be matched up-front by private sources. This report recommends a state investment of \$20-\$30 million annually for three to five years. State funding beyond this probationary period should be on a year-to-

year basis. The bulk of funding should be made available only after securing matching private funds, which gives both private and public sectors a financial stake in the partnership.

This funding should *not* be used for typical "bricks and mortar" projects often found in the state's bonding bill, or to fund a new layer of bureaucracy. *Money should be used to endow chairs, invest in necessary high-tech research equipment, and fund other direct expenses for high-tech research projects.*

The League recognizes that previous attempts have been made to create similar-looking outreach partnerships — including the likes of the Minnesota Extension Service, Minnesota Technology Inc., and its forerunner, the Greater Minnesota Corporation. The League believes the newly-proposed Northstar Research Coalition is distinctly different because it targets money for early-stage University research that supports new and existing high-tech industry clusters critical to the state's future economic health.

This model demands significant participation from all parties involved. The state must provide initial start-up capital; the University must adapt its research practices to be more market-friendly while staying true to its basic research mission, and be willing to accept external resource control; business leaders must clearly define industry research needs, provide support at the Legislature for the Northstar effort, and provide initial matching financial support and long-term funding to sustain promising research.

To ensure that public funds are being used wisely, its public purposes would need to be statutorily defined. Short- and long-term goals also need to be tracked to measure Northstar's productivity, including external funding attraction, patents, licenses, company start-ups and job creation.

RECOMMENDATION #2

Evaluate the quality of all graduate and professional programs and ensure accountability for quality improvement by publishing results of quality measurements.

A. Continue using National Research Council (NRC) rankings to measure overall program quality.

NRC rankings are widely regarded as the most comprehensive measure of quality in our nation's research universities, and should continue to be a barometer of quality in the University's graduate education and research programs.

B. Develop a system for evaluating quality in all graduate and professional education programs, and track long- and short-term results.

NRC rankings provide a good start for measuring quality, but quality needs to be tracked on an annual or biennial basis instead of the 10- or 12-year interval common with NRC surveys. NRC rankings also ignore a majority of graduate and professional programs at the University, each of which ought to have tangible, credible data showing a program's current level of quality.

The Graduate School currently oversees periodic reviews of individual graduate programs, which include an evaluation by a small team of outsiders. However, each program is reviewed only every eight to ten years.⁸ For these reasons, the University should devise a system to continuously evaluate graduate and professional programs for *existing quality*

and rank as a *university priority*. For example, program *priority* might be evaluated according to:

- *current rank*, to determine the commitment to necessary quality improvements (also a good measure of program quality);
- *link with the economic or social health* of the state, to gauge external benefits of quality improvement to a program;
- *cost-efficiency of improvement*, to balance the cost of achieving quality with the benefits derived;
- *mission fulfillment*, to demonstrate the University's commitment to a core group of programs expected from a nationally-renowned university.

On the other hand, program *quality* might be measured through such indicators as:

- customer/student satisfaction surveys
- annual Ph.D.s conferred
- graduate placement
- faculty publications and citations
- admission standards
- research funding broken down by federal, state and private contributions
- U.S. News & World Report rankings

There are numerous other measures that could help quantify the University's output and quality. In fact, the University's "critical measures" effort in the Office of Planning and Analysis (OPA) begins to address these needs. But resource-intensive measures (like satisfaction surveys) and unit-based measures (for individual program quality) are currently at different stages of implementation. See attached appendix for a more detailed description of potential quality indicators.⁹

⁸ Robert Leik, associate dean, Graduate School, University of Minnesota, personal communication.

⁹ In fact, data on many of the measures discussed here and in the appendix currently are gathered in some form. However, in almost all cases, data gathering is done irregularly for individual programs, if at all, and the University has no method of aggregating available data. As a result, the University is unable to get a clear picture of

It is the belief of this committee, however, that final decisions regarding quality benchmarks should be determined by department faculty and administration, whose job it is to understand and achieve quality in their respective programs.

By the same token, faculty also must consult more often with external constituencies to see that "quality" is a function of what the market needs and can usefully absorb, and is not defined merely by the narrow interests of faculty, their national peers, or the administration.

C. Track quality improvement by publishing a biennial report card of each graduate and professional program for the Board of Regents and the general public.

To track progress toward quality improvement, and to instill a measure of accountability, the University and its individual departments should collect and analyze data on a number of measures more regularly across all graduate and professional programs. Once gathered, a biennial report card should be produced for the Board of Regents and made public.

D. Reward programs for quality improvement.

To provide incentives for quality improvement, both the state and the University need to establish a reward system that "pays for performance." Such a reward system might include merit pay raises, scholarly awards and other public recognition for programs that achieve and individual faculty members who contribute to quality improvement.

how its collective mission is being served across the institution by its many programs.

RECOMMENDATION #3

Eliminate low-quality and low-priority programs, reallocating resources to higher priorities and meeting student and state needs through cooperative ventures.

NRC rankings demonstrate that programmatic focus is crucial in improving a university's national standing, particularly for public universities. Doing so allows available resources to be directed toward specified priorities, instead of spreading them thinly across all programs, regardless of their relative importance.

In a state of moderate size with relatively slow growth, the University also must cope with the reality of limited resources — particularly in light of its land-grant tradition of offering "something for everyone." Limited resources require the University to make clear choices about where it wants to spend available money. A good first step would be for the University to gradually narrow its field of 165 advanced degree programs, which is arguably more than a small state like Minnesota can expect to support if high quality is a top priority.

Although program elimination is a political minefield, it is critical in the long-term struggle to improve overall quality in graduate and professional programs, as well as in University research. Some downsizing of programs has already occurred in the last ten years, but more is needed.

A. Eliminate programs that are of low quality or do not positively contribute to making the University one of the top five public research universities.

Using the evaluation system outlined in recommendation #2, the ultimate goal is to close or consolidate programs that are determined to be of either low quality and/or low priority to the University's

mission. Any resources captured should be redirected to higher priorities (see recommendation #4 for examples).

In some cases, cutting programs might yield few leftover resources due to faculty contracts and other factors. Even when this is the case, closing such programs still makes good sense because it sends the right message about demanding program quality and focusing resources.

Discipline is also needed at the Legislature to help streamline University programs — replacing legislative parochialism and micro-management with a broader, more cooperative vision for University quality.

B. Aggressively pursue alliances with other universities to achieve higher program quality and better meet student needs.

Alliances with other state, regional, national and even international universities will improve quality in two important ways. First, for vital but expensive programs — where low *quality* is the issue — alliances could generate the critical financial and student mass necessary to initiate new programs (or reinvigorate existing ones) that the University cannot afford to support alone.

Second, alliances could help consolidate programs and reduce costs in fields the University believes are a low *priority*. In both cases, such alliances help meet the needs of both students and the state simultaneously. In fact, the Graduate School is already working on alliances with the University of Wisconsin and other institutions on a limited scope. The League supports such work and encourages the University to increase such activity.

RECOMMENDATION #4

Strengthen graduate and professional education programs by devoting resources and setting appropriate policy in areas that offer significant pay-offs for improved quality.

In light of limited new resources, the University simply must, to use an over-worked phrase, "do better" with existing resources. To do so, it will have to establish and implement priorities that clearly demonstrate a vision for improved quality in research endeavors and graduate and professional programs. Below are some areas in need of particular attention.

A. Maintain high admissions standards to graduate and professional programs commensurate with expectations for improved quality.

Because programmatic quality is closely tied to the quality of students, individual programs must align admission policies to attract and retain the very best students. In particular, it is critical that University programs become attractive to the state's most talented students, instead of allowing them to go to out-of-state universities.

Further, the University's highest priority programs should become a magnet for the brightest graduate students from around the nation and world.

There is more than a little Minnesota populism in the belief that the University need not cater to the state's best students because, as one person put it, "they can go to Harvard." Such a point presumes that the University is a place for "the rest of us" instead of attracting the "best of us." Continuing such a self-deprecating opinion of the University will likely ensure that it remains a second-tier university.

