

Flint Rotary

Introduction

Today I would like to discuss the State of Michigan's strategy to achieve prosperity in the face of intense international competition and rapid technological change.

However it seems appropriate first to broaden our perspective a bit and view the challenge facing Michigan within the broader context of the major changes occurring in the very structure, the very fabric, of the world economy...

In a sense, Michigan's challenge--indeed, Flint's challenge is the challenge of dramatic economic change itself, being driven in large measure by knowledge ...

Background

To discuss this challenge, I am going to toss aside my hat as president of the University of Michigan, and instead return to my roots as a scientist and engineer.

Throughout my scientific career, I have been heavily involved in stimulating technological change...

In areas such as nuclear energy, lasers, thermonuclear fusion...indeed, I even worked on the Rover Project to develop a nuclear rocket in the 1960s...

In the 1970s, I switched my attention to areas such as supercomputers and computer networks....

I am going to put on a hat as former dean of the College of Engineering at Michigan...as one who has been involved for the past several years in attracting to our state a number of the nation's thought leaders,

But there is one additional hat I would also like to put on... that of a member of the National Science Board...our nation's principal source of science policy...

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.

Few have realized the enormous changes that our society is undergoing as it approaches 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.

Indeed, knowledge will play the same role that in the past were played by natural resources or geographical location or unskilled labor...

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 such as the University of Michigan and its sister institutions 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...

We--that is YOU AND ME--seem hell-bent, both as a nation and as a society, on destroying the extraordinary resources represented by system of public education--from K through 12 through 16 through lifetime education-- just as we are entering an age of knowledge in which they will become our most valuable resources.

Indeed, a tragic combination of public misunderstanding, short-sightedness, and downright selfishness, is now threatening to deprive our children and grandchildren with the same opportunities for an quality education that you and I enjoyed-- because of the sacrifices of our ancestors.

Leading to the frightening prospect that we will manage to destroy our international competitiveness of 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...

Themes of Pluralism, Globalization, and Knowledge

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...

Looking back over history, one can identify certain
abrupt changes, discontinuities, in the nature,
the very fabric of our civilization...

The Renaissance, the Age
of Discovery, the Industrial Revolution

There are many who contend that our society is
once again undergoing such a dramatic shift in
fundamental perspective and structure.

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.

This new critical commodity knows no boundaries.

It is generated and shared wherever educated, dedicated, and creative people come together... and, as we have learned, it spreads very quickly.

Key element in transformation, is the emergence of knowledge as the new critical commodity, as important as mineral ores, timber, and access to low skilled labor were at an earlier time.

The knowledge revolution is happening worldwide and at a very rapid rate.

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 similar 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 themes of the future,
the changing nature of the American population...
our increasing interdependence with other nations
and other peoples... and the shift to a knowledge-intensive,
post-industrial society.

Are actually not themes of the future
...but rather themes of today...

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

Yet I also fear that few have realized the enormous
changes that our society is going through as it
approaches the 21st Century.

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 to our
nation 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...

Michigan has dropped to 20th in per
capita income (and at \$15,393 is now
slightly behind the national average
of \$15,481)

We have slipped to the bottom in

- ...in our public support of higher education
- ...in the fraction of tax dollars we get back from Washington
- ...in the burdensome nature of our tax system
- ...in the climate we provide for small business development

We are still number one...or close to it...but in other areas

- ...but in unemployment
- ...in mortality
- ...in high school dropouts
- ...in the fraction of our citizens we lock up in jail

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!

producing jobs and improving our quality of life.

Whether we will emerge from this transition as a world economic leader once again...with a strong, prosperous--albeit new--economy

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.

Previous economic transformations were closely associated with major public investment in infrastructure such as railroads, canals, electric networks, and highways.

In the coming economic transition, an equivalent infrastructure will be an educated population.

The actions we must take today...

...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.

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!

Unfortunately, what is also apparent is our inability to agree on actions aimed at improving the quality of our schools--or equity in their financing.

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) 38th in appropriations per student
- ii) 37th in appropriations as a percent of personal income
- iii) 26th in appropriations per capita

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.

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...

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 basis.

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 about ability to manage our institutions during a period of great financial difficulty...

And threatens to slam the brakes on quality education in

Michigan.

We recognize that the choices before Michigan are not easy.

We must address pressing social issues of employment, health, social welfare, we must meet the important needs of our citizens today.

But also we must balance these immediate needs with investment in our future.

We cannot continue to address symptoms of our problems without addressing their causes.

We cannot bring back the past even if we wanted to

For generations, the people of Michigan sacrificed so that their children could have a better life.

They had faith in education.

We must rekindle that faith

and that commitment to the future today.

We must care for our children's future as much

as we attempt to our present needs and desires.

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 their present situation reflects as much as anything else our own personal priorities...

...as parents

...as volunteers...

...as citizens and voters...

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 of education, not investors in the future.

The Challenges

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.

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...

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 public 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. Our public leaders must develop and implement a strategy to restore an adequate level of public

support for public 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
public 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 the State of 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--just as our nation--
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.

Let there be no mistake about it...this will not be an easy transition...and the outcome is still very much in doubt.

In my frequent interactions with the leaders of the public and private sectors throughout this nation I detect an increasing sense of fatalism about Michigan's--indeed, America's--will and capacity to take the actions necessary for our future.

Indeed, many now believe that that our nation is well down the road toward "outsourcing" its knowledge resources--just as we have been our labor, our manufacturing, our products--since American industry can not only depend on domestic knowledge resources--that is, a well-educated labor force or an adequate supply of scientists, engineers, and other professionals.

- i) There is increasing pessimism that the staggering problems facing K-12 education can be overcome on the time necessary to preserve our economic strength.
- ii) Further, despite the fact that most other nations regard higher education as our greatest strength, there is little sign that this view is shared either by our elected political leaders or the public at large. Indeed, it has become fashionable to attack our universities, even as we continue to seriously underfund them.
- iii) The rapid growth of "transnational" companies which seek resources, whether they be labor, processes, or knowledge--wherever they can get them at highest quality and lowest price--suggests that outsourcing of knowledge from other parts of the world will become increasingly common as the quality of

American education deteriorates.
This is truly a frightening prospect. Industry has
already outsourced labor and manufacturing.
Can Michigan afford to lose its competitive capacity to
produce knowledge as well?

Let's face the facts, people...

We're not going to be rich and prosperous if all
we do is mow one another's lawns.

We have to bring something to the table of the
international marketplace.

We have to generate our wealth...through our
people...their knowledge and their skills.

I, for one, do not share the pessimism of many of
my colleagues.

I believe that we can meet the challenge of the
knowledge-based, global society that is
our future.

But it is also clear that to do so will require
sacrifices 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 in that most
critical resource for our future--our system of
public education.

Conclusion

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