





LIBRARY
OF THE
MASSACHUSETTS INSTITUTE
OF TECHNOLOGY

HD28
.M414
no. 287-
67

WORKING PAPER
ALFRED P. SLOAN SCHOOL OF MANAGEMENT

UNUTILIZED IDEAS IN UNIVERSITY LABORATORIES:

A PRELIMINARY STUDY

Donald H. Peters and Edward B. Roberts

September, 1967

#287-67

MASSACHUSETTS
INSTITUTE OF TECHNOLOGY
50 MEMORIAL DRIVE
CAMBRIDGE, MASSACHUSETTS 02139



Massachusetts Institute of Technology
Alfred P. Sloan School of Management

Research Program on the
Management of Science and Technology

UNUTILIZED IDEAS IN UNIVERSITY LABORATORIES:

A PRELIMINARY STUDY

Donald H. Peters and Edward B. Roberts

September, 1967

#287-67

The research presented in this paper was supported in part by grants by the National Aeronautics and Space Administration to the M.I.T. Center for Space Research (NsG-496) and by the Gillette Safety Razor Company. However, the findings and views reported are those of the authors and do not necessarily reflect those of the supporting organizations. This work was done in part at the M.I.T. Computation Center.

This paper should not be reproduced in whole or in part, by any process, without the permission of the authors.

HD 28
.m414
no. 287.67

RECEIVED
JAN 23 1968
M. I. T. LIBRARIES

REPORT ON A PRELIMINARY STUDY OF THE
EXISTENCE OF UNUTILIZED IDEAS IN UNIVERSITY LABORATORIES

For a number of years, the M.I.T. Research Program on the Management of Science and Technology at the Alfred P. Sloan School of Management, has been conducting analyses of the problems of organizing and managing technology-based enterprises. As part of this program a series of investigations have been directed specifically at the problems of technology transfer and the formation of new technologically-based companies. Under the direction of Professor Edward B. Roberts, this research has involved an analysis of the backgrounds and motivations of more than 200 entrepreneurs who have left university departments and laboratories, or other technical organizations, in order to found their own companies. To date this research has included as sources of spinoffs four of M.I.T.'s laboratories, four M.I.T. departments, a not-for-profit laboratory, an industrial laboratory, and a government in-house research laboratory.¹

These studies have identified both a number of factors that are characteristic of technical entrepreneurs and their enterprises, and has also dif-

¹Reports of this research are contained in a number of M.I.T. Sloan School unpublished theses, a list of which can be obtained from the authors. Summaries of portions of the work are available in the following papers:

- a. Roberts, E.B. and Wainer, H.A., Some Characteristics of Technical Entrepreneurs, Working Paper #195-66, (Cambridge: M.I.T. Sloan School of Management, May, 1966).
- b. Roberts, E.B. and Wainer, H.A., "Technology Transfer and Entrepreneurial Success", Proceedings of the 20th National Conference on the Administration of Research (Denver: Denver Research Institute, 1967).
- c. Wainer, H.A., and Rubin, I.M., Motivation and R&D Entrepreneurs: Determinants of Company Success, Working Paper #234-67 (Cambridge: M.I.T. Sloan School of Management, January, 1967).

ferentiated on several dimensions more successful from less successful new technically-based firms. Most significantly, the role of personal and organizational factors in the transfer of technology has been identified and its importance emphasized. At the same time, the magnitude of the sample of technical entrepreneurs from the small number of parent organizations studied suggests the possibility that there may exist large numbers of unexploited ideas in such organizations. Such ideas might be associated with individuals who have the technical capacity and who work in an environment conducive to the generation of new ideas but who have neither the interest or motivation to exploit them through the formation of new enterprises, or who may lack the resources or ability required to organize a new firm. It is of interest, therefore, to examine the extent to which these ideas might exist and their potential significance, as well as the reasons that are specifically involved in the blockage preventing their exploitation. For this reason, a study has been initiated that will investigate the nature and existence of unutilized ideas in university laboratories. This paper summarizes the results of a questionnaire distributed within two of the M.I.T. laboratories and outlines the further research in progress on this study.