B. Expand the Grant-in-Aid program to support the work of promising young faculty and to leverage external funding for research efforts.

Even when the University has identified a successful program or research approach, it struggles to find the resources necessary to take proper advantage of it. This seems to be the case with several centralized research funding programs in the Office of Research, including the Grant-in-Aid (GIA) and New Initiatives in Interdisciplinary Research programs, which have overcome some of the persistent "silo" problems of departments.

GIA, for example, provides seed money to young faculty and to faculty investigating interdisciplinary areas so each can obtain preliminary research data. Researchers then use preliminary research efforts to attract external funding — so the GIA, in effect, provides start-up funding for faculty so they might later attract external funding more easily. In 1995, 175 GIA awards were given out averaging about \$14,000 each, or about \$2.5 million total.

The return to the University on this invested seed money is considerable. In a 1985-86 survey of GIA recipients, 111 faculty respondents received a total of \$600,000 (about \$5,400 each). Ten years later, those faculty members received \$55 million in external funding, \$22 million of which was derived from initial research paid for by the original GIA award.¹⁰

An internal evaluation of GIA noted, "At a time when federal funding for research and scholarship is being reduced, institutional support for seed-funding these activities is going to be ever more vital."¹¹

Despite this apparent success, the program's funding has been stagnant for a number of years, having risen only 20 percent since the program's advent more than ten years ago. The likely reason is that many departments and faculty view centrally-controlled research programs with suspicion, believing such money is more wisely distributed by departments.

But as outlined in this report, departments have incentives *not* to fund new faculty members and interdisciplinary research. Centrally-controlled research funding — through programs like the GIA — appears to be one way to overcome such barriers. We recommend doubling internal funding for GIA to at least \$5 million annually.

C. Expand graduate and doctoral fellowship assistance, and improve the experience of doctoral, graduate and professional students.

As a faculty member/administrator noted, program and research quality are directly related to the quality of students at the University: "Better graduate students will make this a better institution."

This is particularly the case with doctoral and graduate fellows, who are provided grants in order to concentrate on their own education and research. Although most evidence is anecdotal, many believe the University is slowly losing the war of fellowship assistance.

The criticism is that the number of fellowships is too few, and commitments are on a year-to-year basis, instead of multi-year commitments that cover the life span (or at least a significant part) of a student's schooling, which is becoming common in other universities.

For the current 1997-98 school year, for example, the Graduate School has awarded \$2.1 million for 116 graduate and

¹⁰ Charles F. Louis, *Evaluation of the Effectiveness of the University of Minnesota Grant-in-Aid of Research, Artistry and Scholarship Program*, University of Minnesota, no date.

¹¹ *ibid.* p. 2.

doctoral fellowships. Individual programs also receive discretionary fellowship support from the Graduate School — \$1.6 million in block grants and \$1.3 million in tuition waivers.

All told, the University will spend \$5 million this year for fellowship support, which includes annual stipend, health insurance and tuition waivers. By comparison, Michigan spends about \$20 million, and Northwestern \$11 million on fellowships.¹² This report recommends that the University devote at least an additional \$2-\$4 million for fellowship programs, which should be used to create *more* fellowships, and make *longer* commitments to individual recipients.

Consider this: doubling, even tripling, the number of Graduate School fellowship awards (currently 116) would require the financial equivalent of a minor rounding error in University's \$1.5 billion budget, yet offer a significant boost to the University's reputation for courting the world's best students.

Certainly money is not the only reason top-notch graduate students go elsewhere. According to surveys, top graduate students are mostly seeking high-quality programs and compatibility with faculty research interests.¹³ However, in this chicken-and-egg scenario, increasing the number and commitment level of fellowship awards to top graduate students might be a necessary first step to improving program and institutional quality that will attract future students.

A student's perception of quality also is based partly on his/her general experience while on campus. Again, anecdotal

evidence suggests that prospective graduate students are often not treated in a welcoming way, which can diminish their interest in the University.

As the University found out with its undergraduate programs, paying more attention to student amenities and the quality of programs improves the perceptions of the students themselves, who are powerful agents for the University's future reputation.

For this reason, the University should look to improve the experience of all post-undergraduate students (what one person called "'Hasselmo-ization' for graduate students"). Similar to the efforts at the undergraduate level, improving the graduate experience demands that key indicators be tracked for quality improvement. Such indicators should be determined by the Graduate School and individual programs, and implemented along with the "program quality" measures discussed on page 6.

D. Improve the University's physical plant to address the negative effect that an extensive maintenance backlog has had on the quality of education and research programs.

As President Yudof was quick to point out, the University's physical plant is in disrepair and lab equipment is outdated, which has a tangible, negative effect on the perceived quality of graduate and professional education and research programs. The League supports the facilities initiative proposed by President Yudof to address the University's woeful backlog of building maintenance.

In the future, however, the University must consciously plan, and prepare budgetarily, for the depreciation and subsequent repair of buildings instead of expecting the Legislature to step in and

¹² Myrna G. Smith, director of the Graduate School Fellowship Office, University of Minnesota, personal correspondence. Smith said Michigan uses about 60 percent of fellowship money specifically for minority recruitment.

¹³ Office of Planning and Analysis, *op. cit.*, "Chapter VII: Graduate and Professional Education," p. 12.

address the backlog of maintenance and emergency repairs. Wherever possible — such as the proposed improvements to Walter Library — all building and maintenance projects also must be linked directly with President Yudof's four-point plan for research emphasis so the University can strategically invest in new areas while improving the overall condition of its physical infrastructure.

E. Eliminate obstacles and streamline administrative processes with respect to fast-moving opportunities, so departments can respond more quickly to emerging research opportunities and graduate and professional education needs.

This recommendation does not require additional resources, but it might in fact be more difficult to achieve given the University's bureaucratic tendencies. Eliminating bureaucracy is crucial if the University is to capitalize on new opportunities in research and education, particularly in interdisciplinary areas.

A number of reports have noted the negative impact of a slow-to-react University, and have clearly demonstrated the need for streamlining the process by which new programs and related research are initiated and, for that matter, terminated for lack of long-term promise.

An important first step and a good example would be for the Board of Regents to make tuition policies more adaptable to the marketplace for professional and mid-career programs, where demand exists and customers are willing and able to pay closer to the full cost of operating such programs.

RECOMMENDATION #5

Improve human resource training and management to unleash the human capital resources of University faculty.

The recent addition of a vice president of human resources by President Yudof is a positive first step for improving human resource management. Below are a few additional steps that could be taken.

In particular, improvements in research and programmatic quality will be driven by faculty. As such, the degree to which faculty are involved, encouraged, managed and rewarded will dictate their level of buy-in to any strategy for quality improvement.

A. Re-evaluate the traditional teaching-research-outreach paradigm of faculty duties to make better use of each faculty member's talents.

In order to improve faculty performance and output, traditional expectations have to be questioned and reconsidered. For example, the traditional idea that faculty members make equal contributions to the University's education, research, and outreach mission needs updating, both in concept and delivery.

Such an approach assumes that faculty are equally skilled in all three areas, which likely under-utilizes exceptional skills of individual faculty members. The University, or individual departments, instead should experiment with a "team" concept that employs the various skills of different team members to fulfill individual parts of the mission.

B. Reward faculty achievements and activities considered desirable, such as quality teaching and interdisciplinary research.

Similar to the above recommendation to rethink traditional teaching and research duties, increased support is needed for career development so faculty can upgrade their skills regularly, and branch off into new learning areas. Fundamental to this is rethinking the current faculty reward structures that penalize (or at least fail to reward) faculty for pursuing interdisciplinary research, or excelling in teaching, advising, or community outreach.

C. Provide better training for faculty in policy leadership positions, and remove faculty from administrative positions unrelated to policy-making at the program, department and college level.

