

AN EVALUATION OF THE OKLAHOMA STATE INNOVATION EVALUATION CENTER

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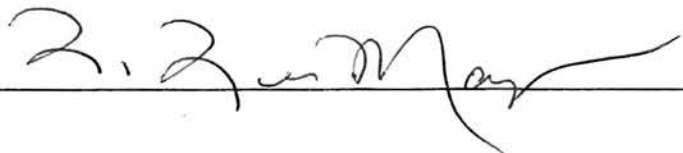
Candidate for Degree of Master of Business Administration

Major field: Business Administration

Scope and Method of Study: This study performs an evaluation of the performance of the Oklahoma State Innovation Evaluation Center as compared to historical data, the Oregon Innovation Center and its capacity to aid inventors and innovators. The data are the success projections from the Oregon and Oklahoma State Innovation Center obtained from their reports to the National Science Foundation and historical survival rates taken from literature. A comparison of the data given to client inventors and innovators is compared with factors causing new venture failures.

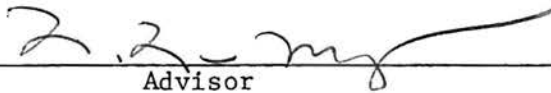
Findings and Conclusions: The Oklahoma State Innovation Evaluation Center is able to evaluate the probable success of a new venture by an inventor or innovator attempting to capitalize on his or her invention. The Oklahoma State Center gives an overall success projection greater than that of the Oregon Center on which it was modeled, but does not differ significantly from the historical success rates. The output to the clients does not, however, deal with the major problems facing them.

ADVISOR'S APPROVAL

A handwritten signature in cursive script, appearing to read "R. Z. May", is written over a horizontal line.

AN EVALUATION OF THE OKLAHOMA STATE INNOVATION EVALUATION CENTER

Report Approved:



Advisor



Director of Graduate Studies



Head, Department of Management

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INTRODUCTION AND SURVEY OF LITERATURE

Currently in the United States several major industries are experiencing difficulties. The automobile industry has only recently begun to recover from the depressed sales levels of the last few years (1). Steel production is down to a level far short of that needed to be profitable, and many of the older plants are closing their doors for good(2). This is coupled with extraordinarily high interest rates and a depressed housing market(3,4). Both the auto and steel industries are losing out to foreign competition, as seen in the negative balance of payments(5,6).

Trends for the last decade give ample evidence as to why all of this has come about. Productivity over the last three decades has declined and currently appears to be stagnant(7). Foreign competitors, on the other hand have demonstrated increased productivity. Japan and West Germany spend 336 and 700 dollars per worker, respectively, on capital investment. This compares with the 226 dollars the U.S. spends per worker on capital investment(8). By 1977 industrial investment in the U.S. had dropped 12% from the level of the 1960's and federal funding from it had dropped by 45%(9).

In contrast to the mature labor intensive industries requiring large amounts of scarce resources are the new technology firms such as I.B.M., Texas Instruments, 3M, and Polaroid, which were spawned by inventions and innovations. They outperformed traditional industries such as steel, chemical, food and paper in compounded sales by 8.5% and job growth by 6% in the last decade(10). This may be the exception to the rule, however. The number of patents issued to American inventors has declined since 1970 by 25%(11). At the same time the number of

patents issued to foreign residents has increased 40%(12). As a result of this, new equity issues in the U.S. are at an all time low(13).

Much of the United States' industrial success can be attributed to the independent inventors, who have accounted for more than half of the major inventions in this century(14,15). Of eleven major inventions in the steel industry, all but four have come from private inventors(16). Firms having less than 1,000 employees accounted for more than half of the major inventions from 1953 to 1973(17). Firms having less than 100 employees accounted for more than 25% of the major U.S. inventions during the same time frame(18).

In spite of the many contributions made by the private inventor and innovator, several barriers exist for them. Due to the legal and financial risks associated with the private inventor or innovator, most firms are unwilling to provide financial or technical assistance without an unfavorable agreement favoring the firm(19). In addition, the U.S. patent system has not changed to any extent since its creation in 1935(20). An inventor or innovator may become involved in patent rights litigation after he has received a patent. Of those cases which go to court, the existing patent is found to be invalid 70% of the time, resulting in costly settlements(21). The federal government currently has over 100 programs to provide assistance, but due to the lack of coordination, they are ineffective(22). Private firms that provide assistance to the inventor and innovator are risky and expensive. One California firm evaluated 3,500 inventions and gave all of them an optimistic evaluation. Of the inventions evaluated, only six were successful(23).

One organization that deals with lowering the barriers to the private inventor and innovator is the Oklahoma State University Innovation Evaluation Center and the Industrial Technology Research and Development Foundation (ITRAD). During 1980-1981 ITRAD and the Engineering and Business Administration Schools of Oklahoma State University received a grant from the National Science Foundation of the development of an improved evaluation center. The grant's primary purpose is to provide assistance for an idea evaluation center and expand the scope of ITRAD. The goal of the center and the foundation is to change the current unfavorable economic conditions in Oklahoma, specifically the southeast quadrant of the state by developing new industries(24).

RESEARCH DESIGN

This study discuss several characteristics used in determining the private inventor or innovator's potential market success in the introduction of his or her product or process. This study also determines if the Oklahoma State University Innovation Evaluation Center is able to successfully identify promising inventions. It will then evaluate the information assistance that is provided by the center for the client that allows the client to be more competitive in the market place. This assistance is evaluated on its ability to meet the needs of the client. Based on this evaluation, changes or additions will be recommended to increase the likelihood of successful introduction of the client's product or process.

In order to determine if the Oklahoma State University Innovation Evaluation Center evaluated and actually identified promising inventions and innovations, a comparison to the Oregon Innovation Center is made. The assumption is that the Oregon Center, on which the Oklahoma State Center was modeled, was able to perform similar evaluation successfully, using all input and output data common to both centers. Then a comparison of the Oklahoma State Center's success projections will be made against the category of small businesses that produce that product or use the process. This is accomplished by taking the success projection for each product as estimated by the Oklahoma State Center and comparing it with the historical survival rates from literature. Those factors that have been cited in literature as being the most important in the success or failure a new business will be compared against the Oklahoma State Center's output to the client. This will indicate those factors which are important to the private inventor and innovator that are not being

addressed by the output currently produced.

Based on those factors not addressed, additions and changes to the computer generated output will be suggested in order to increase the likelihood for success for the private inventor and innovator.

RESULTS AND ANALYSIS

The Oklahoma State University Innovation Evaluation Center uses the Oregon Innovation Center as a model(25). The evaluation procedure first has an inventor or innovator, fill out a form detailing the nature of the invention or innovation, and its stage of development, how action has been taken to patent and promote the invention and what are the manufacturing costs. In addition, the inventor or innovator provides personal information (exhibit 1). This information is sent to the innovation center where the invention is assigned to a member of the evaluation panel for analysis and research. After studying the product or process, the panel member presents the invention to the full panel, consisting of one professor and graduate research assistant from the school of business, two professors and three graduate research assistants from the school of engineering, for analysis and research. The panel provides a forum for both engineering and business aspects to be discussed. After studying the product or process the panel member presents the invention to the full panel for open discussion. The panel members, who have studied the client's information form, evaluate a prototype if it is available.

After the discussion, the panel members analyze the invention using the PIES II Innovation Evaluation Instrument. The panel member assigned to this particular invention or innovation provides most of the background and detailed information (exhibit 2). Each of the thirty-three criteria are discussed until a consensus is reached. If the invention is found to be very similar to a product already on the market, the invention is not evaluated further but is returned to the client with an explanation. Those inventions that are beyond the panel's technical expertise are forwarded to persons at the university

that have expertise in that field. Questions that the panel cannot answer are coded as "don't know" or "not applicable".

After the panel completes and records the responses for the thirty-three criteria, the consensus values are processed using a software package developed by the University of Oregon Innovation Center. A Radio Shack Model III minicomputer and dot matrix printer provide the needed hardware (exhibit 3). The output consists of three sections. The first provides an overall summary of the consensus scores for each of the thirty-three criteria. This is followed by a short explanation of the score given for each criteria. The last section provides a projection of the client's chances for successfully introducing his or her product or process into the market system. These results are sent to the client along with a short summary of the computer generated output (exhibit 4).

