The identification of decision-making strategies used by graduate students in the discovery of potential venture opportunities

by

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Introduction

From the moment that an idea for a venture opportunity is identified and developed, the entrepreneur is faced with various alternatives in what direction their fledgling organization should go. In addition, these antecedents that influence an individual’s decisions change as the firm evolves from a mere concept to well-established organization. Due to these accomplishments, the individual could reap financial rewards by identifying a suitable buyer. If they wish to maintain the size and scope of the organization’s activity, they could make the conscious choice to focus on the firm’s day-to-day operations. The person could even explore other options so that the organization can establish and sustain a greater competitive position in a particular market. These strategies could include an emphasis in strategic innovation (e.g., disruption models), intensive growth (e.g., market penetration), integrative growth (e.g., vertical integration), diversification (e.g., mergers and acquisitions), and globalization (e.g., export and subsidiaries) (Allen, 2009). No matter what the situation, the entrepreneur is always faced with challenging decisions.

As a result, it would be beneficial to examine the antecedents that influence an entrepreneur’s decisions during the entrepreneurial life cycle. More specifically, what factors have a significant effect on the individual’s cognitive process as they make decisions that are crucial to the firm’s survival and growth? By identifying entrepreneurs who have led successful ventures, one could gain insight into their perceptions during this experience as their firms made the transition from startup to well-established organization. Were decisions influenced by conditions within the environment? Did factors inherent to the organization (e.g., its culture) sway the decisions of these ambitious individuals? Or were the attributes of the person themselves that became the most significant factors in determining the future direction of the firm. By constructing an instrument that identifies and weighs these antecedents, one could perform a statistical analysis to determine the drivers that lead the person’s decisions to grow, maintain, or sell their respective firms.
Statement of the Problem

Due to the fact that entrepreneurial research relies so heavily on work from “other” disciplines, many of these efforts have typically examined only the relationship between the entrepreneur and their firms (Mitchell et al., 2002). From economics, we learn that an entrepreneur’s contribution to society lies in the formation of the organization itself (Low & MacMillan, 1988; Rumelt, 1987; Schumpeter, 1934). While these models are proficient in describing what entrepreneurship is and when it occurs, unfortunately this line of inquiry is limited in addressing the question of how and why (Mitchell et al., 2002). From psychology, trait-based research has attempted to link one’s personalities with the creation of new venture opportunities. However, efforts to identify a unique set of global characteristics that is common among entrepreneurs have generally met with failure (Brockhaus & Horowitz, 1986; Sexton & Bowman-Upton, 1991; Shaver, 1995). As an extension of strategic management, scholars have typically focused on how an individual’s attributes and/or actions influence the firm’s performance. However, only Herron (1990) has demonstrated that one’s “entrepreneurial” skills are related to organizational performance and further research that attempts to link these variables have met with conflicting results (Cooper et al., 1986; MacMillan & Day, 1987; Sandberg, 1986).

Therefore, entrepreneurial research must begin to examine the how’s and why’s of venture creation (Mitchell et al., 2002). Scholars need a better understanding to why some individuals become success entrepreneurs while others do not? How can some individuals identify potential opportunities while others that encounter the same situation do not? Why do some individuals act on opportunities while others are satisfied with their current situation? Why do some individuals exit the entrepreneurial experience while others stay until their creation dominates the particular market? Therefore, to answer the above-mentioned questions, the investigation will use social cognition theory (Fiske & Taylor, 1984) as a framework so that we can turn our attention away from outcomes and focus on the entrepreneurial process itself.

At the cornerstone of the entrepreneurial process is the decision-making strategies utilized by the individual as they attempt to identify potential venture opportunities. Research has demonstrated that successful entrepreneurs have the
capacity to use certain types of decision-making strategies based on the context of the environment (Busenitz and Barney, 1997; Gustafsson, 2006; Mitchell et al., 2000; Mitchell et al., 2002; Sarasvathy, 1999; Sarasvathy et al., 2003; Sarasvathy, 2008). When the entrepreneur is placed in a situation with a high degree of uncertainty, then the Correspondence-Accuracy Principle of Decision-Making (CAP) would suggest that the use of an intuitive (also known as naturalistic) decision-making processes would yield the best results (Hammond, 1988). In contrast, when the level of uncertainty is extremely low, then the paradigm would suggest that a more analytical approach to decision-making would ensure the best outcomes. In addition, complementary studies suggest that this level of expertise in decisional strategy selection is an attribute that can be developed over time. As a result, it would be beneficial if one could confirm the impact of graduate entrepreneurial programs in developing this type of expertise, and if there is indeed a pattern of decisional improvement as the individual goes from entrepreneurial novice to expert (Palich & Bagby, 1995). Please see Figure 1 for the relationship between environmental uncertainty and the appropriate decisional strategy.

