

REMARKS BY

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## MEETING THE CHALLENGE OF GLOBAL COMPETITION

IT IS A PLEASURE TO BE HERE TO SPEAK ABOUT MEETING THE CHALLENGE OF GLOBAL COMPETITION. I CAN'T THINK OF A MORE IMPORTANT ISSUE, CONSIDERING THE THREAT TO THE ECONOMIC HEALTH OF OUR COUNTRY CAUSED BY A STEADILY ERODING COMPETITIVE POSITION IN WORLD MARKETS. OVERSTATING ITS SERIOUSNESS IS DIFFICULT CONSIDERING THAT OVER 70 PERCENT OF THE U.S. DOMESTIC MARKET IS OPEN TO FOREIGN COMPETITION. THE PLAIN TRUTH IS THAT THE U.S. IS IN A GLOBAL STRUGGLE. THE COMPETITION IS FIERCE, AND WE ARE LOSING IN MANY MARKETS.

THE 1985 REPORT OF THE PRESIDENT'S COMMISSION ON INDUSTRIAL COMPETITIVENESS PROVIDED A GOOD PERSPECTIVE OF THE FOREIGN COMPETITIVE CHALLENGE. IT WARNED THAT OUR ABILITY TO COMPETE WAS ERODING AND THAT WE WERE LOSING WORLD MARKET SHARE IN INDUSTRY AFTER INDUSTRY, INCLUDING SEVEN OUT OF TEN HIGH TECHNOLOGY INDUSTRIES.

UNFORTUNATELY, THE TRENDS FLAGGED BY THE PRESIDENT'S COMMISSION HAVE CONTINUED. ACCORDING TO THE DEPARTMENT OF COMMERCE, THE U.S. RECORDED ITS FIRST WORLDWIDE TRADE DEFICIT IN ELECTRONICS IN 1986, GOING FROM A \$1.3 BILLION SURPLUS IN 1985 TO ALMOST A \$1.9 BILLION DEFICIT LAST YEAR. AT THE SAME TIME, A REPORT PREPARED FOR THE JOINT ECONOMIC COMMITTEE OF CONGRESS PREDICTED THAT WHEN ALL THE FIGURES ARE IN, 1986 WILL PRODUCE THE FIRST FULL-YEAR HIGH TECHNOLOGY TRADE DEFICIT SINCE THIS CATEGORY WAS FIRST IDENTIFIED.

ADVERSE EFFECTS OF THE LOSS OF MARKET LEADERSHIP IN HIGH TECH IS NOT RESTRICTED SOLELY TO REDUCED TRADE AND LOSS OF JOBS IN HIGH TECH COMPANIES. THEY ARE FELT MUCH MORE WIDELY BECAUSE HIGH TECH PRODUCTS, SUCH AS MICROCOMPUTERS, ARE USED TO IMPROVE THE PERFORMANCE, QUALITY AND LOWER COSTS OF PRODUCTS, PROCESSES AND SERVICES IN OTHER INDUSTRIES. HENCE, THESE INDUSTRIES, WHICH REPRESENT A LARGE SEGMENT OF THE ECONOMY, ARE PLACED AT A SEVERE COMPETITIVE DISADVANTAGE WHEN THEY DO NOT HAVE THE SAME ACCESS TO THE MOST ADVANCED HIGH TECH PRODUCTS AS THEIR FOREIGN COMPETITORS.

OF THE MANY ACTIONS REQUIRED TO RESPOND TO THIS DISMAL SITUATION, THE MOST EFFECTIVE IS THE EXPANSION OF INDUSTRIAL INNOVATION ON A MASSIVE, UNPRECEDENTED SCALE. LET US BE REMINDED THAT INNOVATION IS THE PROCESS OF CREATING AND PLACING IN USE NEW PRODUCTS, SERVICES AND PROCESSES OR IMPROVEMENTS ON EXISTING ONES. IN ORDER TO AFFORD SUCH A VAST PROGRAM AND ACCOMPLISH IT IN A TIMELY MANNER, THERE MUST BE A SUBSTANTIAL INCREASE IN THE EFFICIENCY OF RESEARCH, DEVELOPMENT AND MANUFACTURING THROUGH TECHNOLOGICAL COOPERATION INVOLVING

PRIMARILY INDUSTRY, GOVERNMENT AND UNIVERSITIES. TWO OF THE MAJOR TYPES OF COOPERATION REQUIRED ARE LARGE SCALE COOPERATION AMONG BUSINESS, GOVERNMENT AND UNIVERSITIES AND COOPERATION AT THE COMMUNITY LEVEL AMONG ALL SECTORS.

IN ADDITION TO PARTICIPATION IN ONE OR BOTH TYPES OF COOPERATION, EACH SECTOR MUST UNDERTAKE RESTRUCTURING, REALLOCATION OF RESOURCES AND THE UTILIZATION OF NEW APPROACHES FOR REDUCING OPERATING COSTS AND IMPROVING PERFORMANCE. I WILL NOW ELABORATE ON THESE ACTIONS, STARTING WITH LARGE-SCALE TECHNOLOGICAL COOPERATION.

### LARGE-SCALE COOPERATION

MCC: THE FLAGSHIP OF THIS TYPE OF COOPERATION IS MCC, THE MICROELECTRONICS AND COMPUTER COMPANY IN AUSTIN, TEXAS. MCC COMMENCED OPERATION EARLY IN 1983. INITIALLY, THERE WERE ELEVEN PARTICIPATING COMPANIES FROM THE U.S. COMPUTER AND SEMICONDUCTOR INDUSTRIES. THIS NUMBER HAS GROWN TO TWENTY. MCC EMPLOYS SOME 460 PEOPLE, OF WHOM 325 ARE SCIENTISTS AND ENGINEERS. THE ANNUAL BUDGET IS CURRENTLY AT A LEVEL OF \$75 MILLION.

