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Report of the Governor's Ad Hoc Committee on HIGH TECHNOLOGY

Maryland

THE GOVERNOR'S AD HOC COMMITTEE ON HIGH TECHNOLOGY

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REPORT OF THE

GOVERNOR'S AD HOC COMMITTEE

ON HIGH TECHNOLOGY

SUBMITTED TO:

THE HONORABLE HARRY HUGHES,
GOVERNOR OF MARYLAND

OCTOBER 1982

THE GOVERNOR'S AD HOC COMMITTEE
ON HIGH TECHNOLOGY

1748 Forest Drive, Annapolis, MD 21401

JOHN F. DEALY, CHAIRMAN

HARRY HUGHES, GOVERNOR

The Honorable Harry Hughes
Governor of Maryland
State House
Annapolis, Maryland 21401

Dear Governor Hughes:

On behalf of the Governor's Ad Hoc Committee on High Technology, I am pleased to submit this Report in fulfillment of your request on November 23, 1981. Contained herein are the Committee's findings and recommendations on a course of action to insure the continued viability and growth of high technology industry in Maryland.

With this Report, the Committee has completed its assigned task. Representatives of the business and academic communities, however, remain vitally interested in such cooperative efforts with the State Government. I believe the Committee has established a workable precedent for future joint endeavors to promote understanding among the public, academic and private sectors.

Sincerely,

John F. Dealy

John F. Dealy, Chairman
The Governor's Ad Hoc Committee
on High Technology

JFD/db

EXECUTIVE SUMMARY

On November 23, 1981, Governor Harry Hughes established the Ad Hoc Committee on High Technology to:

1. assess the present and future impact of this business sector on Maryland's economy, and

2. propose how the State can act more effectively to establish and sustain a major position in high technology industry.

This report summarizes the Committee's analysis and its recommendations for the participation of government, business and the academic community as partners in achieving the Governor's objectives.

The overriding conclusion of the Governor's Ad Hoc Committee on High Technology is that timely, consistent investment to stimulate high technology industry within the State represents a realistic opportunity for more jobs, a broader tax base, and the maintenance of a desirable quality of life for Maryland's citizens. The recent performance of high technology industry and its future growth potential support this conclusion. Growth as a result of technology advancement is a phenomenon found throughout history; contemporary breakthroughs, e.g., electronics, computer technology, bio-engineering, prove to be no exception. According to a recent study by the Joint Economic Committee of the U.S. Congress, high technology industry accounts for 75% of the net growth in U.S. manufacturing employment during the past 20 years.

BACKGROUND: HIGH TECHNOLOGY IN THE U.S. AND MARYLAND

The term "high technology" defies precise definition or limitation. High technology industries are generally characterized by significant engineering/knowledge content and by an ever-present flow of innovation from the physical and life sciences. Electronics, computers, telecommunications, aerospace, and certain medical products are widely perceived as areas with a high technology emphasis. Moreover, high technology products often stimulate innovation in their users, e.g., computer-aided design and manufacturing. Innovation occurs as scientists and engineers refine ideas through basic and applied research, coupled with extensive engineering development.

Recent statistics indicate several characteristics of high technology business in the United States and Maryland including:

... 34,000 establishments and more than 3,000,000 employees in the U.S.
... average annual employment growth as high as 9% in some high technology industries
... over 1,000 establishments employing nearly 80,000 workers in Maryland
... the largest industrial sector in the State's economy with over 40,000 manufacturing employees.

Maryland's high technology companies are found in pharmaceuticals, medical products, electronics, communications, aerospace and instrumentation. The State has particularly high concentrations of employment in:

... the manufacture of communications equipment
... the provision of communications services
... computer services
... research and development.

The precise reasons behind Maryland's current position in high technology are difficult to determine. The State does have a number of resources to build upon including:

... proximity to government and industrial markets
... a generally well-educated labor force
... a quality of life which appeals to corporate decisionmakers
... reasonable business tax rates, etc.

Furthermore, in recent years, State and County governments have accelerated their economic development efforts to attract and retain business in the State.

The growth potential of high technology industry is widely recognized throughout the United States and overseas. Consequently, the competition among states to capture their share has increased dramatically. Since over 80% of the nation's high technology employment is found in 24 states, a built-in cadre of rivals (with some locational advantages) already exists. To remain competitive in this environment, Maryland must secure and build on its advantages while remedying those conditions which place limits on high technology business growth in this State.

WHY MARYLAND SHOULD FOSTER HIGH TECHNOLOGY BUSINESS GROWTH

... Those sectors of Maryland's economy which have fueled economic growth in the past are facing reduced prospects or natural limits in their own continued growth. A high technology thrust would help to rejuvenate Maryland's industrial base.

... High technology industries offer greater employment opportunities over the long term.

... High technology companies represent a good potential for strengthening the State's financial base while maintaining a reasonable tax burden on the individual citizen.

... High technology industries are generally environmentally clean and are very compatible with the State's physical development objectives.

... Maryland already has a national position in some high technology areas and the State has a set of assets conducive to growth in those industries. The State can thus aspire to a leadership position among high technology states with timely, reasonable investments.

CONDITIONS IN MARYLAND AFFECTING HIGH TECHNOLOGY INDUSTRY GROWTH

If Maryland is to pursue successfully a leadership position among high technology states, several conditions, identified by the Committee as barriers to the State's current ability to attract and retain high technology business, should be rectified:

1. Among corporate decisionmakers, Maryland has not been widely perceived as a high technology state. To counter this trend, the State has implemented an aggressive economic development program. The State must continue to undertake actions of substance involving high technology industries and to communicate these actions to decisionmakers throughout Maryland and the U.S.

2. High technology industries require a primary/secondary level educational system producing technically literate personnel and university systems with national reputations for engineering and business school excellence. Maryland's public and private institutions are not yet recognized as national leaders in these areas.

3. Maryland does not have an outstanding reputation for entrepreneurial activity. The birth of high technology companies is usually associated with university environments or a critical mass of existing technology companies. These institutions are supported by aggressive investment capital and commercial banking entities. Educational and financial institutions in Maryland generally have not established a tradition of such entrepreneurial development.

4. The tax structure and cost of living in the State do not offer unusual incentives for attracting high technology businesses. Maryland's competitive position is neutral in terms of these costs. In comparison to many of the Sun Belt areas of the country, Maryland is, in fact, at a disadvantage.