This information may not be of much benefit to the client. Those factors that are most likely to cause their venture to fail are pointed out, but their overall importance may be masked by the amount and variety of information supplied by the center. For example, the leading causes of new business failures are inadequate sales, competitive weakness, excessive operating expenses and the difficulties in collecting receivables, which have accounted for more than eighty percent of new venture failures(26). A weakness in any one of these areas will show up in the PIES II evaluation, but may be overlooked due to a favorable SLR score. If the weakness shows up and the client is able to recognize its importance, he or she may not know how to go about overcoming it.

In looking at client demographics from both the centers, similarities and differences become apparent. The majority of clients for both the

Oregon and Oklahoma State Centers were over forty years of age, and well over half of the clients for both centers were over fifty years old (figure 1). Another similarity was gender. Males comprised the vast majority of clients, ninety-five and eighty percent for the Oregon and Oklahoma State Centers, respectively (figure 2). In contrast to these similarities are the differences in the geographical cross-section of clients. The Oregon center appears to be much more national in its client make-up while the Oklahoma State Center appears to be more regional (figure 3,4).

The predictions of success for the individual inventors or innovators are expressed in the "SUCCESS LIKELIHOOD RATIO" or the "SLR". The higher the "SLR" is, the greater the possibility of success. This numerical projection of the clients chances of successfully introducing a product or process into the market system demonstrates a similarity in the values as observed in the mean values of 28.4 and 41.4 for the Oregon and Oklahoma State Center, respectively (figure 5). In comparing the two centers, the difference between the means is somewhat misleading in regard to the ability of the Oklahoma State Center to correctly estimate the market potential of a client's product or process. The location and character of the two schools are very different. The University of Oregon is primarily a liberal arts school with a large business program. This appears to be an advantage in the technical and business evaluation of the invention or innovation. The primary industries in Oregon are fishing, tourism and lumber. This is very much in contrast to Oklahoma which has a large oil industry along with agriculture and light industry.

A comparison of the two centers' output produced by the model

developed at the Oregon Center can be made using the "SLR" scores in the following hypothesis test:

Ho: Oregon Center $p(\text{success}) = \text{Oklahoma State Center } p(\text{success})$

Ha: Oregon Center $p(\text{success}) \neq \text{Oklahoma State Center } p(\text{success})$

$$\begin{aligned} \text{where the test statistic "t"} &= \frac{\bar{x} - \mu}{\sqrt{s/n}} \\ &= \frac{41.4 - 28.4}{\sqrt{176/41}} \\ &= 6.27 \end{aligned}$$

With such a large test statistic for a sample of 41 observations, the null hypothesis is rejected and the alternative hypothesis, that the Oregon center's output is different from the Oklahoma State "SLR" output is accepted. This indicates that Oklahoma State Center produced a higher or more favorable success projection for its clients than did the Oregon center. This raises a question as to which center accurately projects the success of their clients' products or processes.

Another way to look at the accuracy of the Oklahoma State University success projections is to compare the "SLR" scores against the historical success rates for the business that produces the product or uses the process in new business ventures. This is done by first constructing a table of the Oklahoma State Center clients and categorizing their products or processes (table 1). Next these categories are sorted and used in a comparison against the historical success rates for the category most similar to the clients'. The difference between the two is then determined. By using the mean, standard deviation and sample size of this difference a test can be made using the following hypothesis test:

Ho: Oklahoma State Center's $p(\text{success}) = \text{historical } p(\text{survival})$

Ha: Oklahoma State Center's $p(\text{success}) \neq \text{historical } p(\text{survival})$

$$\begin{aligned} \text{where the test statistic "t"} &= \frac{X_d - 0}{\sqrt{sd/n}} && \text{where } X_d = \text{the mean value of} \\ & && \text{the difference between the "SLR" and} \\ & && \text{the survival rate.} \\ &= \frac{1.46 - 0}{\sqrt{18.5/41}} && \text{sd} = \text{Std. dev. of } X_d \\ &= 0.5052 \end{aligned}$$

The small test statistic indicates that the null hypothesis is accepted and the alternative hypothesis is rejected. This indicates that based on historical comparisons, the Oklahoma State Innovation Evaluation Center is able to determine statistically the likelihood of the success of an invention.

TABLE I
INDUSTRY CLASSIFICATION AND SUCCESS RATE

INNOVATION* NUMBER	CLASSIFICATION BY INDUSTRY	SLR SCORE	SURVIVAL** RATE	DIFFERENCE
EO101	Consumer Durables	42	38	4
EO102	Consumer Durables	41	38	3
EO103	Consumer Durables	34	38	-4
EO104	Small Manufacturing	56	62	-6
EO105	Medical Devices	46	43	3
EO106	Industrial Products	41	72	-31
EO107	Consumer Durables	43	38	5
EO108	Consumer Durables	46	38	8
EO109	Consumer Durables	50	38	12
EO110	Consumer Durables	34	38	4
EO111	Medical Devices	30	43	-13
EO112	Consumer Durables	38	38	0
EO113	Consumer Durables	50	38	12
EO114	Electronic Equipment	32	73	-41
EO115	Industrial Product	39	72	-23
EO116	Medical Devices	54	43	11
EO117	Consumer Durables	43	38	5
EO118	Small Manufacturing	47	62	-15
EO119	Consumer Durables	34	38	-4
EO120	Small Manufacturing	32	62	-30
EO121	Consumer Durables	42	38	4
EO122	Industrial Products	32	62	-30
EO123	Consumer Durables	31	38	-7
EO124	Small Manufacturing	36	62	-26
EO125	Industrial Products	35	72	-37
EO126	Electronic Equipment	48	73	-25
EO127	Consumer Durables	49	38	11
EO128	Consumer Durables	36	38	-2
EO129	Small Manufacturing	48	62	-14
EO130	Industrial Products	27	72	-45
EO131	Consumer Durables	46	42	4
EO132	Consumer Durables	46	42	4
EO134	Consumer Durables	60	38	22
EO137	Small Manufacturing	30	38	-8
EO138	Consumer Durables	62	38	24
EO139	Consumer Durables	42	38	4
EO140	Consumer Durables	45	38	7
EO141	Consumer Durables	46	38	8
EO142	Medical Devices	32	43	11
EO143	Small Manufacturing	36	62	-26
EO144	Consumer Nondurables	36	43	-7
			<u>X</u>	<u>1.46</u>
			S.D.	18.50

* The number assigned to the clients product or process.

** Historical success rate for business started in that category Murphy, Thomas P., A Business of Your Own (New York: McGraw-Hill, 1956)p.4.

SUMMARY AND CONCLUSIONS

The need for the United States to make use of the ingenuity of its citizens has reached a new level of importance. Many of the traditional industries are faced with dwindling resources and increasing foreign competition. Industries spawned by inventions and innovations have been able to reverse this trend. The source of most of the inventions and innovations has been discouraged by barriers set before them by businesses, ineffective government programs, questionable idea brokers and an outdated patent system. The Oklahoma State University Innovation Evaluation Center is one alternative to their dilemma. Although differing statistically from the output of the Oregon Innovation Center after which it was modeled, the Oklahoma output does not differ statistically from historical data in its projections of success. The output does not, however, address the major causes of success or failure of an inventor or innovator starting a business.

In order to maintain and improve its current industrial position in the future the United States must produce new and more modern industries. One source that can provide the basis for many of the needed industries is the private inventor and innovator. As the situation stands now the barriers to the private inventor and innovator make their potential contributions doubtful. The Oklahoma State University Innovation Center appears, statistically, to be able to identify the probability of the successful introduction of a process or product into the market system. By identifying those clients with experience necessary to enable them to be competitive in the market system, the Oklahoma State Center could impact on the clients success probability. A survey of the characteristics of entrepreneurs' success

in new business ventures indicates that the education and experience have an influence. As shown in the table below, the success rate is for an individual with both experience and education is at least twice that of an individual lacking in experience or education(27).