IT IS ALREADY CLEAR THAT MCC WILL HAVE ENORMOUS BENEFITS IN TERMS OF MORE EFFICIENT DEVELOPMENT OF COMPUTER AND SEMICONDUCTOR TECHNOLOGY. THIS IS EVIDENCED IN PART BY THE FACT THAT EACH DOLLAR A PARTICIPATING COMPANY INVESTS IN MCC RESEARCH PROGRAMS PRODUCES, ON AVERAGE, RESEARCH RESULTS COSTING OVER FIVE DOLLARS. THE IMPORTANCE, ALSO, OF SHARING EXTREMELY SCARCE SCIENTIFIC AND ENGINEERING TALENT CANNOT BE OVEREMPHASIZED IN AN ENVIRONMENT WHERE OUR EDUCATION SYSTEM IS FAILING TO PRODUCE SUFFICIENT QUANTITY AND QUALITY OF TECHNOLOGISTS.

EQUALLY IMPORTANT, TECHNOLOGY CREATED BY MCC WILL BE LICENSED ON REASONABLE TERMS TO SMALL COMPANIES. OBVIOUSLY, HOWEVER, EVERY INDUSTRY AND FIELD NEEDS ONE OR MORE COOPERATIVE EFFORTS OF THIS TYPE TO GAIN A FIVE-TO-ONE LEVERAGE IN CREATING NEW TECHNOLOGY.

MTDI: TO FACILITATE THE FORMATION OF MORE LARGE SCALE TECHNOLOGICAL EFFORTS, THE MIDWEST TECHNOLOGY DEVELOPMENT INSTITUTE (MTDI), A CONSORTIUM OF NINE MIDWEST STATES WAS ESTABLISHED EARLY IN 1985.

MTDI SELECTED THREE FIELDS IN WHICH TO INITIALLY SET UP LARGE SCALE COOPERATIVE PROGRAMS: ADVANCED CERAMICS AND COMPOSITES, AGRICULTURE AND ADVANCED MANUFACTURING.

ACCP: MTDI HAS BROUGHT THE ADVANCED CERAMICS AND COMPOSITES PARTNERSHIP TO THE LAUNCH POINT. ALTHOUGH THE RECENT BREAKTHROUGHS IN SUPERCONDUCTIVITY ARE SPURRING INTEREST IN CERTAIN CERAMICS, MTDI HAS IDENTIFIED A BROADER PRE-EXISTING INTEREST IN OTHER ELECTRONIC AND STRUCTURAL CERAMICS. FOUR COOPERATIVE PROJECTS HAVE BEEN DEVELOPED INVOLVING COLLABORATIONS AMONG A NUMBER OF MIDWESTERN UNIVERSITY RESEARCHERS. FOURTEEN INTERESTED CORPORATIONS ARE NOW CONSIDERING PARTICIPATION IN THESE PROJECTS.

REP: IN THE FIELD OF AGRICULTURE, MTDI HAS SET UP THE RURAL ENTERPRISE PARTNERSHIP. THE MAJOR THRUST OF THIS COOPERATIVE EFFORT IS TO MANAGE THE DEVELOPMENT OF TECHNOLOGY TO INCREASE THE PROFITABILITY AND NUMBER OF FAMILY FARMS. FOUR COOPERATIVE PROJECTS ARE UNDERWAY, WITH MANY MORE BEING PLANNED.

AIMSC: THE OBJECTIVE OF THE COOPERATIVE PROGRAM IN ADVANCED MANUFACTURING IS TO ESTABLISH REGIONAL CENTERS UTILIZING THE MOST ADVANCED MANUFACTURING TECHNOLOGY WHICH IS MADE AVAILABLE ON A SERVICES BASIS. THUS, ALL COMPANIES, ESPECIALLY SMALL COMPANIES, WHO PRESENTLY EITHER LACK THE TECHNICAL CAPABILITY OR THE FINANCIAL RESOURCES TO ESTABLISH THEIR OWN ADVANCED DESIGN AND MANUFACTURING SYSTEM, CAN ACCESS ONE AND PRODUCE PRODUCTS WHICH CAN COMPETE IN WORLD MARKETS.

Implications: WHILE THE COOPERATIVE EFFORTS I'VE JUST REVIEWED, ALONG WITH A FEW OTHERS WHICH COULD BE MENTIONED, CONSTITUTE SIGNIFICANT PROGRESS, MANY MORE LARGE SCALE PROGRAMS MUST BE ESTABLISHED.

#### COMMUNITY LEVEL COOPERATION

ALSO ESSENTIAL, AS MENTIONED EARLIER, IS COMMUNITY-LEVEL COOPERATION. THIS TYPE OF COOPERATION IS AIMED MAINLY AT ASSISTING SMALL BUSINESS. TRADITIONALLY, THIS SECTOR HAS BEEN A MAJOR SOURCE OF INNOVATION AND MOST OF THE NEW JOBS. IN ORDER TO MAXIMIZE INNOVATION BY SMALL BUSINESS, A NEW ORGANIZATION IS NEEDED TO FACILITATE COOPERATION, CALLED A SMALL BUSINESS INNOVATION NETWORK TO BETTER MANAGE TECHNOLOGY FOR STARTING NEW COMPANIES AND HELP IN OTHER WAYS TO FOSTER INNOVATION.

THE MAIN ELEMENTS AND FUNCTIONS OF A SMALL BUSINESS INNOVATION NETWORK ARE SHOWN BY THE DIAGRAM. LET ME DESCRIBE HOW IT ASSISTS SMALL BUSINESS.

Cooperation Office: THE COOPERATION OFFICE IS THE PIVOTAL ELEMENT OF THE NETWORK. IT IS A NON-PROFIT, COMMUNITY-BASED ORGANIZATION FINANCED BY STATE AND LOCAL GOVERNMENT, PRIVATE CONTRIBUTIONS, CLIENT FEES AND FUNDS GENERATED BY INVESTMENTS IN

CLIENT COMPANIES. A COOPERATION OFFICE'S BOARD OF DIRECTORS CONSISTS OF LOCAL LEADERS FROM MAJOR SECTORS OF SOCIETY. THE PERMANENT STAFF IS SMALL, BUT THE COOPERATION OFFICE DRAWS ON A VOLUNTEER ADVISORY PANEL OF SCIENTISTS, ENGINEERS, MARKETING SPECIALISTS AND EXECUTIVES FOR THE SPECIFIC EXPERTISE REQUIRED TO ASSIST AN ENTREPRENEUR WHO WANTS TO START A COMPANY PREPARE A BUSINESS PLAN.