The Committee judges that the barriers to high technology industry growth in Maryland are not insurmountable. Maryland's current position, including its existing high technology base and its people/life style assets, provides a realistic foundation for the pursuit of leadership in fostering high technology business. The missing ingredients toward this end are widespread support and commitment from public and private decisionmakers.

The Committee's recommendations set forth below are premised on the fact that the process of technological innovation involves both the public and private sectors. The public sector supports the training of technological labor and the State university system (the primary source of basic research). The private sector funds applied research and the commercialization of technology. With the long-term tax base and quality of life benefits to be derived from a viable high technology sector, the State government should take a leadership position in high technology investment and in forging the requisite public/private partnerships.

AGENDA FOR ACTION

With the active commitment of the Governor and the State legislature, judicious use of State resources can stimulate and leverage similar commitments from Maryland's private sector. The Committee recommends public and private investments in human resource development, capital for technology projects, and programs to promulgate Maryland's emphasis on high technology. An appropriate agenda to encourage the growth of high technology industry should include the following specific actions:

1. FORMATION OF A MARYLAND HIGH TECHNOLOGY ROUNDTABLE

This group would be comprised of decisionmakers from Maryland's high technology businesses, financial institutions, public and private universities, professional organizations, and State government. This group would meet periodically to address itself to issues of significance in Maryland's high technology environment; it would also be an adviser and consultant to the Governor and State legislature on such matters. The Roundtable would serve as a catalyst to develop accurate data on the cost/benefit of high technology investments and to mobilize a Statewide coalition in support of Maryland's leadership role in high technology.

2. INCREASED SUPPORT OF TECHNICAL HIGHER EDUCATION

To meet the human resource needs of high technology industry, the State must develop a preeminent engineering and business reputation at the university level. The State must encourage university-industry partnerships, and the State should invest in an engineering research center such as that proposed by the University of Maryland Engineering Advisory Council.

3. REFOCUS TECHNICAL EDUCATION AND VOCATIONAL-TECHNICAL TRAINING IN MARYLAND'S PUBLIC SCHOOLS

Human resource development at primary, secondary and post-secondary levels should parallel employment trends emerging from the growth of high technology industry. The Committee recommends a Statewide reexamination of educational policy and curricula for technical education at the primary and secondary levels--the objective being a technically literate populace capable of functioning in tomorrow's technical environment. The development of vocational-technical curricula reflecting realistic employment opportunities should be emphasized throughout the State. In addition, special programs should be started which address the industrial retraining needs of existing workers.

4. ENHANCE MARYLAND'S FINANCIAL CLIMATE FOR HIGH TECHNOLOGY BUSINESS

To encourage the process of technological innovation and to spur the expansion of high technology industry, Maryland should begin to build an awareness of technology opportunities among public and private financial institutions. In recognition that building an effective financial climate is beyond the resources of any individual institution or sector of the economy, the Committee recommends two types of

partnerships. A Maryland Investment Fund might be established to provide a public-funded pool of venture capital to help realize unmet opportunities for the development of new high technology products and new high technology enterprises. A second type of partnership--in the form of ad-hoc investment teams--should be created to help package public and private financial resources for significant technology projects.

5. ENCOURAGE THE EXPANSION OF EXISTING HIGH TECHNOLOGY BUSINESS

A large percentage of the industrial growth Maryland can reasonably expect will come from its existing base of high technology companies. The State's tax climate is critical in this regard and the Committee recommends incentives to encourage capital investment (for the most part already in place) and tax incentives for the creation of new jobs. A jobs credit tax incentive would not only accelerate the process of matching labor from declining industries to the requirements of growth firms, but would support the retraining efforts recommended above.

6. DEVELOP AN ONGOING MOMENTUM FOR ACTIONS WHICH PROMOTE THE GROWTH OF HIGH TECHNOLOGY INDUSTRY

For Maryland to achieve a leadership position in high technology business, the public-private partnership, once formed, must be sustained and be flexible in adapting to changed circumstances and competitive challenges from other states. This requires an ongoing education/marketing program emphasizing Maryland's commitment to this sector. It also requires a State legislature sensitive to the benefits to be derived and willing to commit necessary resources. Consideration should be given to a standing committee in the State legislature with jurisdiction over the industrial growth sectors.

In the Committee's judgment, the preceding six steps will materially enhance Maryland's high technology future. **THE TIME AND NEED FOR APPROPRIATE INVESTMENT IS NOW; THE POTENTIAL RETURN IS EXCEPTIONAL.** A more detailed discussion of the current situation, the major issues and the Committee recommendations is presented in the balance of this report.

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INTRODUCTION

Over the past few decades, the State of Maryland has experienced significant shifts in its industrial base and economic conditions. Since World War II, manufacturing employment in the State reached a high of 283,000 in 1967 and currently totals 215,000. Maryland has moved from a reliance on agriculture and heavy manufacturing to a greater emphasis on government employment, services, retail/wholesale distribution and technology-based industries. Looking forward, additional dislocations can be anticipated including declining job opportunities in the government sector.

In recent years, the greatest increase in manufacturing jobs (both nationally and in Maryland) has come from the business sectors generally referred to as "high technology." Recognizing this trend and concerned about Maryland's economic capability to support the needs of its citizenry while maintaining a reasonable tax base, Governor Harry Hughes, in November 1981, established the Ad Hoc Committee on High Technology. The Committee includes representatives from the public and private sectors as well as significant representation from the public and private academic community.

During the past eight months, the Committee (via subcommittees) examined the issue of high technology business in the State of Maryland from five vantage points:

1. the impact of high technology business on the economy and the people of the State of Maryland;

2. business preceptions of problems within Maryland;

3. state and local government initiatives to foster high technology business;

4. creation of a working partnership between industry and education for technology business growth; and

5. the financial climate for technical business in Maryland.

This report summarizes the recommendations from these subcommittees.

In a project of this scope, the Committee sought assistance from many organizations and people. The Committee is grateful for their help and acknowledges the particularly generous contributions of Joseph T. Boyle, Partner, Peat, Marwick, Mitchell & Co.; Edward L. Cahill, Associate, Alex. Brown and Sons; William Kaht, Vice President, Human Resources and Administration, M/A-COM DCC, Inc.; Lawrence C. Kravitz, Director of Research, and John J. Martin, Vice President and General Manager, Bendix Advanced Technology Center; Mary Ellen O'Donnell, Market Research Analyst, First National Bank of Maryland; Mary L. Penrose, Comsat Laboratories. The Committee also acknowledges the dedicated, highly professional efforts of James Peiffer, Maryland Department of Economic and Community Development, in coordinating subcommittee meetings, drafting preliminary reports, gathering source data and verifying factual statements.