The Current Survey

The current study is part of a control study of individuals employed by the parent organizations used in the entrepreneurial studies. The control study will be used to further differentiate technical entrepreneurs from their colleagues. A random sample of 200 employees was drawn from each of two M.I.T. laboratories, the Lincoln Laboratory and the Instrumentation Laboratory. At each organization questionnaires were distributed to

the sampled staff members under a cover letter signed by the Laboratory Director. The questionnaire itself corresponded to those used previously in the study of the backgrounds of the technical entrepreneurs who have been questioned over the past several years. Specifically, each respondent was asked to identify his educational and employment history, his family background, his accomplishments in terms of patents and publications, and the nature of his present job. In addition he was asked to indicate whether or not he had ever had, while at the laboratory, ideas for new products or services whose scope lay outside the laboratory's interests. If so, he was further asked to indicate the market orientation of the idea and the extent to which he had proceeded with it. Each respondent was further asked to indicate what factors impeded his attempts to proceed with such ideas and also to discuss the extent to which he had ever had interest in going into a business on his own. Of the sampled staff members 138 in the Instrumentation Laboratory and 161 in the Lincoln Laboratory returned questionnaires.

The Existence of Unutilized Ideas and their Characteristics

The single most important set of statistics derived from this brief survey of these two laboratories relates to the prevalence of new ideas for products and services and the associated lack of implementation of them. As is summarized in Table 1, 54% of the sampled employees of the Instrumentation Lab, and 45% of the sampled Lincoln employees claimed they had developed ideas whose scope lay outside the interest of their employer. Only a small percentage of these ideas have apparently been given serious consideration by their originators; in the Lincoln Laboratories only 35% of those employees who claimed such ideas indicated that they had done anything with the idea

considered most important, while the respective percentage in the Instrumentation Laboratory is 32%. It is remarkable that these percentages within the two laboratories are so similar in view of the fact that the objectives of the two organizations are quite dissimilar and that they are involved in very different technologies.

TABLE 1

The Existence and Implementation of Ideas
Whose Scope is Outside the Laboratory

Laboratory	Sample	Claim Such Ideas		Attempted to do Something	
		#	%	#	%
Lincoln	161	72	44.7	25	35.2
Instrumentation	138	75	54.4	24	32.0
TOTAL	299	147	49.3	49	33.6

*Percentage based on those who had such ideas. The question dealt with whether or not anything had been attempted with the "most important" of these ideas.

Each individual was also asked to indicate how many of these ideas he had had while at the laboratory. While it must be granted that responses to such a question are undoubtedly rough rather than calculated estimates, the number of claimed ideas is impressive. The 75 individuals from the Instrumentation Laboratory who claimed such ideas claimed a total of 266 ideas. In the Lincoln Lab, where 72 people claimed to have ideas whose scope lay external to the lab's interests, there were a total of 255 ideas claimed. In each lab, therefore, an average of 3.5 ideas was claimed per claimant. Thus, in this initial survey in which a total of 299 employees responded to

the questionnaires, there was a total claim of 521 ideas, indicating at least roughly that there may in fact exist large numbers of externally-oriented ideas within the M.I.T. laboratories. Furthermore, as indicated in the slight degree of implementation of even the most highly rated ideas, the data demonstrate that exploitation of a significant portion of these ideas is not in fact yet accomplished or being attempted at the present time. Again we note the high degree of similarity between the two laboratories.

It should be noted that this study adopts a measure of output which is quite different from those that might be utilized within the laboratories in which the respondents are employed. Those members of the lab who have a propensity for the development of ideas whose relevance or application lies outside the laboratory's scope are not necessarily those who are most valuable to the laboratory itself. We have been unable to determine any significant relationship between having outside product ideas and patent or publishing activity, the only alternate measures of productivity that we have available. Thus, at this time, we are unable to demonstrate that having outside ideas is either complementary to or at the expense of contributions within the lab. However, it may be noted that the majority of the correlations among the several performance measures, though not statistically significant, are in the direction of the assertion that those individuals who are more active in publishing or patenting are also more likely to have outside ideas.

