

Grand Rapids Economic Club

Title: "Runnin' on Empty"...

Personal Introduction

As many of you know, I am a scientist by training and background...

As such, I suffer from two character flaws:

- i) First, I tend to a bit too candid in my remarks...
- ii) Second, I tend to be one of those folks who lives more in the future than in the present or the past...

My life as a scientist and engineer has been spent working on futuristic areas such as:

- i) Nuclear rocket propulsion
- ii) Laser-driven thermonuclear fusion
- iii) Supercomputers
- iv) robotics and artificial intelligence

Hence, perhaps it is natural that as we enter the 1990s, I should find myself looking once again to the future, facing the challenge of helping to build a University capable to serve our state and our nation in the 21st Century.

My Message

My message today will be suffer from both of my character flaws as a scientist/engineer...
...it will be a vision of the future...
...and it will be unusually candid.

In a nutshell, as I look to the future, I am sensing an ever-accelerating pace of change in our society, in our state, in our nation, in our world as we approach the 21st Century.

We are becoming more diverse, more pluralistic as a people. Indeed, almost 90% of the new entrants into our workforce during the 1990s will be people of color, women, or immigrants.

Our economy and commerce are becoming every more interdependent with other nations as the United States becomes a world nation, a member of the global community -- as this past year's events in China, Russia,

and Eastern Europe make all too apparent.
And we are rapidly evolving into a new post-industrial society, in which the key strategic resource necessary for prosperity and social well-being has become knowledge itself, that is, educated people and their ideas.

In the pluralistic, knowledge-intensive, global future that is our destiny, it is clear that the quality of and access to

- ...education in general
- ...higher education in particular
- ...and great research universities
- most specifically of all...

are rapidly becoming the key determinants of the strength and prosperity of our state.

But here there is some good news...

America is particularly well positioned, since our research universities are clearly the envy of the world, as evidenced by the extraordinary demand by graduates of every country to see advanced education and training in the United States.

Indeed, higher education is not only our nation's highest quality, but also probably also its most competitive industry as measured by the test of the marketplace!

Further, Michigan is particularly well-positioned from this perspective, since our state has built over the years not only one of the strongest systems of public higher education in the nation, but possesses several of the world's leading research universities.

But, now for the bad news...and the candor...

A tragic combination of public misunderstanding, short-sightedness, and political opportunism, is now threatening to constrain and hamper our universities... just as we are entering an age of knowledge in which they will become our most valuable resources.

Leading to the frightening prospect that we will
manage to destroy our international competitiveness
of higher education just as we have many other
American industries.

In my home state Missouri we have an old saying
that the best way to get a mule to move
is to first hit it over the head with a 2x4 to get its attention.
Now that I have your attention,
let me explain more clearly what is at stake here...

The Many Michigans...

Part of the difficulty here is that our universities have
become so complex, serving us in so many ways,
that it is difficult to comprehend the central role
they play in our lives.

For example, when you hear the words
“ The University of Michigan”,
you probably think first of those traditional college images:

- Great faculty challenging and exciting students in the classroom..
- Students studying in our many libraries
- Scientists toiling away late in the evenings in our laboratories.....stiving to understand the universe
- Scholars pouring over ancient manuscripts in our collections of antiquity

But there are other images that, in many ways,
better reflect the extraordinary impact that
the university has on our everyday lives.

There is the Michigan of those marvelous Saturday
afternoons in the fall as 105,000 fans cram into
Michigan stadium to watch the Wolverines...
or the pride you felt when Michigan
won the NCAA championship in one
of the greatest Cinderella moments in sports.

Perhaps you think of the Michigan of the Big Chill...

The tradition of student involvement helping to awaken the
conscience of a nation...

Or Michigan of the arts...

Attracting to our state some of the most
extraordinary performers of our time...
Bernstein, Horowitz, the Grateful Dead...

There is also the caring Michigan as seen by the over 750,000 patients each year who are treated by the UM Medical Center,
Or the Michigan as Silicon Valley East, working to build the high-tech infrastructure necessary to create new companies and new jobs...as evidenced by the \$5 B industry in industrial automation now building up in the Ann Arbor-Detroit-Warren crescent...

