REGULATION IS A MAJOR DETERRENT ON THE CREATIVE PROCESS.

The overwhelming nature of widespread regulation results in an adverse interference with the innovative process, pushing the balance away from success. The innovator's most precious assets of time and energy are drained. Expensive delays are experienced, and the creative entrepreneur and his scientists and engineers are kept on the defensive--not on the offensive that is necessary for their success.

In addition to regulations contributing to inflation, a serious consequence of this new regulatory environment is that economic progress is distorted in favor of those fields where government involvement is minimal and where innovation can occur relatively untrammled. In those fields where regulation is diverse and intense, greatly reduced entrepre--neural activities are experience, and only those innovators who can map and navigate the governmental process can succeed.

The costs of regulation to the innovative process in small business are large and real.

GOVERNMENT FAILS TO RECOGNIZE THE DISPROPORTIONATELY HEAVY IMPACT OF THE REGULATORY PROCESS UPON SMALL BUSINESS INNOVATION.

When approaching government, the small businessman often encounters a presumption of harm and dishonesty, or at best, indifference, and not a sympathetic understanding of the peculiar needs and problems of the small guy attempting to be creative. The legislative and rule-making processes are impossible forums for his participation and his bureaucratic adversaries have substantially greater influence and credibility in these processes. Laws, rules, policies and procedures often are made for "administrative convenience", and such administrative conveniences usually become an inconvenience for the innovator. As a society we must address the question of whose convenience is more important--the bureaucrat's or the innovator's?

During the 1970's, "due process of law" in American democracy has become an unfamiliar phenomenom to the small innovator--the process is closed to him--and grossly discrminates against him. This adversary regulatory process in America today has caused the remaining few small innovators to consider government as an alien power committed to their destruction.

The small innovative business cannot deal with this intense and diverse regulatory environemnt as readily as can the large corporation. If a re-birth of innovation is to occur, government must recognize this adverse discrimination and a major departure from current regulatory processes that affect small innovative businesses is necessary.

In view of this deleterious impact of federal regulation upon small business enterprises, and the serious consequences of inflation and stymied innovation, we wish to make the following recommendations:

RECOMMENDATION # 4--CHANGES IN REGULATORY POLICIES.

. A thorough revision of the regulations and operating procedures of OSHA as they relate to small innovative business to include:

--A general exemption from OSHA, except where the accident history of a particular industry or firm is substantially greater than average, and in such cases, the burden should be upon OSHA to justify action; and

--The prohibition of first instance citations except in extreme cases.

. In all regulatory activities, the burden should be placed upon each regulatory agency to establish a cause of concern before requiring regulatory compliance by a small business. Minimum levels of impact should be statutorily defined thereby exempting small businesses in all but extreme and justifiable cases.

. Substantial strengthening of the Regulatory Council to include:

--participation by the Small Business Administration;

--requiring all regulatory agencies to balance the risks of a hazard against the economic costs, with thorough consideration of specific impacts of proposed regulations upon small business creative processes;

--the use of "performance standards" and not "method standards" in those cases where regulatory standards are clearly justified;

--wherever possible, return to reliance upon standards associations with federally mandated standards being the last resort;

--improved congressional oversight of the regulatory process as it relates to small innovative businesses.

. Provide product liability and recall insurance at reasonable costs for small businesses, with exemptions from recalls except in the most extreme cases; and the establishment of statutory limits of liability for product failures similar to Workman's Compensation Insurance.

The OSHA problem is particularly serious for small innovative enterprises that have to deal with this agency, and a revision in OSHA policies and practices is necessary. Some members of our Committee believe that it would be in the best interest of workplace safety as well as of industrial innovation to eliminate OSHA entirely. Others agree, but believe that this may be politically impractical. Still others are of the opinion that government can improve workplace safety with the significant amendments to present policies and procedures that we are proposing.

The recently published report Making Prevention Pay by the Inner-Agency Taskforce on Workplace Safety and Health concludes that OSHA has failed to make an improvement in workplace safety during the past decade. And, it is clear to us that the burden of this program on small innovative businesses is discriminatory and highly adverse. In addition, OSHA is an agency that has generated an enormous amount of litigation, and in cases of appealed OSHA citations, over fifty percent have been vacated. Yet, litigation is not a form of relief for small innovative businesses--the OSHA rule-making and appeals process, and judiciary relief, is a costly and time consuming game that small enterprises cannot play. Therefore, the burdens of citations should not be placed upon small businesses, at least in the first instance, and we urge that the burden be placed upon government to demonstrate on a case by case basis that unusually great hazards exist before OSHA can exercise jurisdiction in the case of small businesses.

In most other areas of regulation, it is our opinion that the burden of compliance for small business enterprises should be substantially reduced, and in many cases can be eliminated without materially compromising the overall objectives of the subject regulation. It is virtually impossible for the struggling innovator to comply with the never ending forms, mandated reports, applications, investigations, inspections, permits, licenses, standards, variances, checklists, guidelines, plans, study-sessions, pubic meetings, rule-makings, non-rule makings, hearings, non-hearings, burdens of proof, appeals, etc., and to accomodate the rapidly growing enforcement budgets at all levels of government to "make businesses comply." The language of government is a strange tongue written by lawyers for judges that is as incomprehensible to the small innovator as is the regulatory process itself. This government problem is more than simply a paperwork blitz--it is a major consumer of time, energy, and capital, and is sometimes absolutely prohibitive.

We believe that it is essential that a clearly specified level of impact or hazard exposure be established before a business is regulated, to allow the entrepreneur to innovate without the burden of regulation consuming his precious time, drive and capital, and in causing inordinate delays for him to learn the appropriate rules, accomplish their compliance, and obtain appropriate permits. The burden is particularly onerous upon the innovating entrepreneur attempting to do something new since most existing laws are intended to eliminate some other form of evil.

The new regulatory environment is another example of how government polices unfairly discriminate against small innovative firms by treating them the same as big corpoations. Some big corporations can survive in this regulatory game--they can enter law making and rule making procedures, retain experts to ply the most subtle interpretations of the rules, and can afford the time and costs of appeals and litigations, etc.,--the small guys simply cannot because "the due process" is too time consuming, costly, and technically overbearing. If the small guy tries, the balance in his struggle for survival weighs heavily towards failure. Therefore, we strongly believe that reasonable exemptions are necessary for small firms if our sector of the economy is to be revitalized as a major source of non-inflationary innovation.

* * *

DIRECT FUNDING OF R & D BY THE FEDERAL GOVERNMENT.

Economists consistently state that technological innovation is the principle contributor to U.S. economic power and is necessary in order to continue to advance our standard of living. And research and development is one of the critical ingredients of innovation. Economists also state that the social return on R & D is high with some estimating it to be twice the private return. For these reasons, together with the anti-inflationary impact of innovation, we believe that it is important to increase our national investment in R & D.

FEDERAL SUPPORT FOR R & D HAS DECLINED AND HAS BECOME CONCENTRATED.

While we believe it is important to increase our national investment in R & D, this investment, as a percentage of Gross National Product (GNP), has been declining since 1968, while that of some countries (Japan in particular) has continued to rise. One-half of our R & D investment is privately financed and one-half is from federal sources; with one-half the federal R & D being for defense. While industrial R & D expenditures have held their own as a percentage of GNP during the last twenty years, government R & D has not kept up with the growth in GNP. In the federal area, small business receives only three and one-half percent of federal R & D expenditures.

Of additional concern to us is that four agencies--defense, space, energy, and HEW--fund eighty-eight percent of federal R & D. Similarly, there is a concentration of U.S. industrial R & D into a few industries and into a few companies. According to Science Indicators, 1976, six industries account for eight-five percent of total U.S. industrial R & D. Ten companies do thirty-six percent, and thirty-one do over sixty-percent. Greater than eighty percent of industry's R & D is carried out by only two hundred firms.

We believe that this concentration of private R & D into a few large firms is not in our national interest. While there is such a great concentration of private R & D, it is small business that has accounted for one-half of our total major innovations over the past twenty years and it did so while conducting only three percent of the total U.S. R & D. This is a powerful testimony for the contributions and effectiveness of small innovative businesses. Science Indicators also reports that during the twenty year period from 1953 to 1973, small businesses contributed twenty-four times the number of major innovations per dollar of R & D as did large firms. In addition, the total cost for maintaining a scientist or engineer in R & D for a small business has averaged one-half of that for large firms. It is further reported that inventors in universities contributed far less frequently.

In view of these facts, we must ask why so much of our federal R & D is awarded to large firms, federal laboratories and universities, and so little to small business since technological innovation is critical to our social-economic progress. We believe that a larger share of federally funded R & D awarded to small businesses would produce substantially greater results.

REVISED INCENTIVES WILL STIMULATE PRIVATE INNOVATION.

One of the critical obstacles to more productive R & D funding is the lack of recognition within government that innovation usually does not result from research findings without proper incentives to put these findings to work. The objective pursued by most federal R & D recepients is to meet the precise specifications required by the government and not to pursue innovative ideas and commercialization of results. This requirement to pursue narrow objectives prevents innovation. In universities the incentive is to uncover new knowlege and to publish these findings in scientific journals--not to produce innovations for commercialization in the private sector.

Sometimes federally funded applied R & D in universities and government laboratories is aimed at preventing a private firm from gaining a technological lead, or in duplicating private technological successes with the objective of public disclosure. Such competition with the private sector, particularly with small firms, is a substantial disincentive to the innovator and to his sources of capital.

We believe that greater private sector utilization of scientific knowledge generated by federally funded research is desireable, and commend the Small Business Innovation Program of the National Science Foundation as a successful model. This imaginative program is directed specifically at converting research on federal objectives into innovation in the private sector. It provides incentives for the small science and technology based firm, venture capital firms, private investors, large companies and universities to work together to explore and finance advanced concepts leading to new products, processes and services. This program provides strong incentives for the utilization of science to do new things.

The members of our Committee believe that it is essential that governmental policy-makers concerned with innovation make better utilization of incentives for the commercialization of research knowledge. We also believe that government must take steps to assure that the disincentives to private initiative of deliberate pre-emptive and duplicatory work, and competition with the private sector at universities or government laboratories be prohibited, and that steps be taken to ensure that this prohibition is enforced.

AN ADVANCING SCIENTIFIC ENVIRONMENT IS ESSENTIAL FOR INNOVATION.

The final concern of the Committee is the health of science in America. U.S. science clearly leads the world with fifty percent of the total science based Nobel prizes during the past thirty years. While this science excellence has existed since World War II, the industrial competitiveness of U.S. technology has declined, and much of the benefits of our excellence in science has been transfered overseas. We have received little in return, except that we now import large amounts of foreign goods made possible by our scientific advancements. We must point out that small business does not establish and train our overseas technological competitors--small innovative businesses create jobs, income, and exports at home.

We must also comment upon what we believe to be an unhealthy mix of basic and applied research at our universities that is mandated by federal funding requirements. We support the principal that universities are a proper environment for much of our basic research. However, government support to universities for applied research has increased more than six times during the past twenty years, while industry's percentage has declined from approximately fifty percent to twenty percent.

Federal laboratories and non-profit institutions have also prospered in applied research funding. We must respectfully point out, however, that major innovations have not come out of our universities, federal laboratories, and non-profit institutions with a frequency comparable to those emanating from small businesses. We must again ask why we do not have more applied research conducted by small businesses.

While some individuals may claim that applied research in universities is necessary to train an increasing number of scientists and engineers, a 1979 Department of Labor report states that forty-seven percent of those who received doctorates between 1970 and 1977 were not able to get jobs in fields that required that level of education, and that this problem is projected to persist through 1985.

