ABSTRACT: To most, opportunity recognition and exploitation are the key activities of entrepreneurship. In their 1989 paper on the subject the authors identified a factor structure useful in explaining the process. The present work compares the 1998 results with the 1989 results. Evidence is provided that there is a stable temporal model of opportunity recognition and exploitation.

INTRODUCTION

In 1973, Kirzner suggested that opportunity recognition and exploitation is the core of entrepreneurship. Sixteen years later, in 1989 the present authors of this study wrote "While there are many contributions to the literature describing product development and product management functions and processes (Pessemier and Root, 1973; Urban et al., 1987; Pessemier, 1977; Giragosian, 1978; Rothberg, 1981), there are only limited studies describing the recognition and exploitation of opportunity by entrepreneurs (Koller, 1988)." While an ever increasing number of studies dissect the entrepreneurial process, the recognition and exploitation of opportunity by entrepreneurial firms is treated as a minor aspect of the overall business development process. Perhaps this is because researchers have been interested in the overall process and not a single aspect or element of the process. Perhaps it may be due to the stochastic nature of opportunity recognition and exploitation and the fact that it does not lend itself to easy characterization." (Teach et. al, 1989).
In the late 1990s researchers continued to pay more attention to aspects of entrepreneurship other than opportunity recognition and exploitation (Hills and Singh, 1998). This paper is a continuation of 1989 work by the authors and reports on a longitudinal study of the opportunity recognition and exploitation process (Teach et. al, 1989).

BACKGROUND

Opportunity Recognition and Exploitation

Small firm development is by its nature different than large firm development (Gaglio and Taub, 1992). It has been suggested that an entrepreneur informally and intuitively perceives an opportunity, based upon some "feel" for the market (Cooper, 1981). This is in marked contrast to the more structured models used for larger, older and professionally managed firms. The stochastic nature of the recognition process in entrepreneurial firms is supported by a past study that viewed product planning in the electronics industry (Feldman and Page, 1984). Often the idea generation process occurred on an ad hoc basis. Other researchers (Delbecq and Mills, 1985) concluded that successful innovation depended upon a company's willingness to commit the necessary time, money and leadership to research and development (Teach et. al, 1989).

In the large firm it is the confluence of many different factors that create successful new business development (Johne and Snelson, 1988). Product, market, and firm compatibility all are part of the criteria for new business development (Schwartz, 1980) and while ideas may be ad hoc, opportunities are not (Timmons et. al, 1987). Thus, in models of new business development or opportunity recognition and exploitation, there will be sets of external and internal factors that contribute to the definition of an opportunity. While there may be industry dependencies in a model (Barczak, 1992; Schwartz and Teach, 1999), it is perhaps the application of strategies inherent to the process that vary over time, not the model itself.

Models Of Opportunity Recognition And Exploitation

Gaglio and Taub (1992) conjectured that the opportunity recognition and exploitation process could be operationalized. In a subsequent analysis of two types of entrepreneurs they found there were differences in their approaches to opportunity recognition and exploitation.
Bhave (1994) defined a model for opportunity recognition and exploitation, with two paths to opportunity recognition and exploitation: external and internal. In the former, a business was begun, then an opportunity was found. In the later case, the opportunity was found and then the business begun. In either case, opportunities needed to be recognized, refined, the business concept identified, or then a commitment to the idea had to be converted into a reality.

Dealing with only the "search" stage of opportunity definition, Conway and McGuinness (1997) observed "that there was a general pattern of idea generation that cut across companies and across different classes of product development within companies." The respondent firms were technology based and participated in turbulent industries, thus, necessitating continuous product development activities. These authors also cited an older study that suggested that in rapidly changing environments strategies must not remain persistent (Burns and Stalker, 1961).

In 1999, Singh (Singh et. al, 1999) presented a model of opportunity recognition and exploitation, dealing with preparation, incubation, insight, evaluation, and elaboration suggesting some congruence with the model of Bhave (1994).