As noted earlier in the report, the University is burdened by a number of poor management structures and policies. Compounding this are faculty administrators who too often are ill-equipped and/or poorly trained for the tasks of leadership and administration.

In many respects, higher education is one of the last bastions of amateur management — a situation akin to court and hospital administration, which historically were done by judges and doctors before being turned over to professional managers.

The University runs a number of management and leadership training programs in hopes of filling this gap, but even the coordinator of these programs admitted that more faculty leadership training would be very useful.¹⁴

Consequently, some faculty in leadership positions lack the skills necessary to support and motivate faculty members — young and old — to be productive.

Notwithstanding the heroic efforts and abilities of some faculty, the task of administrative management is not well suited to persons expressly trained for teaching, research and outreach activities. Unfortunately, this creates a leadership gap at the highest level and affects the University's ability to establish and implement uniform priorities throughout its many programs.

For this reason, changes must be made to ensure that faculty members are put in appropriate leadership positions — *namely, academic policy-making positions* — and then required to take proper, ongoing training to do the job well. The University also must provide necessary fill-in support so time-consuming training can take place without hurting day-to-day operations of programs and departments.

Equally important, faculty members should not be in administrative positions where they have little professional expertise. Such positions should be transitioned to professionally-trained administrators.

¹⁴ Timothy J. Delmont, coordinator of the Administrative Development Program (ADP), Office of Human Resources, University of

Minnesota. Mr. Delmont noted that ADP tries to make it easy for faculty to receive training. But programs are voluntary, he said, and faculty have a "training threshold" of about 25-40 hours (the typical length of training programs) because, somewhat ironically, they have more immediate management duties to attend.

CONCLUSION

The need for greater quality in the University's graduate and professional education and research programs is clear: the state's long-term economic and social development depends on a top-notch research university.

Because of this importance, the League recommends that the Legislature provide an additional \$25-\$35 million in short-term, on-going support over and above its annual University appropriation to support quality improvements outlined in this report. We envision most of this money going to the Northstar Research Coalition (discussed on pages 3-5), with continued support based on the Coalition's productivity.

Similarly, the business community must show a willingness to support new research initiatives at the University. The general public and business community also will play key roles in selling greater University quality to the Legislature. How convincingly each "goes to bat" for the University will likely dictate the Legislature's financial commitment.

But make no mistake, quality improvement is not merely an issue of providing the University with more resources. Additional resources should be used only as a catalyst for remaking the University.

In return for financial and general support, the University must take steps now long overdue to be more responsive to market needs and demands for both research and education, while becoming more focused, less bureaucratic, and generally more productive. Anything less should result in a discontinuance of additional financial support from the state.

The University of Minnesota remains a jewel in the state's education system. But a concerted effort is needed to restore the luster and to realize the full potential of the University of Minnesota.

As a final measure, this report recommends an 18-month follow-up between President Yudof and Citizens League members on this committee to gauge progress toward greater quality in the University's graduate and professional education and research programs.

III. A Discussion of Northstar

A history of partnerships for research, technology transfer and economic development

Those familiar with the history of higher education and economic development policy in Minnesota might think the League's Northstar Research Coalition proposal is "déjà vu all over again." Despite some external similarities, however, Northstar is notably different from previous efforts.

The state has tried its hand at public-private partnerships and outreach efforts many times in the past in hopes of achieving a variety of objectives related to University research, economic development, and/or technology transfer. Collectively, these efforts — some of which are still around today — have experienced a wide range of success and political acceptance. To the expert or insider, differences among these many separate efforts might be obvious.

But to the average citizen, the subtleties can be confusing and hard to distinguish. For Northstar to succeed, it is critical for its proponents — starting with the Citizens League — to distinguish it from seemingly similar efforts that have preceded it.

Northstar's intent is two-fold:

- to improve the University's expertise and reputation in high-tech research in four areas outlined by President Yudof: digital science; biology at the molecular and cellular levels, multi-media, and design;
- to create new high-tech industry clusters, and to support existing industry clusters in the region and state by making high-tech research at the University more "industry-friendly" from the start so businesses can take full advantage of University technology and expertise to their own competitive advantage.

These objectives will be met through two basic strategies. First, Northstar will leverage state money with matching private resources. It will then invest this money in high-tech research projects (and related items) at the University, with the expectation that these research projects will find external research funding by a predetermined period or be discontinued. Second, decision-making and resource control will lie with an external-controlled board of directors made up mostly of major local CEOs.

As such, Northstar separates itself from past efforts through its:

- *focus on new high-tech research;*
- *external control and industry involvement;*
- *use of public and private funds as seed money to later attract external research funds;*
- *ability to achieve objectives without adding significant new administration.*

FUNDING, AND FACULTY

The Northstar Research Coalition would use public and private funding for three basic purposes:

- **conduct research** in one of the four areas of new emphasis outlined by President Yudof: digital science, biology at the cellular and molecular levels, multi-media and design;
- **endow chairs** — at between \$1 million to \$2 million each, some might consider this an expensive start-up cost, but it provides security for both the University and incoming faculty, while providing a prestigious appointment to attract top faculty;

- **equipment purchases for research** — high-tech research can be very capital-cost intensive, and NRC funds would help cover equipment costs for specific NRC research projects.

A LOOK AT PAST EFFORTS

The Citizens League understands that partnerships and University outreach are not new ideas. The Minnesota Extension Service is an outreach and technology transfer effort that has worked wonderfully for decades. There have been many other efforts as well, most of which have been much less successful.

In the 1960s, the North Star Research Institute was initiated to conduct applied research to encourage greater economic development for the entire Upper Midwest. It faded after failing to make the necessary connections and translations between basic university research and industry needs in applied research. There have been many other organizations as well that have some tangential relationship to some the objectives we have outlined for Northstar.

The objective here is not to catalogue all previous initiatives that were remotely similar to Northstar, but to understand the objectives of the many different efforts, and the strategies and structures employed by each to reach these goals.

In general, past and present partnerships and outreach efforts can be categorized into one or more of four basic groups (in some cases there might be overlap into multiple groups). Each exhibits a different degree of attention to one or more of several basic elements: research, economic development, technology transfer, and research administration.

- **Research for direct product commercialization.** The few efforts in this area concentrate on industry-driven applied research that creates value-added products and markets. The two most notable efforts are the Agricultural

Utilization Research Institute (AURI) and the Natural Resources Research Institute (NRRI).

These quasi-public research agencies are in-directly affiliated with the University, and have a two-fold mission: 1) to find commercial applications for existing University research, and 2) to take existing commodities (e.g., corn or soybeans for AURI, and iron ore or wood for NRRI) and find new, value-added products.

- **University-based research administration and technology transfer.** These organizations act as information clearinghouses and administrative go-betweens for University-industry research collaborations. They market University technologies and research capability to industry and other external funders, negotiate patents and licenses, and streamline and manage the heavily bureaucratic process of externally funded research.

Two such organizations at the University are the Office of Research and Technology Transfer Administration (ORTTA), and the recently-created Research Service Organization (RSO). ORTTA focuses on University-wide technology transfer and research administration, while RSO works exclusively on behalf of the Academic Health Center.

- **Industry-focused technology transfer.** Here, a quasi-public agency takes existing University research and attempts to transfer it to existing businesses to improve productivity and profitability. Minnesota Technology Inc. (MTI) is a classic example of this type of industry-focused technology transfer.

Created out of the Greater Minnesota Corporation (see on page 17) in 1992, MTI's mission is to infuse new technology into the manufacturing industry, help manufacturing businesses find new markets

and expand existing ones, and provide skill-development assistance for manufacturing employees. Today, MTI has six offices, and has a 1998 budget of more than \$10 million (including \$4.4 million in pass-through money for AURI), almost \$7 million of which comes from the state and \$2 million from the federal government.