A large proportion of these ideas lie in products or services that relate to consumer markets. Table 2 below identifies the market areas

checked by the subjects for their most important ideas.

TABLE 2
Market Areas for Most Significant Ideas
(expressed as percentage of totals*)

Market Area	Lincoln Lab	Instrumentation Lab
Consumer	46.4	44.5
Industrial	19.7	20.8
Government (NASA and Defense)	16.9	12.5
Government (other)	7.0	4.2
Two or more of the above*	9.8	18.1
Total	99.8**	100.1**

*A number of ideas were ascribed to more than one of the market classifications. These are identified separately. For the Lincoln Laboratory the bulk of these multiple classifications involved consumer goods and one other area; for the Instrumentation Lab the majority involved industrial markets and NASA or defense.

**Error due to rounding

While the areas claimed to be relevant do not differ markedly between the two laboratories we do note the general tendency for the majority of the ideas to lie in consumer and industrial areas, those areas not immediately related to the laboratories' funding and mission. When one incorporates the multiple classifications there is a minor tendency for the ideas in the Instrumentation Laboratory to lie in industrial markets

relative to the Lincoln Laboratory, in which a greater proportion of the total ideas involve consumer markets. It is hypothesized that this difference may be understood in terms of the strong orientation of the Instrumentation Lab to development and devices, work involving equipment and components much more likely to find immediate use in industry as opposed to the home.

The nature of the marketability of the idea relates significantly to two other dimensions of the individual's background and behavior. First of all, a significantly higher proportion of the consumer and industrial oriented ideas have not been followed up as opposed to those ideas whose application is with the government ($p = .02$).^{*} Presumably this reflects the more general familiarity of the laboratory staff with government markets and with firms serving government markets so that the individual is more likely to be aware of certain steps that he can take to follow-up government oriented ideas. There is also an association at a barely significant level between having taken business courses and having ideas useful in the consumer rather than the other areas. Naturally, no inference is possible regarding the direction of this association.

The attendance of an individual at business courses has been found also to be associated with at least two of the specific responses that individuals make in implementing new ideas. Specifically, having a background including courses in business is related positively to investigating a new idea by building a prototype and negatively to responding through a patent or literature search. It would be the authors' hypothesis that this result reflects the inter-

^{*}The probability levels referred to in this paper all refer to two-tailed tests. A level of .10 has been used to determine significance.

vention of the nature of the respondents' work on their likelihood of taking business courses and on their specific responses in support of new ideas. Analysis of these data carried out by Wainer and Roberts indicates an association between development oriented activities and taking courses in business;² it seems likely that a development orientation would correspond similarly to building prototypes while the search of patents and the literature would be more characteristic of individuals in more research oriented work. Support for this inference is indicated in the frequency of the various responses between the more development oriented Instrumentation Lab and the Lincoln Laboratory, a result to which we will refer more specifically below.

The Activities and Background of those who Claim Ideas

Since the questionnaire was administered by mail the respondent himself is the only source of data about his own accomplishments; there is therefore some concern over the validity of the results obtained in this survey. One indication, however, of the validity of the respondents' claims of ideas for new products and services is the very strong association between claiming ideas and indicating consideration of going into business for oneself. Although a product idea is not a necessary pre-condition to giving serious consideration to self-employment, this relationship would in fact at least be expected, and its strength contributes toward our confidence in the survey data.

Over the entire group of respondents a result that would be expected from the entrepreneurial studies is also obtained. In the studies of spinoff companies there was an indication that individuals whose fathers were self-

²Wainer, H.A. and Roberts, E.B., "Comparison of the Lincoln and Instrumentation Laboratories", private correspondence and report of a comparative study of laboratory personnel presented to the M.I.T. Vice President for Special Laboratories.

employed were more likely to themselves become entrepreneurs. In our survey, those individuals whose fathers were self-employed were significantly more likely to respond that they gave consideration to going into business for themselves ($p = .01$).