	EDUCATED	UNEDUCATED
EXPERIENCED	I 62% SUCCESS RATE	III 25% SUCCESS RATE
UNEXPERIENCED	II 25% SUCCESS RATE	IV 12% SUCCESS RATE

By educating the clients who are experienced but lack the education necessary in critical areas such as sales and competitive position, the clients, on the whole, could move into a position where they could succeed more frequently.

RECOMMENDATIONS

In attempting to increase the success probability for the private inventor and innovator the Oklahoma State University Innovation Evaluation Center has an opportunity to make use of its own resources, the educational programs and the Regional Patent Office. By offering advice and training to the clients, the center has the potential to lower the barriers to the successful introduction of the clients' products and processes. This could be done by using printed material or seminars for the clients. The computer based patent system soon to be installed in the Oklahoma State University Library could make the need for a patent attorney obsolete. This would free the resources of the client for investment in his own business. This could be the edge needed to start a successful business to make use of the clients' products or processes.

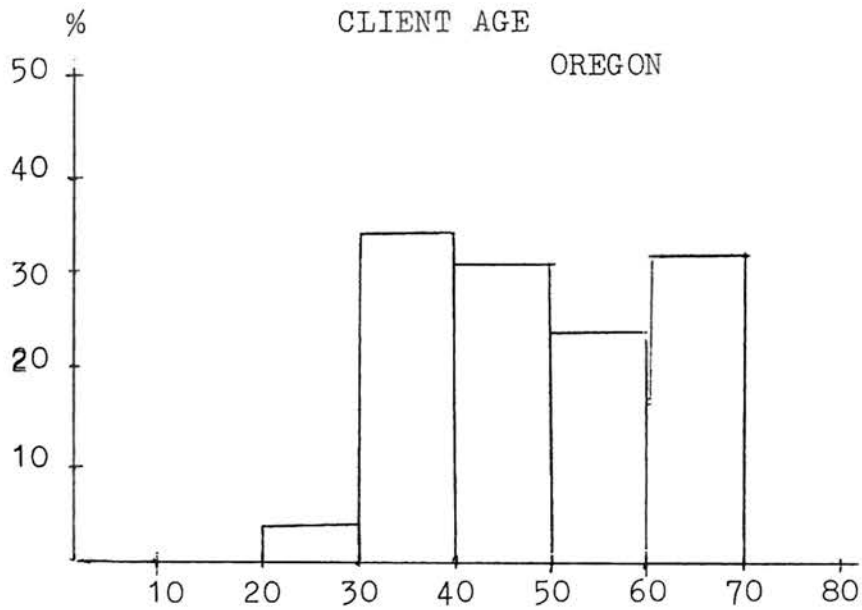
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- 5) See reference 1.
- 6) See reference 2.
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- 11) "Science Indicators 1976", Report to the National Science Board, National Science Foundation, (Washington, D.C., 1977), p. 91.
- 12) See reference 1, p. 93.
- 13) See reference 1, p. 107.
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- 15) Scherer, F.M., Industrial Market Structure and Economic Performance. (Chicago, Rand McNally, Inc., 1970), p. 56.
- 16) Jewkes, John and Others, The Source of Invention. (New York: St. Martins Press, 1959.), pp. 71-85.
- 17) "Small Firms and Federal Research and Development", A Report to the Office of Federal Procurement Policy, Office of Management and Budget, Executive Office of the President, March 10, 1977.
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- 22) The Eugene (Oregon) Register Guard, (June 30, 1977), B., p. 12.
- 23) The Oregon Innovation Evaluation Center Experiment: 1973-1978 Vol. III: Readings on Innovation. pp. 46-49.
- 24) ITRAD Innovation Center For Rural Development: Oklahoma State University, (October, 1982), pp. 1-11.
- 25) See reference 24, p. 3
- 26) The Failure Record Through 1969 (New York: Dunn and Bradstreet, Inc., 1970).
- 27) Shapero, Albert, "The Process of Technical Company Formation in a Local Area," eds. Arnold C. Cooper and John L. Komives (Milwaukee, Wis.: Center for Venture Management, 1972), p. 79.

APPENDIX

FIGURE 1



Source: The Oregon Innovation Experiment 1973-78
Volume II

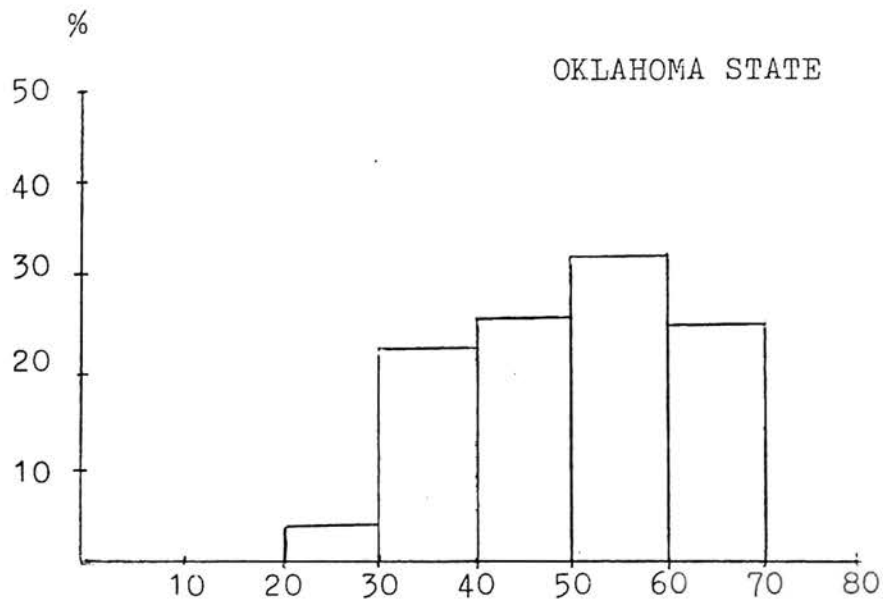
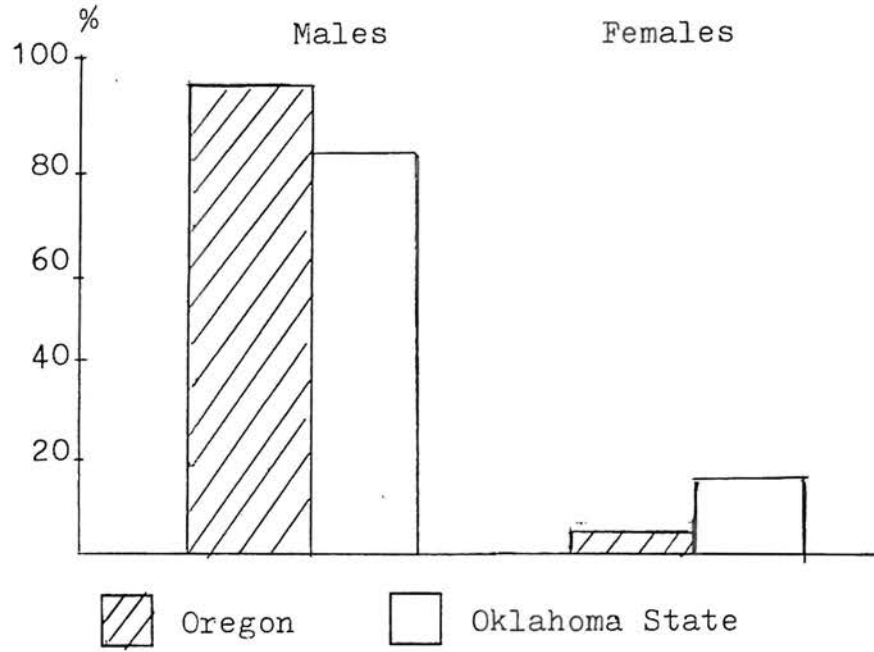
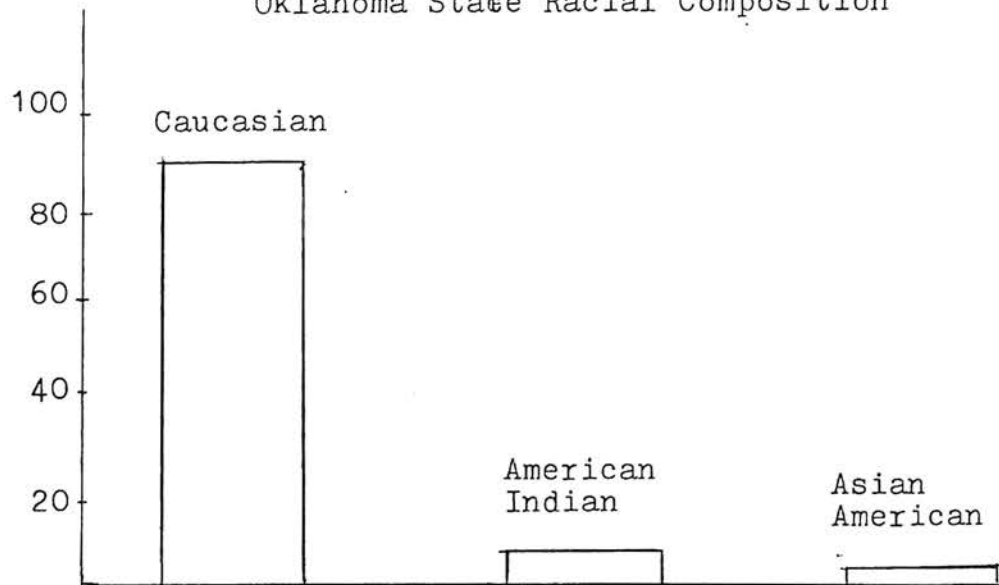