Seed Capital: EQUITY FINANCING IS OFTEN NOT AVAILABLE FOR NEW COMPANIES DURING THEIR INITIAL FORMATION AND EARLY DEVELOPMENT STAGES FROM BANKS, VENTURE CAPITAL FUNDS AND OTHER CONVENTIONAL SOURCES BECAUSE OF THE HIGHER RISKS INVOLVED. THEREFORE, A SOURCE OF SEED CAPITAL IS NEEDED. IT CAN BE PROVIDED IN A NUMBER OF WAYS; HOWEVER, IN THE LONG RUN, THE BEST TYPE OF SEED FUND IS A CONSORTIUM OF STATE AND LOCAL GOVERNMENT AND PRIVATE INVESTORS WHERE THE GOVERNMENT INVESTMENTS ARE SUBORDINATED, AND TAX CREDITS ARE MADE AVAILABLE TO THE PRIVATE INVESTORS.

Business Center: A BUSINESS CENTER PROVIDES VARIOUS COMBINATIONS OF CONSULTING SERVICES, SHARED LABORATORY, MANUFACTURING AND OFFICE FACILITIES AND OTHER SERVICES TO FACILITATE THE STARTUP AND GROWTH OF SMALL BUSINESSES. ECONOMIES OF SCALE MAKE IT POSSIBLE TO PROVIDE OCCUPANTS OF THE CENTER AND SMALL COMPANIES NEARBY WITH NEEDED FACILITIES OF MUCH HIGHER QUALITY AND CONSIDERABLY LOWER COST THAN ANY WOULD BE CAPABLE OF OBTAINING OR PROVIDING FOR ITSELF.

ACQUIRING TECHNOLOGY: HAVING DESCRIBED HOW THE COOPERATION OFFICE AND OTHER PARTS OF THE INNOVATION NETWORK INTERACT TO ASSIST SMALL BUSINESSES TO START UP AND SUCCEED, LET ME NOW MENTION FOUR OF THE OTHER FUNCTIONS PERFORMED BY A COOPERATION OFFICE STARTING WITH ASSISTANCE IN ACQUIRING TECHNOLOGY. THE TWO MAJOR SOURCES OF TECHNOLOGY ARE, OF COURSE, DOMESTIC AND FOREIGN.

REGRETTABLY, EVEN THOUGH THE UNITED STATES IS NOT SELF-SUFFICIENT IN TECHNOLOGY, IT IS NOT MAKING USE OF FOREIGN TECHNOLOGY NEARLY TO THE EXTENT THAT OTHER COUNTRIES DO, ESPECIALLY JAPAN. YET MANY ENTREPRENEURS WANTING TO START A BUSINESS LACK A SUITABLE TECHNOLOGY ON WHICH TO BASE IT, AND MANY EXISTING SMALL BUSINESSES ARE UNABLE TO EXPAND BECAUSE OF LACK OF TECHNOLOGY FOR IMPROVING THEIR PRODUCTS OR ADDING NEW ONES. HOWEVER, EXPERIENCE SHOWS THAT WITHOUT THE TYPE OF ASSISTANCE THAT CAN BE PROVIDED BY A COOPERATION OFFICE, IT IS PROHIBITIVELY COSTLY FOR ENTREPRENEURS AND SMALL COMPANIES TO ACCESS OVERSEAS TECHNOLOGY.

EVEN ACQUIRING TECHNOLOGY FROM U.S. UNIVERSITIES AND GOVERNMENT LABORATORIES IS OFTEN VERY DIFFICULT FOR SMALL COMPANIES. FORTUNATELY, THE ENACTMENT OF THE TECHNOLOGY TRANSFER ACT OF

1986, ALONG WITH THE PRESIDENT'S EXECUTIVE ORDER OF APRIL, 1987 TO FACILITATE THE TRANSFER OF PUBLICLY FUNDED TECHNOLOGY OPENS UP THE POSSIBILITY OF VASTLY INCREASING THE FLOW OF TECHNOLOGY FROM UNIVERSITIES AND GOVERNMENT LABORATORIES TO SMALL BUSINESSES. HOWEVER, IN ORDER TO REALIZE THIS POTENTIAL, THE TYPE OF ASSISTANCE PROVIDED BY A COOPERATION OFFICE IS NEEDED ALONG WITH ACCESS TO SEED CAPITAL.

EXPANDING INTERNATIONAL TRADE: THE THIRD FUNCTION FOR COMMENT IS EXPANDING FOREIGN TRADE BY HELPING TO ESTABLISH JOINT VENTURES BETWEEN SMALL COMPANIES IN THE U.S. WITH THOSE IN OTHER COUNTRIES. THIS IS THE MOST DESIRABLE WAY FOR A SMALL COMPANY TO EXPAND ITS BUSINESS OVERSEAS, BECAUSE THE MARKETPLACE DETERMINES THE VALUE OF THE TECHNOLOGY INVOLVED WHICH ORDINARILY IS THE ONLY WAY THAT THIS CAN BE DONE WHICH IS FAIR TO BOTH PARTIES. ALSO, A J-V PROVIDES A MEANS OF DIRECT AND ENDURING PARTICIPATION IN AN OVERSEAS MARKET.

SMALLER COLLEGE ROLE IN INNOVATION: A FOURTH FUNCTION IS INCREASING THE ROLE OF SMALLER COLLEGES, INCLUDING COMMUNITY COLLEGES, IN INNOVATION. THESE INSTITUTIONS HAVE SUBSTANTIAL CAPABILITIES TO HELP EXPAND INNOVATION; HOWEVER, THEY ARE GROSSLY UNDERUTILIZED. IN ADDITION TO EDUCATION AND TRAINING, THEY INCLUDE THE ABILITY TO PERFORM APPLIED RESEARCH AND CONSULTING TO INDUSTRY.