- **State subsidized economic development.** These efforts and organizations use state money directly to encourage job creation, business expansion, and new-company start-ups. Included in this group are information clearinghouses, job training and other programs too numerous to list; most have little relation to the University of Minnesota.

There are several other characteristics worth noting about past partnership and outreach efforts. Most attempt to improve the economy of greater Minnesota. Most also focus on three broad industries: manufacturing, agriculture, and natural resources. As such, very little has or is being done to support the Twin Cities economy and its industry clusters.

Probably more important, little has been done by the state to develop greater expertise in high-technology research and application. To the layperson this might not be obvious, as there have been high-tech initiatives in the past, such as the creation of the Minnesota High Technology Council. The Council, however, is an administrative and policy association for high-tech companies in the state, and has no research or technology transfer functions.

Efforts were also made earlier this decade to create a geographic locus for high-tech companies. The Minnesota Technology Corridor was a partnership between the state, the City of Minneapolis and the University of Minnesota to attract high-tech companies along a stretch of Washington Avenue near the University. There were few financial resources behind the effort, however, and today there are few high-tech companies located in the corridor.

There have been other high-profile partnership efforts in the past focused on new research as well, including several that sought significant private buy-in. Probably the most famous of late was the Maxwell-Gorbachev Institute. In 1990, then-Governor Rudy Perpich got a \$50 million pledge from British publishing baron Robert Maxwell to start a research group to study global environmental and communication issues. When Russian President Mikhail Gorbachev agreed to lend his name to the project, all that was needed was \$50 million in matching money.

But the effort disintegrated when Maxwell drowned, exposing a bankrupt empire, and Gorbachev fell out of power and prestige. In 1994, a second group attempted to organize the Institute for Global Environmental Management, and even received start-up money from some local businesses. It too faded from lack of financial support.

GREATER MINNESOTA CORPORATION

The snapshot of past efforts would not be complete without a discussion of the granddaddy of all partnerships — the Greater Minnesota Corporation (GMC). The GMC was set up in 1987 to make grants to businesses and various higher education institutions to link university research with the problem-solving needs of rural Minnesota manufacturing businesses.

The Legislature gave the GMC \$106 million in 1987. [Most of the funding, in fact, came from the budget reserve, and \$80 million was "unallocated" the next year when state revenues got tight.] But from the start, the GMC's goals and direction were poorly defined. Within four years, the GMC had established numerous subsidiary offices, proposed even more, and had done little to spur the rural economy despite receiving a total of \$40 million by the end of 1990.

Here is a sampling of GMC-based proposals to expand its network of outreach, research, and

Here is a sampling of GMC-based proposals to expand its network of outreach, research, and technology transfer: the Agricultural Utilization Research Institute, Business Innovation Centers, the Minnesota Advanced Manufacturing Technology Center, Minnesota Project Outreach, SRI International, and Upper Midwest Manufacturing Technology Center. Some never made it past the proposal stage, some started and eventually folded, and several are still operating at or through Minnesota Technology Inc.

A 1991 Legislative Auditor's report said, "The GMC's fuzzy 'quasi-public' status allowed it to escape either public (spending) controls or private discipline over its budgets, with predictable results." In 1992, the GMC was recast as Minnesota Technology Inc., with a narrower focus on technology transfer for manufacturing.

A TRULY "NEW" PARTNERSHIP

The Citizens League believes the Northstar Research Coalition is truly a new breed. It uses existing research capabilities at the University to tackle the research needs of industry in high technology areas, and does so without involving the bureaucracy often typical of such efforts. If research is properly focused, technology transfer and economic development will result because research is aligned up-front with the needs of industry.

As such, Northstar fills an industry research gap while fortifying the strength and reputation of the University and contributing to state economic development.

Northstar also has no geographic or industry biases. As mentioned earlier, past efforts have focused mainly on supporting or rejuvenating the economy of greater Minnesota through agricultural, natural resources and manufacturing sectors. But in the near future all businesses — rural and metro — will be based to some degree on high technology in

the future, whether they are the actual producers of such technology, or simply users of the technology. Given this high-tech orientation, Northstar research will benefit all industry sectors throughout the state.

Most quasi-public partnerships (like MTI) focus on transferring *existing* technologies and know-how to the marketplace. Northstar's intent is to make research more useful from the start, thereby cutting out the need for a "middle" organization to translate the usefulness of such research.

Critical in this function is a clear definition of research projects that are non-proprietary and non-competitive in an immediate sense, but offer clear and useful long-term results and benefits for industry. It can do so by structuring financial awards in a way that will encourage collaboration between industry and University researchers.

An excellent model of this is already in place at the University, which Northstar might appropriately adapt for its own uses. The Center for Interfacial Engineering (CIE) provides the opportunity to formulate and implement long-term non-proprietary research projects of mutual interest between individual companies and University researchers.

Widely applauded by local businesses, CIE's Industrial Fellowship Program invites industry researchers into campus labs to partner with a University researcher to identify a non-proprietary, non-competitive research project of mutual interest. This allows projects that are appropriate both to the University and to private industry. Both the sponsor company and the Center's director must approve the project before it receives funding.

IV. Findings and Conclusions

Defining the problem, and outlining its causes

THE PROBLEM. The University of Minnesota has seen a relative decline in reputation compared with its national peers.

To be sure, the University of Minnesota is a strong institution, and excels in many areas — evidenced by the fact that the University has consistently ranked in or near the top 10 for total research and development expenditures among all research universities.

But in the eyes of many, the University is not the institution it once was. The University's own 1996 accreditation report on the Twin Cities campus, a comprehensive internal evaluation by the Office of Planning and Analysis, observed:

"The hopes to expand [the University's] base of excellence articulated ten years ago have not been realized, and as the recent results indicate, the University of Minnesota has slipped in national ranking of its doctoral programs ... While a number of programs are highly regarded, as a whole the University of Minnesota is not among those very few institutions considered to be 'among the best in the country.'"¹⁵

National rankings — acknowledging their shortcomings — consistently show the University's graduate education programs have dropped in quality relative to national peers. In 1982, the University was ranked 16th by the National Research Council (NRC) survey. By

1993, it had fallen to 20th.¹⁶ In the 1993 survey, the University had five programs ranked in the top ten nationally — good for 23rd place among all universities in the number of top ten programs, and 11th among public universities.¹⁷

Rankings from the *U.S. News & World Report* also suggest that the University has considerable room for quality improvement. While not considered credible by many in academia, *U.S. News* rankings are nonetheless widely read and help form public perceptions.

Again acknowledging methodological criticisms, it is worth noting that University graduate and professional programs were conspicuously absent from *U.S. News*' top 20 in engineering, nursing, physics, geology and history, while medicine, business, biological sciences, computer sciences, English and theater were not among the top 25, and music and fine arts were not among the top 30 programs.¹⁸

¹⁵ Office of Planning and Analysis, "Chapter VII: Graduate and Professional Education," *A Land Grant University for the 21st Century: 1996 Accreditation Self-Study of the Twin Cities Campus*, University of Minnesota, April 1996, p. 1, 4.

¹⁶ Many methodologies can be used to rank universities using NRC survey data. One University of Minnesota economist used four different methodologies to measure "quality," and found the University ranked anywhere from 17th to 23rd in 1993. See Craig Swan, "Notes on National Rankings," Economics Department, November 2, 1995. See website at [www.econ.umn.edu/~cswan/nrc/index.html].

¹⁷ The University's top-ten programs were: Chemical Engineering (1), Geography (3), Psychology (7), Mechanical Engineering (8) and Economics (10); Other public universities with more top-ten departments than Minnesota include UC-Berkeley (35), Cornell (19), Michigan (14), UC-San Diego (14), Wisconsin (13), UCLA (11), Illinois (10), Washington (10), Texas (7), and UC-San Francisco (6); see Swan, *op. cit.*, Table 4.

¹⁸ *U.S. News and World Report, Best Graduate Schools*, 1997.

HOW DID IT HAPPEN?