BACKGROUND: HIGH TECHNOLOGY IN THE U.S. AND MARYLAND

The Committee's task--to propose a course of action for appropriate development of high technology industry in Maryland--required a basic understanding of high technology industry in the U.S. and Maryland. The term "high technology" alludes to a relative level of applied science. Boundaries separating "high," "medium," or "low" technologies are not distinct, particularly in manufacturing where many levels of technology can be found in nearly every plant. High technology products often result from continuing innovation derived from the physical and life sciences. Relatively high levels of expenditures for research and development with large concentrations of scientists and engineers in the workforce further characterize high technology industry.

The Committee concentrated on those industries in high technology industrial sectors with current representation in Maryland. Use of the Standard Industrial Classification (SIC) system to define high technology industry allows published data to be gathered on industry characteristics and trends. The following industrial sectors are used, and the listing of Maryland firms under each SIC is designed only to illustrate representative businesses within that classification.*

SIC#	Description
283	Drugs (include biological products and pharmaceuticals), e.g., Johnston Laboratories, Inc.; MA Bioproducts; National Pharmaceutical Manufacturing Company.
357	Office Machines (includes computers), e.g., Columbia Data Products, Inc.; Electronic Modules Corporation.
366	Communications Equipment, e.g., AAI Corporation; Amecom Division, Litton Industries, Litton Systems, Inc.; The Bendix Corporation, Communications Division; M/A-COM Digital Communications Corporation; Fairchild Space and Electronics Co., Fairchild Industries, Inc.; Western Electric Co., Inc.; Westinghouse Electric Corporation, Defense and Electronic Systems Center.
367	Electronic Components (includes semiconductors), e.g., Denro Laboratories, Inc., First General Resources Co.; K & L Microwave, Inc.; Solarex Corporation; Watkins-Johnson Co., CEI Division.
372	Aircraft and Parts, e.g., Grumman Aerospace Corporation; Martin Marietta Aerospace, Baltimore Division, Martin Marietta Corporation.
38	Instruments, e.g., Airpax, North American Philips Controls Corp.; Gould, Inc., Chesapeake Instrument Division; Penril Corporation, Data Communications Division; Vitro Laboratories Division, Automation Industries, Inc.

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* In many cases, these firms manufacture products in more than one SIC.

SIC#	Description
489	Communications Services, e.g., American Satellite Co., Communications Satellite Corporation (COMSAT); MCI Communications Corporation.
737	Computer and Data Processing Services, e.g., Computer Sciences Corporation, System Sciences Division; General Electric Information Services Company (GEISCO); International Business Machines Corporation, Federal Systems Division.
7391	Research and Development Laboratories, e.g. ARINC Research Corporation; Genex Corporation; Litton Bionetics, Inc., Litton Industries, Inc.

High technology manufacturing in the U.S. (as identified by U.S. Department of Commerce statistics[1]) includes: approximately 34,000 establishments, 3 million employees; and industry shipments totaling $174 billion. Estimates of the performance in high technology industrial sectors indicate annual growth rates in employment ranging between 3% and 9%.[2] This trend, if continued during the 1980's, would result in the addition of 90,000 - 120,000 employees annually. To place the growth of high technology industry in perspective, the Joint Economic Committee of the U.S. Congress estimates that high technology industry accounted for 75% of the net growth in U.S. manufacturing employment between 1959 and 1979.[3]

High technology employment in the U.S. is distributed geographically along the East and West coasts, the Midwest, and a growing concentration in the Southwest. As defined by the Joint Economic Committee of Congress,* the largest high technology manufacturing states are: California, New York, Illinois, Massachusetts and Pennsylvania. In the same study, the fastest growing states (between 1975 and 1979) are: Nevada, Washington, New Hampshire, Maine, and Utah. While the Joint Economic Committee study presents general trends in high technology manufacturing, its definition of high technology is broad and the trends tend to be heavily impacted by the initial size of a state's overall labor base.

High technology activities in Maryland (including manufacturing and research) are found in an estimated 1,041 establishments. Communications and computer services account for nearly 70% of all such businesses. Total employment in high technology firms according to latest estimates is 79,811, and manufacturing employment of 41,259 (19.2% of total manufacturing in the State) makes the high technology sector the largest manufacturing industry in Maryland's economy. High technology manufacturing in the State is generally labor intensive. While the value added by manufacture of high technology products is over one billion dollars, this figure ranks behind the food products and primary metals industrial sectors. Like the U.S. trend, the State's employment in high technology has grown steadily in both the manufacturing and service sectors, and includes the addition of over 15,000 jobs between 1969 and 1979.[4]

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* Includes employment in: chemicals and allied products; non-electrical machinery; electric and electronic equipment; transportation equipment; and instruments (this definition is much broader than the Committee's definition).

The geographic distribution of high technology business in Maryland is concentrated in the Baltimore and Washington, D.C. metropolitan areas. For example, in Maryland's largest high technology manufacturing sector (SIC 3662 Radio and Television Transmitting Equipment), 43.4% of the business is found in the Washington, D.C. metropolitan area; 37.6% in the Baltimore metropolitan area; and 19% is found in the balance of the State.5

Maryland contributes approximately 1.5% of the total U.S. employment in high technology manufacturing. However, a consideration of individual high technology sectors reveals significant concentrations of employment in the following areas:6

- SIC 366, Communications Equipment (5.1%)
- SIC 489, Communications Services (4.4%)
- SIC 737, Computer Services (4.5%)
- SIC 7391, Research and Development Laboratories (4.9%)

The State's position in these sectors is partially explained by its proximity to major agencies of the U.S. Government. For example, the impact of federal expenditures for communications products is particularly evident in Maryland. Approximately 50% of the state's manufacturers and 65% of the larger establishments (over 50 employees) in SIC 3662 have strong ties to defense and NASA programs. Recent figures show Defense Department expenditures in Maryland at $3.8 billion (3.1% of the U.S. total) and NASA expenditures at $421 million (7.9% of the U.S. total). Military prime supply, military prime service, and military prime R & D contracts account for 46% of defense expenditures in the State. Research and development for space science and supporting space activities comprise 67% of NASA expenditures in Maryland.7

A discussion of factors which influence high technology business growth in Maryland is presented in the following section.