**Single Industry Issues**

Pavia (1991) performed an extensive study of new product development paradigms, studying high technology and software firms. Barczak (1995) thought that the entire business development process had to be studied, not just simply one part at a time. She also viewed other studies as being flawed because they "typically cut across industry lines." She suggested that new product development processes and the firms' decisions in their processes as well as their outcomes varied over time. They would "be dependent on the unique characteristics of the industry in which the firm competes." A conclusion that is certainly agreed with by the present authors (Schwartz and Teach, 1999).

**Performance Issues**

Prior studies have suggested that performance differences among firm types imply the adoption of different marketing strategies (Romano, 1990; Pavia, 1991). The present authors believe that strategies apply differently over time and by industry and by performance level (Schwartz and Teach, 1997),
but that the opportunity recognition and exploitation model may be unchanging over time.

**THIS STUDY**

The current study included data collected from a sample of firms from the incubators included in the 1997 National Business Incubation Association directory. Firm types in this survey were technology and non-technology product manufacturing firms and technology and non-technology service firms. The authors wished to perform a longitudinal study of opportunity recognition and exploitation utilizing both their 1989 data and the new 1998 data.

Five propositions are suggested by the prior work in the field. Only the first two are considered in this study. The additional three will be the subject of a future paper.

| Proposition One: | The existence of a general model for opportunity recognition and exploitation should mean that there will be similar factor structures resulting from the analysis of the 1998 data as compared to 1989 data. |
| Proposition Two: | A general model for opportunity recognition and exploitation notwithstanding, there will be firm type and industry specific differences in the application of model strategies. |
| Proposition Three: | There will be industry specific differences in the variables in each step of the model that will not vary over time (to be demonstrated in a future paper). |
| Proposition Four: | There will be firm type specific differences in the variables in each step of the model that will not vary over time (to be demonstrated in a future paper). |
| Proposition Five: | High-performing firms will evidence different patterns of opportunity recognition and exploitation than low performing firms and these will not vary over time (to be demonstrated in a future paper). |

**METHODOLOGY**

Ten general letters of introduction to entrepreneurs, with pre-tested questionnaires, for firms housed in business incubators across the United States were mailed for distribution to over 400 business incubator managers in the United States. These incubators were identified as 1997 members of the National Business Incubator Association. A letter to the incubator
manager indicated why the survey was being conducted and requested that the surveys, each with return envelopes, be forwarded to their client firms. Initial and follow-up telephone calls were also made to the incubator managers requesting their participation and assistance. The data set represented the general population of entrepreneurial firms located in United States based business incubators.

**The Questionnaire**

In 1989 the literature was reviewed in order to determine appropriate opportunity recognition and exploitation issues to research. Several studies were utilized as a basis for survey questions. A study by Cooper and Dunkelberg (1986) clarified the entrepreneurship process and was useful in defining criteria for this study. A study of critical success factors further clarified and supported the criteria selected for this research (Dickinson et al., 1984). The strategic windows concept (Abell, 1978) suggested that an external vs. internal focus should be characterized.

A questionnaire was developed which utilized six point balanced Likert-like scales, that is, a statement was made and the respondent was to record the strength of his or her agreement or disagreement with the statement. A six-point scale was used in order to "force" a non-neutral respondent position. The questionnaire covered the entrepreneurial stage of the business, information on the early stages of the firm's development, and information to classify the firm. The entire questionnaire took about 30 minutes to complete (Teach et. al, 1989)

In 1998, in consideration of the nature of the new sample frame, i.e., incubating firms, new questions were added or old ones deleted from the original survey. The survey covered:

- The entrepreneurial stage of the business
- The original business setting
- Some information on the early stages of the firm's development
- Marketing and the recognition of product opportunities (product firms only)
- Information to classify the firm
- Information on the company's product(s) (product firms only)