FIGURE 2

CLIENT DEMOGRAPHICS



Oklahoma State Racial Composition



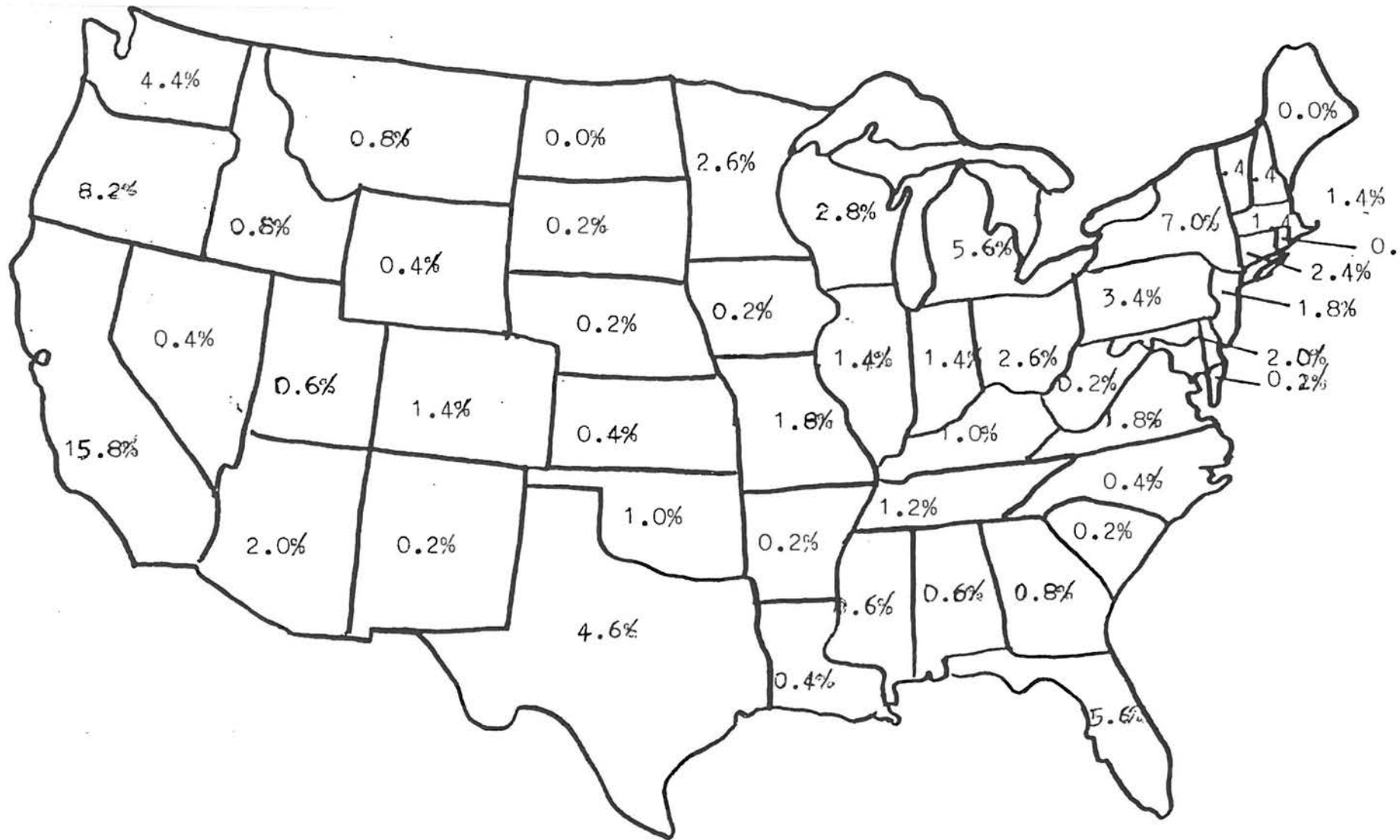


Figure 3 Oregon University Innovation Evaluation Center

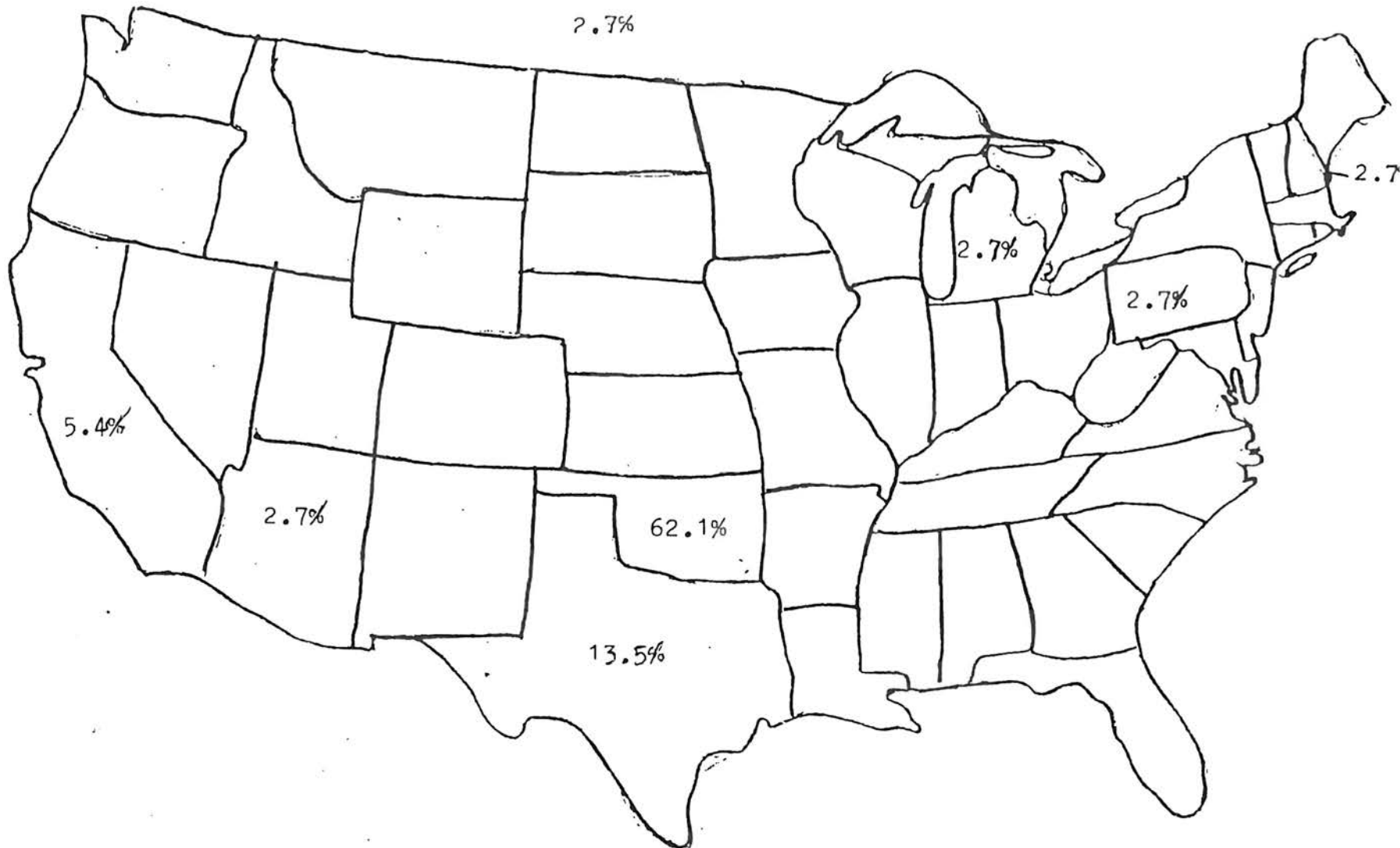


Figure 4 Oklahoma State University Innovation Center Clients By State

FIGURE 5



Source: The Oregon Innovation Experiment: 1973-78
Volume II

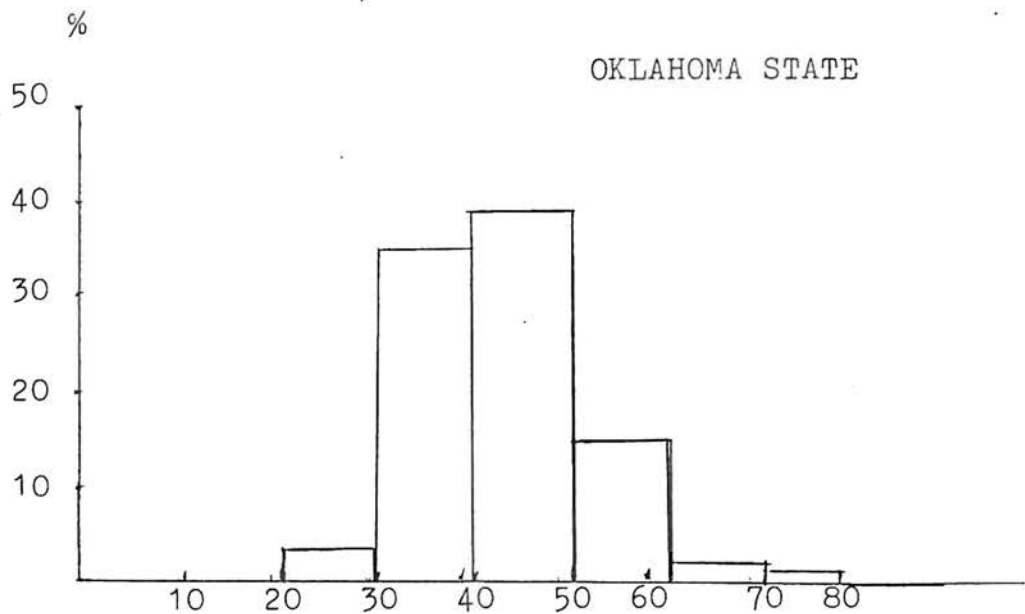


EXHIBIT 1



FOR CENTER USE ONLY
File # EQ138

Submitted by: _____
(Please print or type your name)

Street Address

City State Zi.

Home Phone: _____
Area Code

Work Phone: _____
Area Code

INDUSTRIAL TECHNOLOGY RESEARCH AND DEVELOPMENT FOUNDATION, INC.

**CONFIDENTIAL
INNOVATION REGISTRATION
AND DISCLOSURE
DOCUMENT**

ITRAD Innovation Center
P.O. Box 1335
Durant, OK 74701
405/924-5094

In Cooperation with
Oklahoma State University

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Board of Regents of the University of Wisconsin System.
Permission to use this document is granted to the Industrial Technology Research
and Development Foundation, Inc.

CONFIDENTIAL INVENTION DISCLOSURE AGREEMENT

Date _____

ITRAD Innovation Center
P.O. Box 1335
Durant, OK 74701

Enclosed is a description, and other materials, of my idea for registration with the Industrial Technology Research and Development Foundation, Inc. (hereafter called the ITRAD INNOVATION CENTER). After your review, I understand that you will send me your evaluation of the potential for my idea. I understand that:

1. The ITRAD INNOVATION CENTER engages the services of the Product Evaluation Center at Oklahoma State University to perform the evaluation.
2. The ITRAD INNOVATION CENTER will use best efforts to keep my disclosure confidential. Staff, students, and evaluators having access to my file will have signed a nondisclosure agreement with the ITRAD INNOVATION CENTER, stating that they will keep my idea and its evaluation in strict confidence.
3. In consideration for this confidential evaluation, I agree to hold harmless the ITRAD INNOVATION CENTER and Oklahoma State University, its employees, agents, students, and others assisting in the evaluation of my idea, both now and in the future, from any loss or damage arising out of this disclosure and subsequent evaluation.
4. Materials submitted herewith or in the future in connection with my idea may be retained by the ITRAD INNOVATION CENTER or returned to me at my expense, at the option of the ITRAD INNOVATION CENTER. It will be my responsibility to advise you of any change in my mailing address.
5. Any assistance beyond this initial evaluation is provided at the option of the ITRAD INNOVATION CENTER and will depend upon the merit of my idea and the availability of staff and resources.