The University's Office of Planning and Analysis speculated that the institution's decline relative to its peers stemmed possibly from its competitors "doing better faster," so to speak.¹⁹ But why, and how? Some of the internal factors responsible (as identified by this committee) include a lack of programmatic focus, poor management structures, bad policy-making, and uncompetitive salaries. Some external factors are at play as well, including competing interests among different stakeholders, and a populist tradition.

I. LACK OF PROGRAMMATIC FOCUS, AND PROGRAM DUPLICATION

National Research Council (NRC) rankings show that the public institutions climbing in national rank have limited programmatic scope. In contrast, the University has a huge array of advanced degree programs — 165 doctoral, masters, and professional programs in all — which many believe leads to a diffusion of priorities and available resources.

Biology-based programs on the Twin Cities campus offer a good example. For example, there are two independent biochemistry programs, one in the College of Biological Science in St. Paul and a second in the Medical School in Minneapolis. There are also two quasi-independent biomedical engineering programs — a "center" run by the Medical School and an "institute" run jointly by the Medical School and the Institute of Technology. There are fully six separate genetics-based programs listed in the 1997-98 University directory.

An internal University report in 1996 pointed out: "The lack of coordinated effort has resulted in unnecessary competition between units involved in research and teaching of basic biological sciences ... The result has been a

proliferation of areas of biology research and a duplication of efforts in biology teaching."²⁰

Another internal report on biology programs noted, "[t]he list of graduate programs is long (38 programs)...as well as confusing in names of programs and in the claims of intellectual coverage. It is imperative that consolidation of graduate programs in the biological sciences at the University of Minnesota occur."²¹ These reports helped initiate the wholesale reorganization of biology-based programs that is currently underway.

A third internal report on the Graduate School recommended closing marginal programs and consolidating closely-related programs "[i]n the interests of better graduate education and for the benefit of applicants who are not sure of which subdivisions of a certain subject best match their interests."²²

In fact, the Graduate School reports that it has eliminated almost 30 graduate and professional programs (net) over the last 10 years (with disproportionate cuts in professional and masters-only programs). But one could likely find similar examples of poor coordination and program duplication among the 165 remaining programs at the University.

At the very least, with 165 different programs, the University likely falls short of properly focusing what it offers, thereby diluting available resources for programs, some of which arguably contribute little to the University's mission or add little to the state's social or economic development.

²⁰ Ronald Phillips, memo to the Biological Sciences Policy Council from the Biological Sciences Enhancement Committee, Phase I, February 2, 1996, p. 1.

²¹ Academic Health Center, *Guiding Principles for Biological Reorganization*, April 22, 1997, p. 1.

²² University of Minnesota, *Report of the Committee to Review the Graduate School*, Fall 1992, p. 14.

¹⁹ Office of Planning and Analysis, *op. cit.*, p. 34.

2. MISSED OPPORTUNITIES IN EMERGING RESEARCH AREAS

The University has failed to fully capitalize on a number of important opportunities in emerging fields of research. As a result, the University is playing catch-up in areas that are now considered critical to many universities and state economies. For example:

- One of the great intellectual revolutions in recent history, the discovery and decoding of DNA, bypassed the University in its early years, and the University has been scrambling to catch up.²³
- Despite the fact that the biomedical engineering field was pioneered by the University, and despite its obvious relation to a strong medical device industry in the Twin Cities, the University was late in establishing a degree-granting biomedical engineering program;²⁴ it was ranked 72nd in faculty quality by the 1993 NRC survey.
- The software and personal computing revolution has yet to take hold in the University's various computer programs. Instead, the University has chosen to stick with a supercomputing focus. Maybe not surprisingly, computer science ranked 47th nationally, and had a rating that was among the lowest of the University's 39 programs ranked by the 1993 NRC survey.
- A number of significant medical breakthroughs occurred at or in cooperation with the University's Medical School, including the first successful open-

heart surgery, development of the first successful heart-lung machine, the first pancreas transplant, the first successful bone-marrow transplant, and the development of the first total-body CAT-scanner.²⁵ Yet the program today is not generally ranked among the nation's top 25 medical schools, and has been beset with public relations problems.

- Notwithstanding some areas of excellence, in general the University's arts and humanities programs have been institutionally neglected and are collectively weak in quality. Eight of the University's lowest-rated programs in the NRC rankings were arts and humanities programs. In fact, with an average rating of 2.94 on the 5-point NRC scale, arts and humanities had easily the lowest rating of the five broad areas in the NRC survey.²⁶

The University's East Asian programs are an interesting example of achieving quality *in spite* of institutional neglect. In an external review report, a Cornell professor noted that East Asian programs "are running a credible program in a crisis mode."²⁷ The report added that despite the growing global prominence of China and Japan, and despite growing student demand for Chinese and Japanese programs both locally and nationally, the University has been reducing the faculty in these areas.

²³ Robert Holt, then-dean of the Graduate School, and current professor of Political Science, University of Minnesota, resource testimony to the Citizens League committee on the global economy, January 10, 1995; Leo Furcht, vice provost for the Academic Health Center, also testified (August 12, 1997) that the University "missed the boat" on molecular biology.

²⁴ Paul Citron, Medtronic vice president of science and technology, resource testimony to the Citizens League on August 12, 1997. Citron said it took almost a decade to turn the original proposal for a biomedical engineering center into reality.

²⁵ Hubert H. Humphrey Institute of Public Affairs, *The University as an Engine of Economic Growth*, University of Minnesota, April 1, 1992, p. 23.

²⁶ The five program groups are arts and humanities, engineering, biological sciences, physical sciences and mathematics, and social and behavioral sciences.

²⁷ "External Review Committee Final Report on the Programs in Chinese, Japanese and East Asian Studies, University of Minnesota," June 30, 1997, p. 2.

3. POOR MANAGEMENT STRUCTURES AND IRRATIONAL POLICIES, WHICH DISCOURAGE PROGRAM INNOVATION

The above "sources" of decline — failure to focus programs, not identifying and reacting quickly to new opportunities — are fundamentally rooted in issues of leadership and human resource management.

Too often the University's bureaucracy has failed to provide leadership and management at the proper level. This has resulted in irrational policies that block program and departmental innovation critical to staying on the cutting edge of academia.

- **Human resource management:** The University recently issued a series of four reports on human resource management. One report noted that the University has historically given issues of human resource management low priority despite the fact that the University is a people-intensive industry. Fully three-fourths of the University's budget of \$1.5 billion goes for employee compensation.²⁸

A second report pointed out that discipline-trained faculty are *assumed* to have administrative and managerial competencies. Subsequent attempts to help faculty develop such skills are not valued, the report said, and there is poor awareness and appreciation for the risk involved in failing to adequately train employees. It noted that managing business functions of the University was viewed as "tangential to the primary mission of the University."

As a result, faculty did not routinely embrace and value the role of administration, and in fact, viewed administration "with ambivalence or even hostility, believing the administration

intends to create barriers for them and interferes with their autonomy."²⁹

The report said a stronger leadership infrastructure was mandatory for the University to be fiscally responsible. As noted earlier, President Yudof's recent addition of a vice president for human resources is a positive first step.

- **Interdisciplinary programs and related research:** A number of policy and budgetary obstacles discourage departments and college deans from pursuing interdisciplinary activity. A task force report on this subject by the Academic Health Center noted that "there are few institutional incentives for interdisciplinary programs despite their importance."³⁰

As the University budgeting system is currently structured, individual colleges and departments earn revenues from tuition and indirect cost recovery for its programs. Interdisciplinary programs, by definition, spill over these neat budgetary lines because they often involve programs (and related research and curriculum) from two different colleges. As a result, colleges and departments are reluctant to spend money on interdisciplinary programs because they carry college and departmental funds outside defined boundaries. A report by the Academic Health Center noted:

"The current system creates incentives for unit managers to protect the interests of their own units, sometimes at the expense of the AHC as a whole ... The significant obstacles encountered by developers of interdisciplinary programs cause faculty and staff to look primarily within their colleges or business units when

²⁸ Working Group on Human Resources, University of Minnesota, Chuck Denny, chair. See Working Group papers: *Staffing; Education, Training & Development and Performance Management; Dispute Resolution; Compensation*. See reports at: [<http://www.umn.edu/ohr/cdenny/denny.html>].