POTENTIAL FOR APPLIED RESEARCH AND CONSULTING HAS NOT BEEN FULLY UTILIZED IN MAJOR PART BECAUSE THERE HAS BEEN A LACK OF MEANS TO IDENTIFY SPECIFIC NEEDS FOR THOSE RESOURCES. THE COOPERATION OFFICE PERFORMS THIS FUNCTION.

UNDERSTANDING OF TECHNOLOGY: THE FIFTH FUNCTION FOR COMMENT IS TO HELP PEOPLE UNDERSTAND THE CRITICALLY IMPORTANT ROLE OF TECHNOLOGY IN SOCIETY, ESPECIALLY THAT MOST NEW JOBS RESULT FROM THE APPLICATION OF TECHNOLOGY BY THE PROCESS OF INNOVATION. MOST PEOPLE DO NOT KNOW WHERE JOBS ORIGINATE, NOR HOW TERRIBLY DIFFICULT IT IS TO CREATE THEM. THAT LOW LEVEL OF UNDERSTANDING CAN EASILY ACCOMMODATE THE BELIEF THAT THE STORK BRINGS JOBS; ALTHOUGH THE BIRD HAS BEEN PREOCCUPIED WITH THE MORE TRADITIONALLY PRESCRIBED ROLE.

A NETWORK IN A COMMUNITY PROVIDES A PERSPECTIVE ON JOB CREATION THAT CAN BE WIDELY UNDERSTOOD BECAUSE OF LOCAL PARTICIPATION IN THE PROCESS. IN OTHER WORDS, THIS IS THE WAY THAT THE CULTURE OF TECHNOLOGY MUST BE IMPLANTED AT THE GRASS ROOTS OF SOCIETY IN ORDER TO GET THE BROAD BASE OF PUBLIC SUPPORT NECESSARY TO VASTLY EXPAND INNOVATION.

EDUCATION AND TRAINING ABOUT TECHNOLOGY AND ITS ROLE IN INNOVATION CAN BE PROVIDED TO ALL MEMBERS OF THE COMMUNITY AT

LOW COST THROUGH THE USE OF COMPUTER-BASED EDUCATION COURSES. SINCE THE BUSINESS CENTER WILL HAVE A SMALL COMPUTER, COURSES CAN BE DELIVERED THERE. SMALL BUSINESS OWNERS WILL BE GLAD TO VOLUNTEER THEIR TIME TO DESCRIBE THEIR EXPERIENCES WHICH WILL ADD REALITY TO THE COMPUTER-BASED EDUCATION COURSES.

IT IS ESPECIALLY IMPORTANT TO PROVIDE SUCH KNOWLEDGE TO YOUNG PEOPLE, BOTH IN GRADE SCHOOL AND HIGH SCHOOL. COURSES CAN BE SUITABLY STRUCTURED FOR DIFFERENT GRADE LEVELS. A COMBINATION OF COMPUTER-BASED EDUCATION COURSES AND CONTACT WITH PEOPLE OPERATING SMALL BUSINESSES CAN BE A HIGHLY EFFECTIVE SOURCE OF MOTIVATION FOR YOUNGSTERS TO TAKE MORE MATH, SCIENCE AND LANGUAGES.

REPLICATION: INNOVATION NETWORKS ARE BEING REPLICATED IN MANY PLACES IN A VARIETY OF SETTINGS, INCLUDING INNER CITIES AND RURAL COMMUNITIES. THE MOST PROGRESS IN IMPLEMENTING NETWORKS HAS BEEN MADE IN ILLINOIS, SOUTH CAROLINA, AND MINNESOTA. ILLINOIS IS IN THE PROCESS OF IMPLEMENTING FOURTEEN, SOUTH CAROLINA, SEVEN, AND MINNESOTA, FOUR.

#### INDIVIDUAL SECTORS

WHILE THERE IS PROGRESS IN IMPLEMENTING SMALL BUSINESS INNOVATION NETWORKS, IT IS FAR SHORT OF WHAT IS REQUIRED. MUCH GREATER PARTICIPATION IS CALLED FOR BY ALL SECTORS WHICH SHOULD BE ONE OF THE NEW APPROACHES TO BE ADOPTED, ALONG WITH OTHER MEANS FOR IMPROVING PERFORMANCE AND REDUCING OPERATING COSTS. THERE IS ALSO EXTENSIVE FRACTIONATION OF, AND OVERLAP IN, EFFORTS BY COMMUNITY ORGANIZATIONS WHICH ARE SERIOUS DETRACTORS FROM EFFICIENCY. THIS WILL BE REVIEWED LATER.

LET ME NOW ELABORATE ON RESTRUCTURING, REALLOCATING RESOURCES AND UTILIZING NEW APPROACHES BY INDIVIDUAL SECTORS.

BUSINESS: SUCH EFFORTS ARE WELL UNDERWAY IN THE BUSINESS SECTOR. CORPORATIONS HAVE BEEN ELIMINATING LAYERS OF MANAGEMENT, CONSOLIDATING DIVISIONS, CLOSING DOWN OR SELLING LEAST-PROFITABLE OPERATIONS, REDUCING THE WORKFORCE AND, AT THE SAME TIME, IMPROVING QUALITY OF PRODUCTS AND SERVICES.

THESE ACTIONS ARE WIDESPREAD, OF MASSIVE PROPORTIONS AND BEING MADE ACROSS ALL INDUSTRIES, NOT IN JUST THOSE WITH THE WORST PROBLEMS. AT&T TOOK A \$3.2-BILLION PRETAX CHARGE FOR PLANT CONSOLIDATIONS, INVENTORY WRITEDOWNS AND JOB REDUCTIONS TOTALING MORE THAN 27,000. GENERAL MOTORS ANNOUNCED THE CLOSING OF 11 U.S. AUTO MANUFACTURING PLANTS, ONE-THIRD OF ITS DOMESTIC FACTORIES. SPERRY (NOW UNISYS), HONEYWELL, AND CONTROL DATA HAVE MADE MASSIVE LAYOFFS AND TAKEN LARGE WRITEOFFS.