This survey suggests that there is a large potential for entrepreneurship within both laboratories. In the Instrumentation Lab, 53% of the respondents indicated that they had given consideration to going into their own business while in Lincoln the comparable figure is 41%. Eight of the Instrumentation Lab subjects had in fact already at some time established their own companies as had six of the respondents from the Lincoln Laboratories. Thus, it is apparent that the prospect of self-employment receives significant attention by the current members of the laboratories. One might expect the number of spinoffs from the Lincoln and Instrumentation Laboratories to have grown already beyond the respective fifty and thirty that were studied by Roberts and Wainer.³

Data were also collected to explain why so many of the individuals who indicated they had product ideas or interest in self-employment had not proceeded with the ideas or gone into business for themselves. Table 3, on the next page summarizes the reasons cited for not starting one's own business. In both laboratories the most important factors claimed are a lack of interest on the part of the individual and a perceived lack of the financial resources needed to start a firm. Also very important is unwillingness to take the financial risk associated with being on one's own, reflecting, it is believed, the

³Roberts and Wainer, "Technology Transfer and Entrepreneurial Success", op. cit.

TABLE 3

Reasons Given for not Going into Business for Yourself
(Frequency and Percentage)

Reasons	Lincoln Laboratory		Instrumentation Laboratory		Total	
	#	%	#	%	#	%
1. No interest--satisfied with present position	21	34.5	10	14.7	31	24.0
2. Indecisiveness--too many uncertainties	3	4.9	5	7.4	8	6.2
3. Lack of necessary personality traits	1	1.6	1	1.5	2	1.6
4. General inexperience	5	8.2	7	10.1	12	9.3
5. Inadequate in business matters	4	6.6	3	4.4	7	5.4
6. Lack of substantive technical experience	--	--	1	1.5	1	0.8
7. Lack of sufficient time	--	--	2	2.9	2	1.6
8. Lack of time or facilities to develop an idea to usefulness	--	--	3	4.4	3	2.3
9. Lack of adequate financing	14	23.0	14	20.6	28	21.7
10. Unwilling to take the financial risk	8	13.1	14	20.6	22	17.1
11. No idea yet	3	4.9	4	5.9	7	5.4
12. Intend to--am still in the stage of planning the move	1	1.6	2	2.9	3	2.3
13. Other	1	1.6	2	2.9	3	2.3
Total	61	100.0%	68	99.8%*	129	99.9%*

*error due to rounding

relative security of the present job. A number of respondents view themselves as either inadequate or unprepared for entrepreneurship. This is reflected in the responses associated with general inexperience, inexperience in important technical areas, and the responses of those who claim that there is a discrepancy between how they view themselves and the "personality" they believe to be necessary for success in one's own business. A few of the subjects indicated themselves to be prepared to begin their own businesses, claiming to be either in the process of planning such a move, or viewing themselves as waiting for the opportunity to present itself in the form of an exploitable idea.

Table 4 tabulates the problems that were claimed to impede attempts to proceed with an idea. There is a great similarity naturally between these problems and the reasons that were given above for not going into business. The most dominant factors claimed are related to a lack of time, money, or facilities to develop the ideas and to a lack of interest on the part of its originator. The higher relevance in the Instrumentation Laboratory of factors relating to the practicality of the idea might, it is speculated, reflect more awareness of market factors by personnel involved in more development-oriented work.

Table 5 gives some indication of just what was done with those ideas that the individual had chosen to follow up.* Although a number of different actions were taken, three actions appear to dominate: discussing the idea with people who are viewed to be qualified to assist in its evaluation, building a working prototype, and performing a patent or literature search. As we

*The reader is reminded that the ideas being studied here and their follow-up relate only to entities outside the scope of interest of the employing lab. We have no data on within-scope ideas or within-lab follow-up of ideas of interest to the employing laboratories.