Or the Michigan which attracts to our state almost a quarter of a billion dollars of federal R&D each year...not to mention many of the world's leading scientists and engineers

Or the Michigan of the "cutting edge", which conducts the research that changes our lives... as evidenced, for example, by announcement earlier this fall that a Michigan team had identified and cloned the gene responsible for cystic fibrosis, thereby opening up the possibility of saving thousands of lives every year.

Or Michigan as the University of the World... Long renowned as a truly international center of learning... Whether it be through our great area studies programs the China Center, producing advisors to presidents... Japanese Studies, Southeast Asian Studies Russian and Eastern European Studies Or our alumni throughout the world...

Or the Michigan of outer space... ..Apollo 15...the Michigan mission to the moon... ..which not only established the first UM Club in space... ..but named a crater after Michigan on the moon.

And, of course, there is the Michigan as the educator, attempting to provide, in the words of one of our first presidents "an uncommon education for the common man" an education as good as any available in the world for all citizens, regardless of race, creed, and socioeconomic background ...to over 350,000 living alumni throughout the world... ..160,000 in our state alone.

It is important to note these different perspectives of the University because all too often we tend to think of these

marvelous and complex institutions in one-dimensional images
that reflect only our particular interests or needs of the moment...
...when we read about student unrest on our campus...
...or open the tuition bill for our son or daughter...
...or see Michigan get two kickoffs run back on them by Notre
Dame...

What is the University of Michigan?

The comprehensive research university is
a very large, complex, and diverse beast...

University of Michigan = "mega-university"

- i) Spans all intellectual disciplines and professional areas
- ii) Provides instruction, research, service
- iii) Attempts to conduct programs that rank among the nation's best in all areas (and succeeds...)
(Indeed, most of our academic programs are generally ranked higher than our football or basketball teams!!!)

It is clear that the public research university...
...an institution for which the University of Michigan is not only the prototype, but perhaps also the flagship...
...touches the lives of a great many people in a great many different ways...

Through education, research, and service...
through health care, economic development, and
...yes...even through a sense of pride in their athletic accomplishments.

Yet as important as these institutions are today in our everyday lives, it is my belief that in the future they will play an even more critical role as they become the key player in providing the knowledge resources...knowledge itself, and the educated citizens capable of applying it wisely... necessary for our prosperity, security, and social well-being.

Let me explain...

Themes of Pluralism, Globalization, and Knowledge

Our universities today are at a particularly important moment in history, since they are being called upon to

educate students who will be spending most of their lives in another century...citizens of the 21st Century, if you will.

And while it is always risky to try to speculate about the future our students will find, three themes of 21st Century America seem clear...

i) It will be future in which our nation becomes a truly multicultural society, with a cultural, racial, and ethnic diversity that will be extraordinary in our history

In which those groups we refer to today as minorities will become the majority population of our nation in the century ahead...

In which women take their rightful place as leaders of America...

ii) It will be a future in which America will become "internationalized"...

in which every one of our activities must be viewed within the broader context of participation in the global community...

In an age of intercontinental missiles, threats to the global environment, instantaneous worldwide communications, a world economy, and an international marketplace of ideas and arts and political trends,

it is clear that we are becoming increasingly interdependent with other nations and other peoples.

Further, as the destination of roughly half the world's immigrants, the United States is rapidly becoming a "world nation" with not simply economic and political but strong ethnic ties to all parts of the globe.

The 21st Century will be the first post-European century in American history.

An absolute majority of young people born in US in the 21st Century will be born of parents of other than European background...

Asian, African, Hispanic

And this will represent a major change in the character of our society.

iii) The Age of Knowledge

But there are even more profound changes underway...

Today we are evolving rapidly to a new post-industrial,

knowledge-based society, just as a century ago our agrarian society evolved through the Industrial Revolution.