In summary, the Committee believes that there is a need to increase federal R & D expenditures and that this increase should go in new directions.

RECOMMENDATION # 5--CHANGES IN POLICIES FOR FEDERAL FUNDING OF R & D

. The decline in R & D expenditures as a percentage of Gross National Product must be arrested and re-directed upwards towards the goal of three percent by 1985.

. This increase should be heavily directed towards basic research at universities and applied research and development in the private sector, with strong incentives for commercialization.

. There should be decreased emphasis on applied research in universities, federal laboratories and non-profit institutions, particularly where such applied work might pre-empt private initiative or is duplicatory or competitive with private sector activities.

. Each federal agency should be directed to allocate at least ten percent of its R & D budgets to small business and increase current levels by one percent of its budget each year until the ten percent minimum is established, starting in 1980.

. Each year, starting in 1980, each agency with a budget of over $100 million for R & D should allocate at least one percent of its R & D budget to the small business program using the same format as that of the National Science Foundation but with their own research topics, and review and awards procedures. This program should be coordinated by an Inner-Agency Small Business R & D Committee chaired by the Small Business Administration.

. A clear federal policy should be established and enforced to prohibit federal funds from being used to finance projects that are competitive with or duplicatory of private sector technological developments, or in any other ways might prevent the establishment by small businesses of exclusive technological or intellectual properties in new areas of non-defense technological advancement.

* * *

FEDERAL PROCUREMENT POLICIES.

The U.S. government is the largest purchaser of goods and services in the world. Federal procurement policies greatly affect the ability and incentives for government contractors to innovate.

Unfortunately, federal procurement rules and their administration are grossly discriminatory against small businesses. Large corporations

are able to follow changing trends well in advance in procurement and to influence specifications to favor their companies. They know the system, can handle it, and can afford large government marketing staffs to effectively compete. Small businesses, which have historically provided fifty percent of the most significant innovations, are essentially precluded from this process. We do not believe this is in the national interest. Small businesses need a greater opportunity to participate.

At present, the federal procurement system chews the small innovator to bits. The small firm has little negotiating power and cases of unfair discriminatory treatment against small innovative businesses are legion. For example, patent policies in some agencies result in patent rights being awarded to large contractors, yet small firms rarely are able to obtain patent rights under similar circumstances. In addition there are cases where patent rights developed at the expense of a small business have been required to be assigned to the government for use by others as a condition of the small firm obtaining a government contract.

Small businesses are further discriminated against in government payment procedures. Delays occur in receiving payments and the small business is less able to obtain low cost loans to carry overdue government receivables. In addition, debt service is not a reimbursable cost.

It is the opinion of this Committee that changes should be initated in procurement policies in order to encourage and allow greater participation by small innovative businesses on a more equitable basis.

RECOMMENDATION # 6--CHANGES IN FEDERAL PROCUREMENT POLICIES.

. Cost sharing requirements for research and development awards for small businesses shall be eliminated and negotiated, fees shall be allowed on all R & D awards;

. No federal agency shall exclude small business from a fair and equitable opportunity to compete on a merit basis on the same terms as other participants;

. No agency shall restrict opportunities for small businesses to submit unsolicited proposals and shall give such proposals a fair review based upon their merit. Each agency shall provide small firms opportunities to receive sole source awards;

. Independent research and development costs, and bid and proposal costs, shall be allowable costs for small business firms at a rate for small businesses of at least two times the level allowed for large businesses.

. A separate set of simplified Federal Acquisition Regulations should be developed to apply to small business firms;

. All proposals submitted by small business must be awarded or declined within four months of submission;

. Proposal evaluations shall consider total costs relative to the work proposed, and not consider overhead or indirect cost rates due to variations in institutional and company accounting practicies;

. Fee negotiations shall take into consideration the level of interest rates and shall be higher in times of high interest rates than in times of low interest rates. All debt service costs shall be allowable costs for small businesses, and procedures should be instituted for prompt payments to small businesses, with late payment penalties;

. Every federal agency should study policies and procedures that discriminate against small businesses, and to institute changes that will equalize opportunity without harming the public interest.

* * *

## PATENTS.

### OUR PATENT SYSTEM HAS WEAKENED.

It is with alarm and consternation that we report two major weaknesses that have emerged in the patent system in recent years that are damaging incentives for innovation, particularly by small science and technology businesses. The usefullness of patents has diminished dramatically.

The first weakness is that judicial decisions, at the trial court level, are resulting in fifty percent of the patents issued by the U.S. Patent and Trademark Office being declared invalid when contested. In the ten circuit courts of appeal, this figure becomes seventy-two percent. As a result, the innovator seeking patent protection is inviting expensive litigation to test the validity of his patent, and the odds greatly favor his potential competitor, often a resourceful large corporation wishing to use his technology. A basic reason for such judicial invalidities is that the Patent Office did not have available to it, or was unable to identify, or failed to use, prior art that the courts declare as pre-emptive.

The second major weakness is that the cost incurred in defensive patent litigation sometimes approximates $250,000, which is usually an impossible burden for a small business. These developments are inhibiting to innovation and place the small innovative business in a position of not being able to benefit from the patent protection to which it is entitled and that may be necessary for its success.

It must be recognized that the reliability of patents is the keystone in the commitment of funds to carry out the commercialization of a patented (or potentially patentable) invention. Few entrepreneurs and investors are willing to risk time, energy and funds in the com-

mercialization of an invention in a free market economy knowing that the path they are pioneering may soon be trod upon by others, including large firms with greater resources and with preferential access to the market for the new invention. As a result, the only legal method to protect newly pioneered technology is by maintaining new technology as a trade secret. Tying up significant discoveries and inventions in trade secrets is not in the public interest since knowledge transfer does not occur for others to use.

OTHER GOVERNMENT AGENCIES FAIL TO RECOGNIZE THE NECESSITY OF INITIAL EXCLUSIVITY FOR SUCCESSFUL INNOVATION.

Although our constiutionally provided federal patent system is intended to provide exclusive protection to inventors with novel contributions, the importance of this policy of exclusivity is frequently ignored by government. We believe that a change in attitude within government about exclusivity of technology by small business would substantially enhance innovation. Small firms pioneering new techniques are often treated as large resourceful corporations attempting to monopolize markets. In some cases government vigorously attempts to pre-empt or duplicate technology being pioneered by small firms in order to prevent initial exclusivity. The result is that in such fields where government R & D activities are pre-emptive or competitive, interest by entrepreneurs and risk capital sources diminishes. This Committee believes that there must be a greater awareness within government that exclusivity is frequently a substantial motivation in decisions to pioneer new fields.

It is unfortunate that the benefits of patent protection of inital exclusiviety have greatly diminished for small businesses and this trend favors large resourceful corporations that can afford expensive litigation. It is the small innovative businesses that make a far greater contribution to innovation in America that are being deprived of the protection necessary for them to become established. We therefore have the following recommendations for strengthening incentives for innovation provided by the patent system:

RECOMMENDATION #7--CHANGES IN PATENT POLICIES.

. The Patent and Trademark Office should develop a practical and effective computer based search and retrieval system for its own use and public access, with particular concern for its usefullness for small business firms.

. A new mandatory re-examination procedure should be instituted in the Patent and Trademark Office whereby a litigant who raises a defense of invalidity of a patent based on new found heretofore unconsidered art should first test the assertion of invalidity in the patent office where the most expert opinions exist at a much reduced cost.

. The budget of the patent office should be increased sufficiently to allow for more thorough searching of prior art using the most modern search technology.

. The patent laws should be amended to recognize that the reliability of patents is a keystone in the commitment of funds to carry out commercializations of patented inventions, and incontestability should be mandated after a period of time so as to result in absolute reliability, except in cases of fraud.

. Legislation should be passed to give small businesses title to inventions made under government contracts, with the provision that commercialization be undertaken in a reasonable time. If such commercialization is not undertaken, title should revert to the government and the government should license small businesses. As an alternative, small business should be able to obtain title to inventions developed under government awards if they invest an amount of capital at least equal to the amount of the R & D award under which the invention occurred. Likewise, with inventions made in national laboratories, the government should preferentially license small business concerns.

. Small businesses should be able to obtain (with appropriate restrictions) compulsory licenses through suitable proceedings in cases where uncommercialized patents block entry into new markets.

. The Justice Department should be required to undertake competitive impact studies for taking anti-trust action against small business when a small business is attempting to exploit the full property rights afforded by its patent.

* * *

This report is only a brief compilation of the recommendations that we believe are important to lead to a renaissance in anti-inflationary technological innovation by small business enterprises. We hope that we have articulated the distinctive characteristics of the creative process in small businesses that are substantially different than the creative processes in large corporations. In most cases, the same government regulations, policies and processes applied to all businesses, in effect, discriminate against small innovative businesses.

The necessary exemptions and the special needs of small innovative businesses are usually discarded by federal policy makers because it is feared that they will be applied to all industry. Yet we believe that special considerations are usefull and tolerable if restricted by ceilings to levels meaningful to our sector of the American innovative community.

The issue of special treatment for small innovative enterprises in the formulation of laws, policies and governmental processes, is more than a matter of equity--it is a matter of national concern because of the far reaching ramifications of innovation in economic and social growth and the disproportionately large contributions of independent innovators. The potential for continued innovative contributions from small business is far too great to continue to be ignored, and meaningful special considerations must be made.

With the removal of the disincentives that are now imposed upon small innovative businesses, we are confident that the amazing resourcefullness of American innovators will again emerge and result in material social and economic growth for our country.

APPENDIX II

# A Report to the Assistant Secretary of Commerce for Science and Technology

## Commerce Work Group on Job Creation

Bestätigung des Vereins über die Teilnahme an der Jugendleiter-Card-Schulung

Hiermit bestätigen wir, dass

Herr/Frau

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# RECOMMENDATIONS FOR CREATING JOBS THROUGH THE SUCCESS OF SMALL, INNOVATIVE BUSINESSES

A Report to the Assistant Secretary of Commerce for Science and Technology

This report, prepared under the direction of William C. Norris, Chairman of the Board and Chief Executive Officer of Control Data Corporation and a member of the Commerce Technical Advisory Board, represents the views of a Work Group of private citizens, each of whom has had unique and valuable experience in technology and entrepreneurship.

December, 1978

## EXECUTIVE SUMMARY

Job shortage in the United States is the most important consequence of our recent decline in technological innovation. Jobs are at the heart of American society, but we don't have enough of them, and we aren't creating new ones fast enough, particularly skilled jobs.

The shortage of jobs underlies our blighted inner cities and proverty stricken rural areas where residents, reliant on welfare, are bereft of the means to regain control of their personal lives to rise above the squalor. It also underlies the unemployment rate of nearly 35 percent for minority teenagers. This means a paucity of career opportunities that will attract their commitment to self-improvement programs as realistic alternatives to lives dominated by despair, desolation, and crime.

The ability of our economy to carry out technological innovation -- to introduce commercially successful new products, services, and processes -- is the foundation of both our domestic prosperity and our international competitiveness. Because innovation is such a key factor in our economy, it supports much of our real economic growth, which in turn permits a rising standard of living and provides a solution to the stubborn problem of stagflation -- rising prices combined with high unemployment.

Internationally, our historic preeminence in technological innovation is being challenged by other industrial nations, Japan and West Germany in particular. The challenge is explicit. It is shown clearly by recent trends in several international economic indicators -- the falling value of the dollar, our declining share of world exports, and our negative trade balances in manufactured goods. Continuation of these trends promises the loss of U.S. leadership in technological innovation and a further deterioration of our economic health.