TABLE 4

Factors Impeding Attempts to Proceed with the Ideas
(Frequency and Percentage)

Factor	Lincoln Laboratory		Instrumentation Laboratory		Total	
	#	%	#	%	#	%
1. Lack of motivation or interest; satisfaction with present job	15	22.0	15	21.7	30	21.9
2. Insufficient potential as a product	3	4.4	6	8.7	9	6.6
3. Idea not sufficiently ad- vanced to be practical	3	4.4	5	7.2	8	5.8
4. No support within the labora- tory	5	7.4	5	7.2	10	7.3
5. Lack of understanding on the part of others	2	2.9	--	--	2	1.5
6. M.I.T. policies prohibited work	4	5.9	--	--	4	2.9
7. Lack of time or facilities to develop the idea	28	41.2	22	31.9	50	36.5
8. Lack of money for development	4	5.9	9	13.0	13	9.4
9. Prior patent	--	--	2	2.9	2	1.5
10. Other	4	5.9	5	7.2	9	6.6
Total	68	100%	69	99.8%*	137	100.0%

*error due to rounding

TABLE 5

Specific Actions taken with the Ideas
(Frequency and Percentage based on those who had done something)

Action	Lincoln Laboratory		Instrumentation Laboratory		Total	
	#	%	#	%	#	%
1. No action as of yet--however am in planning stage	--	--	2	8	2	4
2. Approached management	1	4	2	8	3	6
3. Discussed the idea's feasibility with qualified people	10	40	6	24	16	32
4. Made patent or literature search	5	20	2	8	7	14
5. Made a working prototype	3	12	5	20	8	16
6. Preliminary testing of the product idea	1	4	2	8	3	6
7. Writing a patent application	1	4	1	4	2	4
8. Consider forming a new company	--	--	2	8	2	4
9. Attempted to form a new company	1	4	2	8	3	6
10. Leaving the lab to join a company which can support the idea	--	--	1	4	1	2
11. Idea presently being used	3	12	--	--	3	6
Total	25	100%	25	100%	50	100%

suggested earlier, the respondents from Lincoln Laboratory, which is much less purely development oriented than is the Instrumentation Lab, relied more heavily on the discussion and search activities, whereas the more development oriented

Instrumentation Lab respondents were relatively more often involved in building a working prototype.

When we examine the kinds of activities in which the respondents are involved there are a number of suggestive relationships that may prove useful in predicting whether an individual is likely to generate new ideas for products and services. These results must however be accepted only tentatively, since significant results were derived in only one of the two laboratories on each respective relationship. First of all, the more experienced individual is more likely to generate ideas useful outside the laboratory. Within the Instrumentation Laboratory, the idea-bearers were significantly more experienced in the number of companies by which they had been employed prior to joining the laboratory ($p = .04$), while within Lincoln, those individuals having ideas had a significantly longer period of experience with the laboratory ($p = .03$). However, at the Instrumentation Lab those individuals claiming to have new ideas were more apt to be at lower positions in the laboratory ($p = .03$).

One of the more intriguing results of this survey bears upon the kind of work that the individual performs at the laboratory. In both laboratories the extent to which an individual was involved in research as opposed to development is related significantly to his claiming new product ideas. The direction in the two laboratories is, however, contradictory. Within the Instrumentation Laboratory the percentage of time devoted to research was associated with having ideas ($p = .08$). This result is confirmed by the fact that the "Bullpup Classification", a measurement device designed to differentiate technical work along a spectrum from pure research to prototype development, was significantly lower for the idea-bearers ($p = .02$), indicating that the idea-bearing individuals at Instrumentation more frequently described their work as being more like re-

search than development. The direction of the association within Lincoln is, however, exactly reversed; the number of ideas was negatively related to the percentage of time devoted to research ($p = .04$) and the idea-generators claimed a significantly greater proportion of their time to be devoted to development ($p = .05$). The laboratories differ in their missions and the nature of the work performed, the Lincoln Laboratory being more heterogeneous in the nature of the technical work performed and the Instrumentation Laboratory being clearly a development laboratory. The extent of this difference can be indicated by the difference in the median Bullpup Classifications for the two labs; on a scale from 1 to 9, where 9 indicates prototype development, the median Bullpup Classification in the Instrumentation Lab is 9, while in Lincoln the median classification is the mid-scale value of 5. Also indicative of the difference between the laboratories is the fact that the mean percentage of time devoted to Research in Lincoln Laboratory is 26.6%, while at the Instrumentation Lab the comparable figure is 14.7%.