WHY THE STATE OF MARYLAND SHOULD ENCOURAGE THE GROWTH OF HIGH TECHNOLOGY INDUSTRY

As the growth potential of high technology industry becomes more widely recognized, the competition among states to capture its growth has increased. The characteristics of high technology industry make it doubly attractive to economic developers.

> As the American economy has declined over the past decade, the importance of high technology industries has increased. These firms are not only important because of their high growth records but because they develop and transmit new ideas, new capital, and new skills to other firms in the economy which, in turn, help contribute their own future growth.[8]

The State of Maryland's current position in high technology industry argues for an effort to make Maryland a leading "high technology state."

Since over 80% of the Nation's high technology employment is found in 24 states,[9] a built-in universe of competitors, with some locational advantages, already exists. Therefore, Maryland must secure and build on its own advantages or else the State will lose out to more aggressive economic development efforts. Representatives of high technology companies on the Committee indicate that they regularly receive calls from economic development officials in other states. The economic development mission led by the Governor of Arizona (March, 1982) is just a recent example of the rivalry for expansions by Maryland's technology companies.

While the characteristics of high technology industry and increasing competition provide a general justification, the Committee identified five specific reasons why investments in the State's high technology future are necessary and desirable:

1. Those sectors of Maryland's economy which have fueled economic growth in the past are facing reduced prospects or natural limits in their own continued growth. Generally, economic growth in the State's economy is a result of basic industry bringing income into the State--which is then circulated--creating more business and jobs (typically in trade, services and construction). Since World War II, manufacturing and federal government employment have been the State's leading basic industries.*

   Maryland's manufacturing sector, with large concentrations in primary metals and transportation, comprised 36% of the State's nonagricultural employment in 1946. By 1981, this percentage had dropped to 13.5%, and the number of manufacturing employees actually declined over this 35 year period.[10] Maryland, like much of America, lost jobs in heavy industries to other places at a different level of

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* Agriculture, fishing and tourism are also important basic industries.

industrial maturity and/or with cheaper labor. Meanwhile the government sector, driven by federal government employment has grown from 13% in 1946 to 25% in 1981 of the State's total nonagricultural employment.[11] However, recent federal budget cuts have flattened this growth curve and government employment may actually decline in Maryland. As a result of these trends in Maryland's basic industries, the State's ability to sustain an expanding economy will become increasingly difficult. A leadership position in high technology growth industries would materially improve this situation.

2. High technology industries offer greater employment opportunities. Three reasons for this conclusion are:

   a. The demand for high technology products is less vulnerable to the business cycles that affect other durable goods. Furthermore, demand for many high technology products comes from growing industrial and government markets (e.g. defense programs).

   b. High technology industries are based on knowledge and technical skills. These attributes require a variety of different personnel requirements. A research engineering position can stimulate as many as 20 supporting positions,* and since profitability is based on skilled labor, personnel development is a high priority in most high technology organizations.

   c. America's developing role in the world economy is trending toward leadership in service industries, information storage and transfer, automated manufacturing systems and bio-technology.

3. With losses in its manufacturing base, Maryland faces concomitant losses in tax revenue. For there to be an appropriate balance between the cost of government services and a reasonable tax burden on individuals, continued industrial growth must be encouraged. High technology industry offers a realistic opportunity for the State of Maryland to remain fiscally sound at a reasonable cost to the citizenry.

4. High technology industries are very compatible with Maryland's physical development objectives. High technology industry is generally environmentally clean.

   > To be sure, acids, plating solutions, and other potentially hazardous chemicals are used in the manufacture of certain components and materials. Nevertheless, the industries in this sector have behaved responsibly in confining their toxic by-products to closed-loop systems or waste treatment facilities.[12]

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* Based on the experience of Committee members.

Much of high technology manufacturing is characterized by assembly and testing of components. These industries seldom require large amounts of natural resources, e.g., electricity or water. The ability to maintain a balance between providing room for industry and protecting the State's natural resources and environment is facilitated by the relatively low intensity of land use by high technology industries.

5. Maryland already has a national position in some high technology industries, and the State has a set of assets -- people, climate, customers -- which is conducive to significant growth in these industries. A survey of 691 high technology firms across the country identified factors that influence the regional location of high technology companies.[13] These factors shown with Maryland's assets demonstrate the State's compatibility with the requirements of high technology industry.

FACTORS AFFECTING THE LOCATION OF HIGH TECHNOLOGY COMPANIES

Rank	Attribute	Maryland's Status
1.	Labor skills/availability	Highest concentration of scientists and engineers in any U.S. metropolitan area.
2.	Labor costs	Generally at the industry norm for technical occupations in metropolitan areas.
3.	Tax climate	Competitive with Mid-Atlantic States, but at a disadvantage with important areas of Southeast and Southwest.
4.	Academic institutions	Universities graduate approximately 1,000 engineers per year. The engineering reputation of Maryland universities is competitive but not preeminent.
5.	Cost of living	The Baltimore region is below the national average. The Washington suburbs of Maryland are higher than the national average.
6.	Transportation	Three major airports, interstate highway system, foreign trade zones.

Rank	Attribute	Maryland's Status
7.	Access to markets	Immediate access to government agencies and overnight truck access to one-third of the U.S. industrial and consumer markets.
8.	Regional regulatory practices	The State is supportive of growth and development.
9.	Energy costs/availability	Good supply; cost is generally competitive.
10.	Cultural amenities	The State presents outstanding attractions.
11.	Climate	Moderate.
12.	Access to raw materials	The State offers good access to components and related finished products.

6. Maryland can assemble the "pieces" to become a leading high technology State with reasonable and timely investments.

While the "pieces" are here in some degree, the Committee identified several conditions which impede, at the present time, the process of technological innovation and the growth of high technology industry.

CONDITIONS IN MARYLAND AFFECTING HIGH TECHNOLOGY INDUSTRY GROWTH

If Maryland is to pursue successfully a leadership position among high technology states, Maryland must address the following conditions which hamper the State's ability to attract and retain high technology business. Specifically, how well does the State encourage high technology industry through its: business climate, educational system, and financial and tax climates.

BUSINESS CLIMATE

A consideration of Maryland's business climate for high technology industry rests as much on perception as it does on fact. Among corporate decisionmakers, Maryland has not been widely perceived historically as a high technology state. To counter this trend, the State has implemented an aggressive economic development program. The use of advertising campaigns, the active participation of the Governor on economic development missions (e.g. Silicon Valley) and with prospects, and targeted presentations to high technology and other companies exemplify this emphasis. The program's message is simple: Maryland is pro-business, it wants and will work to encourage an industry's growth.