Figure 1: The relationship between environmental uncertainty and the appropriate decision strategy.
Research Questions

1) Before starting a graduate program \( (t_0) \), are there significant differences in the capacity of a cohort [Cohort A -- Graduate Students in Entrepreneurial Programs, Cohort B -- Graduate Students in Traditional MBA Programs, and Cohort C -- Graduate Students in Non-Business Programs] to identify unique venture opportunities that exist in the environment and use appropriate decision-making strategies during the identification process?

2) Upon completion of their graduate programs \( (t_g) \), are there significant differences in the capacity of these same cohorts to identify unique venture opportunities that exist in the environment and use appropriate decision-making strategies during the identification process?

3) After one year post-graduation \( (t_{g+1}) \), are there significant differences in the capacity of these same cohorts to identify unique venture opportunities that exist in the environment and use appropriate decision-making strategies during the identification process?

4) If a cohort demonstrates significant improvements in the capacity to identify venture opportunities and use an appropriate decision-making strategy during the identification process, what are the cohort’s profiles in improvement [based on the rate and magnitude of change] from the start of their respective programs to one year after the completion of their degree requirements?

Overview of the Study

For this project, the investigators will rely on both qualitative and quantitative methods to answer each of the four research questions. To answer the first, second, and third research questions, researchers will assess the subject’s cognitive capacity to a) identify venture opportunities, and b) use certain decision-making strategies during the identification process. These two factors represent the dependent variables of the study. This will be achieved utilizing a behavioral simulation with a think-aloud protocol (Ericsson & Simon, 1993; Gustafsson, 2006; Sarasvathy, 1999).
After the content of each of the subject’s transcripts are analyzed, the dependence technique of multivariate analysis of covariance (MANCOVA) will be used to determine if significant differences exist between each of the three cohorts (Hair et al., 2006; Tabachnick & Fidell, 2007). The MANCOVA was selected due to the need to control for extraneous variables such as the length of study of each graduate program or prior entrepreneurial experience.

In the final stage of the project, a profile analysis will be conducted to determine potential “patterns of improvement” for each of the three cohorts using the interdependence technique of cluster analysis (Gore Jr., 2000; Hair et al., 2006; Ketchen & Shook, 1996). If it can be determined that cohorts do “reside” in analogous groups based on significant changes in the study’s two dependent variables, then a repeated measures multivariate analysis of variance (MANOVA) will be used as a confirmatory procedure to corroborate the results of the cluster analysis. This statistical technique will allow researchers to assess the degree of flatness, parallelism, or differences in each of the cohort’s improvement profiles that may occur over the course of the study (Tabachnick & Fidell, 2007).

The Study’s Sample

Working in conjunction with ten institutions that have actual Master’s Degree in Entrepreneurship, the subjects of interest will consist of 250 graduate students (25 from each institution) enrolled in these respective programs. In addition, 250 graduate Master’s of Business Administration (MBA) students will be randomly selected and asked to participate to act as the comparison cohort. To serve as study’s control group, 25 non-business graduate students from each institution (250 in total) will also be randomly selected and asked to participate in the investigation. Prior to any data collection procedures, details of the investigation will be submitted to the University of South Florida’s Institutional Review Board (IRB) for their consent in meeting the standards of the Human Research Protection Program (HRPP). Once the safety, privacy, and confidentiality of all participants are ensured, measures will be conducted to acquire all the necessary data to answer each of the study’s research questions.
In regards to the intended institutions, each is in a different geographical location within the United States to control for regional differences based on U.S. Census Bureau guidelines. The U.S. Census Bureau sub-divides the United States into nine distinct regions. To take into account the current growth rate of Region 5, it has been divided into two groups consisting of Delaware, Washington D.C., Maryland, West Virginia, and Virginia in Region 5a, and North Carolina, South Carolina, Georgia, and Florida in Region 5b. To eliminate any effects of the school’s funding source, five public and five private institutions have been identified for the investigation. See Table 1 for the intended institutions of the study.