Given their brilliant performance of the 50's and 60's small businesses* again could play a major role in providing more jobs and

* Throughout this report small businesses are defined as those that have less than 500 employees, are not majority owned by larger firms, are operated for profit, and are involved in the creation or creative use of new knowledge, products, processes, or services. Activities related primarily to real estate transactions are excluded.

make significant contributions to the solutions of the underlying problems of our economy. The performance of the small business sector could be stimulated to provide these benefits by changes in federal policy and commercial practices and without increases in federal budget support. Whatever early losses in federal revenues they may cause are expected to be offset by subsequent gains from the resulting spurt in economic activity.

Throughout most of our history, small enterprises have produced many of our best jobs; a large proportion of the new products and services that have made us the world's leading nation in science, engineering, and technology; and a steady supply of creative entrepreneurs. But the contributions of small firms have sharply declined over the last decade. We believe the underlying causes are mainly certain growth-inhibiting government policies.

One is the increase in capital gains taxation, which has greatly reduced the availability of capital for small businesses. Another is increased regulatory barriers inhibiting the access of small firms to the capital market. A third is the continuing concentration of research and development effort in a few industries and in relatively few firms within those industries, and little incentive to diffuse technologies.

Increased technological innovation appropriate to the small family farm and food processor is also needed. Rising costs of energy, plateauing productivity of major food crops, increasing scarcity of water, continuing high levels of pollution, and decreasing fertility from erosion mandate that small farms and food processors also be made significant and lower-cost contributors to the nation's food supply.

The overall objectives of the recommendations in this report are:

1. To assure that the small enterprises regain their previous economic vitality, and

2. To foster the viability of the small family farm and small food processor through development and application of technologies that require less capital and fossil fuel, and are more conserving of other natural resources.

The following 12 recommendations are directed to changes in federal policies and commercial practices in five categories:

- Increasing the availability of capital and management expertise in small businesses (Recommendations 1-5).

- Reducing the burden on small businesses of compliance with government regulations (Recommendation 6).

- Stimulating the diffusion to and more effective application by small businesses of the technology developed in government laboratories and large businesses (Recommendations 7 and 8).

- Increasing the amount of R&D performed by small businesses and its utility to small farms and food processors (Recommendations 9, 10, and 11).

- Stimulating the export performance of small businesses (Recommendation 12).

While we recognize the potential significance to small businesses of issues relating to the U.S. patent system and federal patent policy, we exclude recommendations for policy changes in this area because it is under active review by the Domestic Policy Review on Industrial Innovation and by the Committee on Intellectual Property and Information of the Federal Coordinating Council for Science, Engineering, and Technology.

The complete text of each recommendation follows:

Recommendation 1.

We recommend that the capital gains tax rate be reduced to 25 percent (the pre-1969 rate) on the capital gains realized from the sales of stocks of small businesses (less than 500 employees at date of purchase) whenever such stocks have been held for more than three years, with a rate of 10 percent for the capital gains of investors in the smallest businesses (less than 100 employees at date of purchase). The reduced rates would not apply to capital gains realized from the sale of real estate. (Pages 15-18)

Recommendation 2.

We recommend deferral of capital gains taxes on the sales of stock if the proceeds are reinvested within one year in small businesses, except those whose principal activities are real estate transactions. (Pages 18-19)

Recommendation 3.

We recommend that the threshold for application of the full corporate tax rate of 46% be raised for small businesses from $100,000 to $200,000 of annual net income; and for annual net income below $200,000 a progressive rate schedule beginning at 10% on the first $50,000, and increasing in 10% increments to $200,000 on each additional $50,000. In addition we recommend that the carry-forward provisions for start-up losses of small businesses be extended from five to ten years. (Pages 19-20)

Recommendation 4.

We recommend restoration of the Qualified Stock Option Plan for Key Employees of small businesses. (Pages 20-21)

Recommendation 5.

We recommend (1) that ERISA's prudent man standard be restated so that it is clearly applicable to the total portfolio of pension fund investments rather than individual investments, and (2) that pension fund managers explicitly be permitted to invest up to five percent of pension fund assets in small firms. (Page 21)

Recommendation 6.

We recommend that small businesses be allowed to deduct twice their payments for regulatory advisory services related to compliance with federal, state, and local regulation. (Pages 22-23)

Recommendation 7.

We recommend that each federal agency allocate five percent of its R&D funds for technology transfer. These funds should be used to establish well defined and organized programs of technology transfer

in which there are incentives to individual researchers to contribute their time and skills to the identification of commercial applications. Such incentives should be related to the benefits realized from technology transfer. (Pages 23-26)

Recommendation 8.

We recommend that private sector individual or corporate owners of technology be rewarded, through appropriate changes in the tax code, for selling, leasing, or licensing their technology to small business firms in the United States. In addition, we recommend the establishment of a voluntary national policy to encourage companies to make their technologies available for uses by others. (Pages 26-27)

Recommendation 9.

We recommend that each federal agency receiving R&D funds by appropriation from the Congress be required to allocate at least 10 percent of all such funds (excluding those for basic research) to small businesses and that this objective be achieved in annual one percent increments beginning in FY1980. (Pages 27-30)

Recommendation 10.

We recommend that small business firms be allowed to establish and maintain a reserve for R&D for use in times of financial stress. (Pages 30-31)

Recommendation 11.

We recommend that there be some redirection of federally supported agricultural research to the development of technology for improving the efficiency of small family farms and food processors and for making food production, transportation, and preservation less capital and fossil-fuel intensive. (Pages 31-33)

Recommendation 12.

We recommend that the creation of Small Business Export Trade Corporations be encouraged by a double deduction for these corporations of up to $100,000 of annual expenses associated with the exporting activities of each client, with a loss carry-forward of ten years. In addition, we recommend that small businesses be allowed a double deduction of special expenses of serving export markets up to $100,000 annually. (Pages 33-34)

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# I. INTRODUCTION

This report recommends changes in federal policies to increase the contributions of small, technologically innovative firms to our society. We define such firms as those that have less than 500 employees, are not majority owned by larger firms, are operated for profit, and are involved in the creation or creative use of new knowledge, products, processes, or services. We exclude throughout the report activities related primarily to real estate transactions.

The small business sector no longer contributes as much to economic prosperity as it so brilliantly did in the fifties and sixties. The loss is not just for the few that might have had the satisfaction of technological entrepreneurship; more importantly it is a loss for all Americans who would have shared in the abundant economic benefits and would have held the myriad of skilled jobs that such pioneering would have made possible.

More innovation means more skilled jobs for an increasingly educated population, an improved export performance, a higher rate of productivity improvement, and at least a partial solution to stagflation, a crippling combination of inflation and unemployment. Further, we desperately need more innovation to cope with both new problems and widely accepted national goals - - better central cities, safer and more satisfying work, a cleaner environment, and less dependence upon autocratically controlled overseas sources of energy supplies. We need to recognize the growing concern over the quality of life in our country - - concern that technological innovation is not focusing adequately on both life's necessities of food and housing and on the amenities that make life more enjoyable. We think commercially successful innovation is like good health: a society can never have too much.

Our concerns span the entire spectrum of requirements for successful innovation - - from the inception of the research and development (R&D)[1] to the widespread use of a new product, process, or concept. We look then well beyond research and development (that is, activities to create new knowledge or design) to encompass the introduction and diffusion of an invention through its commercial application that creates jobs, increases productivity, and adds to exports. Thus successful innovation requires a combination of market demand (need), technical feasibility, and commitment of financial support. This combination ultimately is manifested in the establishment of all of the producing and marketing facilities required for national and international distribution of the product or service. Hence, our report deals not only with the role of scientist, engineer, and inventor, but also that of the financier, the production craftsman, and the marketing person; all are involved in bringing an invention into widespread use.

[1]Research and development includes (1) basic research (acquiring scientific knowledge), (2) applied research (acquiring knowledge for potential application), and (3) development (designing special materials, devices, processes, and products).

We recognize that federal policies alone cannot cause small, technically oriented firms to flourish. Their existence depends on the entrepreneurial spirit that has been an integral part of our culture and institutions, and they have contributed importantly to our economic strength. Other industrialized countries do not have so large a sector of technically oriented small businesses, which explains in large part their historic lack in innovation. In recent years, however, they have recognized this deficiency and instituted policies to encourage the development of small technically oriented companies. At the same time, policy changes in the United States have had largely unintended adverse consequences.

Our recommendations are to reshape certain existing policies to make them less of a handicap to business, rather than to expand the government into new areas. We stress that our recommendations involve no increase in federal budgetary support, but they probably would cause an initial reduction in federal revenues.

The report is focused on what can be done: measures that will pay off to society. As a prelude to such recommendations, we believe it is important to review briefly what we regard as the present crisis in innovation and its consequences.

## II. CONSEQUENCES OF THE SLOWDOWN IN INNOVATION

The loss of the potential contribution of the small, technically oriented firm and more generally the decline in innovation in our economy have wide-ranging ramifications for jobs in the United States, our trade position, our productivity, the general performance of our economy, and our ability to meet the new problems our society faces.

### A. Jobs

Unemployment in the United States throughout the nineteen seventies has persisted at unacceptable rates (See Figure 1.). It is increasingly recognized as a stubborn problem that is not solvable by fine tuning of national fiscal and monetary policies. Nor is the creation of temporary and dead-end jobs in the public sector more than a palliative. Training programs go nowhere without viable jobs for their graduates.

Holding a meaningful skilled job is also recognized as the means of admission to most of the benefits of a prosperous society and to full citizenship in economic, social, and political life for an individual and his family. Alternating periods of unemployment and dead-end jobs leave their scars on successive generations.

Finally, the concentration of unemployment and underemployment among particular groups and localities means explosive social problems. The consequences of unemployment spread through the neighborhood to encompass its small businesses, its public services, and its education system so as to poison the social atmosphere of sections of our country.




SOURCE: 1960–69, INTERNATIONAL ECONOMIC REPORT OF THE PRESIDENT, WASHINGTON, 1977, p. 146
1970–77, ECONOMIC REPORT OF THE PRESIDENT, WASHINGTON, 1978, p. 291

Figure 1. Unemployment in the United States, 1960-77, in Percent of All Workers

The solution must be found in job creation - - particularly skilled jobs - - in the private sector. Innovation plays a key role, for high employment has been associated with the development of new industries and products, founded on new technology; and small businesses have an impressive record of creating new jobs through new technology. A previous study for the Commerce Technical Advisory Board found that from 1969 to 1974 employment increased at an annual rate of only 0.6 percent in a sample of large mature companies, at a rate of 4.3 percent in established but innovative companies, and at a rate of 40.7 percent in young high technology companies.[2] (See Figure 2.) Of course, the success of new products may result in the displacement of old products. Still the process of innovation - - the adding of new products to the economy - - stimulates demand and investment. It permits noninflationary growth in overall demand and offers escape from the dilemmas of continuing stagflation.