The ability to demonstrate a consistent sensitivity to the needs of high technology industry is obviously a long-term process. Particularly with existing industry, Maryland must continue to offer evidence of a solid commitment to the high technology sector. Maryland's competitors have initiated statewide research foundations, public support of venture capital activities, and public/private partnerships of high visibility in technology areas. Moreover, states with established high technology reputations like Massachusetts, California and Minnesota are taking these additional steps.

North Carolina's Research Triangle, California's Silicon Valley and Massachusetts' Route 128 are models for other states to evaluate their business climate and to begin to offer evidence of their own commitment to high technology industry. From a comparative standpoint, Maryland has more resources to start with than many places and can establish a high technology reputation with smaller investments than other places are now committing. A meaningful program will require across-the-board support from the Governor, State Legislature, educators and private industry. A continuing process of education and consensus building should be started. The end product should be actions of substance and high visibility which can be communicated to decisionmakers throughout Maryland and the U.S.

EDUCATION

The importance of human resource development to high technology industry locational decisions is documented on page 6 of this report. The availability of skilled labor is the most important consideration for an expanding high technology firm. Furthermore, the presence of excellent academic institutions ranks fourth. In light of this direct relationship between education and high technology business growth, an effort was made to ascertain Maryland's current ability to provide the research, training and personnel resources to foster high technology growth.

PRIMARY AND SECONDARY EDUCATION

At least two major issues arise from an analysis of high technology trends affecting primary and secondary education in Maryland: (1) the need to develop a continuing supply of technical labor for high technology industry; and (2) the need to develop the technical literacy of all students for life in an increasingly technological society.

Students in Maryland's elementary schools appear to receive a good grounding in mathematics and science at the present time. However, a large percentage of students in high school take essentially no mathematics or science classes, creating an increasing pool of young people illiterate in these subjects. This is reflective of a national problem; an estimated 70% of the students graduating from high schools in the U.S. are functionally "illiterate" in science.*[14] This is an alarming figure when viewed within the context of the needs of American society in the future and the practices in other major countries, especially Japan and the Soviet Union.

VOCATIONAL-TECHNICAL EDUCATION

Similarly, concern must be expressed at the long-term loss of employment (in Maryland and other states) in heavy industries such as automobile manufacturing and steel processing. These employment losses must be made up in other areas, such as high-technology industry, and new skills must be taught to a significant portion of the existing labor force. Retrained personnel could fill vacancies in a variety of technical support positions where staff is often in short supply. With the current attitudes at the Federal level, it is clear that such retraining will have to be instituted by the states for the good of their citizens and their own economies.

HIGHER EDUCATION

The quality and quantity of higher educational opportunities are critical to high technology industry. Many states view the support of higher education as the major investment in economic revival. By developing links between institutions of higher education and economic development strategies, a state can better provide the research, instructional, and technological development capacity that industry increasingly needs. This point of view has been recently expressed in budget messages from a diverse group of states including: Colorado, Illinois, Kansas, Mississippi, Missouri, New York, and South Carolina.[16]

The State of Maryland's role in supporting higher education, particularly technical education, is critical since 87% of college graduates within the State come from publicly supported institutions.[17] Since higher education (particularly engineering and business) is one of the most important focal points in high technology industry's locational decisions, an inadequate commitment of resources by the State would be particularly shortsighted.

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* The problem is compounded by the loss of mathematics teachers to industry (e.g. as programmers).

HIGHER EDUCATION IN ENGINEERING AND BUSINESS

The reputation of a university engineering or business school is often derived from the perception of its graduate programs as evidenced by the Massachusetts Institute of Technology and Stanford University. Preeminent engineering and business schools result from the confluence of superb faculty, up-to-date facilities and equipment, and outstanding students. Recruiting first-class faculty is complicated by the fact that they are scarce, and the competition from other universities and from private industry is fierce. The ability to sustain a recruiting effort requires the organizational flexibility to provide special salary arrangements and to offer incentives for entrepreneurial activity. The need for up-to-date facilities and equipment is closely linked to the ability to attract faculty. Important researchers are not likely to locate in places where obsolete facilities are a barrier to their research. While Maryland's two leading technical universities (University of Maryland and Johns Hopkins University) have very good individual departments and faculty and a solid reputation in engineering, they are not yet perceived to be among the leading engineering schools in the country. Business school MBA programs at Maryland universities are limited and not well-known nationally.

UNIVERSITY - INDUSTRY RELATIONSHIPS

The development of preeminent engineering and business schools will induce a number of beneficial responses from neighboring industry. High technology industry can provide discretionary equipment funds (and donated equipment) with minimal procurement restraints. Industry can provide sources of contract funding to carry out directed research.

Furthermore, industry can become a more active source of scholarships, work-study programs, and internships for engineering and business students. Industry looks to the local engineering and business schools for graduates, graduate education, and other relationships which enhance its recruiting and working effectiveness. In addition, a significant contribution made to industry by university engineering schools is that of providing an expert resource for consultation on problems and research issues which arise in high technology industrial organizations. Particularly in smaller industrial operations, a market exists for consulting and other technical problem-solving. A number of states have begun research centers to serve as a focal point for university-industry relationships. Initiated with relatively modest investments, these centers provide a compelling signal of a prolonged interest in developing mutually beneficial university-industry relationships. An engineering research center in Maryland would provide strong evidence of the State's commitment and improve Maryland's competitive position to capture its share of high technology industry growth.

FINANCING

High technology businesses have the same types of financial needs as business in general. These needs are summarized in a study conducted by the Maryland Department of Economic and Community Development.

> There are five different types of capital needed for economic growth and development: (1) equity by firms for new product development; (2) equity by firms for enterprise development; (3) short and medium-term debt (working

capital) by firms for inventories and accounts receivable; (4) long-term debt by firms for plant and equipment and (5) long-term debt or grants by local governments for infrastructure, etc.[18]

One of the operating characteristics of high technology business is a greater emphasis on equity for new product and enterprise development than is found in other businesses. Financing to meet these requirements is almost exclusively sought from private sources. However, in the past ten years, public financial programs have been started to fill perceived gaps in private sector capital markets.

PUBLIC FINANCING

Federal, state and local financing programs traditionally address:

... short and medium-term loans for working capital

... long-term loans or guarantees for plant and equipment

... long-term loans for land, utilities, roads, etc.