The questions used in both the 1989 and 1998 factor analyses are shown below. These are the questions from "The Entrepreneurial Stage of the Business" portion of the survey only.
1. The idea behind this business seemed to be thrust upon us.
2. Ours was a deliberate effort to search for an idea to start a new business.
3. Ours was an accidental process that just happened to uncover the concept behind the business.
4. "Brain Storming" played a major role in the original development to uncover the concept behind the business idea.
5. We employed formal opportunity scans to develop the original business concepts.
6. The business concept was developed while the principal was employed by another firm.
7. The business concept developed out of research that was unrelated to the subject.
8. The idea behind the business came from reading material.
9. The business concept, or a closely related one, was actually seen in another context.
10. The business concept was developed while in conversations with other people.
11. The business idea was strictly market driven.
12. The business idea was technology driven.
13. The business idea was strictly my idea alone.
14. The firm produced a formal business plan prior to its establishment.
15. The firm developed formal marketing plans prior to its establishment.
16. In order to refine the original business concept, the firm employed an evaluation screen.
17. In order to refine the original business concept, the firm employed formal evaluation processes other than screens.
18. The firm knew who its first customers would be before introducing its first product.
19. There was an immediate demand for the firm's first products.
20. The first product represented a major improvement over all other available products.

Note: Bold italics indicate those questions eliminated from the 1998 Survey.

Respondent Firms

Seventy-six surveys were returned with eight being unusable, because the firms failed to identify the products or services they sold. This resulted in 68 usable questionnaires. Because of sample size, the results are viewed as a convenience sample for future research directions. Exhibit One identifies the respondent firm type. Firms were categorized either by their SIC code, if provided, or by the nature of their defined products or services. The firm types and representative products are shown in the Exhibit One as well. Exhibit Two provides demographic information for the firms.

EXHIBIT ONE:
RESPONDENT FIRMS

<table>
<thead>
<tr>
<th>Type</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPM Technology product manufacturer</td>
<td>Software, Heat exchangers, Infrared monitors, medical devices</td>
</tr>
<tr>
<td>NTPM Non-technology product manufacturer</td>
<td>Skids, Custom golf shoe, Shutters</td>
</tr>
<tr>
<td>TSP Technology service provider</td>
<td>Engineer recruiter, accounting, internet service provider</td>
</tr>
<tr>
<td>NTSP Non-technology service provider</td>
<td>Marketing presentations, Social services, Jewellery appraisal</td>
</tr>
</tbody>
</table>
THE PROPOSITIONS – DATA PROCEDURES

Proposition One

In order to compare the 1989 data analyses, to the current analyses, the identical factor procedures were used, that is, a maximum likelihood extraction with a varimax rotation. To ensure that comparability was achieved between the 1989 firm sample of two-hundred software firms, and the 1998 firm sample which covered the wider frame of four firm types as described in Exhibit One, only the set of 1998 technology manufacturers were utilized. Thus the temporal comparison was only between the technology firms.

As not all variables from the original 1989 work were included in the 1998 survey questions, only the 18 matching questions and responses were included in the analysis. Further, due to the size of the data set (thirty-nine high technology firms and eighteen variables) only those variables which loaded greater than 0.40 on the factors were included. The set of 18 variables was thus reduced to 13 with 39 observations.

To test the similarities in the 1989 and 1998 factor structures and to demonstrate the proposition, the factor analyses were run and the interpoint distances were calculated between all pairs of firms. These distances were calculated by applying the 1989 factor loadings to the 1998 firm data to form an interpoint distance vector based on the 1989 loadings and 1998 data. The 1998 factor scores were then used in a similar fashion to form an interpoint distance vector based on the 1998 loadings on 1998 data. Since
factors are orthogonal, the distance between all possible pairs of firms can be easily calculated.

If the use of both sets of factors to model the opportunity recognition and exploitation process were perfect, i.e., capturing exactly the same information, then the correlations between the two sets of interpoint distances would be one. If there were no relationships between the two factor structures, then the correlations between the two interpoint distance vectors would be zero. Thus, the value of a correlation coefficient or a coefficient of determination reflects the degree of similarity between the two factor structures. Additionally, because a factor made up of two of the original variables was excluded from the 1998 interpoint distance calculations, the amount of variance explained by any model would be expected to be reduced, because that factor explained over 11% of the variance.

Proposition Two

To support the proposition, an analysis of variance was performed across the firm types for each of the variables to determine if there were statistically significant differences in the importance of opportunity recognition and exploitation strategies among firm types.