Because of the differences in the nature of the laboratories we are offered two potential reasons based on assumptions of linearity for the contradictory results between the nature of the technical work and the generation of product ideas. Namely it is possible that either of the following explanations could equally explain the data:

- a. Idea generators tend to be in a specific position or region of the research and development spectrum; it is merely the fact that the Lincoln Laboratory is more research oriented that explains why the contradictory results appear between the two laboratories;
- b. Idea generators are in fact most likely to appear involved technically with work at the end of the spectrum that is opposite to the primary emphasis of his laboratory.

With these two alternate hypotheses in mind the data have been reexamined.

While this examination has not rigorously rejected either of the above hypotheses it has suggested that some modification may be necessary. Specifically, it

is suggested that idea generators are more apt to be involved in work less toward the research end of the technical spectrum. However, it strongly appears that involvement in work that is devoid of either research content or alternately of any development content is not conducive to idea generation. Thus it appears that the idea generators less frequently than expected describe their work as having no research or no development. We shall now discuss the number of relationships that contribute toward this conclusion.

Considering the generation of ideas versus the percentage of time devoted to research, there is clear tendency in the Lincoln Laboratory for those individuals claiming ideas to be performing research a smaller portion of their time. Grouping the data into ranges of ten percent, each of the groups devoting less than 40% of their total time to research claims a higher proportion of the idea generators than expected while all of the groups above 40% are uniformly less populated by idea-bearers than expected. In the Instrumentation Laboratory the result is strikingly similar with the exception that of those individuals claiming to do no research at all, there is a significantly smaller than expected number of individuals who claim to have ideas ($p' = .05$). Thus, beyond the qualification that in this laboratory individuals who claim to be involved in no research are less apt to generate ideas, the results in both laboratories conform to the hypothesis that idea generators are more apt to be involved in work described more toward the development end of the technical spectrum.

The Bullpup Classification is not significantly related to idea generation in the Lincoln Laboratory but is, as we have indicated, significantly related in a contradictory fashion within the Instrumentation Lab; that is, at the Instrumentation Laboratory idea generators are more frequently than expected

found to be involved in research rather than development work. Again, however, the result does not hold at the extremes. Relative to the rest of the respondents in the laboratory, those who describe their work at the extreme end of the development scale are less frequently than expected to also claim to have product ideas ($p = .10$). Correspondingly in the Lincoln Laboratory a disproportionately small number of idea claimers describe their work as involving no development work. This result corresponds to the one uncovered in the Instrumentation Laboratory where we discovered that being involved in work devoid of research content restricts idea generation; here we have seen that idea generation is also restricted by work devoid of any development content.

It is these relationships that jointly contribute to our tentative acceptance of the conclusion that idea generators may in general appear to be less frequently involved in technical work toward the research end of the technical spectrum. To this finding we add the qualification that when the technical content of a job is purely research or purely development we may expect a reduced contribution of product ideas. This result corresponds very well with conclusions recently presented in Science by Pelz. He comments: "Effective scientists, in short, did not limit their efforts either to the world of pure science or to the world of application but were active in both." Pelz attributes the favorable effects to diversity, by which scientists "broaden the range of elements from which the scientist or engineer can draw in synthesizing new combinations." Although Pelz's measure of technical performance is more oriented to in-house productivity, while our considerations and interest are oriented to outside new product ideas, it is encouraging that the results that he has derived appear so similar. We are inclined to attribute the importance of having both research and development activities for potential idea-generators to the necessity for

⁴Pelz, D.G., "Creative Tension in the R&D Climate", Science, 157, pp. 160-165, July 14, 1967.

such individuals to be involved in creative work that is at the same time related to "real world" problems. The combination of the stimulation of research and the practicality of applied development contributes an environment conducive to the development of new product and service ideas.