The State of Maryland has seven programs which address these financial situations.* The presence of public financial assistance programs does not signal the general availability of financing for high technology projects. Public programs seldom address financing for new product or enterprise development, and the amount of capital and restrictions on its use cannot always keep pace with accelerated growth in high technology industries. For example, industrial revenue bond regulations limit the amount of financing to $10 million within a period three years before and after the date of the bond. Larger high technology companies, in an expansion mode, may be forced to develop facilities outside the jurisdiction of their current activity.

PRIVATE FINANCING

High technology companies seek four general types of private sector equity and debt financing: venture capital, mezzanine financing, public equity, and conventional loans. In each type of financing, the situation in Maryland and California (a hotbed of entrepreneurial activity) can be contrasted.

Venture capital provides seed capital for start-ups, as well as second and third round financing. Venture capitalists tend to locate near locations with a great deal of entrepreneurial activity. Maryland has two Venture Funds and a minority enterprise small business investment company. A handful of other small business investment companies (SBIC'S) are located in Washington, D.C. Last year Maryland venture firms raised $44,000,000 compared to $306,000,000 in California.[19]

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* Maryland Industrial Development Financing Authority, Industrial Revenue Bonds, Development Credit Corporation of Maryland, Maryland Industrial Land Act, Maryland Industrial and Commercial Redevelopment Fund, Maryland Small Business Development Financing Authority, and Tax Increment Financing.

Mezzanine financing is a term applied to later-round investors (at a time which may present less risk) in growth companies. These investors, often corporations or pension funds, tend to invest larger amounts ($10,000,000 and higher) at higher prices. Mezzanine investors are less restricted geographically in their investment activities than other types of private financing.

The successful small growth company often has as one of its goals access to the public equity market. The number of initial public offerings of equity securities in a state is a good indication of growth business activity. In the past 30 months, 11 Maryland companies have issued initial public offerings compared to 123 California firms. Of the five investment banks generally associated with initial public offerings, two are in New York and one is in Maryland.[20]

Many banks target loans to small growth firms, especially those involved in high technology products and services. In addition, these banks also tend to have small business investment company (SBIC) subsidiaries which invest directly in small growth firms. In 1980, commercial and industrial loans as a percentage of total bank assets were 45% higher in California than in Maryland. Only eight states in the Nation have a lower ratio of business loans to total bank assets than Maryland.[21]

HIGH TECHNOLOGY ENTREPRENEURSHIP

The birth of new high technology companies or spin-off companies is usually associated with technical universities or a critical mass of existing high technology companies. They are supported by investment capital and commercial banking organizations which specialize in seeking investment opportunities in technological innovation.

Maryland's situation suggests a financial climate not particularly supportive of entrepreneurs.* While many factors affect the availability of financing for high technology companies, there may be a correlation between the size of the financial community and the relative availability of financing. Therefore, the Committee concludes that a program to improve the financial climate for high technology business in Maryland would need the participation on a continuing basis of both public and private sector representatives of debt and equity capital.

TAXES

In the Joint Economic Committee's survey of 691 high technology firms, tax climate was the third most important consideration in choosing a region for a new facility (behind labor skills and availability), and the second most important consideration in choosing a site within a region (behind labor availability). Their interpretation of the results pointed out that, while state and local tax burdens constitute a rather minor production cost, the impact on an area's labor climate is significant. Relatively high taxes are a

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* The Committee's conclusion is based on statewide statistics, and does not reflect the attitude or practice of any individual financial institution.

barrier in recruiting necessary personnel.[22] This conclusion may be heightened in situations where competing geographic areas have comparable locational advantages. In these cases, taxes become the most important indicator of an area's business climate.

MARYLAND'S TAX CLIMATE

The tax climate in Maryland is subject to socio-economic trends which challenge the State's ability to finance public services. Population growth is slowing, the population is becoming older, and, without rising personal income, the growth of state revenue will slow.[23] The public sector can respond by raising taxes, cutting costs, improving productivity or reducing service levels.[24] In the long run, more broadly-based revenue sources will be required.[25] While the government is currently faced with such choices, a balance needs to be struck between meeting the rising cost of services, and protecting the State's competitive position for economic development.

TAX BURDENS

A comparison of state tax rates demonstrates regional patterns of relative tax burdens. Maryland's tax burden is somewhat more favorable than competing areas in the Northeast and Far West and generally less favorable than competing areas in the Southeast and Southwest. In view of the Committee's concern over the ability of Maryland to retain, expand and attract new technology industry, an analysis of the State's competitive position against representative Sunbelt areas with apparent tax advantages was undertaken.[26] Maryland's tax position is roughly comparable to these areas in terms of local tax policies; however, the State cannot compete with state tax burdens in areas which can export their tax burden. For example, Texas (no corporate or personal income tax) and Florida (no personal income tax) can shift their tax burden through severance taxes on natural resources and sales taxes, respectively.

TAX INCENTIVES

From a different perspective, tax policies can also serve as inducements to industry. The Committee took a comparative look at tax and financial incentives in representative technology centers.[27] Metropolitan areas in the South have, at this time, few specific tax and financial incentives targeted for high technology companies. The Committee has concluded that areas whose principal source of growth is from new locations will rely on the appeal of their general business climate, cost of living, and quality of life. In contrast, metropolitan areas with larger existing technology bases have targeted programs to encourage retention, local expansion, and start-up technology businesses. While Maryland's tax climate may never be fully competitive with every section of the country, the Committee perceives additional opportunities to expand the State's tax base through retention, expansion and new start-ups in its existing high technology base. A tax program to induce capital investments and job creation would encourage these activities.

RECOMMENDATIONS

Maryland's existing high technology base and other people/environmental assets provide a realistic foundation on which to build a leadership position in high technology industries. Widespread commitment and support from both public and private sector decisionmakers will be required to achieve this end. Considering the long-term tax base and quality of life benefits to be derived from a viable high technology sector, the Committee recommends that the State government move aggressively to forge the requisite public/private partnerships.

With the commitment of the Governor and the State legislature, judicious use of State resources can stimulate and leverage similar commitments from Maryland's private sector. Public and private investments are needed in human resource development, in providing capital for technology projects, and in a consistent program to publicize Maryland's emphasis on high technology (both to its citizenry and potential employers).