Some examples:

1. Industrial production is steadily switching away from material and labor intensive products and processes to knowledge intensive processes:
2. Our nation's future has probably never been less constrained by the cost of natural resources.
3. Increasing manufacturing production has come to mean decreasing blue collar employment!
4. We are in the midst of an information revolution that is changing the basis of economic competitiveness and world power.

(Indeed, if you want to know the real reason for the recent events in Eastern Europe, China, and the Soviet Union--the collapse of communism--it was the silicon chip which created a truly international exchange of ideas and perspectives that could not be constrained by any government!)

In a sense, we are entering a new age, an age of knowledge, in which the key strategic resource necessary for our prosperity, security, and social well-being has become knowledge--educated people and their ideas.

Concerns...

Needless to say, these same challenges of pluralism, of globalization, and of this age of knowledge that is our future will pose great challenges and demand changes in our state and our nation.

The America of the 20th Century that we have known... was a nation characterized by a rather homogeneous, domestic, industrialized society...

But that is an America of the past.

Our students will inherit a far different nation... a highly pluralistic, knowledge-intensive, world nation that will be the America of the 21st century

Of course, these are really not themes of the future ...but rather themes of today...

...in a sense, I have simply been reading the handwriting on the wall...

The impact of these changes are already painfully apparent

to Michigan's workers and industries.

In fact, it is here in Michigan...in the heart of the "Rust Belt" that the impact of these extraordinary changes are most clearly seen...

We all know that past decade was a period of great difficulty for our state...

Industries of great economic importance such as steel and automobiles have fallen victim to intense competition from abroad...

Plants have closed...we still have many people chronically unemployed...or under employed

Indeed, Michigan's per capita income has now dropped below the national average...

Our unemployment rate consistently is at the top...and, soon, if we are not careful our prison population will be as well...

It is clear that our state is in the midst of a profound transition...
...from an industrial economy based upon the abundance of natural resources, unskilled labor, and, to some degree, constrained, slowly moving domestic markets...

To a knowledge-based economy, characterized by intensely competitive world markets, rapid change, and--most important of all--educated people and their ideas.

This has not been...and will not be...an easy transition to make.

The truth is that the outcome is still very much in doubt!

Whether we will emerge from this transition as a world economic leader once again...with a strong, prosperous--albeit new--economy producing jobs and improving our quality of life.

Or whether we will fail to heed the warnings...
...to make the necessary investments and sacrifices today necessary for strength and prosperity tomorrow...

And become an economic backwater in the century ahead.

It is clear that we face a watershed--a fork in the road ahead.

My central theme is that education, broadly defined, will be the pivotal issue in determining which of these two alternative futures will be Michigan's...and America's.

Indeed, I am absolutely convinced that the dominant issue of the 1990s will be the development of our human resources.

Examples:

1. We already see this in Michigan...
A recent article by the Booth Newspaper chain noted that the most prosperous cities in Michigan were characterized by a well-educated and highly skilled labor force...areas such as Grand Rapids, Oakland Country, and Ann Arbor. Indeed, over 90% of the people in Ann Arbor have completed at least 12 years of school. In contrast, those areas most hard-hit by the economic transition have been cities such as Saginaw, Flint, and Detroit, cities in which only 50% of the population has a high school education.
2. Indeed, when then Vice-President Bush was traveling around the country and meeting with corporate executives to prepare himself for the 1988 election, the message he heard time and time again was the the key investments the United States had to make were in:
 - i) education
 - ii) technology
3. This situation has not gone unnoticed by our competitors from abroad. Indeed in recent trade negotiations, Japan admonished the United States to stop worrying so much about near-term financial issues and instead focus on long-term strategies by investing in scientific research and upgrading the quality of its schools--particularly in critical areas such as mathematics, science, and foreign languages.

Hence the challenge before higher education is the challenge before America...

And the actions we must take...

...and the investments we must make...

...will clearly determine our capacity to respond to this future...

The Dangers of Underinvestment

But here there are dark clouds on the horizon...

increasing evidence that we as a people have not yet recognized either the nature or the magnitude of the investments

we must make to achieve prosperity
in an age of knowledge.