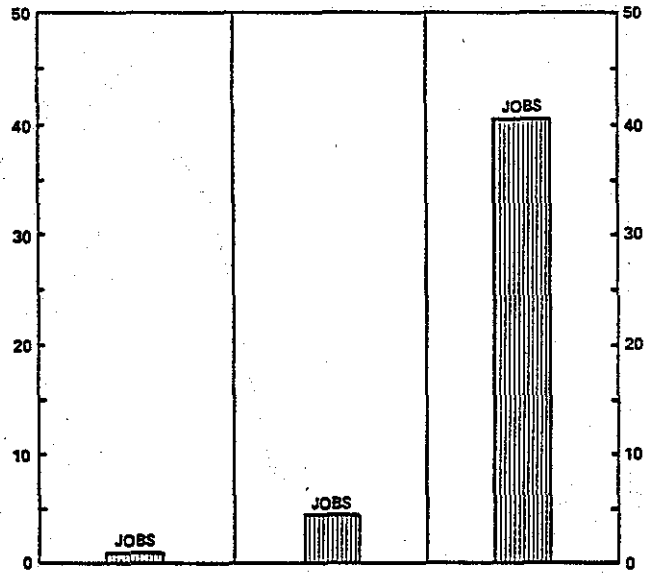
B. Export Performance

The strength of the dollar rests ultimately on our success as a trading nation. The postwar pattern in U.S. trade is a relatively simple one. We have deficits - - more imports than exports - - in minerals, fuels, and other raw materials as well as in less technologically intensive manufactured products such as textiles and shoes. We cover these deficits by surpluses - - more exports than imports - - in such technologically intensive products as aircraft, chemicals, and electronics. Also contributing significantly to the surplus is trade in agricultural products. Much of our success in agriculture is based on the high level of innovativeness displayed by American farmers and their supplying industries, underscoring the importance of including small farms and small food processors within the concept of innovative small businesses.

While our trade in agricultural products continues to provide a significant surplus (See Figure 3.), the recent record of trade in manufactured products is depressing. As shown in Figure 4, the U.S. share of world exports of manufactured goods has dropped alarmingly over the past 20 years. Traditionally, we have been a net exporter of manufactured products, but our imports of such products by 1972 grew to exceed exports, creating one of the factors in the U.S. devaluation decision. With the price advantage

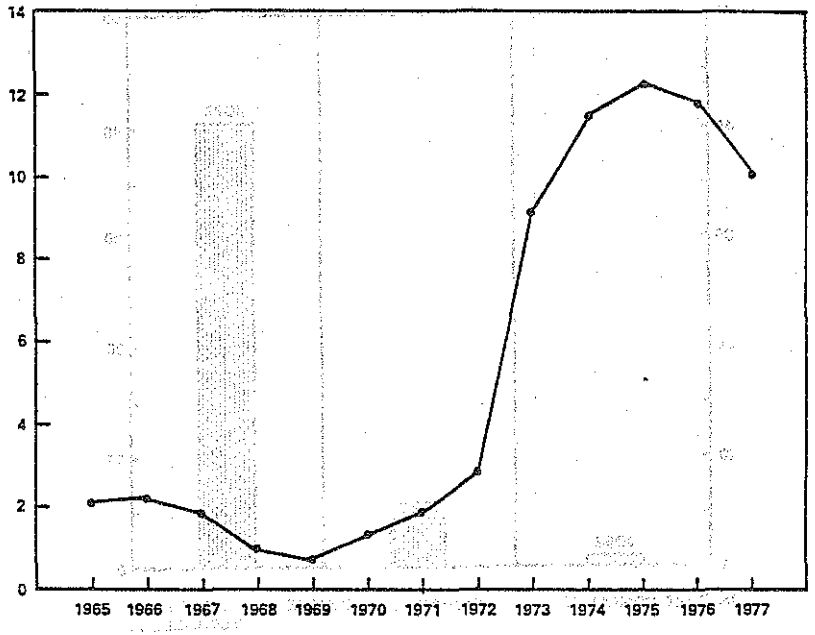
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[2] The Role of New Technical Enterprises in the U.S. Economy (A Report of the Technical Advisory Board to the Secretary of Commerce, 1976) Appendix A. See also the statement of Dr. Edwin V.W. Zschau, Chairman, Capital Formation Task Force of the American Electronics Association, before the Senate Select Committee on Small Business, February 8, 1978.



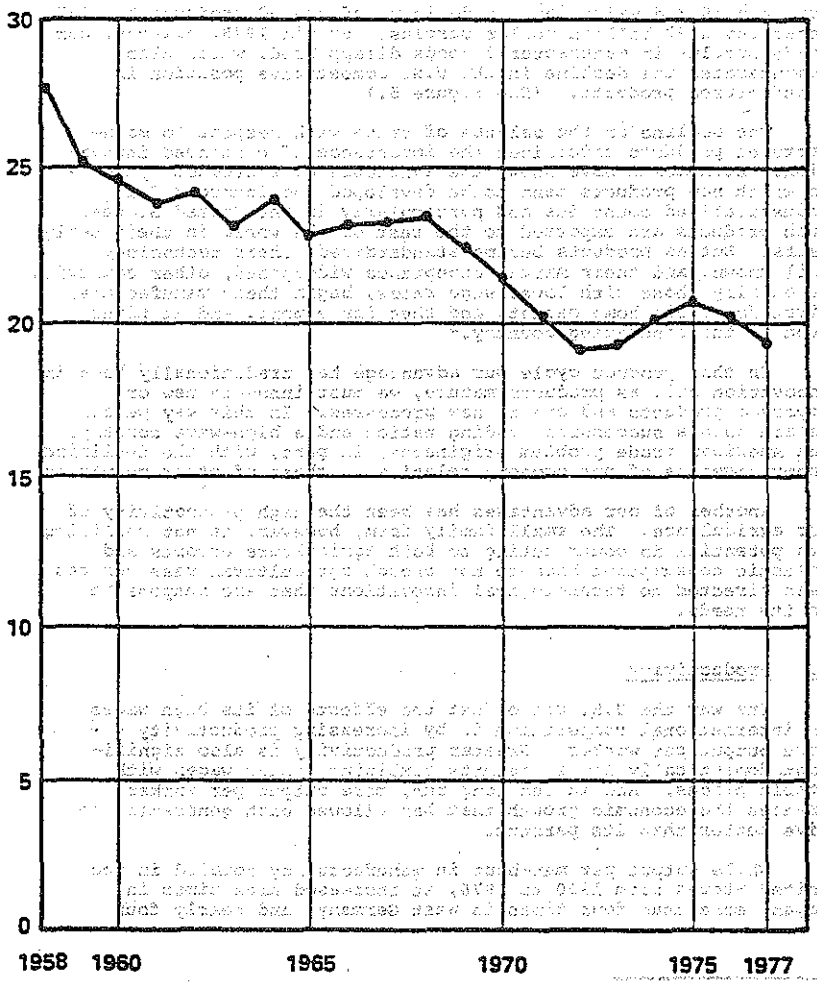

SOURCE: THE ROLE OF NEW TECHNICAL ENTERPRISES IN THE U.S. ECONOMY. A REPORT OF THE COMMERCE TECHNICAL ADVISORY BOARD TO THE SECRETARY OF COMMERCE, JANUARY 1976, p. 2.

Figure 2. Average Annual Growth of Jobs in Innovative Companies, Mature Companies, and Young High Technology Companies, 1969-74, in Percent (Compounded)




SOURCE: 1965–76: INTERNATIONAL ECONOMIC REPORT OF THE PRESIDENT, JANUARY 1977, p. 151. 1977: U.S. DEPARTMENT OF COMMERCE, OFFICE OF INTERNATIONAL ECONOMIC RESEARCH.

Figure 3. U.S. Foreign Trade in Agricultural Products, 1965-77 (Balance in Billions of Dollars)




SOURCE: COMMERCE AMERICA, JUNE 19, 1978, p. 9.

Figure 4. U.S. Share of World Exports of Manufactured Goods, 1958-77, in Percent

from the 1973 devaluation, trade in manufactured products by 1975 generated a 22 billion dollar surplus. By mid-1978, however, our trade surplus in manufactured goods disappeared, which also demonstrates the decline in the U.S. competitive position in manufactured products. (See Figure 5.)

The decline in the balance of trade with respect to manufactured products underlines the importance of continued innovation. Economists have shown the existence of a product cycle in which new products tend to be developed and introduced in industrialized countries and particularly in the United States. Such products are exported to the rest of the world in their early years. But as products become standardized, their technology well known, and their market acceptance widespread, other countries, especially those with lower wage rates, begin their manufacture, first for their home market, and then for export, and at times even to the innovating country.[3]

In this product cycle our advantage has traditionally been in innovation and, as products mature, we must innovate new or improved products and create new processes. In this way we can remain both a successful trading nation and a high-wage country. The American trade problem originates, in part, with the declining innovativeness of our economy relative to those of other countries.

Another of our advantages has been the high productivity of our agriculture. The small family farm, however, is not realizing its potential in contributing to both agriculture exports and domestic consumption because not enough agricultural research has been directed to technological innovations that are responsive to its needs.

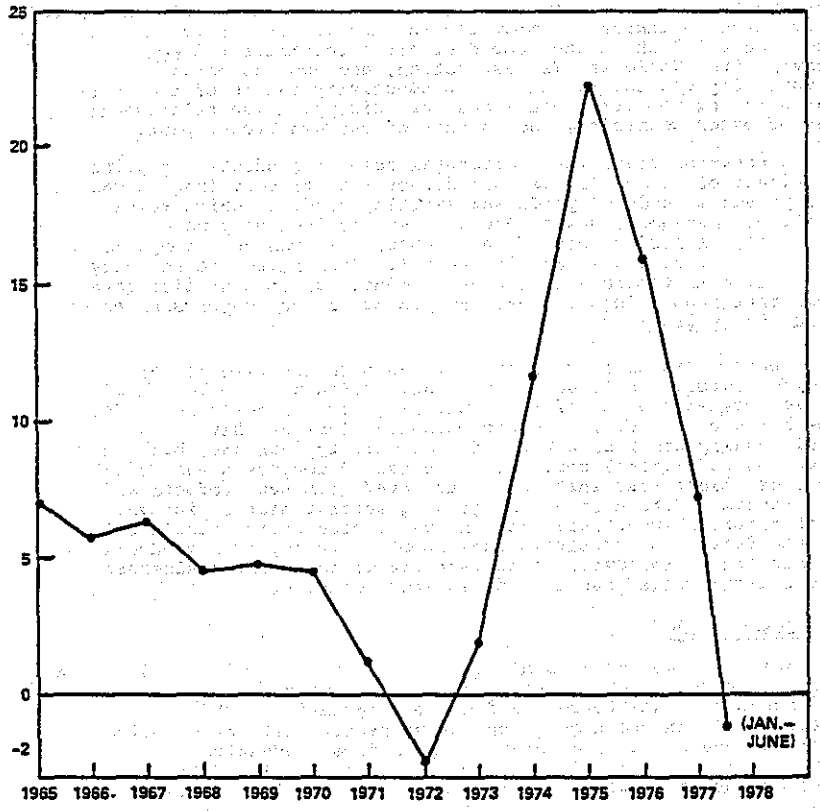
C. Productivity

One way the U.S. can offset the effects of its high wages in international competition is by increasing productivity - - more output per worker. Greater productivity is also significant domestically for it permits combining rising wages with stable prices. And in the long run, more output per worker creates the economic growth that has allowed each generation to live better than its parents.

While output per man-hour in manufacturing doubled in the United States from 1950 to 1976, it increased nine times in Japan, more than four times in West Germany, and nearly four

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[3]Raymond Vernon, "International Investment and International Trade in the Product Cycle, "Quarterly Journal of Economics, Vol. LXXX (May, 1966).




SOURCE: 1965–76: INTERNATIONAL ECONOMIC REPORT OF THE PRESIDENT, JANUARY, 1977, p. 152. 1977–78: U.S. DEPARTMENT OF COMMERCE, OFFICE OF INTERNATIONAL ECONOMIC RESEARCH.

