TECHNOLOGY DEVELOPMENT

A Report to the Public Service Subcommittee
of the YSU Board of Trustees
Concerning the Establishment of a Non-Profit Corporation
to Facilitate Technology Development in the Mahoning Valley

Prepared by
Dr. Gil Peterson, Director, Center for Urban Studies
Dr. George Sutton, Dean, William Rayen College of Engineering
Youngstown State University
Youngstown, Ohio 44555-3355

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NON-PROFIT TECHNOLOGY DEVELOPMENT CORPORATION

Purpose Of The Report

The purpose of this report is to project the feasibility of establishing a non-profit technology development corporation in association with Youngstown State University. Such a corporation would be established to aid in initiating research and development that would result in products or processes that would enter the market in a reasonable period of time and create jobs in the regional economy. Further, the corporation will be designed to avoid University liability, provide flexibility in employing faculty talent, work closer with regional entrepreneurs and manufacturing firms, and provide a motivating force in stimulating market-oriented research and development.

Need

During the 1970's and 1980's, the Mahoning Valley experienced a loss of nearly 50 percent (46%) of its manufacturing jobs, with an 81 percent job loss in the steel industry alone (Youngstown State University, Center for Urban studies/Ohio Bureau of Employment Services, 1989). Unfortunately, this trend is expected to continue, with an additional nine percent job loss in the manufacturing sector forecasted through 1995 for the entire northern Ohio region (Case Western Reserve, 1989).

New jobs have been created during the last decade in the Mahoning Valley to offset the lost manufacturing jobs, but most of these jobs have been in the service sector. Though we should welcome these new jobs, we must be aware, that for the most part, these are low paying jobs with few benefits that do not generate the multiplier to support economic expansion to the extent that the former manufacturing jobs did. Consequently, this situation has resulted in a very slow rate of economic recovery.

The existing local economic trend is not only affecting the standard of living for a substantial portion of the population, but it also represents an erosion of the tax base which is needed to provide public services and infrastructure, including the region's support for higher education. We must not let ourselves slide into a "have not" region status, because it will weaken our bargaining position in all public sector efforts and become unattractive for certain private investors. Melkers and Eberts (1990) writing for the Federal Reserve Bank of Cleveland aptly stated the following:

> A region that increases its comparative advantage by cutting wages also reduces its standard of living. Lower wages mean reduced purchasing power of workers and, consequently, lower income for regions, which in turn stifles economic development. On the other hand, a region that can gain a competitive edge through producing superior products can do so without lowering wages and sacrificing its standard of living.
>
> (The) key to developing superior products is research and development....
>
> Vital to a region's long-run economic growth is the ability of its manufacturing sector to improve product quality and to introduce more technologically advanced products.

One of the most viable means of regaining a strong local economy is through the formation of small firms that will efficiently produce **new technology** products that can compete on the international market and still pay an adequate wage to employees.

Unfortunately, most independent entrepreneurs and small firms cannot afford research and development costs. Furthermore, U.S. firms that have annually set aside a percentage of their profits for research and development are no longer doing so, due to the current economic climate--falling profits, high interest rates, high percentage of borrowed capital, leveraged buyouts, and stock repurchase.

For the first time in 14 years, U.S. corporations are not investing enough in research and development to keep even with the annual inflation rate. Furthermore, private research labs and research departments are being eliminated or contracted; and at the same time, the capital rich Japanese are rapidly increasing their investment in research (Markoff, 1990). The U.S. technology competitive position in the world is declining at an alarming rate (Reich, 1989).

Universities And Technology Development

More and more people are looking to the universities to play a stronger role in assisting in local economic development. It has been recommended that "the universities should become regional centers for technological development and an equal partner in economic development" (Luke, et al., 1988). Michael Fogarty (1989), Director of the Center for Regional Economic Issues at Case Western Reserve University, recently stated that Ohio's "... relatively weak technology base is likely to be an increasing severe constrain on the region's ability to increase its rate of technological change and innovation." He further stated that "... we should put a premium on efforts to develop the region's technology base by strengthening the links between industry and the universities." David Sweet, Dean of the College of Urban Affairs at Cleveland State University, issued a similar statement when he called for closer ties between the community, business, and the University in the development of new technology to strengthen the local economic base (Mattox; Sweet, 1988). Jay Gibson of the University of Arizona sees the University as a "natural ally" for economic growth, recommending the University to be marketed "... as part of the area's regional competitive advantage." He further explained that the talent and facilities of a University can greatly reduce research and development costs to business, while at the same time it can result in contractual income to the university (Mattox; Gibson, 1988).