6. The ITRAD INNOVATION CENTER acquires no right or license in my idea by this registration. If you wish to participate in the further development and/or marketing of my idea, I understand that you will contact me in the future to arrange a mutually satisfactory royalty payment to you or your designee in exchange for services performed for me in the future. You have no obligation to perform any such future services, nor am I required to agree to any royalty arrangement.

THE NAME OF MY IDEA IS: _____

I have carefully read this and the enclosed Registration form and understand their contents.

ENCLOSED is my check (or money order) in the amount of \$75 made payable to the ITRAD INNOVATION CENTER, for submitting my idea named above.

signature) _____

Please print or type your name here! _____

City _____ State _____ Zip _____

Phone: _____

Area _____
Witness: _____

DISCLOSURE

Please give a detailed description of your invention or innovation. Include information on the size of the device, materials, uses, and so forth. Attach any photographs you may have, but DO NOT SEND ANY PROTOTYPES UNTIL WE REQUEST THEM.

Please describe your invention in both a technical and nontechnical manner. Use the space below for nontechnical description, attach technical description on separate page. The patent disclosure may be submitted in lieu of technical description.)

[REDACTED]

is suggested, but not required, that you have this description notarized if you have no form of protection for your invention. This establishes the date of conception of your idea. A DETAILED DESCRIPTION IS NECESSARY.

Date of _____
County of _____

On this _____ day of _____, 19____, before me, _____
Notary Public, personally appeared _____ known to me (or proved to
me on the oath of _____) to be the person whose name is subscribed to the within
instrument, and acknowledged that he (she or they) executed the same.

Witness my hand and official seal.

Notary Public in and for the
State of _____
County of _____
My commission expires _____

PLEASE fill out this form accurately and completely. This information is necessary for the evaluation of your invention. For your protection, do not send original documents; copies only, please.

INNOVATION INFORMATION

1. DEVELOPMENT STATUS:

A. I currently have ...

- Idea only
- Rough sketches and/or diagrams Enclosed
- Finished, working drawings Enclosed
- Photographs Enclosed

Copies of drawings and photographs would be helpful for evaluation — no prototypes please.

B. PROTOTYPE AVAILABILITY

- No prototype
- Functional model or prototype
- Market-ready prototype

[If you have a model or prototype, please enclose a photograph of it.]

The prototype is: Available, if requested Yes No

DO NOT SEND PROTOTYPE UNLESS REQUESTED

C. DESIGN MODIFICATIONS: What additional changes in the design have you thought about?

None ; The product is fully developed.