While we all give the "age of knowledge" lip service, the evidence suggests that in reality, many of us cling to the past wanting us to return to the agricultural and manufacturing economies that once made us rich... We simply cannot continue any longer in this dream state We have to face reality.

1. Over the past several years, numerous studies have suggested that Michigan is seriously underinvesting in its "knowledge infrastructure"...by as much as 30% to 40% relative to other states.
2. The challenges faced by K-12 education are apparent. By any measure, K-12 is in serious trouble.

We are "A Nation At Risk"...

Earlier this fall, a group of visiting Japanese business leaders was asked to identify our nation's greatest asset...and our great liability.

They were unanimous in their opinion that America's great assets were its research universities... and its greatest liabilities were its schools...

Note: it is bad enough that...

10% of Americans are illiterate

25% now fail to complete high school

But in recent years we have learned that in international comparisons of achievement in science and mathematics, our grade school and high school students score at the very bottom of industrialized nations.

We are a sports-oriented society,
and we like to frame issues in the language of the playing field like "being Number one".

But folks, this isn't a game we are talking about today, this is a deadly serious matter of raising a generation of American who will be able to hold their own in an increasingly competitive, increasingly complex, increasingly science-oriented world.

The coins of the realm in the age of knowledge will be science, mathematics, and technology...

But most American students are simply not developing these skills.

We hear along about the 21st century, but this sounds remote.
These kids that test at the bottom of the heap
in world terms will be the backbone of our labor force
at the turn of the century...
...and will be running our country in 2025!

3. The situation is somewhat different yet no less acute for higher education in our state.

While the quality of Michigan higher education today is still high, the long term prognosis is poor if we continue as we have been in recent years.

Over the past two decades, the State of Michigan has dropped from the position of a national leader (ranked 6th in 1965) in its public support of higher education to among the lowest in the nation.

Let's look at the comparisons for a moment:

Among the states, Michigan currently ranks

- i) 32th in appropriations per student
- ii) 37th in appropriations as a percent of personal income
- iii) 35th in appropriations as a percent of tax revenue

Further, we not only fall significantly below the national average in our support, but it is clear that we are slipping even farther behind with each passing year:

In fact, the increases we have provided in our support to higher education now rank

- iv) 42nd over the past two years
- v) 45th over the past ten years

nearly dead-last among the states.

Note: Cost of restoration:

To US Ave:	\$120 M (+12%)
Top 1/3:	\$250 M (+25%)
6th:	\$350 M (+35%)

Hence, no matter how you slice it, our state now ranks among the lowest in the nation in its support of higher education.

As a highly industrialized state undergoing a dramatic change to a knowledge-intensive economy, Michigan is critically dependent upon quality higher education for well educated citizens and creative ideas. Yet Michigan has

now fallen into the bottom ranks of industrialized states in its support of these critical resources.

We are being outspent by 30 - 40%

in state support per student...

Not simply by prosperous states like California...but by neighbors such as Indiana and Ohio!

They understand what we have yet to grasp.

The world is changing rapidly, and we have to prepare ourselves for tough competition.

Until now we have been able to sustain the quality of public higher education in this state in the face of a catastrophic loss of state support because of our traditional autonomy, so wisely granted almost 150 years ago by the authors of our state constitution.

This autonomy allowed Michigan's universities to take strong internal actions, reallocating resources, redefining priorities, and increasing tuition levels to partly compensate for reduced public support.

But in recent years, even this autonomy has been threatened...through efforts from Lansing

i) to constrain tuition levels to artificially low levels even as state appropriations eroded still further

ii) to dictate who we must admit

iii) even to dictate what we must teach...

Our autonomy has allowed us to continue to move forward

...even though the gas tank is running on empty...

...but now state government threatens to challenge even our ability to manage our institutions during a period of great financial difficulty...

And threatens to slam the brakes on quality education in Michigan.

Whether measured in terms of

state appropriation per student or fraction of our tax dollars directed toward higher ed,

it is clear that in comparison with other states, our present level of public support is simply inadequate to maintain over the long run a system of higher

education that is competitive on a national --
indeed, on a worldwide -- basis.