AND THE LIST GOES ON. IN FACT, I DON'T KNOW ANY U.S. COMPANY THAT ISN'T DOING EVERYTHING IMAGINABLE TO BECOME MORE COMPETITIVE, INCLUDING NEW APPROACHES SUCH AS GIVING PRODUCTION WORKERS MORE RESPONSIBILITY FOR PRODUCT COST AND QUALITY AND INCREASING THE EFFICIENCY OF R&D THROUGH COOPERATION WITH OTHER ORGANIZATIONS. STILL, MUCH MORE NEEDS TO BE DONE, ESPECIALLY IN EXPANDING COOPERATION IN RESEARCH AND DEVELOPMENT. AND COOPERATION NEEDS TO BE EXTENDED TO INCLUDE AUTOMATED MANUFACTURING.

FOR THE MOST PART, OTHER SECTORS, PRIMARILY EDUCATION, STATE AND LOCAL GOVERNMENT AND PRIVATE, NONPROFIT, COMMUNITY-BASED ORGANIZATIONS HAVE YET TO FACE UP TO THE TOUGH DECISIONS AND UNPLEASANT TASKS OF IMPLEMENTATION INHERENT IN THE CHANGES REQUIRED.

EDUCATION: OUTSIDE OF SOME CONSOLIDATION AND PAIRING AND SHARING AMONG PRIMARY AND SECONDARY SCHOOLS IN RURAL AREAS, RELATIVELY LITTLE PROGRESS HAS BEEN MADE IN THE EDUCATION SECTOR TO BETTER CONTROL COSTS AND ACHIEVE SUBSTANTIALLY IMPROVED LEARNING OUTCOMES.

ACHIEVING THESE GOALS SOON ENOUGH AT AN AFFORDABLE COST REQUIRES MANY ACTIONS IN K-12 AND UNDERGRADUATE AREAS. I'LL ONLY TAKE TIME TO MENTION THOSE ACTIONS REQUIRED FOR K-12 WHICH INCLUDE:

- o ADOPTING COMPUTER-BASED EDUCATION (CBE) AS THE PRIMARY METHOD OF DELIVERY TO REPLACE THE PRESENT SUPPLEMENTARY MODE.
- o DOUBLING OF TEACHERS' SALARIES OVER A PERIOD OF TIME.
- o REQUIRING NATIONWIDE TESTING OF TEACHER PERFORMANCE AND LEARNING OUTCOMES.
- o PROFESSIONALIZING SCHOOL MANAGEMENT.
- o MAKING AVAILABLE "CHOICE," I.E., STUDENTS CAN SELECT THE SCHOOL THEY WISH TO ATTEND.
- o ADOPTING VOUCHERS.
- o INCREASING THE MOTIVATION OF STUDENTS.
- o DEVELOPING MORE RELEVANT CURRICULUM.
- o ELIMINATING INDEPENDENT SCHOOL BOARDS.

ALTHOUGH TIME AVAILABLE TODAY WILL ONLY ALLOW A BRIEF ELABORATION ON EACH ACTION, MANY ARE BEING ADVOCATED BY



OTHERS AND THEIR REPORTS PROVIDE ADDITIONAL SUPPORT FOR THE BLUEPRINT I HAVE OUTLINED.

CBE AS PRIMARY MODE: FUNDAMENTAL TO THE PLAN IS UTILIZATION OF CBE AS THE PRIMARY MODE OF INSTRUCTION, UNDER PURVIEW OF TEACHERS CERTIFIED AS MEETING SPECIFIC PROFESSIONAL STANDARDS IN USE OF ADVANCED EDUCATIONAL TECHNOLOGIES, IN ADDITION TO SUBJECT MATTER EXPERTISE.

THE ESSENCE OF COMPUTER-BASED EDUCATION IS, OF COURSE, DIRECT INVOLVEMENT OF THE STUDENT AT THE CENTER OF THE LEARNING PROCESS AND THE ASSUMPTION OF RESPONSIBILITY FOR HIS OR HER OWN LEARNING PROGRESS. OUR TRADITIONAL INSTRUCTOR-CENTERED CLASSROOM PERMITS TOO MANY STUDENTS TO SETTLE FOR A PASSIVE ROLE -- IN A SENSE, WAITING FOR LEARNING TO "HAPPEN TO THEM" RATHER THAN ACTIVELY SEEKING IT.

CBE DOES NOT IMPLY A DIMINISHED ROLE FOR THE TEACHER; QUITE THE CONTRARY. RATHER, WHILE RELIEVING THE TEACHER OF THE LECTURE AND RECORDKEEPING FUNCTIONS, THE INSTRUCTOR HAS MORE TIME TO DEVOTE TO MEETING THE NEEDS OF THE INDIVIDUAL STUDENT.

NEITHER COST NOR PERFORMANCE ARE REAL OR PERCEIVED BARRIERS TO USE OF CBE IN A PRIMARY INSTRUCTIONAL MODE. THERE HAVE BEEN DRAMATIC DECREASES IN THE COST OF HARDWARE, SOFTWARE AND COURSEWARE WHILE AT THE SAME TIME THERE HAVE BEEN SIGNIFICANT INCREASES IN PERFORMANCE AND QUALITY.

TEACHER PAY: PAY LEVELS OF CERTIFIED TEACHERS OVER TIME MUST BE DOUBLED. IT IS RELEVANT TO NOTE THAT WHEN I GRADUATED FROM ENGINEERING SCHOOL IN 1932, SALARIES OF TEACHERS AND ENGINEERS WERE ABOUT EQUAL. TODAY, ENGINEERS' SALARIES ARE AT LEAST TWICE THAT OF TEACHERS. NO WONDER OUR EDUCATION SYSTEM HAS DETERIORATED.

IN CONTRAST IS THE PAY SCALE FOR TEACHERS AND ENGINEERS IN JAPAN. THOSE EMPLOYED IN ENGINEERING AND ARCHITECTURAL SERVICES EARNED AN AVERAGE OF \$14,000 IN 1985, WHEREAS, THE UPPER SECONDARY SCHOOL TEACHER AVERAGED \$17,000.