Universities have the technical talent and they have the research and development facilities to make a contribution to shrinking the technology gap by utilizing resources that have already been provided through public investment. This responsibility is being accepted by universities across the country. The Silicon Valley, Route 128, and Research Triangle Park are well known for their umbilical ties to the University, and most large universities can point to a list of spin-off companies that are located in the surrounding community. Only recently, however, has the university become to be recognized as a major force in shaping local economic development.

Bania and Fogarty (1987), studying Cleveland's scientific and engineering base, found a correlation between investment in university research and the formation of new firms and the concentration of scientists and engineers employed in local industry. Similarly, Jaffe (1989) found there was a relationship between increases in university research and increases in the number of patents being filed in a local area. Furthermore, universities that engage in applied technology oriented research are capturing a greater share of private investment funds.

Carnegie Mellon University has a non-profit company called the Enterprise Corporation which was founded by the university to assist start-up companies. In the ten year period ending in 1987, there have been 20 high-tech firms founded, and ten of these firms are now sharing royalties with CMU (Ranii, 1987).

When universities let it be known that they are prepared to offer such services, the funds can begin flowing from large corporations as well. Alcoa, Data Control, Ford, and Kodak all contract for university research, finding it more cost effective than carrying out the same research in their own facilities. Another model requires large corporations to pay an annual fee to support a technology center engaged in research that could result in future benefits, and still another example permits corporation engineers to work with academicians in the university labs (for a fee) engaged in research of corporate interest (Lefkowitz, 1987).

Ohio's Thomas Edison Program was established to provide funds for industry/university research that would result in job formation within the state. Chris Coburn, Executive Director of the Edison Program, stated that, "In some countries, industry/university cooperation has been perfected to a science", and he is encouraging the same cooperation here. Most of the states surrounding Ohio have programs that are supporting industry/university research in pursuit of new technology development (Lefkowitz, 1987).

Communities, industry, and universities are increasingly working closer to provide focus for directing the university towards targeted accomplishments that realize economic growth. All indicators point to the university as playing a leading role in the forthcoming decades, particularly in communities where economic revitalization is the number one agenda item.

Purpose Of A University Technology Development Corporation

It is in the best interest of Youngstown State University to support a healthy growing local economy. Therefore, the University should be doing everything possible to assist in economic development. This is not to suggest the University should alter its primary mission of providing higher education, but rather it represents the utilization of existing talent and resources in a concerted manner to realize a sustained contribution to local economic vitality, provide new technology development transfers to the classroom, and improve the University's reputation to attract research support funds and talented faculty.

There is always a certain amount of research underway at YSU, and some of this may find its way into the market place and contribute to local economic growth. However, more tangible results can be achieved in this vain if formalized policy is adopted which clarifies the University's role and commitment in assisting in economic development. Furthermore, such policy should represent a strong statement to motivate the faculty to channel their efforts to bring desired fruition.

In order to facilitate this effort, it would be desirable to establish a non-profit corporation. The purpose of this corporation would serve the following:

1. It would represent the central office for individuals and industry to contact when seeking technology development assistance.
2. The director of the corporation would make the initial evaluation of a proposal (go/no-go) in terms of its potential for marketability.
3. The director of the corporation would be the coordinator for making arrangements for use of University facilities and contracting with faculty.
4. The director of the corporation would be the signature authority for all contracts; thus, eliminating the existing multi-step signature process.
5. The University would be exempt of all liability on the part of the corporation's activities.
6. Faculty would receive full remuneration--no University fringe benefits or overhead would be deducted.

In order to utilize the services of the University community effectively, it would be necessary for the director to be able to contract directly with members of the faculty rather than through the Centers of the Public Service Institute. It would also be necessary to establish contractual relationships which would allow faculty and staff to utilize University property on behalf of the technology development corporation at appropriate rental/use fees.

The charter of the technology development corporation would, of necessity, be very broad to allow the operation of support and spin-off with financial return. It would seem logical that accumulation of funds beyond some limit would be prohibited, the excess accruing to YSU in appropriate ways.

The primary advantage of the technology development corporation versus the existing situation is the difference in inertia, a great deal of which is necessary in a university to assure stability, but is not needed in this type of enterprise, in fact, is detrimental to this type of enterprise. A secondary advantage is the lesser number of restrictions imposed on the use of money.