The technical spectrum was also found to be significantly related to the respondents' attitudes toward self-employment. Those who described their work as basic research were much less frequently found to have ever given consideration to going into business for themselves ($p = .02$).

In the entrepreneurial studies cited earlier religious background appeared as a significant factor related to the entrepreneur's level of education and establishment of his own business. While in the present study religion was not found to be significant in determining whether or not an individual had product ideas, it was important in determining whether new product ideas were at all followed up. Specifically, it was discovered that Jewish respondents were more frequently found to do something with an idea while Protestant respondents did something with their ideas less frequently than expected. This result conforms to other research suggesting that the differences between persons of different religious background may be explained in part by high levels of n-achievement on the part of the Jewish group.⁵

Summary of Conclusions and the Immediate Directions for Future Research

In this section we first summarize those results cited previously that are regarded as most important, then we comment on the research, and finally we briefly indicate the directions of future study.

⁵Roberts and Wainer, Some Characteristics of Technical Entrepreneurs, pp.10-18.

As a study of unutilized ideas in university laboratories, the survey study of the M.I.T. Lincoln and Instrumentation Laboratories has contributed the following primary conclusions:

- a. The evidence indicates that large numbers of new product ideas exist in the M.I.T. laboratories, ideas that are oriented outside of the direct interests of the employing laboratory;
- b. A significant number of these ideas have not received the attention by their idea-generators necessary to an adequate assessment of their potential;
- c. A high proportion of the ideas relate to consumer and industrial markets; furthermore, ideas related to these market areas are least likely to receive serious consideration when the originator is employed in a laboratory supported by government funding and primarily oriented to governmental missions;
- d. A number of factors have been suggested by the data that relate to the likelihood of an individual having product ideas; the more important ones include:
 1. the more experienced individual is more apt to claim product ideas,
 2. the orientation of the individual's work is related to the likelihood that he claims new product ideas--while an orientation toward the development end of the technical spectrum is conducive to idea generation, work containing no research content retards the generation of product ideas.

The weakness of the survey method that was used to collect this information is that it has not allowed the investigators to infer the significance of the ideas that remain unimplemented from these two laboratories. Moreover, we have only one check on the validity of the respondents' answers with regard to whether or not they had product ideas, and this check, though confirming, is based on posterior inference. Future studies will aim to correct these weaknesses by specifically examining one or two of the ideas that an individual claims to have developed. Furthermore, an interviewing technique will be implemented so that the aspects of idea generation and blockages to their implementation can be more deeply and more consistently examined. These studies are now being initiated

in several M.I.T. departments. By including faculty and instructors in the subsequent research we intend to describe more completely the phenomena of university product and service idea generation so as to treat not only the laboratory staff personnel but also members of the academic staff.

JUL 9 75

~~SECRET~~



ROSEMEAD

Date Due

JAN 27 '76	
FEB 11 '76	
OCT 08 '70	
SEP 10 '70	
JUN 15 '77	
NOV 28 '77	
MAY 21 '76	
JUN 08 '80	
SEP 10 '70	
MAY 25 '67	
SEP 07 1991	
APR 25 2000	

Lib-26-67

MIT LIBRARIES



3 9080 003 901 623

283-67

MIT LIBRARIES



3 9080 003 870 646

284-67

MIT LIBRARIES



3 9080 003 870 638

285-67

MIT LIBRARIES



3 9080 003 901 581

286-67

MIT LIBRARIES



3 9080 003 901 631

287-67

MIT LIBRARIES



3 9080 003 901 649

288-67

MIT LIBRARIES



3 9080 003 901 706

289-67

MIT LIBRARIES



3 9080 003 870 687

290-67

MIT LIBRARIES



3 9080 003 901 672

291-67

MIT LIBRARIES



3 9080 003 870 695

292-67

MIT LIBRARIES



3 9080 003 870 703

293-67