²⁹ *Education, Training & Development and Performance Management; op. cit.* p. 5-6.

³⁰ Academic Health Center, *Programs and Inter-Disciplinary Programs*, Implementation Task Force Report, February 1997, p. 2.

attempting to contribute to the goals of the AHC and the University."³¹

Given equal interdisciplinary and single-disciplinary proposals, a college dean or department chair will logically choose the single-disciplinary project because it will generate more funding from tuition and indirect cost recovery. Issues like tenure and scholarly accolades also become complicated when faculty activities cross departmental boundaries.

So in fact, deans can be *penalized* for funding interdisciplinary projects despite the widespread belief that interdisciplinary programs are the cutting edge in higher education today, and are critical to the future reputation of the University.

- **Tuition policies:** To keep in step with the market's educational demands, the University must be able to offer programs that are time-sensitive and flexible. Unfortunately, rigid tuition policies, bureaucratic red tape and cultural inertia often prevent departments from creating new programs that respond to a changing society, even where market demand is obvious.

For example, an increasing number of professionals are returning for advanced, mid-career degrees. At the moment, however, the University greatly underserves this growing local market. Instead the demand is met by private colleges and universities — which now enroll almost half of all graduate and professional students in the region — and Metro State.

For example, private college graduate enrollment in the Twin Cities has grown from about 3,400 students to more than 16,000 students in the last ten years, fueled

by programs catering to working adults.³² In contrast, the University's graduate and professional population was about 13,250 in 1996, an increase of 1,800 over the last ten years. But since 1990 University enrollment in graduate and professional programs increased by less than 300 students.³³

How and why has this happened? Current tuition policy set by the Board of Regents requires that tuition be capped to guarantee a degree of financial access, despite the fact that program costs might be considerably more than prevailing tuition rates, and students (or their employers) might willingly pay a greater share of the costs.

Under such a tuition policy, new programs require subsidy without giving departments any additional funding. This means that new programs cannibalize resources from existing programs within departments. As a result, most departments cannot afford, or are unwilling to create, new programs to meet existing demand.

4. SALARIES AND DEPARTMENTAL SIZE

A lot of rhetoric surrounds the debate over faculty salaries at the University. Many University proponents believe uncompetitive salaries are a fundamental obstacle blocking greater quality. Critics, on the other hand, believe University compensation is not far out of line with the market.

In fact, both are right. For example, the average salary for full professors at Minnesota is 30th out of 34 "peer" universities, and 13th out of 17 public universities in the survey. At \$73,000, the average salary for full professors

³¹ Academic Health Center, *Inter-Disciplinary Programs Committee Report*, University of Minnesota, September 4, 1995, p.4.

³² Minnesota Private College Research Foundation, *Minnesota Private College Review*, September 1997; see also Nancy Livingston, "Area Private Colleges Add Master's Degrees," *Pioneer Press*, September 4, 1997, p. 1A.

³³ Higher Education Services Office, "Minnesota Post-Secondary Education Enrollment Data: Students by Place of Residence," *Basic Data Series*, 1986 to 1996.

at Minnesota is almost \$13,000 below the average of the other 33 universities.³⁴

This gap closes, however, when considering *full compensation* (salary plus benefits) for all professors (full, associate and assistant). Using this comparison, Minnesota ranked 21st nationally, and 5th among public schools, and competitive compensation for associate and assistant professors appears to be less of an issue using this measure.

No matter the ranking, however, money is obviously important to faculty members. An informal report on faculty retention by the University's Office of Planning and Analysis showed that faculty compensation "was often mentioned as the most important factor affecting the decision to leave."³⁵

Data from the NRC rankings also indicate that reputation (and inferred program quality) is influenced by the size of department faculty — particularly for top-rated programs.³⁶ Common sense suggests that a greater number of faculty would produce more research, train more graduate and doctoral students, and create more national exposure for a particular department or program.

Unfortunately, the analysis required to determine whether this relationship applies to the University was beyond the capacity and time constraints of this committee report. It is therefore difficult to conclude for certain that faculty size has played a significant role in the University's decline in national standing.

There are cases where programs have declined in rankings while seeing a related

decline in department faculty size, such as the Department of Economics.³⁷ This might well be the case with other departments that have not been allowed to hire replacement faculty after retirements. Since 1975, for example, the Twin Cities campus has trimmed more than 600 full-time faculty from its payroll (almost 20 percent), and cut part-time faculty positions almost in half to 345 positions in 1995.³⁸

5. COMPETING AGENDAS AMONG MANY DIFFERENT STAKEHOLDERS

While the University enjoys significant autonomy, it is still dependent upon a number of internal and external stakeholders whose collective vision can best be described as fuzzy because each tries to impose a separate agenda on the University.

For example, legislators often see annual state appropriations to the University as justification for micro-managing University policy and resource distribution, despite the University's constitutional autonomy. Worse yet, legislators often decide University policy based on narrow, short-term parochial interests, trying to ensure that their particular district is served by certain programs, or receives its "fair share" of resources.

In the past, the Board of Regents also has shown a penchant for micro-management, choosing to focus on minor administrative tasks. While the Board has a duty to question the University's direction and focus, the Board of Regents has mistaken the "vision" role of a board for authority over administrative and managerial issues.

³⁴ Robert Sloan, president of the Twin Cities Chapter of the American Association of University Professors, "The 1995-96 AAUP Salary Survey," date unknown.

³⁵ Office of Planning and Analysis, *op. cit.* "Chapter XIII: Faculty," p. 13; see also Mary Jane Smetanka, "U Struggling to Keep Its Best, Brightest," *StarTribune*, August 10, 1997, p. A1.

³⁶ National Research Council, *Research-Doctorate Programs in the United States: Continuity and Change*, National Academy of Science, 1995.

³⁷ Brenner, Mark and Halil Dundar, *National Research Council Survey of Doctoral Graduate Programs: Factors that Affect Ratings of the Quality of Graduate Faculty*, 1995, p. 5.

³⁸ EEO-6 and IPED reports on full and part-time faculty from 1975 to 1995, provided by John Felipe, Office of Equal Opportunity & Affirmative Action, University of Minnesota. The majority of faculty cuts came between 1975 and 1985.

The Board of Regents also has been out of step with past University presidents, evidenced by high-profile disputes that played out in the local media. It's encouraging that new Board Chair William Hogan said a concerted effort will be made to shift the Board's attention away from micro-managing, and toward a more cohesive relationship with the University president.³⁹

Lastly, internal conflicts abound at the University over the allocation of resources, pitting departments and programs against each other to protect the resources each has at the expense of University-wide priorities.

6. MIDWEST CULTURE, EXPECTATIONS AND DEMOGRAPHICS

Culture and demographics have had a subtle yet significant influence on public universities. NRC rankings in 1964 show 10 midwestern universities were ranked in the top 15 public universities nationwide. In 1993 NRC rankings, the top 15 public universities changed considerably, and every one of the ten midwestern universities declined in rank. Almost all universities that moved up in rank were from southern or western states.⁴⁰

Why the stark geographic disparity? There are likely many factors involved, but midwestern culture and demographics are important considerations. A populist midwestern culture and comparatively slow population and economic growth rates in the Midwest have created the conditions for both the rise and recent fall of midwestern public universities from the rankings of the very best research universities in the country.

Historically, Midwesterners have valued education at all levels, and have been willing to invest in it. A populist midwestern culture

meant an egalitarian approach to higher education that provided a broad array of programs and relatively easy entry. As the industrial heartland of America, midwestern states also had the financial means to support this egalitarian approach, even in their best research universities. As midwestern research universities grew, so too did their reputations, as 1964 NRC rankings indicate.