From the faculty point of view, the primary advantage would be the ability to take home a larger percentage of their fees than are possible through the University. They now take home about 56 percent of what we charge the client, before taxes. With an external agency, they could take home nearly 100 percent before tax.

Thus far, we have admitted to no disadvantages for such an enterprise. It must be accepted that the success or failure rests primarily upon the executive director and secondarily upon the board of directors. The problems of overcoming political pressures and obtaining the best personnel could prove significant.

University Investment And Return

The University is requested to provide office space for the corporation and permit the use of equipment when not required for instructional purposes.

Government and private sources will be contacted for the purpose of obtaining start-up operational funds for the non-profit corporation. These funds will be used to pay the director's salary, a one-half time secretary/bookkeeper, faculty consulting fees, and University equipment incremental costs (no overhead charges).

Royalties obtained from product development would be used to support the non-profit corporation. If royalty payments should exceed the operational requirements of the non-profit corporation, the excess payments will be donated to a University foundation, according to agreement established with the University before the creation of the corporation.

Several types of contractual groups are envisioned: independent entrepreneurs from the public seeking University assistance in developing a prototype product, University faculty members wishing to develop a marketable product, and profit-making corporations that will want University research assistance. In all cases of the above, University faculty will be responsible for conducting the research and development.

The charge rate should be structured along the following guidelines.

1. Independent entrepreneurs with no funds will not be charged for research and development work. The costs will be covered from funds raised for this purpose for the non-profit development corporation. The corporation would receive a royalty should the product become profitable.*
2. In cases where an independent entrepreneur would be able to obtain funds to fully pay for research and development, equipment rental, and faculty consulting time would be charged at an established rate. Any partial support from the non-profit corporation would necessitate a royalty agreement.
3. Small business enterprises, as defined by the federal government, would be charged the same as No. 2 above.
4. Large business would be charged at full operating costs and would not be eligible for non-profit corporation funds.

In addition to monetary remuneration, the University should develop a positive reputation which will result in goodwill in the community and political support; furthermore, it should enhance the University's ability to obtain more research grants and attract qualified faculty. In the long run, perhaps the greatest benefit will come in the form of a healthy local economy.

*Faculty members who come to the non-profit corporation as an entrepreneur will not be reimbursed for labor, however, other costs will be supported.

Support for the technology development corporation will initially come from endowments and grants and, hopefully, later by revenue generated by royalties from spin-off companies. Royalties shall be split between the corporation and the University according to an agreed upon formula.

Job Description For Director Of Technology Development Corporation

Education and Experience. The ideal director shall have a degree in engineering or science with business experience or a degree in business with technology experience, with at least one degree at the graduate level, preferably a Ph.D. Professional experience shall ideally include teaching at the college-level and employment in industry, including one or both of the following: research and development or industrial production.

Responsibilities. The director will be required to closely interact with the administration and faculty to gain cooperation and participation in support of technology development. The director will also be expected to seek research support funds from private industry, foundations, and government.

The director will be required to make a preliminary evaluation of technology development proposals in terms of technical feasibility and market potential. Final determination of proposal acceptance for research and development will be made by the director and his/her advisory committee. In addition to the director, the technology development advisory committee shall consist of one representative of the School of Engineering, one representative of the School of Business Administration, one representative with a financial background, and one representative with an industrial background.

The director will be responsible for the coordination of research project managers and project budgets.

The director's primary mission is to encourage technology development that will contribute to the economic expansion of the Mahoning Valley.

Idea To Market Process

The evaluation and development process is illustrated in the following figure. The process steps are delineated below.

Step One: An idea is submitted to the director of the technology development corporation for an initial determination of technical and market feasibility. If the director deems the idea to have a potential for success, he/she submits the idea in the form of a proposal to the advisory board (described above).