Figure 5. U.S. Foreign Trade in Manufactured Goods, 1965-78 (Balance in Billions of Dollars)

times in France. Among the industrialized countries, only the United Kingdom had an increase comparable to that in the United States. (See Figure 6.) While the record of other countries reflects a recovery from World War II destruction, and some catch-up in productivity was inevitable, the productivity record of the United States during the last decade has been disappointing relative to that of other countries, and to that of our own recent past.

Innovation plays the fundamental role in productivity gains. The effect of innovation is most direct with process innovations -- improved methods of producing existing products which raise output per man-hour. New products affect productivity more indirectly. A new product of one industry -- such as a computer, a machine tool, or a new material -- will often raise productivity in the firm that purchases the new product. Various studies have shown that innovations in these two forms are the major sources of productivity growth.[4]

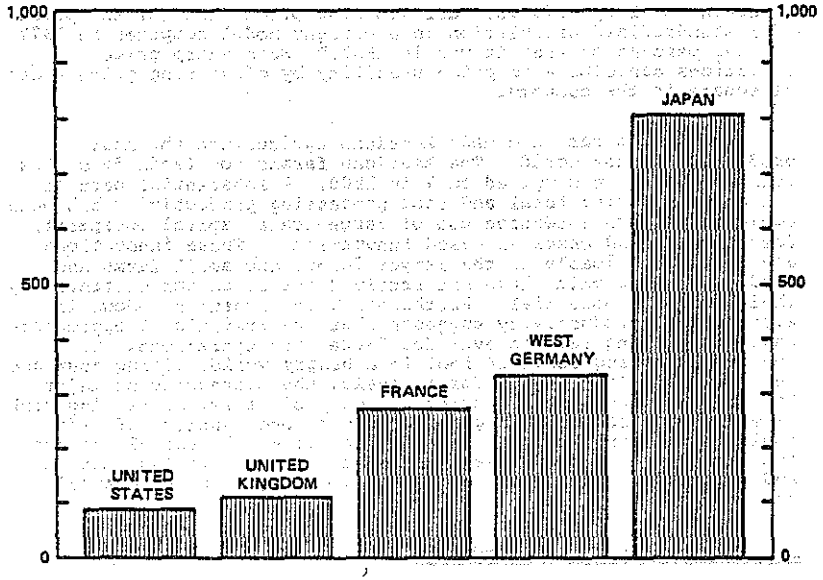
Another factor in productivity has been the rise of the service sector. While services broadly defined were about half the economy at the end of World War II, services now account for two-thirds of the U.S. economic output.[5] Services have traditionally had a slow rate of productivity increase, but the reduction in clerical costs with the use of computers and office machines illustrates what can be achieved with new products and new methods. With a large and growing service sector, innovation is of critical importance both in the service sector itself and in the manufacturing industries that supply both improved products and new ones. Moreover, in the service sector small businesses play a larger role than they do in manufacturing.

D. Stagflation

While the causes of stagflation are not well understood, there is evidence that a declining rate of innovation compounds and intensifies the forces leading to stagflation. This is because it is in the highly innovative sector that marked price declines occur. To take three examples from innovative industries: (1) the price of the transistor by 1965 fell to one hundredth of its 1951 value, (2) the price of a long distance

[4]While productivity is often measured as output per worker, total factor productivity is a more comprehensive measure because it reflects the role of increased capital per worker. Again, however, innovation plays the key role in raising total factor productivity. See, for example, Edward S. Denison, Why Growth Rates Differ (The Brookings Institution, 1967), pp. 7-9.

[5]U.S. Department of Commerce, U.S. Service Industries in World Markets (1976), p. 7.




SOURCE: "OUTPUT PER HOUR, HOURLY COMPENSATION, AND UNIT LABOR COSTS IN MANUFACTURING, ELEVEN COUNTRIES, 1950–77," BUREAU OF LABOR STATISTICS, U.S. DEPARTMENT OF LABOR, MAY 4, 1978.

Figure 6. Output Per Hour in Manufacturing (Increase in Percent, 1950-76)

telephone call by 1970 was half its 1950 price, and (3) the price of a standardized calculation on a current model computer in 1977 was one percent of what it was in 1957.[6] Such sharp price reductions contribute to price stability by offsetting price rises elsewhere in the economy.

Innovation has also made American agriculture the most productive in the world. The American farmer now feeds 55 of his fellow countrymen compared to 7 in 1900. A substantial part of the gain in agricultural and food processing productivity has been achieved through intensive use of large-scale capital equipment, fossil fuel, and chemical based innovations. These innovations are mostly applicable to the larger farms, and small farms and food processing units have not received the attention warranted by their economic potential. Furthermore, the recent slowdown in agricultural productivity suggests that the traditional approaches have diminishing returns even for large farm operations. The inexorably rising costs of food in a hungry world, rising cost and uncertain availability of fossil fuels, the plateauing of major food crop productivity, growing scarcity of water, continuing high rate of soil erosion, and growing concern over quality of life indicate that innovation in agriculture is still urgently needed but with a redirection toward technologies that are less capital and fossil-fuel intensive and more conserving of other natural resources.

## E. Innovation and New Problems

Today the economy is faced with challenges of achieving a better environment, renewing blighted inner cities, developing alternative sources of energy, and conserving energy and resources. Small innovative enterprises can play important roles in all of these areas, especially in rebuilding inner city communities.

With innovation, new opportunities and options become available for new, technically oriented, small businesses in revitalizing inner city communities. These include new types of building design, construction, and renovation; installation and maintenance of solar energy devices; urban farming and small-scale food processing; specialized computer-based education training centers; technology application centers; health care centers; and private delivery of welfare services. Widespread participation in small enterprises gives control to residents of the inner city and provides them the long-absent economic opportunity and incentives for success. Most importantly, urban revitalization that is based on diverse profitable enterprise rather than a host of public programs will provide a community the means of being self-sufficient and responsive to changing needs from within.

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[6] Data for 1 and 2 from Burton Klein, Dynamic Economics (Harvard University Press, 1977) pp. 130 and 138; for 3, Control Data price/performance records on central processing units.

## F. The Unnoticed Crisis

By its nature a decline in innovativeness is not readily perceived. We do not see this crisis the way we see the urban decay or the lines at the employment office. But we think this unnoticed crisis underlies in large part our visible crises.

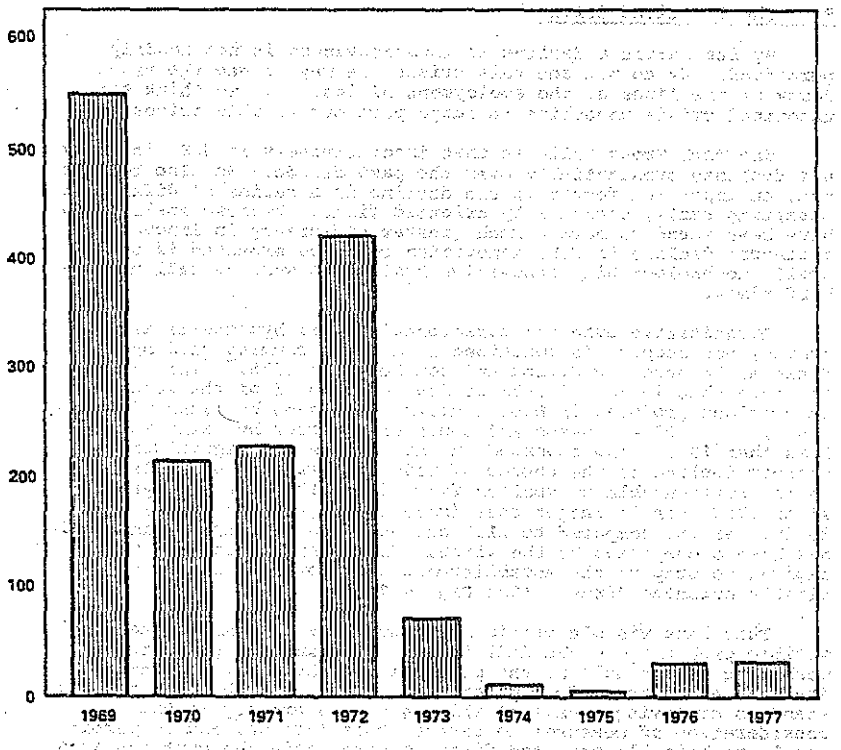
The Work Group believes that innovativeness in U.S. industry has declined substantially over the past decade. We also believe that an important factor in the decline is a series of difficulties besetting small, technically oriented firms. Because small firms have been found to have a much greater efficiency in innovation, a general decline in U.S. innovation could be expected if our small, technologically innovative businesses were to fall upon hard times.

Quantitative evidence corroborating this hypothesis is scarce, but support is contained in a study commissioned by the National Science Foundation and completed in 1975.[7] The study reported that in the 1953-73 period, about half of the major innovations produced in U.S. industry were made by firms with less than 1,000 employees and about one-quarter by firms with less than 100. Also reported in the study was a significantly sharper decline in the number of major innovations per sales dollar attributable to smaller firms (less than 100 employees) since 1967 than in larger ones (more than 1,000 employees): 33 1/3 percent compared to 21.1 percent. The decline in innovation has been accompanied by the virtual disappearance of seed venture capital to support the establishment and growth of small, technically oriented firms. (See Figure 7.)

This less visible crisis may contribute to some of the more visible problems - - the deficit in the balance of payments and weakening of the dollar, the productivity slowdown, and the devastating effects of stagflation on jobs, urban blight, and our standard of living - -all of which gives an urgency to the consideration of measures to reverse this decline, and to permit small, technically oriented firms to make again the contributions to the economy they achieved in the fifties and sixties. It is to these recommendations that we now turn.

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[7] William K. Scheirer, Small Firms and Federal R&D (Washington) p.9. See also Richard O. Zerbe, Jr., "Research and Development By Smaller Firms", Journal of Contemporary Business, Spring 1976.




SOURCE: REPORT OF THE SBA TASK FORCE ON VENTURE AND EQUITY CAPITAL FOR SMALL BUSINESSES, U.S. SMALL BUSINESS ADMINISTRATION, JANUARY 1977, p. 13 (1969–75); GREYLOCK MANAGEMENT CORP. (1976–77).

Figure 7. Number of Small Company Public Issues, by Years

## III. RECOMMENDATIONS FOR RESTORING AND ENHANCING THE VITALITY OF SMALL TECHNICALLY ORIENTED BUSINESSES

### A. Increasing the Availability of Capital

Access to the public securities market for all business firms is controlled by regulations of the Securities and Exchange Commission. Full compliance with these regulations, which is necessary to protect the interests of investors, can be excessively burdensome to business firms, and especially so to small business firms. In recognition of this principle, the SEC created Regulation A, which facilitates small securities offerings by exempting them from the costly and time consuming requirements of full registration. Over time, the value of the exemption was reduced markedly because of inflation. The SEC has, however, recently raised its ceiling and also modified Regulations 144 and 146 so as to facilitate the sale of equities in small businesses by major stockholders. With these changes in securities regulation, the major barrier hindering access to the securities market by small businesses lies in the tax laws. It is to be hoped that the SEC will review its regulations on a regular basis and revise them periodically so as to minimize their adverse impact upon small businesses.

SEC regulations are one illustration of the way government policies shape the structure of capital markets. Actions of other government agencies also have an impact. We believe that the combined effect of policy changes over the past decade has served to place small companies at a disadvantage with respect to access to capital markets.

Policy changes have also made the climate for investment in small businesses more unpredictable. Small operations are inherently fraught with uncertainty, and abrupt changes in government policy compound these uncertainties, making investment in small businesses excessively risky.