THE HIGHER PAY LEVEL FOR U.S. TEACHERS WILL BE AFFORDABLE DUE TO INCREASED PRODUCTIVITY OF THE CERTIFIED TEACHER, USE OF PARAPROFESSIONALS TO ASSIST TEACHERS AND REDUCTIONS IN THE NUMBER OF ADMINISTRATIVE PERSONNEL.

TEACHER CERTIFICATION: THIS HAS BEEN TALKED ABOUT FOR YEARS, AND THERE IS GROWING CONSENSUS IN SUPPORT OF IT. TEACHER COMPETENCY TESTING IS GREATLY FACILITATED THROUGH THE USE OF COMPUTER-ASSISTED TESTING.

STUDENT TESTING: EQUALLY NECESSARY IS NATIONWIDE TESTING OF LEARNING OUTCOMES. TESTING IS ALREADY IN PLACE IN SEVERAL STATES, AND THE NATIONAL GOVERNORS' ASSOCIATION TASK FORCE ON EDUCATION FOR ECONOMIC GROWTH HAS RECOMMENDED ESTABLISHING PROGRAMS TO MONITOR STUDENT PROGRESS THROUGH PERIODIC TESTING OF GENERAL ACHIEVEMENT AND SPECIFIC SKILLS.

SCHOOL MANAGEMENT: RELATIVE TO THE MANAGEMENT OF SCHOOLS, IT IS IMPORTANT TO NOTE THAT SCHOOLS ARE OFTEN HANDICAPPED BY LACK OF STAFF AS SKILLED IN MODERN MANAGEMENT PRACTICES AS ARE THEIR COUNTERPARTS IN BUSINESS.

CLOSING THE GAP IN MANAGEMENT EXPERIENCE CAN BEST BE ACCOMPLISHED BY PLACING SCHOOL MANAGEMENT UNDER CONTRACT TO BUSINESS. FEE SCHEDULES FOR THESE SERVICES WOULD BE KEYED TO LEARNING OUTCOMES, I.E., LARGER FEES WOULD BE EARNED BY HIGHER STUDENT PROFICIENCY TEST RESULTS.

CHOICE: A CALL FOR STUDENT CHOICE HAS BEEN MADE BY THE NATIONAL GOVERNORS' ASSOCIATION, A CARNEGIE TASK FORCE COMMITTEE FOR ECONOMIC DEVELOPMENT, AND OTHER BIPARTISAN GROUPS. A GROWING NUMBER OF SCHOOL DISTRICTS HAVE ALREADY MADE IT POSSIBLE FOR STUDENTS TO SELECT SCHOOLS FROM AMONG SEVERAL OPTIONS. STUDENT CHOICE WILL BRING SOME COMPETITION INTO THE EDUCATIONAL SYSTEM AND WILL IMPROVE AND DIVERSIFY THE OFFERINGS.

VOUCHERS: TO FULLY IMPLEMENT CHOICE, VOUCHERS ARE REQUIRED, ESPECIALLY IF CHILDREN FROM POOR FAMILIES ARE TO BE SERVED ADEQUATELY.

STUDENT MOTIVATION: A CBE SYSTEM USED AS THE PRIMARY EDUCATIONAL TOOL WILL MEET THE NEEDS OF EACH STUDENT IN A PRIVATE AND ENCOURAGING WAY, AND WILL CERTAINLY BE A SOURCE OF MOTIVATION. SUCCESS IN LEARNING WILL GENERATE A THIRST FOR MORE LEARNING.

RELEVANT CURRICULUM: CLEARLY, A MORE RELEVANT CURRICULUM IS REQUIRED WHICH HAS THE CENTRAL FOCUS ON MATHEMATICS, SCIENCE AND LANGUAGES. IN ADDITION, AS NOTED EARLIER, THE ROLE OF TECHNOLOGY AND THE PROCESS OF INNOVATION MUST BE TAUGHT IN PRIMARY AND SECONDARY SCHOOLS, WHICH WILL CREATE A MUCH HIGHER INTEREST IN THOSE SUBJECTS.

INDEPENDENT SCHOOL BOARDS: FINALLY, WE MUST ELIMINATE THE ANACHRONISTIC INDEPENDENT SCHOOL BOARD. DURING RECENT YEARS, SUCH BOARDS HAVE TAKEN VERY FEW INITIATIVES FOR NEEDED CHANGE. FREQUENTLY, TURNOVER AMONG BOARD MEMBERS IS HIGH BECAUSE THEY TIRE OF HASSLING WITH UNIONS OVER TEACHER PAY WITHOUT HAVING THE MEANS TO REACH A GOOD SOLUTION.

EVEN WORSE, THEY ARE USUALLY ISOLATED FROM ECONOMIC DEVELOPMENT DECISIONS AND LOCAL CITY AND COUNTY GOVERNMENTS. IT IS ANALAGOUS TO HAVING A KEY DIVISION OF A COMPANY SEPARATE AND AUTONOMOUS FROM THE REST OF THE ORGANIZATION. CLEARLY, THERE NEEDS TO BE A RESTRUCTURING WHEREBY INDEPENDENT K-12 SCHOOL BOARDS ARE BROUGHT INTO CITY OR COUNTY GOVERNMENT.

STATE & LOCAL GOVERNMENT: IN STATE AND LOCAL GOVERNMENT, THERE ARE MANY OPPORTUNITIES SIMILAR TO THOSE IN CORPORATIONS FOR ELIMINATING TIERS OF MANAGEMENT, CONSOLIDATING DEPARTMENTS, REDUCING THE TOTAL NUMBER OF EMPLOYEES AND ADOPTING NEW METHODS, ALL AIMED AT IMPROVING EFFICIENCY

FOR EXAMPLE, THERE ARE SEPARATE DEPARTMENTS FOR AGRICULTURE AND ECONOMIC DEVELOPMENT. SEPARATION IMPLIES THAT AGRICULTURE ISN'T A BUSINESS, BUT SOMETHING SPECIAL. THIS HAS HELPED TO CAUSE MISDIRECTION OF GOVERNMENT POLICIES THAT UNDERMINE THE FAMILY FARM. WHAT IS NEEDED IS A CONSOLIDATION OF THE DEPARTMENTS OF AGRICULTURE AND ECONOMIC DEVELOPMENT INTO A DEPARTMENT OF URBAN AND RURAL ENTERPRISE. NOT ONLY WOULD MORE EFFICIENT ADMINISTRATION BE ACHIEVED, BUT FRESH THINKING WOULD BE STIMULATED.