All the while, the number of higher education institutions has been growing rapidly — from 1,700 higher education institutions in 1940 to 3,500 schools in 1989, to 3,700 schools in 1995.⁴¹ Such expansion is likely responsible for at least some of the reputational decline among midwestern universities. Institutional expansion brought a certain amount of program duplication, and to a degree, competition. This meant that merely *offering* a particular program did not automatically confer quality on the program.

Comparatively slower population and economic growth in the Midwest also put financial stress on states to support their now-sprawling research universities. This has been particularly true at the University of Minnesota during the 1990s.

In the past, breadth, access and quality could all be achieved and maintained simultaneously in public research universities. But it appears that reputation today is more a function of program focus and specialization, and midwestern universities are having trouble adapting to the "new generation" of streamlined public research universities. As financial pressure increased, the University of Minnesota has generally chosen to sacrifice a degree of selectivity and focus in favor of maintaining program breadth and relatively wide access.

³⁹ William Hogan, Board of Regents chair, resource testimony to the Citizens League, August 5, 1997.

⁴⁰ Analysis done by Marvin Marshak, former senior vice president of Academic Affairs, and current professor of physics, University of Minnesota.

⁴¹ Kenneth Keller, former president of the University of Minnesota, and current faculty member, resource testimony to the Citizens League on July 29, 1997.

CONVERGING FACTORS

Existing concerns at the University likely will be exacerbated by a number of converging factors — a global economy, demographic change, revenue trends, and demands for spending accountability — whose immediacy will virtually *mandate* some degree of change at the University. The University needs to react to these pressures and use them to its advantage in pushing for quality improvement.

I. RAPID SHIFT TOWARD A GLOBAL AND KNOWLEDGE-BASED ECONOMY

The shift to a global and knowledge-based economy puts greater pressure on the University's research and graduate and professional education programs to keep the state competitive.

In today's knowledge-based economy, a diminishing share of the value of final products is derived from the value of raw materials. Instead, knowledge and innovation are providing the greatest share of value in today's economy. Compounded and intensified by the cost-cutting induced by world-wide competition, the prosperity of the state and region will depend on maintaining their competitive advantage — namely a highly-skilled workforce and persistent innovation.

A survey of higher education in *The Economist* said universities are viewed as increasingly useful assets in an economy that values ideas (and the ability to manipulate them) over more traditional factors of production. Their value lies both as a research laboratory and as a mechanism that augments human capital, which help businesses compete.⁴²

The 1996 Citizens League's report on the global economy highlighted the growing responsibility of the University to provide competitive advantages for the state and

region. This competitive advantage is provided through the education of doctoral, graduate and professional students, who generate new knowledge, take technology know-how to companies, and often start their own enterprises.

2. DEMOGRAPHIC CONCENTRATION & A DIFFUSE HIGHER EDUCATION SYSTEM

As currently configured, the state's higher education system is poorly structured to meet the future demand for higher education. An enrollment increase is expected in higher education in the coming decade as the "echo boom" generation reaches traditional college enrollment age, particularly in the metro region extending to St. Cloud and Rochester.

However, the state's higher education infrastructure is spread widely throughout the state — *where the students aren't* — a *de facto* state policy from decades past that equated access with geographic proximity. As a result, significant resources are spent to support institutions with questionable cost-effectiveness, and money is funneled away from potentially better uses.

3. COST AND REVENUE PRESSURES AT THE UNIVERSITY OF MINNESOTA.

Make no mistake, the University is a financial heavyweight, raising and spending about \$1.5 billion annually. But pressure from both the spending and revenue sides of the University budget is creating problems that will have to be addressed if the University expects to retain, much less improve, quality.

- **Downward trend of University support as a state priority:** Widely regarded as an "education state," Minnesota has nonetheless been dedicating a shrinking share of its budget to higher education, and the University in particular.

For example, as a percentage of the state budget, the Legislature appropriated 7.5

⁴² *The Economist*, "Survey Universities," October 4, 1997.

percent of its budget in 1987 to the University of Minnesota. By 1996 that percentage had slowly eroded to 5.6 percent of the state budget. Between 1990 and 1994, state appropriations to the University virtually froze, rising just \$7 million to \$445 million. University appropriations have since risen at very modest rates, and there has been little "make-up" funding from leaner years.⁴³

State funding instead is getting funneled to other priorities, some of which are driven by formulaic appropriations like K-12 education and health care, while other priorities are driven by public demand, like property tax relief and criminal justice.

- **Rapidly increasing student tuition:** Rising costs and flat state support have combined to steadily increase both graduate and undergraduate tuition at the University. Over the last ten years, graduate tuition and fee rates increased by 93 percent, including a 6 percent increase last year.⁴⁴ The University also uses undergraduate tuition — which rose 88 percent from 1986 to 1995⁴⁵ — to subsidize higher-cost graduate and professional programs.
- **Declining federal research support, and increasing competition for available research dollars:** A 1996 report by the American Association for the Advancement of Science noted that funding for federal non-defense research is projected to decline about 20 percent by the year 2002. It added that Midwest universities collectively are dependent on the federal government for more than half

of their research funds and are likely to feel the full impact of any federal cuts.⁴⁶

In 1996, the University of Minnesota received almost 60 percent of all research funding (\$196 million out of \$340 million total) from the federal government, and Minnesota traditionally ranks in the top 15 in total federal obligations.⁴⁷

In fact, the University of Minnesota might survive federal research spending cuts better than some, because most of its federal research funding comes from the National Institutes of Health and the National Science Foundation, and comparably little comes through the departments of Defense and Energy, where funding appears less stable.

However, there also is considerably more competition for available federal funding. Thirty years ago there were only a couple of dozen legitimate research universities. Today, the Rockefeller foundation lists about one hundred "Research I" universities, each of which competes for external research funding. The explosion of higher education institutions nation-wide also has expanded the number of university professors actively competing for a funding pie that is growing more slowly than in previous years.

4. PUBLIC AND LEGISLATIVE DEMAND FOR SPENDING ACCOUNTABILITY

Similar to other public agencies, the University is seeing more demand for spending accountability in exchange for annual

⁴³ HESO, *Post-Secondary Education Data Book: Report to the Governor and 1997 Legislature*, State of Minnesota, January 1997, p. 209. Some might point to the state's 1998 appropriation of \$540 million (a \$45 million increase over 1997) as "make-up" funding, but this is to be followed by a 1999 appropriation of \$535 million (a \$5 million decrease over 1998).

⁴⁴ Thomas Gilson, senior analyst, Office of Planning and Analysis, personal communication.

⁴⁵ HESO, *op. cit.*, p. 278.

⁴⁶ American Association for the Advancement of Science, *The Future of Science and Technology in the Midwest: Trends and Indicators*, Washington D.C., August 1996.

⁴⁷ Office of Research and Technology Transfer and Administration, *Levels and Trends of Sponsored Programs: Fiscal Year 1996*, University of Minnesota, February 1997. p. 14, 35. Total federal obligations include sponsored and non-sponsored federal funding for research, training, public service and student aid.

public investment. This is particularly true at the Legislature, where individual legislators believe that their demand for spending accountability represents concerns expressed by their constituents.

The demand for accountability is apparently rooted in two sources. The first is the sheer level of financial support. This year the University crossed the threshold of a half-billion dollars in state appropriations. As the public investment increases, so does public scrutiny over spending.⁴⁸

A second factor behind greater spending accountability is a perception among business and community leaders that the University is unresponsive to their needs or interests. This committee received testimony on several occasions that University faculty and departments are very insular, and often resist seeking customer feedback on their "product" — namely, graduates and research.