2. LEGAL PROTECTION: I currently have ...

- NO protection
- A PATENT Number Issue Date Copy Attached
- a patent applied for Application Date
- a Preliminary patent search Date of search Copy of findings attached
- a Disclosure Document with U.S. Patent Office Date
- COPYRIGHT Issue Date COPYRIGHT number
- notarized records of invention

3. PRODUCT TESTING: Testing which has already been conducted includes:

none _____

functional testing (does it work as intended?) conducted by self X independent agency X

user testing (consumer understands and can use product with ease) conducted by self X independent agency X

marketing testing (consumer reaction) conducted by self X independent agency X

product safety testing

a. when used as intended conducted by self X independent agency X

b. potential problems if misused conducted by self X independent agency X

MARKET INFORMATION: (Please be complete, as this information is extremely important.)

A. Current competition—Please list existing products or processes that do a similar job.

Not aware of any.

B. Competitive advantages—Why is your innovation better than existing products or processes? Please list the most important advantages in order of importance, i.e., Number 1 equals most important.

C. Projected Market—Who will use your invention? Please list users in order of importance, i.e., Number 1 equals most important.

1. Major users: multiple homes, apartments, businesses
single family dwellings.

2. Possible other users: _____

2. PERSONAL INFORMATION (This information is useful in understanding and assisting independent inventors; it is for statistical use only and is kept confidential.)

A. Current occupation (or occupation before retirement) _____

Are you currently ... Name of employer _____

_____ employed? Employer's address _____

your job title Company President

X self-employed? Name of your business _____

your business address _____

your job title Company President

X Engaged in small business? _____ Engaged in large business?

_____ Retired? _____ Unemployed?

_____ Student? Where? _____ Major? _____

_____ Faculty? Where? _____ Department? _____

B. Birthdate _____ Male Female

C. Education

Grade School High School

College _____ Highest Degree _____ Major _____

D. Ethnic background: Black-American _____ Mexican-American _____

Puerto Rican _____ Cuban-American _____ Other Spanish-Speaking American _____

American Indian _____ Eskimo or Aleut _____ Asian-American _____

Caucasian _____



EXHIBIT 2

PIES — II

INNOVATION EVALUATION INSTRUMENT

by
Gerald G. Udell and Kenneth G. Baker

Wisconsin Innovation Service Center
College of Business and Economics
University of Wisconsin
Whitewater, WI 53190

Action to be taken. (check appropriate category)

- SBI Program
 MTA Program
 Technology Transfer
 Close File

INSTRUCTIONS:

Check the response that best corresponds to your evaluation for each Criterion. Be sure you answer all questions. NOTE that "don't know" and "not applicable" responses are coded "DK" and "NA." Be SURE to use them when they are appropriate.

After each Factor group, a space is provided for your written comments relative to that section. If you have any specific information, comments or suggestions, use this space. These comments are highly useful in providing additional information and insights.

SOCIETAL FACTOR

LEGALITY CRITERION: In terms of applicable laws (particularly product liability), regulations, product standards, this idea/invention/new product...

- might not meet them, even if changed _____
- might require substantial revision to meet them _____
- might require modest revision _____
- might require minor changes _____
- will meet them without any changes _____

SAFETY CRITERION: Considering potential hazards and side effects, the use might be...

- very unsafe, even when used as intended _____
- unsafe under reasonably foreseeable circumstances _____
- relatively safe for careful, instructed users _____
- safe when used as intended, with no foreseeable hazards _____
- very safe under all conditions, including misuse _____

ENVIRONMENTAL IMPACT CRITERION: In terms of pollution, litter, misuse of natural resources, etc., it might...

- violate environmental regulations and/or have dangerous environmental consequences _____
- have some negative effect on the environment _____
- have no effect on the environment if properly used _____
- have no effect on the environment X _____
- have a positive impact on the environment _____

SOCIETAL IMPACT CRITERION: In terms of the impact (benefit) upon the general welfare of society, it might...

- have substantial negative effect
- have some negative effect
- have no effect if properly used
- have no effect on society
- have a positive effect on society

COMMENTS:

BUSINESS RISK FACTOR:

FUNCTIONAL FEASIBILITY CRITERION: In terms of intended functions, will it actually do what it is intended to do?

- the concept is not sound; cannot be made to work
- it won't work now, but might be modified
- it will work but major changes might be needed
- it will work but minor changes might be needed
- it will work — no changes necessary

PRODUCTION FEASIBILITY CRITERION: With regard to technical processes or equipment required for production, this invention might...

- be impossible to produce now or in the foreseeable future
- be very difficult to produce
- have some problems which can be overcome
- have only minor problems
- have no problems

STAGE OF DEVELOPMENT CRITERION: Based on available information, there is...

- only an idea with drawings and/or description; no prototype
- a rough prototype which demonstrates the concept but is not fully developed and tested
- a rough prototype with performance and safety testing completed
- a final prototype with testing completed; however, minor changes might be needed
- a market-ready prototype

INVESTMENT COSTS CRITERION: The amount of capital and other costs necessary for development to the market-ready stage might be...

- greater than returns — investment will not be recoverable
- excessive — might not be recoverable
- heavy — probably recoverable
- moderate — recoverable within five years
- low — recoverable within two years

PAYBACK PERIOD CRITERION: The expected payback period (time required to recover initial investment) likely to be...

- over 10 years
- 7 to 10 years
- 4 to 6 years
- 1 to 3 years

PROFITABILITY CRITERION: Profitability is defined as the extent to which anticipated revenues will cover relevant costs (direct, indirect, and capital). Anticipated revenues...

- might not cover any of the relevant costs
- might cover direct costs but contribute minimally to indirect and capital costs (ROI)
- might cover direct and indirect costs but might not meet capital costs (ROI)
- might cover direct and indirect costs and meet minimum capital costs (ROI)
- will cover direct and indirect costs and easily exceed capital cost (ROI)

MARKETING RESEARCH CRITERION: The marketing research required to develop a market-ready product is estimated to be...

- extremely difficult and complex
- relatively difficult and complex
- moderately difficult
- relatively easy and simple
- very simple and straightforward

RESEARCH AND DEVELOPMENT CRITERION: The research and development required to reach the production-ready stage might be...

- extremely difficult and complex
- relatively difficult and complex
- moderately difficult
- relatively easy and simple
- very simple and straightforward

COMMENTS:

DEMAND ANALYSIS FACTOR

POTENTIAL MARKET CRITERION: The total market for products of this type might be...

- very small — very specialized or local in nature
- small — relatively specialized or regional in nature
- medium — limited national market
- large — broad national market
- very large — extensive national and possible international market

POTENTIAL SALES CRITERION: Expected sales of this product might be...

- very small
- small
- medium
- large
- very large

TREND OF DEMAND CRITERION: The market demand for products of this type appears to be...

- rapidly declining — product might soon become obsolete
- declining — potentially obsolete in near future
- steady — demand expected to remain constant
- growing slowly — modest growth opportunity
- rapidly expanding — significant growth opportunity

STABILITY OF DEMAND CRITERION: The fluctuation in demand is likely to be . . .

- highly unstable — subject to severe unpredictable fluctuations
- unstable — susceptible to moderate unpredictable fluctuations
- predictable — variations can be foreseen with reasonable accuracy
- stable — modest variations can be accurately foreseen
- highly stable — not susceptible to fluctuations

PRODUCT LIFE CYCLE CRITERION: The product life cycle is likely to be . . .

- less than two years
- two to four years
- five to seven years
- eight to ten years
- more than ten years

PRODUCT LINE POTENTIAL CRITERION: The potential for additional products, multiple styles, quality price ranges, etc. is . . .

- very limited — single product only
- limited to minor modifications only
- moderate — multiple markets/use potential
- high — new product spin-offs likely
- very high — could be foundation of a new industry

REMARKS:

MARKET ACCEPTANCE FACTOR

COMPATIBILITY CRITERION: Compatibility with existing attitudes and methods of use is . . .