Governor's Higher Ed Taskforce

Interestingly enough, this alarming situation has not
gone unnoticed by public leaders...

A loud warning was voiced in 1985 by the Governor's Commission
on the Future of Higher Education in Michigan

The Commission clearly identified the fact that
"public higher education in Michigan is at
a crossroads".

It noted that per capita support had fallen from
a position as national leader to far below
the national average.

Further, it noted that Executive Order cuts
had played havoc with planning, resulting in
maintenance deferrals, equipment purchase cuts,
and eroded support for fundamental activities--
all at a time when other states were increasing
support for their systems of higher education.

It also credited Michigan's universities with launching
a systematic process of improving efficiency
and redirecting the system. In particular, it
noted that from 1980 to 1984, over 100 programs
were eliminated, thereby indicating the
discipline, good management, and commitment
of higher education leaders to use public funds
responsibly and frugally.

It concluded that if nothing was done, higher ed
in Michigan was likely to face a future in which
mediocrity is coupled with inaccessibility, a
totally unacceptable results for Michigan's citizens.

Let me quote the conclusion of the report:

"To provide wide access to a higher education
system of mediocre quality is to perpetuate a hoax
on Michigan's citizens."

And what has happened over the ensuing years?

The increase in Michigan's support of higher
education in each of the past three years
has not only failed below inflation...but
ranked among the very lowest in the nation --

45th over the past decade!

What has happened to our priorities?

What is wrong here???

Who is to blame???

Our schools and colleges???

Certainly they must take stronger actions to improve quality...and strive harder to operate in a more cost-effective manner...

But these institutions are not to blame...

What about our elected public officials???

It is certainly not their fault!!

It is clear that our elected leaders, whether in Washington or Lansing or our local communities...

Would like nothing better than to make education their highest priority.

To become

...the Education Governor

...or the Education Party

...or the Education President

They understand clearly the importance of investing in our human resources, and they are searching valiantly for creative ways to improve the quality of our schools and provide adequate and equitable financial support.

But they also face formidable constraints, since in the end they must be responsive to the wishes of the electorate...and face it, gang...the electorate today says:

i) no more taxes...

ii) no more crime...

iii) no more cuts in social services or national defense...

and our public officials have no choice but to respond.

No, the real finger of blame for the crisis we face in education should be pointed, as Michael Jackson would say, at "The Man in the Mirror"... ...at you and at me...

We are the ones who fail to demand the highest quality in our educational institutions in Michigan...

We are the ones who steadfastly resist a tax base adequate to support both our needs and desires...and provide an adequate level of support for quality education in this state.

We are the ones who block any effective efforts to achieve equitable financing of education in Michigan.
We are the ones who generally are too busy to help our own children in their studies or participate in their activities.
And we are the ones who insist on building more and more prisons, even when we know that this investment comes out of the hide of education and social services-- which are, of course, the only true long term solutions to crime!
We have become consumers,
not investors in the future.

What's Going On Here?

Something has changed in America...

You know, I was brought up in a long tradition in which one's first responsibility was to one's children
My parents scrimped and saved for my college education...
...and my wife and I have done the same for our daughters.

Saving for a college education came first...
...before a house, before a fancy car, before an exotic vacation

But today's generation is different...

...the "me generation" of the 1960s has grown up into comfortable Yuppiehood...

...it is bad enough that they have not saved for their children's college education

...and not supported adequate tax programs to support higher education

...but they have actively encouraged government at both the state and federal level to intervene in an effort to hold tuition levels to unrealistic low levels...

(either not realizing or perhaps not caring that they were undermining the quality of the education their children would receive at these bargain-basement prices--and depriving many others from less fortunate backgrounds of the opportunity for a college education because of the erosion of financial aid programs in the face of inadequate tuition revenue).j

Our approach to education...like to so much else in life these days...can be summarized by that T-shirt slogan:

"Eat dessert first, life is uncertain"

Yet the writing on the wall could not be clearer:

As we prepare to enter the Age of Knowledge,
our ability to sustain the strength of our state
and our nation...to achieve the quality of life for our
citizens...will be determined, more than any other factor,
by how we develop, nurture, and educate that
most precious of resources, our people.