The University currently has little empirical data on "customer satisfaction," such as graduate student satisfaction and placement in private and academic workforces, or how research projects are regarded by private companies. Not surprisingly, the business community has viewed the University with skepticism. The few customer surveys that have been done "suggest that the reputation of the University with industry in the state is not as positive as it ought to be."⁴⁹

One survey by the Academic Health Center (AHC) was particularly unflattering. The survey asked employers like Allina how good AHC graduates were. The general response was that students were competent, but

poorly prepared for the specific job for which they were hired.

The survey also polled graduates on their opinions of program quality and usefulness. One program in particular was rated well-below average in student satisfaction. The survey itself, however, was roundly criticized by AHC faculty.⁵⁰

⁴⁸ Keller, *op. cit.*

⁴⁹ Report of the Strategic Planning Committee for Research and Postbaccalaureate Education, *Enhancing Research Effectiveness: The Foundation for Learning and Teaching in the 21st Century*, University of Minnesota, February 3, 1994, p. 54. The University is, however, in the midst of conducting and completing a series of surveys of graduates at all levels.

⁵⁰ Furcht, *op. cit.*

Appendix A

Quality Indicators

ADDITIONAL INDICATORS OR MEASURES OF DEPARTMENTAL AND INSTITUTIONAL QUALITY

purposes of institution-wide measurement. In other cases, data might be available but was not uncovered in the research conducted for this report.

INSTITUTIONAL MEASURES

- Faculty salary rank
- Number of endowed chairs
- Voluntary funding support/national rank
- Endowment (total, and per student; national ranking for each)
- Alumni giving (total, and per alumni)
- Company start-ups
- Satisfaction surveys of Minnesota constituencies

RESEARCH/FACULTY MEASURES

- Research proposals submitted/received
- Percentage of "funded" faculty
- Scholarly recognition:
 - Memberships: National Academy of Science, National Academy of Engineering, Institute of Medicine
 - Awards: Nobel, Pulitzer, National Institutes of Health MERIT

GRADUATE PROGRAM MEASURES

- Number of interdisciplinary programs
- Number of mid-career programs
- Number of degree-granting masters/doctoral/professional programs
- Admissions standards for incoming graduate/doctoral/professional students:
 - Entrance exam scores: GRE, GMAT, LSAT
 - Awards: Fulbright and Rhodes Scholars
 - Undergraduate GPA/honor students
- Median time to degree
- Foreign/non-Minnesota enrollment

In some cases, data on some of the measures listed might be available for individual departments, but have not been aggregated for

Work of the Committee

CHARGE TO THE COMMITTEE ON UNIVERSITY MINNESOTA QUALITY

I. BACKGROUND

The University of Minnesota has long been one of the state's greatest assets, providing both well-educated workers and cutting edge technology for the region's businesses, and serving historically as a critical impetus for state economic development.

In a rapidly evolving global and information-based economy, research universities will play a key role in the long-term economic health of both regions and states. For this reason alone, the University of Minnesota must continually strive for ever-improving quality.

National rankings of the University show that it compares very favorably with some of the best public and private universities in the country. However, these rankings suggest — and a perception exists — that the University is not improving at the same pace as society is changing around it, or at the same level as other peer public universities — especially in graduate education and research programs.

While acknowledging the shortcomings of national reputation rankings, these surveys show that the collective reputation of graduate programs at the University has declined slightly over the last 15 years. Moreover, concern over University quality is shared by a variety of local stakeholders, including the business community, policy makers, citizens, even faculty and administration at the University.

Despite these concerns, recent improvements in the quality of undergraduate education at the University have not been matched by comparable improvements in graduate education and research programs.

A question persists: Why aren't things changing faster if there is widespread concern over the present and future quality of the University?

II. CONTEXT FOR COMMITTEE

The Citizens League has a long history of interest in higher education policy, particularly concerning the University of Minnesota. In *Compete Globally, Thrive Locally* (1996), the League stressed that bolstering and ensuring quality at the University was a critical long-term infrastructure investment for the state. The work of this new Citizens League committee, and its resulting report, is a follow-up effort to "make the case for quality" at the University, while creating an implementation framework to achieve improved quality.

The appointment of Mark Yudof as the new president of the University of Minnesota also offers a timely opportunity for the Citizens League to offer constructive suggestions to President Yudof, the Legislature and other leaders on the measures necessary to improve Minnesota's flagship research university.

III. FOCUS OF CHARGE

The Citizens League committee should address the central questions:

- By what measures should "quality" be defined in the University's graduate education and research programs?
- What opportunities are present for improving the global stature of the University while simultaneously bolstering the state's quality of life and long-term economic health?

- What internal and external changes are necessary for the University of Minnesota to achieve greater quality in its graduate education and research programs? What type of societal climate, institutional culture, and general incentives would facilitate greater quality at the University?

COMMITTEE MEMBERSHIP

The Committee on University Quality was co-chaired by **Carl (Buzz) Cummins III** and **Jane Vanderpoel**. A total of 30 Citizens League members took an active part in the work of the committee. In addition to the chairs, they were:

John Adams	Marvin Marshak
Andy Brown	Nicholas LaFontaine
Richard Clarke	Dick Osgood
Mary Lou Dresbach	Todd Otis
Anne Ducey	Irene Qualters
Jack Evert	George Reilly
Linda Ewen	Jack Rossmann
Ted Ferrara	Mark Schiffman
Howard Guthmann	James Stanton
Rick Heydinger	Paul Taylor
Herb Johnson	Blair Tremere
Steve Kelley	Emily Anne Tuttle
Sheila Kiscaden	Gedney Tuttle
Rick Krueger	Joanna Vail

COMMITTEE MEETINGS AND EXPERT RESOURCE TESTIMONY

The committee met for the first time on July 22, 1997, and concluded its deliberations on November 11, 1997. The Citizens League Board of Directors approved the final report of the committee on November 25, 1997. During this time, the full committee met 15 times and studied a large and varied amount of printed materials, and heard from the following resource speakers:

Dr. Mark Brenner — Graduate School dean, and vice president, Office of Research
 Dr. Robert Bruininks — executive vice president and provost, University of Minnesota

Paul Citron — vice president of science and technology, Medtronic
 Dr. Leo Furcht — head of the Department of Laboratory Medicine and Pathology, director of the Biomedical Engineering Center, and vice provost for the Academic Health Center
 Peter Gillette — president, Piper Trust; former commissioner of the Minnesota Department of Trade and Economic Development
 Dr. Kenneth Keller — former president, University of Minnesota; current Humphrey Institute of Public Affairs faculty member
 Dr. William Hogan — chairman of the Board of Regents
 Rep. Joe Opatz — DFL - St. Cloud
 Thomas Wollner — staff vice president, Corporate Research Laboratories, 3M
 Dr. Mark Yudof — president of the University of Minnesota

During the final month of deliberations, the Citizens League also held a focus group with 11 graduate students to gather additional input. The following students participated: Penny Beuning, Wendy Crone, Alexei Ditter, Tom Foster, Susan Liew Giovengo, Thomas Haakenson, Martin O'Hely, Albert Nakano, Theresa Post, Yongping Zhu. The focus group was coordinated by Lyn Egolf, Council of Graduate Students administrator.

Acknowledgment on this list does not imply the individuals' endorsement of the final report or its recommendations.

MEETING SPACE

Meeting space was generously donated by **Minnesota Hospital and Healthcare Partnership** for the committee's meetings. The League greatly appreciates such in-kind contributions to its study committees.

STAFFING

This report was prepared by Ron Wirtz. Lyle Wray provided staff assistance. Gayle Ruther and Trudy Koroschetz provided administrative support.

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The Citizens League has been an active and effective public affairs research and education organization in the Twin Cities metropolitan area for more than 40 years.

Volunteer research committees of League members study policy issues in depth and develop informational reports that propose specific workable solutions to public issues. Recommendations in these reports often become law. Over the years, League reports have been a reliable source of information for governmental officials, community leaders, and citizens concerned with public policy issues of our area.

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