The Committee recommends the following specific actions to encourage the growth of high technology industry in the State:

I. FORMATION OF THE MARYLAND HIGH TECHNOLOGY ROUNDTABLE

Appointed by the Governor, this group of decisionmakers from Maryland's high technology businesses, financial institutions, professional organizations, public and private universities and State government would meet periodically to address issues of significance in Maryland's high technology environment. The Roundtable would also act as an adviser and consultant to the Governor and State legislature on such matters. Specifically, the Roundtable would serve the following major functions:

... advise and assist the development of preeminent engineering programs at Maryland's universities; support the development of realistic industrial retraining programs; and stimulate the enhancement of technical education in public schools

... serve as a catalyst in developing financial support for other recommended programs (to be discussed later) such as: the Maryland Investment Fund and the Engineering Research Center

... help establish teams of public and private sector representatives to address specific high technology objectives, e.g., financial investment teams for particular projects.

A critical first step is appointment of a suitable chairman for this High Technology Roundtable. The chairman should have flexibility to recruit membership and develop organizational guidelines

Appointment by the Governor of a Maryland High Technology Roundtable at this time would focus attention, in a low-cost but effective manner, on Maryland's commitment to this growth area.

II. INCREASE SUPPORT OF TECHNICAL HIGHER EDUCATION

This report documents the importance of universities to high technology industry. Enhancing the technical capabilities and reputations of the universities within the State is central to accomplishing high technology objectives. The following programs are recommended in this regard:

A. The Development of Preeminent Engineering and Business School Programs at the University Level

Development of a preeminent position in selected high technology and business disciplines is a pivotal objective and should be initiated as soon as possible. Since resources are always limited, it is recommended that a limited number of areas be identified as key technologies for growth industries and supported heavily. The identification of these key technologies should be undertaken at an early date by a committee sponsored by the Governor. It is worth noting that the Maryland and Washington areas are already a high technology region, with a strong existing base on which to build, especially in digital systems, computer science and bio-technology.

The overall reputation of Maryland universities would be further enhanced by:

... recruitment of key faculty who are nationally respected in the identified areas.* This faculty can reflect its reputation onto the university, attract other top-class staff and establish strong research programs. Industry should be solicited for assistance in the search process

... the provision of first-class research facilities to attract and keep this level of faculty, coupled with the availability of special salary arrangements

... the provision of incentives to encourage the enterprising faculty researcher to obtain Federal or industrial funding for his research. In the State university, in particular, there is a disincentive in that the contribution to overhead from all such funding must be turned back to the State. This turnback procedure should be changed so that a significant fraction is retained directly by the researcher for additional equipment or new project seeding.

B. The Encouragement of University-Industry Partnerships

The relationship between high technology industry and its neighboring universities should clearly be a partnership. The State of Maryland, with the assistance of the Maryland High Technology Roundtable and other groups, should take an active role in encouraging these relationships, especially in the following areas:

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* This is not to be interpreted as implying that universities in Maryland are currently without individual faculty members who are first-class.

... Equipment Funding -- A major impediment in almost all engineering schools is the inadequacy of funds for scientific equipment necessary to do state-of-the-art research. Consideration should be given to establishing an Engineering Research Equipment Fund with contributions from technology-oriented companies in the State of Maryland.

... Graduate Education -- Industry has a direct need for convenient, high quality graduate educational opportunities for its professional staff. Extension programs should be strongly encouraged. For example, the University of Maryland must become more visible in parts of the State, especially around I-270 in Montgomery County and the Baltimore metropolitan area, where concentrations of high technology industry exist.

... Engineer Retraining -- Because of the speed with which technical advances occur, a continuing need exists to retrain engineers. This need should be addressed in a broader, less ad-hoc manner than is currently the case. Industry and the universities should jointly investigate formal programs to address this need, e.g., establishing summer retraining programs.

... Research Funding -- While industry should be encouraged to provide contract funding to universities to carry out directed research, it must be recognized that a number of impediments exist. One such inhibiting factor is the legal work associated with setting up the contract and the protection and ownership of proprietary information. It is recommended that a standard contract agreement be worked out between major industry representatives and the university.

C. The Development of an Engineering Research Center

It is recommended that the State of Maryland implement the plan for the development of an Engineering Research Center as proposed by the University of Maryland Engineering Advisory Council. This action would focus attention in Maryland on the opportunities for consulting and other technical services available in university/industry relationships. Moreover, it would provide a signal, nationwide, of Maryland's commitment to support high technology in the manner of similar centers in North Carolina, California, Texas, Minnesota, etc.

III. REFOCUS VOCATIONAL-TECHNICAL TRAINING AND TECHNICAL EDUCATION IN MARYLAND PUBLIC SCHOOLS

With major shifts in employment levels, substantial retraining of workers from declining industries would provide labor for high technology industries and begin to reduce unemployment levels within the State. In addition, public schools in Maryland should be better able to develop interest in technical careers and to provide a greater technical literacy among the general student population. To address these situations, the State of Maryland should undertake the following programs:

A. The Development of Vocational-Technical Curricula Which Reflect Emerging Employment Opportunities in the State

It is recommended that a special committee be charged with developing specific curriculum recommendations for vocational-technical schools. This committee might include: members of the State Advisory Board on Vocational-Technical Education, the Department of Labor, and high technology industry. The industry segment of the panel would provide guidance on which new fields should be emphasized by the vocational-technical schools. This action would insure that proper employment opportunities are really available to the students from these schools and that industry's needs for technical labor are adequately met.

B. The Development of a Special Job Training Program to Address Maryland's Particular Industrial Retraining Needs

It is recommended that the State of Maryland also institute a job training program to be planned by the special committee described above in section A. Industry should be expected to make employment commitments to "graduates" from the program, in order to provide the necessary incentives and motivation to the workers being retrained, and to ensure that truly hard-to-fill areas of employment are being addressed.

C. Conduct A Statewide Reexamination of Technical Education in Maryland Public Schools

It is recommended that an influential committee be formed by the Governor to determine effective ways to correct inadequacies in public school technical education. Actions which seem appropriate include:

... imaginative programs in mathematics and science teaching to capture the interest of high school students (e.g., the fascination with computer-driven video games should be harnessed by the schools)

... revisions of course selection rules so as to require more students to continue their mathematics/science education through high school

... formation of a vehicle by which industry can interact regularly with the County and State high school education authorities and help improve and expand mathematical and scientific education.