Comments on the methodology employed

Whilst the authors are confident that their methodology is appropriate and defendable, there are two particular problems to be noted. Firstly, the limited numbers of respondents is problematic in respect of the factor analysis, as generally a 5:1 ratio of observations to variables is considered appropriate. The agglomeration of different firm types, thus blurring any distinctions among firms participating in different SIC codes, could be considered problematic as well. Finally, the data is only representative of entrepreneurial firms housed in incubators and thus should not be extended to the universe of similar firms outside of incubators.

RESULTS

Proposition One: The existence of a general model for opportunity recognition and exploitation should mean that there will be similar factor
structures resulting from the analysis of the 1998 data as compared to 1989 data.

The 1998 factor analysis resulted in six factors accounting for 70.3% of the variance, appearing similar to the 1989 results (Exhibit Three). The omission of several 1989 survey questions did result in the elimination of one 1989 factor. In Exhibit Three the factors are ordered by explained variance in the 1989 analysis (Teach et. al, 1989).

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14</td>
<td>0.88</td>
<td>17.9</td>
<td>1</td>
<td>14</td>
<td>0.77</td>
<td>14.4</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
<td>0.72</td>
<td><strong>11.7</strong></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>-0.44</td>
<td>9.4</td>
<td>2</td>
<td>13.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>-0.67</td>
<td>8.4</td>
<td>3</td>
<td>12</td>
<td>0.97</td>
<td>9.1</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>0.93</td>
<td>7.5</td>
<td>4</td>
<td>12</td>
<td>0.97</td>
<td>9.1</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>0.96</td>
<td><strong>7.2</strong></td>
<td>5</td>
<td>6</td>
<td><strong>0.99</strong></td>
<td><strong>9.2</strong></td>
</tr>
<tr>
<td>7</td>
<td>5</td>
<td>-0.65</td>
<td>6.1</td>
<td>22</td>
<td>0.67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>0.54</td>
<td>7.7</td>
<td>6</td>
<td>8</td>
<td>0.78</td>
<td><strong>11.6</strong></td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>0.48</td>
<td>6.8</td>
<td>1</td>
<td>0.43</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The correlation analysis between the two sets of interpoint was 0.89. A graph of the interpoint distances between the data sets and their firms is shown in Exhibit Four. It would appear that opportunity recognition and exploitation can be effectively modeled and that the model remained relatively constant over time.
EXHIBIT FOUR:
1989 AND 1998 INTERPOINT DISTANCES BY FIRM PAIRS

**Proposition Two:** A general model for opportunity recognition and exploitation notwithstanding, there will be firm type and industry specific differences in the application of model strategies.

There are differences in the emphasis on strategies and processes used in opportunity recognition and exploitation. Those differences are small compared to the overall number of questions asked, which may serve to explain the relative stability of the model. Due to space constraints, only the first set of questions is shown (Exhibit Five). Because of the size of the data set, the significance at any level is reduced. The standard error of the estimate is a function of the square root of the sample size. However, the proposition appears to be demonstrated.

**DISCUSSION**

Based upon these results, the authors believe that further analyses are indicated. The three additional propositions will be studied utilizing the original 1989 data. These include:

**Proposition Three:** There will be industry specific differences in the variables in each step of the model that will not vary over time.
Proposition Four: There will be firm type specific differences in the variables in each step of the model that will not vary over time.

Proposition Five: High-performing firms will evidence different patterns of opportunity recognition and exploitation than low performing firms and these will not vary over time.