We believe government policy must create a more favorable and predictable climate for small business investment. Towards this goal, we recommend five specific actions that reverse the trend of placing small businesses at a disadvantage in obtaining capital and key personnel.

1. Taxation of Capital Gains

Changes in capital gains taxation are probably more responsible than any other factor for the deterioration in technological entrepreneurship that has occurred in the United States during the last decade. Such changes successively have lowered after-tax returns for successful innovation to a level where now, technologically innovative firms no longer are able to attract adequate investment. The present level of capital gains taxation has become a critical constraint on the founding and expansion of small, technically oriented firms.

Engaging in industrial innovation is inherently risky because uncertainties of development of new technology are compounded by uncertainties of market acceptance of new products, processes, and services. At the same time innovation is a capital intensive activity, not because it requires such massive investment as steel and chemicals, but because of the time lag between launching a development and its large-scale market acceptance. Capital is required to cover the expenditures for start-up costs before revenue begins to be realized. Such capital is forthcoming only when potential investors believe that the after-tax returns will be adequate to cover the risks. The problem of adequate rewards, however, is not just one for capital; key management and technical personnel traditionally have been compensated for the personal risks in joining uncertain ventures by sharing in the fortunes of the firm rather than by salary payments. In our free enterprise system successful technical entrepreneurship creates the economic values. These, in turn, are reflected in the rise in stock prices of the enterprise and realized by investors and key individuals by the sale of their stock in such enterprises. Thus the after-tax capital gain is the critical incentive for technical innovation by small firms.

Since 1970, the tax on capital gains has increased dramatically. Prior to 1969, the maximum capital gains tax rate paid by individuals was 25 percent. The Tax Reform Act of 1969 increased that rate to a maximum of 40 percent -- a 35 percent rate on the capital gains themselves and an additional 5 percent possible from the operation of the minimum tax. Legislation also reduced the tax on earned income from a maximum rate of 70 percent to 50 percent.

Thus the differential between the taxation of salaries and capital gains narrowed from 70 percent on salaries and 25 percent on capital gains to 50 percent and 40 percent respectively.[8]

The Tax Reform Act of 1976 provided for further increases in the minimum tax and also raised the maximum rate on capital gains to 49.5 percent. These changes virtually eliminated the differential between the rates on earned income and capital gains. The effect of these changes was further compounded by a high rate of inflation which produced significant capital gains in current dollars, and hence capital gains taxes, for assets whose value after adjustment for inflation had actually declined. The impact of such changes in taxation has been dramatic for the small, technically oriented firms in which the prospect of capital gains has been the major incentive for investors. Therefore, we place the highest priority on a capital gains tax reduction targeted on small, technically oriented firms.

We consider such tax reduction a preferred method of improving the availability of capital to small, technically oriented firms. By increasing the rewards for successful ventures, an incentive is provided to manage such enterprises in an efficient way, leaving to the marketplace the distribution of the incentives among firms. Thus such an approach is preferable to the provision of loans or other federal financing to small firms, an approach that would thrust upon the federal government the difficult task of deciding among promising loan applicants. We recognize that our proposal might result in an initial revenue loss to the federal government, but given the narrowly limited target of the proposed tax reduction, it would be a minimal one, and losses would be offset by the gains in employment and output from these successful firms.[9]

The 95th Congress recognized the negative consequences of the present high rate of capital gains tax by passing significant rate reductions. The legislation, however, does not restore the 1969 rates. Given the risks of small, technically oriented businesses we consider such a rollback essential for these firms to realize their potential in such vital areas as job creation. We also consider essential an even lower rate of 10 percent to attract investment in the smallest of businesses -- for example, those with less than 100 employees. Application of the lower rate would be determined by the size of the businesses at the time the investment was made and thus serve to attract capital to

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[8] Tax Policy, Investment and Economic Growth (A Report by Securities Industry Association, 1978) p. 63.

[9] Michael K. Evans. The Economic Effects of Reducing Capital Gains Taxes. Chase Econometrics Associates, Inc., April 1978. See also Tax Policy, Investment and Economic Growth, pp. 34-7.

new firms and to recognize the higher risk of investment in the smallest firms. We would exclude from the rollback all real estate activity, because such transactions do not have as high a potential for job creation as investment in other small businesses.

Recommendation 1.

We recommend that the capital gains tax rate be reduced to 25 percent (the pre-1969 rate) on the capital gains realized from the sales of stocks of small businesses (less than 500 employees at date of purchase) whenever such stocks have been held for more than three years, with a rate of 10 percent for the capital gains of investors in the smallest businesses (less than 100 employees at date of purchase). These reduced rates would not apply to capital gains realized from the sale of real estate.

2. Tax-free Exchange of Stock

Continued investment even in successful, technically oriented, small firms whose stock has risen in value usually remains risky. Stockholders have a propensity to diversify their investment. Under present tax laws often the most profitable way to diversify is through merger with a large firm, carried out by a tax-free exchange of stock. Investors find that equity shares of large firms are likely to be more liquid and represent a diversified set of economic activities. Yet this method of diversification tends to concentrate capital in larger firms.

We consider it important instead to have tax policies that encourage the use of capital in the start-up of new firms. At the same time we recognize that that investor's desire for diversification of his risk is a legitimate one. Therefore we would like to establish an alternate route for tax-free diversification of risk that would encourage the formation and growth of small firms by allowing the tax-free rollover of investment in one small firm to another such firm.

We think such a provision -- similar to the rollover provision on sale of homes -- would make funds available to new, small, technically oriented firms, precisely from the most knowledgeable and receptive investors -- those that have already participated in such ventures. It would remove the tax incentive for the premature sale of successful firms to large firms and thus serve to retain at least some of them as independent business entities during their dynamic early stages of growth. Further, it would allow the investor to diversify by holding stock in several small, technically oriented firms.

Essentially the same proposal was made in 1976 by the Tax Policy Task Force of the Small Business Advisory Committee on Economic Policy.

Recommendation 2.

We recommend deferral of capital gains taxes on the sales of stock if the proceeds are reinvested within one year in small businesses, except those whose principal activities are real estate transactions.

3. Taxation of Corporate Income and Tax Treatment of Start-up Losses

Taxation of Corporate Income. Not only have small businesses experienced great difficulty in obtaining capital in their start-up period, but they continue to have trouble finding capital for financing expansion during their early years of existence. Although quantitative data are not readily available, capital shortage is believed to contribute significantly to the high failure rate of small businesses.

Causes of capital shortages in business firms range over a broad spectrum, but in the case of small young companies that are bringing new products or services to market, current tax rates on net earnings are so high as to preclude establishing a solid financial base that is attractive to investors. The best and easiest way for small firms to achieve a sound financial base and adequate funds to support expansion is, of course, through retained earnings. Current tax rates on corporate earnings are not, however, sufficiently differentiated between small firms and large established corporations, although the reductions made by the 95th Congress in the corporate tax structure were a step in the right direction. Before the 1978 reductions, net earnings by all companies, regardless of size and age, were subject to a tax of 20% on the first $25,000 of net income, 22% on the next $25,000, and 48% on income over that amount. In 1978, Congress lowered these rates to 17% on the first $25,000 of net income, 20% on the next $25,000, 30% on income between $50,000 and $75,000, 40% on income between $75,000 and $100,000, and 46% on income over $100,000. Most states also collect income tax on small businesses, and many in addition impose taxes on dividends to stockholders.[10] We believe small businesses would have better chances for survival and growth if the tax rates on net earnings were reduced further.

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[10] Tax Review, Vol. XXXVIII, No. 12, December 1977, p. 47.

Tax Treatment of Start-up Losses. The established corporation is provided a tax incentive for innovation in that its expenses for the early phases of innovation are a deduction from its corporate income tax. The new firm cannot obtain the same tax benefit since it lacks profits from which losses can be deducted. Such losses can, however, be carried forward and charged against income in subsequent years, but only within a five-year period. Some of the most advanced and promising technology has a longer gestation period and so does not yield profits within this five-year span to which earlier losses can be offset. In such cases there is a tax bias against the smaller firm as compared to the large firm. We believe this tax bias should be eliminated.

Recommendation 3.

We recommend that the threshold for application of the full corporate tax rate of 46% be raised for small businesses from $100,000 to $200,000 of annual net income; and for annual net income below $200,000 a progressive rate schedule beginning at 10% on the first $50,000, and increasing in 10% increments to $200,000 on each additional $50,000. In addition we recommend that the carry-forward provisions for start-up losses of small businesses be extended from five to ten years.

4. Qualified Stock Option Plan for Key Employees

Small, innovative companies depend upon stock incentives to attract and retain key employees because they cannot afford the high salaries paid by larger companies. Small companies tend to go through a growth cycle where, in the early stages, technical knowhow is the dominant skill required. In due course, commercial products or services are produced from this knowhow, but the number of customers is small. Later, as market opportunities expand and production grows, new requirements develop: how to manufacture and market products on a larger scale and how to organize and operate efficiently more complex activities. This stage requires managerial talents that are more likely to be found in larger firms than in smaller ones.

The problem, then, is how to attract experienced managers from larger companies. Prior to 1976 a widely used and successful incentive was an Incentive Stock Option, which allowed a key employee the following choice: If he chose not to be taxed in the year of grant on the then value of the stock, he could defer payment of tax from the exercise date of the option to the earlier of (1) the year of sale of the underlying stock or (2) ten years after the grant of the option. The Tax Reform Act of 1976

eliminated this option. Consequently, the current law unduly penalizes key employees of smaller companies who must sell optioned stock at the time of option exercise in order to pay the required tax, yet are unable to sell the stock obtained from exercising the option because of the limited or illiquid market for the stock.[11]

Recommendation 4.

We recommend restoration of the Qualified Stock Option Plan for Key Employees of small businesses.

5. Pension Fund Investment

Funds available for investment are increasingly under the control of institutional investors. Pension funds are a leading example, and their assets are now about $200 billion. The managers of such funds are subject to ERISA regulations, and a conservative interpretation of these regulations requires the fund managers to limit their equity investment to stocks of blue chip firms traded in large volumes on public exchanges. Amending ERISA regulations could open up a new source of funds for small, technically oriented firms. We find much merit in the recommendation of a 1976-77 Small Business Administration Task Force on Equity Finance that ERISA be amended in such a way as to increase the availability of capital to new, small, innovative firms without jeopardizing the safety of pension plan investments.[12]

Recommendation 5.

We recommend (1) that ERISA's prudent man standard be restated so that it is clearly applicable to the total portfolio of pension fund investments rather than individual investments, and (2) that pension fund managers explicitly be permitted to invest up to five percent of pension fund assets in small firms.

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[11]"A Program of Tax Revision Proposals to Enhance Capital Formation for Growth Businesses", National Venture Capital Association (NVCA), Washington, D.C. May 1, 1977, pp. 9-11. Also see pp. 34-36 of Technological Innovation: Its Environment and Management, U.S. Department of Commerce, Washington, D.C., 1967, sometimes referred to as the Charpie Report, for a discussion of the merits of liberalized stock options for small firms.

[12]Pages 14 and 15 of the cited report.

B. Reducing the Burden of Regulation

Small businesses, along with large businesses and non-profit institutions, have been burdened by the recent expansion of both federal and state regulations. Some of the recent regulations -- those for occupational safety and health and for environmental protection -- have impacted most businesses. Others -- those for food and drugs and auto safety -- have applied to specific industries. We understand the social concerns that led to such regulations, and we are aware that both federal and state governments are reviewing whether current regulations are the most cost-effective way of dealing with these societal problems. For example, the Interstate Commerce Commission is relaxing its rules against shippers with their own trucking operations to seek for-hire traffic to eliminate otherwise empty back-hauls. We also recognize that the balancing of social gains and economic losses in assessing regulation is a complex task, ill-suited to a work group focussing primarily on the job-creating potentials of innovations by small, technically oriented businesses.