- very low — will block market acceptance
- low — some conflict; will slow market acceptance
- moderate — no negative effects
- high — compatibility will aid marketing effort
- very high — will give market acceptance a strong boost

LEARNING CRITERION: The amount of learning required for correct use is . . .

- very high — expensive and/or time consuming training required
- high — detailed instructions required
- moderate — normal instructions sufficient for most users
- low — minimal instructions needed
- very low — no instructions needed

NEED CRITERION: The level of need filled or utility provided by this innovation is . . .

- very low — gimmick soon forgotten by the owner
- low — would only superficially fulfill psychological non-essential needs
- moderate — fulfills both psychological and physical non-essential needs
- high — fulfills either basic psychological or physical needs
- very high — fulfills both psychological and physical needs

DEPENDENCE CRITERION: The degree to which the sale or use of this product is dependent upon other products, processes or systems is . . .

- very high — no market control; very high cost
- high — little market control; high costs
- moderate — reasonable market control and cost
- low — strong market control; low cost

23. **VISIBILITY CRITERION:** The advantages and benefits are . . .

- Statements
- very obscure — very difficult and/or costly to communicate
 - obscure — requires substantial explanation
 - visible — requires some explanation
 - visible — easily communicated
 - very visible — advantages are obvious and easy to communicate

24. **PROMOTION CRITERION:** The costs and effort required to promote the advantages, features, and benefits are likely to be . . .

- Statements
- very high — prohibitive in relation to expected sales
 - high relative to expected sales
 - moderate — commensurate with expected sales
 - low relative to expected sales
 - very low relative to expected sales

25. **DISTRIBUTION CRITERION:** The cost and difficulty of establishing distribution channels are likely to be . . .

- Statements
- very high — prohibitive in relation to expected sales
 - high relative to expected sales
 - moderate — commensurate with expected sales
 - low relative to expected sales
 - very low relative to expected sales

26. **SERVICE CRITERION:** The cost and difficulty associated with providing product service is likely to be . . .

- Statements
- very high — will require frequent service and parts
 - high — will need periodic service and parts
 - moderate — will need occasional service and parts
 - low — need for service and parts will be infrequent
 - very low — will require little or no parts and service

COMMENTS:

COMPETITIVE FACTOR:

27. **APPEARANCE CRITERION:** Relative to competition and/or substitutes, appearance is likely to be perceived as . . .

- Statements
- very inferior — no customer appeal
 - inferior — little customer appeal
 - similar to competition/substitutes
 - superior — has customer appeal
 - very superior — has strong customer appeal

28. **FUNCTION CRITERION:** Relative to competing and/or substitute products, services or processes, the function performed might be perceived as . . .

- Statements
- very inferior — a significant competitive disadvantage
 - inferior — some competitive disadvantage
 - similar — to competition/substitutes
 - superior — some competitive advantage

VIABILITY CRITERION: Relative to competition and/or substitutes, viability of this product is likely to be perceived as...

- very inferior — a definite competitive disadvantage
- inferior — might be a competitive disadvantage
- similar — to competition/substitutes
- superior — might be promoted as an improvement
- very superior — easily promoted as a major improvement

PRICE CRITERION: Relative to competition and/or substitute products, the selling price is likely to be...

- much higher — a definite competitive disadvantage
- higher — a competitive disadvantage
- similar to competition/substitutes
- lower — a competitive advantage
- much lower — a definite competitive advantage

EXISTING COMPETITION CRITERION: Existing competition for this innovation appears to be...

- very high — new entry might be difficult and/or relatively expensive
- high — only a small market share is likely
- moderate — market penetration can be gained with reasonable effort and expense
- low — a significant market share might be possible
- very low — entry might be easy and/or relatively inexpensive

NEW COMPETITION CRITERION: Competition from new entrants or competitive reaction is expected to be...

- very high — product lead will be very short
- high — product lead will be relatively short
- moderate — market share can be maintained
- low — product lead will be relatively long
- very low — a strong chance to sustain large market share

PROTECTION CRITERION: Considering patents (or copyrights), technical difficulty or secrecy, the prospects for protection appear to be...

- no legal protection or secrecy possible
- no legal protection but some secrecy might be possible
- limited legal protection but some secrecy might be possible
- might be patented, copyrighted and/or short-run secrecy possible
- can definitely be patented, copyrighted and/or long-term secrecy possible

COMMENTS:

In my opinion, the likelihood of this idea, process or product being successful in the marketplace is: (Place an X at the appropriate place on the line marked A - B.)

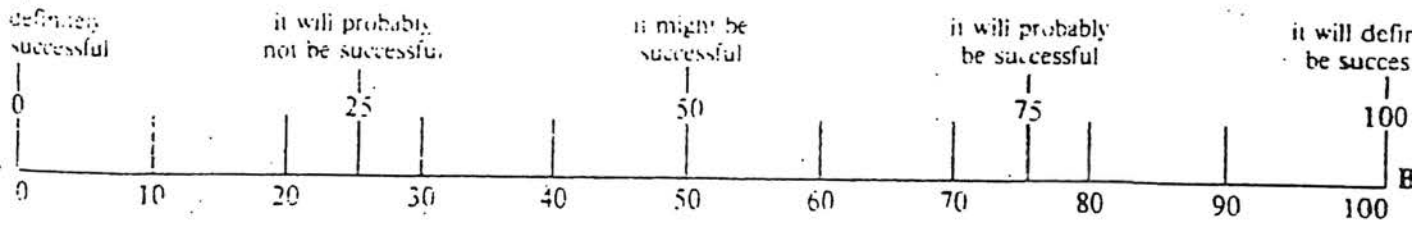


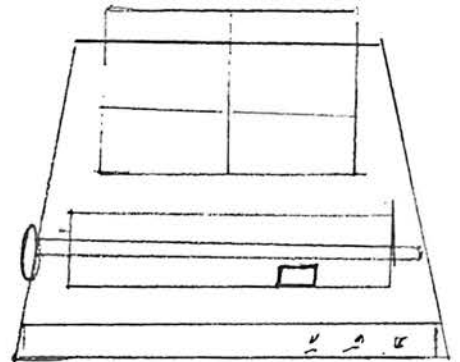
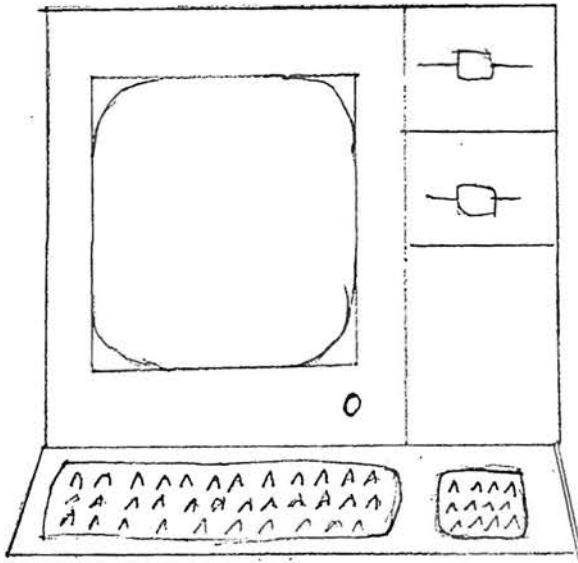
EXHIBIT 3

Exhibit 3

Radio Shack Model II Computer

specifications:

48K RAM
Dual Disk Drives
Monochrome Screen



Radioshack Dot Matrix Printer

specifications:

132 Column Capacity, 80 Columns Used

EXHIBIT 4

36/14/82

ITRAD Innovation Center
P. O. Box 1335
Durant, OK 74701

Attention: R. E. Oliver

The evaluation of the following innovation has been completed and the results are enclosed:

File - E0139

Name - [REDACTED]

Product - [REDACTED]

If there are questions please let me know.

Sincerely Yours,

B. Scott Sims, Ph.D.
Director
OSU Product Evaluation Center

File - E013E

Name - [REDACTED]

Product - [REDACTED]

Date - 06/14/82

THE CRITICAL VALUE IS THE SUM OF QUESTIONS 1,2,5,6, AND 8. FOR THIS IDEA
the critical value is 24. This is ABOVE the critical level of 19 and is
percent of the maximum of 25.