IV. ENHANCE MARYLAND'S FINANCIAL CLIMATE FOR HIGH TECHNOLOGY BUSINESS

To encourage the process of technological innovation and to spur the expansion of high technology industry, Maryland should begin to build an awareness of technology opportunities among public and private financial institutions. In recognition that building an effective financial climate is beyond the resources of any individual institution or sector of the economy, the Committee recommends two types of partnerships.

A. The Maryland Investment Fund

The Maryland Investment Fund would represent a pool of venture capital to help realize unmet opportunities for the development in the State of new high technology products and new high technology enterprises. The organization of

the Fund should be determined by a group of public and private sector representatives; however, the Committee anticipates the need for an initial public investment in the fund. This investment may be supplemented by investments from private sources. The creation of the Maryland Investment Fund would accomplish three objectives:

... increase the availability of financing specifically needed for innovation

... spur further entrepreneurial activity in the public and private sectors

... give the State the flexibility to invest in job producing activities.

B. Ad Hoc Investment Teams

Investment team(s) should be created, as appropriate, to help package public and private financial resources for significant technology projects. These teams would be ad-hoc groups of public and private representatives organized to bring existing financial resources to bear on projects such as:

... an important expansion of an existing high technology firm

... the acquisition of equipment to support technical education in the State

... the development of a research industrial park or other important infrastructure for high technology companies

... the support of significant research -- of benefit to Maryland's high technology base — taking place in the universities or other government supported institutions. Investment teams would raise the level of awareness among public and private financial representatives of investment opportunities in high technology projects, and create an environment which allows the creative participation of multiple investors in high technology projects.

V. ENCOURAGE EXPANSION OF EXISTING HIGH TECHNOLOGY BUSINESSES

A large percentage of the industrial growth that Maryland can reasonably expect will come from its existing base of high technology companies. The retention and expansion of high technology companies, in a cost-sensitive environment, require public financial encouragement. The State's tax climate is pertinent in this regard, and the Committee recommends the following actions:

A. Encourage Capital Investments by Maryland's High Technology Businesses

In a sense, the State of Maryland can take a major step in encouraging capital investment by maintaining state depreciation provisions linked to the Federal Accelerated Cost Recovery System. As of December, 1981, 29 states allowed Federal Accelerated Cost Recovery System depreciation in reporting corporate income.

B. Creation of a Jobs Credit Tax Incentive

Tax incentives for the creation of jobs accelerate the process of matching labor from declining industries to the requirements of growth industries. Currently, California, Colorado, Connecticut, Delaware, Kansas, Louisiana, Maine, Missouri, Montana, New York, Ohio, Oklahoma, Oregon, and Utah have tax incentives of this type.

The Committee recommends that the Governor appoint a committee or group to identify a realistic tax program which not only supports but accelerates the process of matching labor from declining industries to the requirements of growth firms. This proposal would make the retraining program recommended above more viable.

VI. SUSTAIN THE MOMENTUM FOR GROWTH OF HIGH TECHNOLOGY INDUSTRY

The preceding recommendations detail an action agenda and identify the most appropriate areas for public/private partnerships. If Maryland is to achieve a leadership position in high technology business, the public-private partnership, once formed, must be sustained and be flexible in adapting to changed circumstances and competitive challenges from other states. This requires an on-going education/marketing program emphasizing Maryland's commitment to this sector. It also requires a State legislature sensitive to the benefits to be derived and willing to commit necessary resources. Consideration should be given to a standing committee in the State legislature with jurisdiction over the industrial growth sectors. As the State moves toward high technology leadership, other methods to institutionalize this momentum should be identified and employed.

NOTES

[1]U.S. Department of Commerce, Bureau of the Census, 1979 County Business Patterns: U.S. Summary; 1979 Annual Survey of Manufactures.

[2]U.S. Department of Commerce, Bureau of Industrial Economics, 1982 U.S. Industrial Outlook.

[3]Joint Economic Committee, Congress of the United States, Location of High Technology Firms and Regional Economic Development, prepared for the use of the Subcommittee on Monetary and Fiscal Policy, June 1, 1982.

[4]U.S. Department of Commerce, Bureau of the Census, 1979 and 1969 County Business Patterns: Maryland.

[5]Maryland Department of Economic and Community Development, The Directory of Maryland Manufacturers, 1981-1982, June 1981.

[6]U.S. Department of Commerce, Bureau of the Census, County Business Patterns: 1979, United States and Maryland.

[7]Community Services Administration, Geographic Distribution of Federal Funds in Maryland, Fiscal Year 1980.

[8]Joint Economic Committee, p. (v).

[9]Ibid., p. 8.

[10]U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, States and Areas, 1939-1978, pp. 262-266. Maryland Department of Human Resources, Research and Analysis Division, Labor Market Dimension, 1979, 1980, 1981.

[11]Ibid.

[12]TMA, The Effect of Massachusetts Tax Policy on High Technology Business, 1980.

[13]Joint Economic Committee, p. 23.

[14]Based on information in "Science and Engineering Education for the 1980s and Beyond." Prepared by the National Science Foundation and the Department of Education, October, 1980.

[15]One example of this conclusion is found in the Proceedings of the Consensus Conference of Montgomery County Executives, August, 1982.

[16]"The Chronicle of Higher Education," "State Support for Higher Education," February 10, 1982, pp. 1-6.

[17]National Center for Education Statistics, Digest of Education Statistics, 1981, p. 84.

[18]Maryland Department of Economic and Community Development, Financial Assistance To Maryland Industry, 1980, p. 4. Abstracted from Martin Katzman and Belden Daniels, Development Incentives to Induce Efficiencies in Capital Markets, 1975.

[19]"Venture Capital Journal," January, 1982, p. 10. and Karen Zehring, Corporate Finance Source Book, 1982.

[20]Based on information supplied by Alex. Brown & Company, Baltimore, Maryland.

[21]U.S. Federal Deposit Insurance Corporation, "Assets and Liabilities: Commercial and Mutual Savings Banks," semiannual.

[22]Joint Economic Committee, p. 26.

[23]This conclusion is based on socio-economic and revenue projections found in the Report of the Capital Debt Affordability Committee on Recommended Debt Authorizations, Fiscal Year 1982, pp. 42-46.

[24]Committee for Economic Development (CED), "Public-Private Partnership: An Opportunity for Urban Communities," Research and Policy Committee of the Committee for Economic Development, February 1982, p. 64.

[25]CED, p. 66.

[26]Based on information supplied by: Maryland Department of Economic and Community Development. Texas Industrial Commission. Florida Department of Revenue. North Carolina Department of Commerce.

[27]Ibid.