**EXHIBIT FIVE:**
**MEAN RESPONSES FOR ENTREPRENEURIAL STAGE QUESTIONS BY FIRM TYPE**

<table>
<thead>
<tr>
<th>Question</th>
<th>TPM</th>
<th>NTPM</th>
<th>TSP</th>
<th>NTSP</th>
</tr>
</thead>
<tbody>
<tr>
<td>(38) (11) (11) (8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1  Thrust upon us</td>
<td>3.79</td>
<td>4.18</td>
<td>3.36</td>
<td>2.38</td>
</tr>
<tr>
<td>2  Deliberate search</td>
<td>3.87</td>
<td>3.36</td>
<td>3.09</td>
<td>4.75</td>
</tr>
<tr>
<td>3  Accidental process</td>
<td>3.92</td>
<td>4.00</td>
<td>4.18</td>
<td>4.88</td>
</tr>
<tr>
<td>5  Formal scans</td>
<td>4.74</td>
<td>5.09</td>
<td>5.18</td>
<td>4.38</td>
</tr>
<tr>
<td>6  Employed elsewhere</td>
<td>3.33</td>
<td>2.64</td>
<td>3.27</td>
<td>2.50</td>
</tr>
<tr>
<td>8  Reading material</td>
<td>4.42</td>
<td>4.00</td>
<td>4.27</td>
<td>4.38</td>
</tr>
<tr>
<td>9  Seen elsewhere</td>
<td>4.05</td>
<td>3.55</td>
<td>4.09</td>
<td>32.88</td>
</tr>
<tr>
<td>12 Technology driven</td>
<td><strong>2.33</strong></td>
<td><strong>4.27</strong></td>
<td><strong>4.82</strong></td>
<td><strong>4.50</strong></td>
</tr>
<tr>
<td>14 Formal bus plan</td>
<td>3.33</td>
<td>3.27</td>
<td>3.00</td>
<td>3.50</td>
</tr>
<tr>
<td>15 Formal marketing plan</td>
<td>3.85</td>
<td>3.91</td>
<td>2.91</td>
<td>4.25</td>
</tr>
<tr>
<td>20 Knew first customers</td>
<td>2.77</td>
<td>2.64</td>
<td>2.09</td>
<td>2.88</td>
</tr>
<tr>
<td>21 Immediate demand</td>
<td>2.89</td>
<td>2.45</td>
<td>2.36</td>
<td>3.13</td>
</tr>
<tr>
<td>22 Major improvement</td>
<td>2.08</td>
<td>2.73</td>
<td>3.00</td>
<td>2.75</td>
</tr>
</tbody>
</table>

Notes: The bold responses are significant at the 0.100 level. Only the variables that loaded on the 1998 factors are shown.

Further, the authors would like to suggest a model of opportunity recognition and exploitation that is more inclusive than other models previously suggested (Bhave, 1994; Singh et. al., 1999). This process would include the following steps:

- Criteria for development
- Search for information
- Identification
- Investigation
- Evaluation
- Prioritization
Following the Singh et. al (1999) suggestion, the various steps may be sequential or some may be skipped. Time and industry specifics would play a role in how the steps are taken.

Other authors have suggested a "model of New Product Development" which includes ideas (from technical and market activities), screening ideas, preliminary venture analysis, detailed business analysis, pre-commercialization analysis, post-commercialization analysis, leading to a commercial entity, and finally success or failure (Calantone and di Benedetto, 1988). Their model fits within the model suggested by the present authors.

SUMMARY AND CONCLUSIONS

The authors agree with the Singh and Hills proposition that there is a general model of opportunity recognition (Singh et. al, 1999). This has also been suggested by Vesper (1980) when he observed that there is a process behind the search and exploitation of opportunities. To lend clarity to the study of opportunity recognition, it is suggested that attention be paid to several issues.

Firstly, a clearer definition of what opportunity recognition and exploitation means is needed. While it is agreed that idea generation is a step in the process (no agreement on whether that is first or second though), does the process also cover exploitation (sales and success) and all the steps in between (different paths notwithstanding)? Secondly, while the general model of opportunity recognition and exploitation may be stable, there are two impacts on the model that also need to be considered in any analyses: firm and industry type, and whether or not these models are stable over time. Thirdly, it is proposed that there may be differences between high and low performing firms opportunity recognition and exploitation models.

Finally, while there may be "Many Roads to Mecca," (Teach et. al, 1989), but there appears to be only one map.
ACKNOWLEDGMENTS

To our other long time friend and colleague, Gerry Hills, who has led the way for opportunity recognition research, and who motivates and challenges us to add to our seminal work.

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