NO	CRITERION	% of Maximum	Strong Point	Weak Point
1	Legality	100	X	
2	Safety	100	X	
3	Environmental Impact	0		
4	Societal Impact	100	X	
5	Functional Feasibility	100	X	
6	Production Feasibility	100	X	
7	Stage of Development	100	X	
8	Investment Costs	44		
9	Payback Period	57		
10	Profitability	5		X
11	Marketing Research	100	X	
12	Research & Development	100	X	
13	Potential Market	64	X	
14	Potential Sales	37		
15	Trend of Demand	59		
16	Stability of Demand	44		
17	Product Life Cycle	29		
18	Product Line Potential	24		X
19	Compatibility	29		
20	Learning	65	X	
21	Need	64	X	
22	Dependence	39		
23	Visibility	100	X	
24	Promotion	34		
25	Distribution	29		
26	Service	100	X	
27	Appearance	59		
28	Function	55		
29	Durability	22		X
30	Price	10		X
31	Existing Competition	61	X	
32	New Competition	15		X
33	Protection	100	X	

THE SUCCESS LIKELIHOOD RATING FOR THIS INNOVATION IS marked on the scale
on the last page for SLR interpretation.

Product Evaluation Center

Oklahoma State University

I N N O V A T I O N E V A L U A T I O N

LE - EC138

ME - [REDACTED]

PRODUCT [REDACTED]

TE - 06/14/82

Our initial evaluation of your innovation has been completed. Thirty-three (33) areas of concern for new product introduction are grouped into 5 major factors. The evaluation given for each of the 33 areas of concern corresponds to the judgment of several evaluators. Their responses have been averaged and the appropriate evaluation for each area of concern is printed below.

The preliminary evaluation should provide you with some indication of marketability and probable success of your innovation.

SOCIETAL FACTOR

1. Legality (p.49)

In terms of applicable laws (particularly product liability), regulations, product standards, this idea/invention/new product will meet them without any changes.

2. Safety (p.52)

Considering potential hazards and side effects, the use might be very safe under all conditions, including misuse.

3. Environmental impact (p.54)

In terms of pollution, litter, misuse of natural resources, etc., use might *** EVALUATORS HAVE DETERMINED THAT THIS CRITERIA IS NOT APPLICABLE***.

4. Societal impact (p.56)

In terms of the impact (benefit) upon the general welfare of society, use of this innovation might have a positive effect on society.

BUSINESS RISK FACTOR

3. Function feasibility (p.60)

In terms of intended functions, this innovation will work - no changes necessary.

5. Production feasibility (p.63)

With regard to technical processes or equipment required for production, this invention might have no problems.

7. Stage of development (p.64)

Based on available information, there is a market-ready prototype.

8. Investment costs (p.65)

The amount of capital and other costs necessary for development to the market-ready stage might be moderate - recoverable within five years.

9. Payback period (p.67)

The expected payback period (time required to recover initial investment) is likely to be 1 to 3 years.

10. Profitability (p.72)

This is defined as the extent to which anticipated revenues will cover the relevant costs (direct, indirect, and capital). Anticipated revenues might cover direct costs but contribute minimally to indirect and capital costs (ROI).

11. Marketing research (p.74)

The marketing research required to develop a market-ready product is estimated to be very simple and straightforward.

12. Research and development (p.77)

The research and development required to reach the production-ready stage might be very simple and straightforward.

DEMAND ANALYSIS FACTOR

. Potential market (p.81)

The total market for products of this type might be large - broad national market.

. Potential sales (p.85)

Expected sales of this product might be medium.

. Trend of demand (p.87)

The market demand for products of this type appears to be growing slowly - modest growth opportunity.

. Stability of demand (p.90)

The fluctuation in demand is likely to be predictable - variations can be foreseen with reasonable accuracy.

. Product life cycle (p.91)

The product life cycle is likely to be two to four years.

. Product line potential (p.95)

The potential for additional products, multiple styles, qualities, price ranges, etc., is limited to minor modifications only.

MARKET ACCEPTANCE FACTOR

. Compatibility (p.99)

Compatibility with existing attitudes and methods of use is moderate - no negative effects.

. Learning (p.102)

The amount of learning required for correct use is low - minimal instructions needed.

. Need (p.105)

The level of need filled or utility provided by this innovation is high - fulfills either basic psychological or physical needs.

2. Dependence (P.107)

The degree to which the sale or use of this product is dependent upon other products, processes or systems is moderate - reasonable market control and cost.

3. Visibility (P.110)

The advantages and benefits are very visible - advantages are obvious and easy to communicate.

4. Promotion (P.112)

The costs and effort required to promote the advantages, features, and benefits are likely to be moderate - commensurate with expected sales.

5. Distribution (P.114)

The cost and difficulty of establishing distribution channels are likely to be moderate - commensurate with expected sales.

6. Service (P.116)

The cost and difficulty associated with providing product service is likely to be very low - will require little or no parts and service.

COMPETITIVE FACTOR

7. Appearance (P.121)

Relative to competition and/or substitutes, appearance is likely to be perceived as superior - has customer appeal.

8. Function (P.123)

Relative to competing and/or substitute products, services or processes, the function performed might be perceived as superior - some competitive advantage.

9. Durability (P.125)

Relative to competition and/or substitutes, durability of this product is likely to be perceived as similar - to competition/substi

2. Price (P.126)

Relative to competition and/or substitute products, the selling price is likely to be higher - a competitive disadvantage.

Existing competition (p.129)

Existing competition for this innovation appears to be low - a significant market share might be possible.

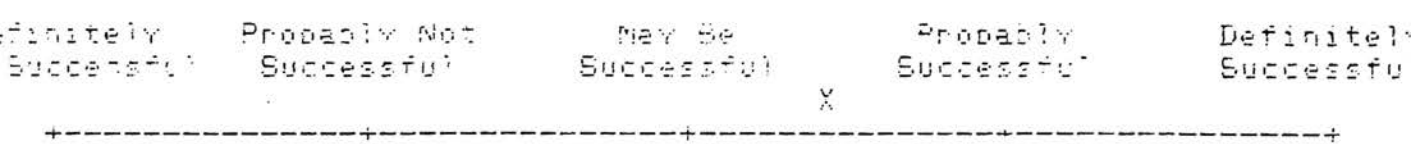
New competition (p.131)

Competition from new entrants or competitive reaction is expected to be high - product lead will be relatively short.

Protection (p.133)

Considering patents (or copyrights), technical difficulty or secrecy, the prospect for protection appears to be that a patent, copyright and/or long-term secrecy is definitely possible.

Likelihood Question: Likelihood Estimate: 62 (See X on chart below)
In your opinion, the likelihood of this idea, process or product being successful in the marketplace is:



This estimate should be interpreted as an overall summary, based on the 33 criteria, of the likelihood or chance of success for your invention or new product idea. If this information seems to contradict some of the written responses for the criteria, it is because the estimate reflects the varying degrees of importance and the interrelationships of the 33 criteria. Consequently, you should place greater emphasis on this information than any specific criterion contained in your evaluation report.

If more information is desired regarding each criterion, refer to the Innovation and Innovation Evaluation. Page numbers for each criterion are shown in parentheses beside each topic.

If you have any questions concerning the above evaluation's format, content, or implications, please contact:

ITR&D Innovation Center
P.O. Box 1335
Durant, OK 74701
405/924-5094

VITA

James A. Webb

Candidate for the Degree of

Master of Business Administration

Report: AN EVALUATION OF THE OKLAHOMA STATE INNOVATION EVALUATION
CENTER

Major Field: Business Administration

Biographical:

Personal Data: Born in Roanoke, Virginia, January 21, 1954 the
son of Dr. and Mrs. J. B. Webb.

Education: Graduate from Monterey High School, Lubbock, Texas, June,
1977; received the Bachelor of Science Degree from Oregon
State University with a major in Chemistry, May, 1984; completed
requirements for the Master of Business Administration degree
at Oklahoma State University, May, 1984.

Professional Experience: Manufacturing Supervisor, Texas
Instruments, Inc., 1982.