We note, however, that innovations -- because they involve new products, services, and processes -- are likely to encounter considerable regulatory uncertainty.[13] Such uncertainty is particularly burdensome to small businesses because they lack the specialized staff of large businesses to cope with the regulatory maze. As a result the task of regulatory compliance is likely to fall upon the already over-committed line management of small businesses. Ultimately it reduces their competitiveness both in domestic and foreign markets. A partial solution lies in the creation of regulatory advisory services, themselves largely small profit-making businesses, which can develop computer data bases and an expertise for coping more effectively and efficiently with the complexity of government regulations than individual small businesses. Such a service can save the time of small business management and reduce the cost of compliance.

To encourage the formation of such firms as well as to recognize that even the services of advisory firms will only reduce, but not eliminate, the burden of regulatory compliance on small businesses, we consider it desirable that more than the deduction of the actual business expense be permitted for payment to regulatory advisory firms. Furthermore, as a matter of good government, we think the cost of regulatory compliance for small businesses should be highlighted in government decision making by a tax deduction that exceeds the actual expense.

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[13]George S. Lockwood, Founder and General Partner, Monterey Abalone Farms, "An Address to the Third Annual Colloquium or Research and Development Policy," American Association for the Advancement of Science, Washington, D.C., June 21, 1978.

Recommendation 6.

We recommend that small businesses be allowed to deduct twice their payments for regulatory advisory services related to compliance with federal, state, and local regulation.

C. Improving the Diffusion and Application of Technology

There exists in the United States an enormous volume of information and technology in the laboratories of universities, government, and business. Much of it lies dormant; little is transferred from one of these huge knowledge reservoirs to another, and even less from the reservoirs for transformation into new products and services that serve societal needs.[14] This is social waste: knowledge is one resource whose use by one individual does not preclude its use by another. And for individuals to rediscover what is already known is costly to both the individual and society. We lack well-defined programs to encourage the widespread use of existing technology. We propose such a program that focuses on both the public and private sectors and, as will be emphasized repeatedly, is vital to small business.

Diffusion of technology is particularly important because our nation's R&D efforts are so concentrated as to limit their application to only a few sectors of the economy. Besides important concentrations in federal laboratories and universities, the largest firms in our economy account for much of the organized industrial R&D, especially in the chemical, electronic, aeronautical, and pharmaceutical industries. Small business cannot afford self-sufficiency in technology, and our society can ill afford to let technology lie idle.

1. Technology Transfers from Federally-Sponsored R&D

Universities. The present level of research effort is approximately $5 billion -- nearly 70 percent of which is financed by the federal government.[15]

The main reasons for the small amount of technology flowing into industry include lack of:

1. Well-defined programs and funds to implement technology transfer.

2. Incentives for faculty researchers to seek beneficial commercial applications for research results and to participate in technology transfer programs through personal linkages with users in industry.

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[14]Russel L. Ackoff and others, Designing a National Scientific and Technological Communication System, University of Pennsylvania Press, 1976, pp. 109-153.

[15]National Science Foundation, National Patterns of R&D Resources, National Science Foundation 77-310, pp. 10 and 2.

3. Attention to needs of industry.

4. A positive government patent policy that stimulates private industry to commercialize inventions by transferring rights instead of retaining patent rights in most cases.[16]

Through the establishment of a well-defined technology transfer program, technology flow into small business can be substantially increased. One important element is commercially available, computer-based information storage and communication systems. Massive amounts of information can be stored in the computer memory and quickly recalled. By including two types of information in the data bases -- one consisting of descriptions of technologies in terms that show prospective buyers the kinds of problems the technologies will solve, and the other describing the problems that are to be solved -- interaction can be facilitated between providers and users of technology.

Specifically, when an idea for innovative technology occurs to a scientist during the course of a university research project, he lists it with a commercial, computer-based communications technology data base service. Conversely, those seeking innovations use the same service to obtain information about technologies that may satisfy their needs. This interaction not only greatly increases the chances that the idea will be used, but more importantly it makes innovation possible in response to a combination of market pull and technology push instead of just technology push. Experience teaches that the most successful and least costly innovations are those where there was early linkage between the idea and the needs of the marketplace, because the development could be properly guided through interaction between researchers and users.

Funding for technology transfer programs should be included as part of each government research project grant. The amount recommended is five percent of the total project funding, a small amount in relation to the expected benefit to society.

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[16]Remedies for this serious deficiency were not addressed by this Work Group because it is being addressed by the Committee on Intellectual Property and Information, which was established by the Federal Coordinating Council for Science, Engineering, and Technology. The Committee is in the midst of an effort to arrive at an agreed Carter Administration policy with respect to the allocation of rights in patentable inventions resulting from federally-supported work done by nongovernmental persons. The Committee is chaired by Dr. Jordan J. Baruch, the Assistant Secretary of Commerce for Science and Technology. Its efforts are separate from, but to be coordinated with, the Domestic Policy Review on Industrial Innovation.

Within the university there should be a small administrative organization to help market the ideas for innovative technology. Royalties paid by industry should be divided among the university (to help defray administrative costs), the scientists originating the ideas, and those who are key in helping to find industrial uses.

Another way to encourage closer relationships between small businesses and universities is through having small businesses sponsor the research at universities just as large firms do presently. Such sponsorship could be expanded by allowing small businesses a double deduction from its income taxes.

Government Laboratories. The situation in government laboratories is much like that in universities. A key statistic is that the federal government spends over $1 billion annually to disseminate results of federally-funded R&D.[17] Yet it is frequently impossible or extremely difficult for either government or industry to get these results. Reasons for this are essentially the same as those listed for universities.

The government agency with the largest R&D budget and least effectiveness in technology diffusion is the Department of Defense. The low level of success is due to almost total reliance on documents produced by research and development projects as the means of transfer. Other government agencies relying solely on documents have the same low level of results.

NASA, through its technology utilization program, has made a greater and more diverse effort since 1962 to transfer its research results into commercial use. In addition to the dissemination of publications, NASA has established industrial applications centers that assist industry in acquiring information on NASA technologies. While the NASA program falls far short of what might be achieved, more technology is moved into industry than would be the case without the program.

The largest and most successful federal effort to diffuse technology has been the Extension Service of the Department of Agriculture. USDA field agents working at the county level throughout the United States and drawing from the Department of Agriculture sponsored research results make direct contact with individual farmers.

A final observation to be made on government and university technology transfer activities is that in all cases the process begins after the research and development program has been completed. As noted earlier, however, the most successful industrial innovations are those where there was an early linkage between the idea and the marketplace, so that the development can be properly guided.

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[17] See "Federal Management of Scientific and Technical Information (STINFO)" prepared for the Special Subcommittee on the National Science Foundation of the Committee on Labor and Public Welfare, U.S. Senate, February 1976, pp. 9-10.

We believe that there must be a change from the traditional and ineffective practice by most agencies of merely disseminating information as a means of technology transfer to the more comprehensive approach that has been outlined. Funding for implementing the comprehensive approach for technology transfer should be included as part of every government project -- five percent of the total project funds -- the same as for university projects. For comparison purposes, it should be noted that the U.S. Department of Agriculture Extension Service budget of $270 million is about 50 percent as large as the department's R&D budget of $500 million, and the NASA technology utilization budget is $9 million, or about 0.3 percent of the NASA R&D budget.

Therefore, our proposals focus on facilitating the transfer of technology from the concentrations in government laboratories, universities, and industry to small businesses, where it can often be applied to realize a larger share of its economic potential.

Recommendation 7.

We recommend that each federal agency allocate five percent of its R&D funds for technology transfer. These funds should be used to establish well defined and organized programs of technology transfer in which there are incentives to individual researchers to contribute their time and skills to the identification of commercial applications. Such incentives should be related to the benefits realized from technology transfer.

2. Technology Transfers Within the Private Sector

Another large store of under-utilized technology exists in business firms. Most firms use only part of their stock of technology in their own commercial activities, but the remaining, unused technology may have commercial applications elsewhere in our economy. Even more importantly, firms utilize technology in one product that may have applications to other products. Interfirm transfer of technology is constrained, however, by concern for proprietary protection. Much of this concern is unwarranted because even in the few areas of significant technological breakthroughs in recent years, the new technology was diffused so rapidly that any initial business advantage was soon lost. Thus, in most industries, a number of companies are selling the same basic product, differentiation being achieved by design features to improve user application and appearance. Hence, much of the technology of one firm can be used by others with little competitive threat. Given the benefits to society from increased technology transfer and in recognition of the added costs of marketing technology, we recommend that both financial and social incentives be used to stimulate large companies to make their technology available to small companies.

Financial Incentives. The most frequent method of transfer is through a licensing arrangement. Another way in which technology transfer occurs is through the spin-off of small businesses by large firms. We believe that such spin-offs will be encouraged by the capital gains rollback for small business as set forth in our first recommendation.

A large firm can use technology unrelated to its main activity as the basis for establishing a small business in which it takes a minority position. Its capital gains would be taxed at the lower small business rate just as for any other investor.

Both licensing and spin-offs need to be supplemented by greater incentives for business firms, large and small, to participate more actively in technology transfers, and these can be provided by changes in the tax code. It must be recognized that such transfers are costly, and both buyers and sellers must be able to perceive at least some chance that their costs for transferring their unused technology will be covered. Further, if they perceive the possibility of greater profit, their interest in transfer will be correspondingly greater.

Social Incentives: Social incentive would be provided by the community in the form of a consensus that large companies should make their technologies more available as part of their obligation to society. This is a reasonable gesture by any company, because all technology is in part a product of our educational system and diffusion of knowledge from the technical efforts of other organizations.

Recommendation 8.

We recommend that private sector individual or corporate owners of technology be rewarded, through appropriate changes in the tax code, for selling, leasing, or licensing their technology to small business firms in the United States. In addition, we recommend the establishment of a voluntary national policy to encourage companies to make their technologies available for noncompetitive uses by others.

D. Some Redirection of R&D Spending Towards Small Businesses and the Needs of Small Family Farms and Food Processors

While there has been widespread comment on the decline of U.S. R&D expenditures as a percent of our Gross National Product, this same trend has in recent years also occurred in such countries as France, the United Kingdom, and West Germany; the notable exception being Japan (See Table 1). The United States remains by far the largest money spender on R&D even if defense and space spending is excluded (See Table 2).

The Work Group does not contend that R&D spending in the U.S., in total or in the amount devoted to civilian needs, is either demonstrably deficient or excessive. We

do contend, however, that the amount spent by small firms is grossly inadequate. In 1975 only about three percent of our total national spending on R&D -- roughly $1 billion out of $35 billion -- was attributable to small firms. Funds from the federal government accounted for about two-thirds of this total -- the balance from small businesses themselves.[18] While this small proportion has prevailed for some time, we consider it disturbingly low in view of the impressive record of innovation by small businesses.

Table 1. Distribution of National R&D Expenditures in Selected Industrially Advanced Countries as a Percentage of GNP, 1961, 1967, 1972, and 1975.

| | 1961 | 1967 | 1972 | 1975 |
|---|---|---|---|---|
| United States | 2.74 | 2.91 | 2.43 | 2.32 |
| Canada | 1.01 | 1.33 | 1.17 | 1.20[E] |
| France | 1.38 | 2.16 | 1.83 | 1.48 |
| Japan | 1.45[E] | 1.55 | 1.89 | 2.00[E] |
| United Kingdom | 2.69 | 2.69 | 2.39 | 2.25[E] |
| West Germany | 1.20[E] | 1.97 | 2.31 | 2.25 |

Source: National Science Foundation. Science Indicators 1976, p. 184, except estimates, as noted.