Hence, let me conclude my brief remarks by tossing at you--
and at me-- several challenges:

Concluding Remarks

To Us...

In a very real sense, our state has entrusted to us its most
valuable resources...its youth...and its future.

To be responsible stewards of the public trust, it is clear
that we must strive to achieve greater
cost-effectiveness in our use of public funds...
and I can assure you that we intend to do just that.

But even beyond this, we must become staunch guardians
for the quality of our institutions...

For in education, as in every other aspect of American life,
quality will be the key to our future in an age of knowledge
in a global economy.

We need to give our children the best education and
chance for the future that we can. We should be
willing to pass on to them what we ourselves
have received...opportunity for a better life.

Hence, to us falls the responsibility of taking the forceful and
courageous actions necessary to sustain and enhance
this quality...in the long run the people of this state
both demand and deserve nothing less!

To You...

Higher education represents one of the most important
investments a society can make in its future...since
it is an investment in its people...

It is indeed the case that our state and our nation
have developed the finest systems of higher education
in the world...

But we must also remember this resulted from the willingness
of past generations to look beyond the needs

and desires of the present and to invest in the future by building and sustaining educational institutions of exceptional quality--

Institutions that have provided those of us in this gathering today with unsurpassed educational opportunities.

We have inherited these marvelous institutions because of the commitments and the sacrifices of previous generations...and it is our obligation as responsible stewards--not to mention as responsible parents--to sustain them to serve our own children and grandchildren.

It seems clear that if we are to honor this responsibility to future generations, we must re-establish the priority of both our **personal** and our **public** investments in education, in the future of our children ...and hence in the future of our state and our nation.

To our elected leaders...and those aspiring to public office

1. It is time for our public leaders to step forward and develop and implement a strategy to restore an adequate level of public support for higher education to raise Michigan --that raises us from among the very bottom among the states to a position of national leadership once again.
2. They must bring to an end the present freeze on capital outlay appropriations for higher education (now entering its fourth year) and begin to deal with the seriously deteriorating facilities on our campuses.
3. They must respect our constitutional autonomy and preserve it for generations to follow as the best safeguard for maintaining quality public higher education accessible to all.
4. And most of all, our public leaders must come to understand that they are stewards for the moment of an extraordinary resource for our state--one of the world's finest systems of higher education--a system that has resulted

from the commitment and sacrifices of eight generations of Michigan citizens. They will be judged by future historians by how wisely and effectively they protect and sustain this great resource, so critical to our future.

The Challenge to Us All...

Today Michigan faces serious challenges that will clearly determine its future prosperity and well being...

the challenge of pluralism...

the challenge of participation in a global community...

the challenge of the Age of Knowledge

the challenge of change itself...

As we approach a new century, our state is undergoing a profound and difficult transition to a new economic order...

Our fabulously prosperous industrial economy...
an economy that allowed us to build some of the world's great institutions---including some of its finest universities--

But that economy is rapidly disappearing...
...and our challenge for the next decade is to take the steps necessary to build a new knowledge-based economy which will be competitive in a world marketplace.

This will not be easy...

It will take sacrifice on all of our parts...

It will take renewed commitment to that

most fundamental of all characteristics

in the new economic order: quality

And it will take renewed investment!

If we are to respond, we simply must reorder the priorities of this state...

We must shift away from the temptation to

address only the needs and desires of the moment

And, instead, we must begin to make some of the key

investments necessary for the long term...

The key investments in our people...

in our children...

Michigan continues to be blessed with abundant natural resources, a people of great strength,

and a system of higher education of a quality
envied by the rest of the nation...indeed the world!

But, the writing is on the wall...

If Michigan is to prosper in the age of knowledge
that is almost certainly our future, we must join together
now to restore both our public and
personal investments in education...
...in our people and their ideas...
...in our children...
...and in our future