A SECOND AREA NEEDING CHANGE IS THE TORTUOUS DECISION-MAKING PROCESS IN STATE GOVERNMENT, WHICH IS FRAGMENTED, CHAOTIC AND DOMINATED BY VESTED INTERESTS. WITH DEDICATED AND OBJECTIVE CONSIDERATION, WAYS COULD BE FOUND FOR IMPROVING IT.

IN THE AREAS OF WELFARE AND LAW ENFORCEMENT, THERE ARE MANY OPPORTUNITIES FOR PRIVATIZATION OF SERVICES WHICH WOULD RESULT IN IMPROVED PERFORMANCE AT LOWER COST. IN RECENT YEARS, THERE'S BEEN SOME PROGRESS WITH PRIVATIZATION, BUT IT IS SLOW COMPARED TO POTENTIAL, NOT ONLY IN LOWERING COST, BUT IN PROVIDING A BETTER LIVING ENVIRONMENT FOR TENS OF MILLIONS OF PEOPLE.

MOST COMPELLING, IN MY VIEW, IS THE IMPROVEMENT WHICH PRIVATIZATION AND COMPETITION COULD BRING IN THE AREA OF JUVENILE DELINQUENCY-- THE ROOT OF THE ONGOING ADULT CRIME PROBLEM. CONSIDERING THE RECORD OF EXORBITANT COST AND HIGH RATE OF RECIDIVISM OF THE PRESENT SYSTEM AND SOME FAVORABLE EXPERIENCE WITH PRIVATIZATION, IT IS CLEAR THAT SUBSTANTIAL IMPROVEMENT CAN BE MADE WITH THAT APPROACH.

FOR EXAMPLE, THERE IS THE RECORD OF VISIONQUEST, WHICH IS A PRIVATE FOR-PROFIT COMPANY. ITS BUSINESS IS TO REHABILITATE HARD-CORE JUVENILE DELINQUENTS BY PROVIDING CONSTRUCTIVE MENTAL AND PHYSICAL CHALLENGES IN A CAMP, USUALLY IN A WILDERNESS SETTING. EACH PARTICIPANT LITERALLY GOES ON A "VISION QUEST" TO FIND A PURPOSE IN LIFE.

THE COMPANY WAS FOUNDED IN 1973 BY THREE SOCIAL WORKERS WHO HAD BECOME FRUSTRATED WITH THE TREATMENT OF JUVENILES BY THE JUSTICE SYSTEM. CURRENTLY, THE COMPANY HAS ANNUAL REVENUES OF OVER \$20 MILLION. THE MAJOR SOURCE OF REVENUE IS CONTRACTS WITH STATE COURTS.

ABOUT 600 YOUTHS ARE SERVED EACH YEAR. THE AVERAGE TIME IN THE PROGRAM IS ONE YEAR, AND COSTS ARE ABOUT HALF THAT FOR TRADITIONAL SECURITY INSTITUTIONALIZATION. MOST IMPORTANT, THE RECIDIVISM RATE AVERAGES OVER 50% LOWER THAN TRADITIONAL PROGRAMS.

SUCCESS WITH OTHER PRIVATIZATION PROGRAMS COULD BE CITED; HOWEVER, IN THE AGGREGATE, IT IS NOT LARGE ENOUGH TO PROVE THE CASE. WHAT IS REQUIRED IS A LARGE EXPANSION, OVER A LONG ENOUGH PERIOD, TO MAKE POSSIBLE THE MEASUREMENT AND COMPARISON OF RESULTS OBTAINED BY FOR-PROFIT COMPANIES VERSUS THOSE OBTAINED BY THE GOVERNMENT. IN ADDITION, TO HAVE ESTABLISHED COMPETITION AMONG COMPANIES TO FURTHER STIMULATE CREATIVITY AND EFFICIENCY. I CAN'T THINK OF A LOWER RISK, HIGHER POTENTIAL PAY-OFF PROGRAM.

NON-PROFIT SECTOR: THERE'S ALSO THE OPPORTUNITY TO GAIN A HIGH RETURN THROUGH RESTRUCTURING AND NEW APPROACHES IN OUR COMMUNITIES, WHERE THERE HAS BEEN A PROLIFERATION OF PRIVATE NON-PROFIT ORGANIZATIONS. MANY HAVE OVERLAPPING FUNCTIONS AND ARE OPERATING IN ISOLATION FROM EACH OTHER. THIS IS ESPECIALLY SERIOUS IN THE ECONOMIC DEVELOPMENT AREA AND IMPEDES PROGRESS IN ESTABLISHING EFFECTIVE SMALL BUSINESS INNOVATION NETWORKS FOR CREATING NEW JOBS. THERE ARE COUNTY ECONOMIC-DEVELOPMENT CORPORATIONS, CITY ECONOMIC-DEVELOPMENT CORPORATIONS, CHAMBERS OF COMMERCE, COUNTY EXTENSION OFFICES, SMALL-BUSINESS-DEVELOPMENT CENTERS, AND SO ON. EACH ORGANIZATION IS DOING SOME GOOD BUT FALLING FAR SHORT OF WHAT IS REQUIRED TO EFFECTIVELY CREATE JOBS BECAUSE OF A LACK OF RESOURCES. THROUGH CONSOLIDATION, EFFICIENCY WOULD BE INCREASED AND GREATER RESOURCES WOULD BE AVAILABLE.

ACHIEVING THIS OBJECTIVE WILL NOT BE EASY, IN PART, BECAUSE OF THE LACK OF UNDERSTANDING, NOTED EARLIER, OF THE ROLE OF TECHNOLOGY IN SOCIETY AND HOW DIFFICULT IT IS TO CREATE NEW JOBS. AGAIN, THERE IS THE NECESSITY FOR EDUCATION AND TRAINING ABOUT INNOVATION TO GAIN UNDERSTANDING, WHICH WILL MOTIVATE ACTION FOR CONSOLIDATION AND COOPERATION AMONG COMMUNITY ORGANIZATIONS ENGAGED IN ANY ASPECT OF ECONOMIC DEVELOPMENT.