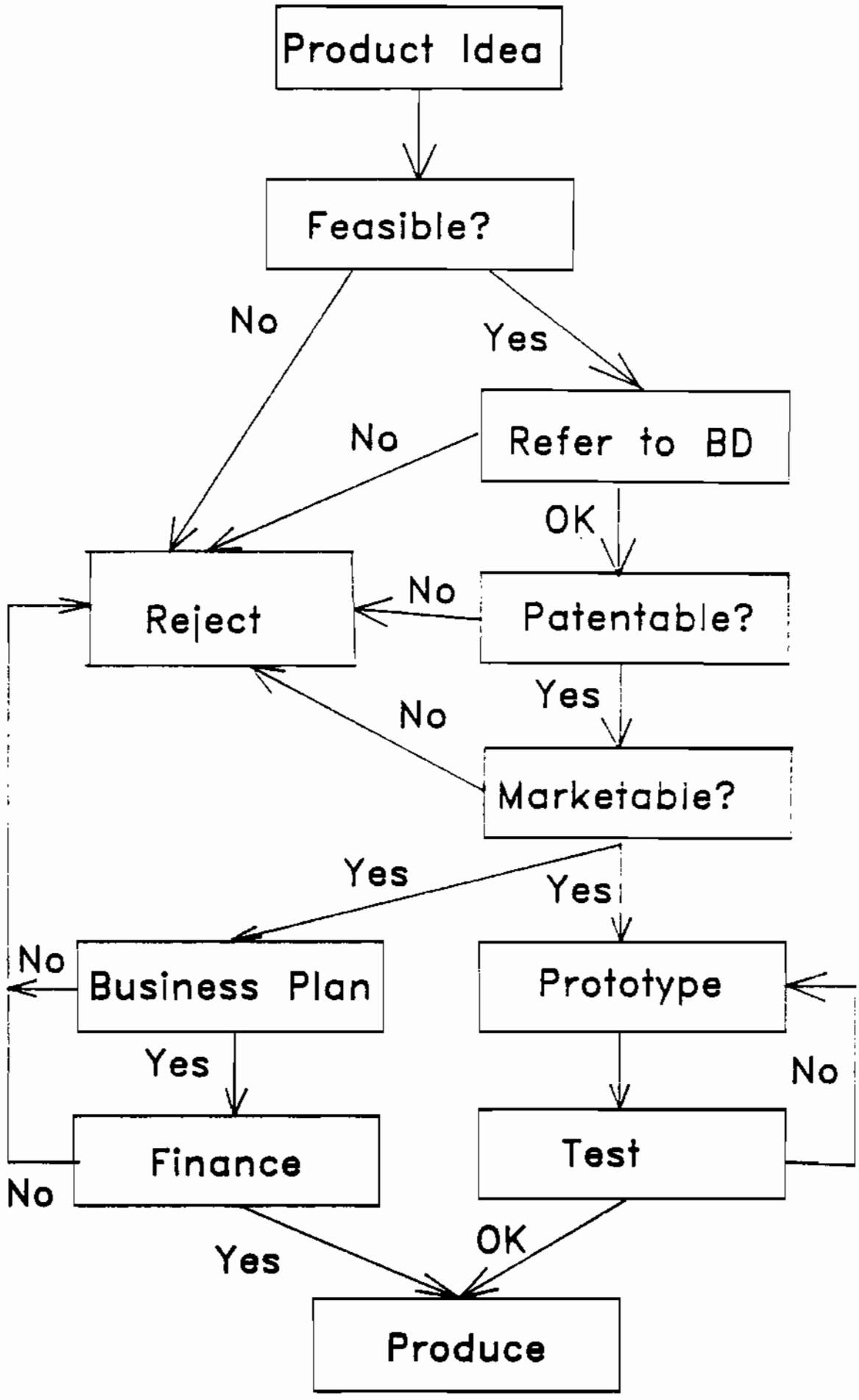
Step Two: If the advisory board approves the project, the proposal will be sent to the Cushwa Center, or another appropriate agency, for a preliminary patent search and a preliminary market evaluation.*

Step Three: If the proposed product is found to be patentable and having profitable market potential, the decision will be made to initiate the development of a prototype. It is at this step that the director must contract with the faculty, or other appropriate persons, for research and development.

Step Four: A business plan for the proposed company will be developed by the Cushwa Center, or another appropriate agency.

*Extensive market research may be required, which can be provided by the Center for Urban Studies as a sub-task for the market analysis performed by the Cushwa Center.

IDEA TO MARKET PROCESS



Steps Five and Six: These steps represent the testing of the prototype and obtaining a commitment for finance, which can be carried out simultaneously. If both of these steps culminate a positive result, the next step will be to establish production.

Step Seven: The corporation will assist in establishing an independent business enterprise (spin-off company), if necessary, which then can function as required for production.*

Long-Term Commitment

The establishment of a non-profit technology development corporation will not likely achieve substantial benefits in the short run. It is something that has to be viewed in the long term, but it does have the potential of making a substantial contribution to local economic recovery in a community that is badly in need of such a commitment. Youngstown State University can exercise leadership and make a major contribution if this commitment is enacted.

*A "company" may be a single proprietor, a partnership, or a corporation.

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