[18] Scheirer, op. cit., p. 10.

Table 2. Estimated R&D Expenditures for Civil Purposes, 1975

(In billions of dollars)

| | Canada | France | Japan | U.K. | West Germany | U.S. |
|---|---|---|---|---|---|---|
| 1. GNP ($) | 152 | 338 | 493 | 229 | 425 | 1516 |
| 2. % R&D | 1.2 | 1.48 | 2.0 | 2.25 | 2.25 | 2.32 |
| 3. R&D ($) | 1.8 | 5.0 | 9.86 | 5.15 | 10.6 | 35.2 |
| 4. % R&D in Space and National Defense | 5.3 | 26.2 | 1.7 | 24.5 | 8.1 | 34.4 |
| 5. % R&D in Civilian Programs | 94.7 | 73.8 | 98.3 | 75.5 | 91.9 | 65.6 |
| 6. R&D in Civilian Programs ($) | 1.7 | 3.7 | 9.7 | 3.9 | 9.7 | 23.1 |

Sources: Row 1. World Military and Social Expenditures 1978, pp. 21-2.
Row 2. Table 2.
Row 3. Product of Rows 1 and 2.
Row 4. National Science Foundation. Science Indicators 1976, pp. 186-7.
Row 5. 100% minus Row 4.
Row 6. Product of Rows 3 and 5.

As seen by the Work Group, one of our principal problems is how to increase R&D in small business firms. Since there have been important innovations created by cooperative work between large and small businesses, we would include such cooperation in our concern to increase the share of federal R&D funds to small business firms.

The Work Group is aware of a recommendation made some years ago (1972) by a Commission on Government Procurement to the effect that awarding a fixed percentage of government procurement to small business firms is not in the national interest. While this may be a valid constraint insofar as all government procurement is concerned, we do not believe it should apply to federal R&D funds. The outstanding track record of small business in technological innovation is ample justification for assuring that R&D activity in small business firms be stimulated through increasing its share of federal spending on R&D. We recognize that in certain basic research programs, the commercial sector may be an inappropriate institution for R&D. We believe, however, that applied research projects jointly involving small businesses and universities can be highly effective, and we recommend that a substantial number of these be sponsored by the government.

The Work Group believes the National Science Foundation's program called "Small Business Innovation Applied to National Needs" has great potential for increasing technological innovation in the private sector and is worthy of emulation or even adoption by other federal agencies. By soliciting innovative proposals from small businesses, the program encourages the conversion of research on federal objectives to technological innovation in the private sector. This is done by requesting a contingent commitment for follow-on funding from a venture capital or large business source for continued development of the idea by the small firm if the research meets mutually agreed upon objectives.

Recommendation 9.

We recommend that each federal agency receiving R&D funds by appropriation from the Congress be required to allocate at least 10 percent of all such funds (excluding those for basic research) to small businesses and that this objective be achieved in annual 1% increments beginning in FY1980.

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Small business firms that invest substantial amounts of their own funds in R&D are subject to risks of temporary reversals that jeopardize the stability of R&D spending, which is often less critical in the short run than other uses of funds. Yet by reducing or eliminating R&D, the small firm may endanger its future and the continued development of new products and services necessary for its longer term growth and survival. Collectively the problem inhibits the growth of small innovative firms as a national resource.

Stability in R&D activity in small firms would be encouraged if such firms were allowed to establish and replenish a Reserve for Research and Development in better profit years to be used to stabilize R&D in lower profit or loss years. The reserve would allow the firm to retain more earnings, which is important to firms seeking credit and investment.

The reserve would not be available to firms that could not generate earnings, but rather would assist those firms that have proved their competence by profitable operations. These are the firms that need encouragement to grow faster and to invest in R&D and to stabilize R&D programs.

The reserve could be accumulated to a level of $100,000 or 10 percent of the most recent year's sales, whichever is higher, up to a $1 million ceiling. Contributions to the reserve could only be made to the extent that actual R&D costs are incurred in any year and limited to the higher of $50,000 or 5 percent of sales for any single year. Any use of the reserve for R&D would be taxable just as contributions to it are tax deductible. If the firm became a large business through growth, or merger or acquisition by another small firm, the reserve could be used but not replenished. Acquisition by a large firm would result in the reserve becoming taxable income.

Recommendation 10.

We recommend that small business firms be allowed to establish and maintain a reserve for R&D for use in times of financial stress.

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More must be done in addressing the steeply rising costs of food throughout our country. Obviously, many factors contribute to these increases, but one of the most important is the plateauing of productivity in major food crops. Per acre yields of wheat, sorghum, maize, soybeans, and potatoes have not increased since 1970. A significant part of the previous increases in productivity was accomplished with massive use of fossil fuels for cultivation, irrigation power, fertilizer, and pesticides. Costs of all of these are rising rapidly. Water shortages in a number of areas of the United States have occurred or are imminent. Productivity gains of the past have been associated with large-scale capital and fossil-fuel intensive agriculture. There is vast potential for improvement with innovations directed at developing less fossil-fuel and capital-intensive technologies, and technologies that make more efficient use of water and land. Research directed at creating these technologies would benefit both large and small farm operation

Small farms also are part of America's poverty problem. The conditions for many people, particularly blacks in rural areas in the South, are worse than in blighted urban areas.

The key element in improving the efficiency of small farms is technology. Capital, government policy, and other factors are important; but without technology appropriate to the task, capital and government policy cannot have the required effect.

Further substantiation of the potential of more emphasis on small-scale operations is provided by a brief review of some relevant current achievements, experiments, and emerging technologies.

- The Ball Company is marketing an energy-efficient canning operation that fits into 750 square feet of space.

- Solar technologies are emerging that make small-scale grain drying and storage more efficient than present methods, and provide a lower cost source of power for irrigation.

- The development of small-scale sprinkler irrigation systems is nearing completion. Indications are that these systems will provide a 15 percent savings in energy and as much as a 20 percent savings of water.

- New, stronger, weather-resistant plastics are becoming available, which makes possible low-cost, small-scale hydroponic food growing and the manufacturing of small-scale methane gas generators.

- Farm-size nitrogen fertilizer plants using air, water, and electricity from windmills are under development.

- Multi-purpose, small scale farm tilling and harvesting implements are becoming available.

- Farm management training for diversified small-scale operations are now readily available through computer-based education.

- One of the most significant experiments under way is the model farm at Tuskegee Institute, where an income of $20,000 net per year is to be generated by a farm of 25 acres, of diversified high-value crops and other intensive agricultural technologies.

These examples demonstrate that new technologies can be developed to enhance significantly the productivity of small family farms and food processors with reduced requirements for capital and fossil fuels. With additional R&D effort, the viability of small farms over a wide range of conditions could be established. Furthermore, many of these kinds of small farm technologies are needed by developing countries and represent an important source of exports in the years ahead.

Recommendation 11.

We recommend that there be some redirection of federally supported agricultural research to the development of technology for improving the efficiency of small family farms and food processors and for making food production, transportation, and preservation less capital and fossil-fuel intensive.

E. Improving Export Performance

Much has been written about the fact that among industrially advanced countries, the United States is the least export minded. This can be discerned from the fact that less than eight percent of U.S. manufacturers export (perhaps 20,000 out of some 250,000 manufacturing companies). Moreover, the U.S. export base is highly concentrated: a recent survey conducted by Business International Corporation discovered that 123 firms accounted for 41 percent of U.S. exports of manufactured goods in 1976.[16]

There are several explanations for the low rate of participation of small firms in exporting activity. First, they lack the knowhow to find and penetrate export markets. Such knowhow can, of course, be bought or acquired through experience, but it is expensive. Second, profit margins in international markets have not, until recently, been sufficiently high to attract a large number of small firms. The currency devaluations earlier in this decade have shifted the terms of trade to such an extent that exporting could well become a highly profitable activity for many small firms.

For this development to occur to any important extent, two kinds of measures are needed. One is institutional: a new private sector organization should be created to enable small firms to reach export markets on a shared-cost basis. The second is financial: special tax incentives are required to encourage small firms to overcome the initial costs of entering export markets. Once threshold barriers are overcome, the profitability of exporting can be expected to sustain the growth of exports from small, technologically based firms. Such exports would strengthen our balance of payments while simultaneously providing for the growth of small firms through opening new markets.

With respect to new organizations, we consider the most promising to be Small Business Export Trade Corporations (SBETC) -- private corporations to provide marketing services to a group of small firms. An SBETC must serve at least three clients who are small business firms, and its primary activity must be export promotion for small business. To encourage their formation, these organizations need special tax incentives.

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[16] "Effects of U.S. Corporate Foreign Investment, 1970-76," Business International Corporation, May 1978.

With respect to individual small businesses, we consider that significant tax incentives are needed to encourage the incurring of the initial special costs of entry into export markets. These include sales literature, sample advertising, trade fair participation, special engineering and tooling, new equipment, reserves for bad debts, and so forth. The special tax incentives as described are believed to be consonant with U.S. commitments to the General Agreement on Tariffs and Trade (GATT). If necessary, the proposed upper limits could be further constrained so as to prohibit a net rebate of income taxes to the participating firms.

Recommendation 12.

We recommend that the creation of Small Business Export Trade Corporations be encouraged by a double deduction for these corporations of up to $100,000 of annual expenses associated with the exporting activities of each client, with a loss carry-forward of ten years. In addition, we recommend that small businesses be allowed a double deduction of special expenses of serving export markets up to $100,000 annually.

## IV. CONCLUSION

More new jobs, especially skilled jobs; better solutions to our national problems of urban decay, pollution, steeply rising costs of food and housing, and health care; and increased competitiveness in international markets, all depend upon our ability to stimulate the rate of technological innovation in the United States. Small businesses can play a significant role in achieving this goal.

The recommendations contained in this report are directed at restoring the vigor and vitality of our small businesses, which traditionally have generated the larger share of the truly innovative breakthroughs in science, technology, and engineering. Ways have been identified to increase the supply of venture capital, without which new businesses cannot get established, much less flourish. Some redirection of government R&D spending is recommended to channel more funds into R&D effort that is most likely to benefit small businesses and small family farms.

Recommendations are made for not only increasing the supply of new technology, but also for stimulating the transfer of technology from federally funded R&D projects to the private sector and from large business firms to small ones. Concrete proposals are offered for expanding exports and for reducing the heavy costs of compliance with government regulations.

Our recommendations do not call for federal aid to small businesses and small farms. On the contrary, implementation of all of the recommendations of this report, or of any one of them, does not require any increase in budgetary support from the federal government.

In addition to our 12 recommendations, we urge the Department of Commerce to encourage the creation of "Community Cooperation Offices", which foster the start-up and growth of small businesses. A Community Cooperation Office is a nonprofit corporation supported by private contributions. The major segments of society are participants, including state and local governments, large and small business, academia, religious organizations, labor unions, and farm organizations.

The Community Cooperation Office assists small businesses in getting started by providing seed capital and in profitable growth by furnishing assistance in locating needed technology and consulting help. Cooperation Offices should be informally linked with the Department of Commerce so that their experiences and concerns can be most effectively shared. The Minnesota Cooperation Office for Small Business represents a possible prototype for consideration by other states.

Finally, we urge the Department of Commerce to undertake the education of the American public as to the importance of technological innovation in creating solutions to our major social problems, and to the vital role of small business firms in the innovation process.

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