#### EFFECTING CHANGE

HAVING REVIEWED THE NEED FOR EXTENSIVE CHANGE IN A NUMBER OF INDIVIDUAL SECTORS, IT IS TIME TO LOOK AT HOW IT CAN BE BROUGHT ABOUT IN EDUCATION, STATE AND LOCAL GOVERNMENT AND NON-PROFIT

ORGANIZATIONS THAT DO NOT HAVE THE RELENTLESS PRESSURE ON THE BOTTOM LINE BY GLOBAL COMPETITION. EVERYTHING CONSIDERED, I BELIEVE THAT THE BEST WAY IS FOR THE GOVERNOR OF EACH STATE TO CONVENE ONE OR MORE COMMISSIONS AS A MAJOR VEHICLE TO INDUCE CHANGE. MEMBERS WOULD BE DRAWN FROM ALL SECTORS. THE CHARGE TO THE COMMISSIONS WOULD BE TO REVIEW CAREFULLY WHAT SHOULD BE DONE STATEWIDE IN ASSIGNED AREAS AND THEN RECOMMEND RESTRUCTURING, REALLOCATING AND ADOPTING NEW APPROACHES ON A SCALE COMMENSURATE WITH THE SWEEPING ACTIONS BY CORPORATIONS, REFERRED TO EARLIER.

WITH THE REALITIES OF GLOBAL COMPETITION IN MIND, COMMISSION MEMBERS SURELY WOULD NOT SHY AWAY FROM COMING TO GRIPS WITH THE DIFFICULT DECISION-MAKING PROCESS NECESSARY TO FORGE A CONSENSUS FOR RECOMMENDATIONS KNOWING THAT IMPLEMENTATION OF THEM WOULD BE DIFFICULT AND UNPLEASANT. THE RESULTS OF THE COMMISSION'S WORK WOULD PROVIDE LEGISLATORS AND STATE AND LOCAL GOVERNMENT OFFICIALS WITH A POWERFUL TOOL FOR GAINING CONSENSUS TO SUPPORT IMPLEMENTATION.

PROMPT ACTION IS CALLED FOR TO MOVE AHEAD ON A STATEWIDE PROGRAM TO STREAMLINE, REALLOCATE AND ADOPT NEW APPROACHES IN ALL SECTORS TO IMPROVE PERFORMANCE. BUSINESS IS REACTING AGGRESSIVELY; FOR OTHER SECTORS, IT IS PRINCIPALLY MAINTENANCE OF THE STATUS QUO, WHILE THE U.S. COMPETITIVE POSITION CONTINUES TO ERODE. DELAY IN RESPONDING WILL ALLOW FURTHER DECLINE IN OUR ECONOMIC STRENGTH, WHICH WILL MAKE IT EVEN HARDER IN THE FUTURE TO TAKE THE ACTIONS NECESSARY TO BETTER COMPETE.

#### CONCLUSION

FINALLY, IN CONCLUDING, I WANT TO RETURN TO COMMUNITY-BASED COOPERATION AND EDUCATION EVEN THOUGH THOSE SUBJECTS WERE REVIEWED IN GREATER DEPTH THAN OTHERS. OF COURSE, THIS WAS DONE, NOT BECAUSE OTHER SECTORS AND ACTIONS AREN'T AS IMPORTANT, BUT BECAUSE ALL OF US ARE INVOLVED, OR SHOULD BE, IN MANY WAYS WITH THE COMMUNITY IN WHICH WE LIVE AND IN EDUCATION.

AS I NOTED EARLIER, AN INNOVATION NETWORK IN A COMMUNITY CAN HELP IN A MAJOR WAY TO IMPLANT A CULTURE OF TECHNOLOGY AT THE GRASSROOTS IN OUR COUNTRY. UNFORTUNATELY, THAT CULTURE IS NOT THERE TODAY, AND THAT'S A GRAVE WEAKNESS IN OUR SOCIETY. IT HOBBLER OUR ABILITY TO IDENTIFY AND TAKE THE ACTIONS NECESSARY TO IMPROVE COMPETITIVENESS, ESPECIALLY IN EDUCATION. WITHOUT RESTRUCTURING, REALLOCATING AND ADOPTING NEW APPROACHES, ACADEMIC EDUCATION WILL CONTINUE TO BE THE ACHILLES HEEL WHICH WILL THWART A U.S. DRIVE TO MEET THE FOREIGN COMPETITIVE CHALLENGE.

THERE IS AN ENORMOUS LEADERSHIP RESOURCE REPRESENTED BY THE GROUP IN THIS ROOM. I URGE EACH OF YOU TO DO AT LEAST THREE

THINGS ON AN ONGOING BASIS. ONE IS TO DEDICATE SOME OF THAT PRECIOUS RESOURCE TO GETTING AN INNOVATION NETWORK ESTABLISHED IN YOUR COMMUNITY OR ASSISTING AN EXISTING ONE. IF YOU DON'T KNOW HOW TO DO THIS, LET ME KNOW, AND I'LL GIVE YOU A HAND.

SECOND, I URGE YOU TO DO WHAT YOU REASONABLY CAN TO INFLUENCE ACTIONS NECESSARY TO IMPROVE ACADEMIC EDUCATION. THIRD, TO BE SURE TO MOVE AS RAPIDLY AS POSSIBLE IN RESTRUCTURING, REALLOCATING AND ADOPTING THE NEW APPROACHES FOR IMPROVEMENT IN YOUR SECTOR. INDEED, I'M SUGGESTING A FULL PLATE OF ACTIVITY, BUT I'VE ALWAYS FOUND THAT THE BUSIEST LEADERS ARE THE BEST LEADERS.

WITH THAT THOUGHT, I'LL END THIS TALK AND, AT THE SAME TIME, WISH YOU WELL IN THE YEARS AHEAD WITH YOUR EFFORTS TO HELP AMERICA MEET THE CHALLENGE OF GLOBAL COMPETITION.