<table>
<thead>
<tr>
<th>Region</th>
<th>Institution</th>
<th>Funding Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Babson University</td>
<td>Private</td>
</tr>
<tr>
<td>2</td>
<td>Drexel University</td>
<td>Private</td>
</tr>
<tr>
<td>3</td>
<td>Northwestern University</td>
<td>Private</td>
</tr>
<tr>
<td>4</td>
<td>University of Missouri at Kansas City</td>
<td>Public</td>
</tr>
<tr>
<td>5a</td>
<td>University of Virginia</td>
<td>Public</td>
</tr>
<tr>
<td>5b</td>
<td>University of South Florida</td>
<td>Public</td>
</tr>
<tr>
<td>6</td>
<td>University of Louisville</td>
<td>Public</td>
</tr>
<tr>
<td>7</td>
<td>Rice University</td>
<td>Private</td>
</tr>
<tr>
<td>8</td>
<td>University of Arizona</td>
<td>Public</td>
</tr>
<tr>
<td>9</td>
<td>University of Southern California</td>
<td>Private</td>
</tr>
</tbody>
</table>

Table 1: Intended institutions to be represented in the study.

The Study’s Timeline

It is the intention of the investigators to collect data from each of the study’s participants throughout the duration of their graduate programs. In addition, data will be collected from each individual one year after the completion of their respective graduate coursework. It is assumed that most Master’s programs last two years or four (five) semesters. If it takes the individual fewer or greater semesters to complete their degree, then the data will be controlled for this extraneous variable during the statistical analysis. The data collection points of interest will be referred to as the following for the remainder of the study (See Table 2):
<table>
<thead>
<tr>
<th>Data Point</th>
<th>Position in the Study’s Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>$t_0$</td>
<td>Initial Program Enrollment -- Beginning of Fall Semester (Y1)</td>
</tr>
<tr>
<td>$t_1$</td>
<td>Beginning of Spring Semester (Y1)</td>
</tr>
<tr>
<td>$t_2$</td>
<td>Beginning of Summer Semester of (Y1)</td>
</tr>
<tr>
<td>$t_3$</td>
<td>Beginning of Fall Semester (Y2)</td>
</tr>
<tr>
<td>$t_4$</td>
<td>Beginning of Spring Semester (Y2)</td>
</tr>
<tr>
<td>$t_g$</td>
<td>Program Completion -- Beginning of Summer Semester (Y2)</td>
</tr>
<tr>
<td>$t_{g+1}$</td>
<td>One Year After Program Completion</td>
</tr>
</tbody>
</table>

Table 2: The intended timeline for the study.

Instrumentation

To assess the subject’s ability to identify new venture opportunities based on a unique scenario, behavioral simulations with a think-aloud protocol will be utilized as described by Gustafsson (2006). Each simulation differs in the level of environmental uncertainty and will allow the investigator to gain insights into the decision-making strategies used by the subject as they attempt to identify venture opportunities. To establish variance in each of these task environments (the scenario), three classes of scenarios will be generated.

The first class of scenarios will illustrate a situation where a radical innovation has been developed. The only thing known is that a unique device exists and a commercial use for this product has yet to be established. There is no knowledge in the cost of production, the demand for such device has not been determined, and the actual properties of this innovation are never clearly described. As a result, the scenario environment contains a high level of uncertainty and should elicit an intuition decision-making strategy. To reduce potential learning effects, ten different scenarios that would fall into this class will be created. Please see Appendix A for an example of this type of scenario.

The second class of scenarios will convey a situation where the demand of the product is know and an organization is in the process of developing a product to
exploit this market. The subject’s task is to determine whether this scenario provides a viable investment in this firm. There is some knowledge in the cost of production and the properties of the product emulate attributes of goods that are consumed in today’s society. As a result, the scenario environment for uncertainty is at a moderate level and should elicit a quasi-rational decision-making strategy. Again, ten different scenarios will be created to reduce potential learning effects. Please see Appendix A for an example of this type of scenario.

The final class of scenarios will convey a situation where both the supply and demand of the good or service are known and the organization has an opportunity to improve its competitive position. Again, the subject’s task is to determine whether this scenario provides a viable investment opportunity for this firm. Financial data is provided and the properties of the product are easy to determine. Thus, the scenario environment has a very low level of uncertainty and should elicit an analytical decision-making strategy. As with the two other classes of scenarios, ten different scripts will be generated to reduce potential learning effects over the course of the study. Please see Appendix A for an example of this type of scenario.

**Data Collection**

In order to maximize response rates, Dillman (2000) suggests that each potential participant be contacted multiple times through the use of a third-party provider (e.g., SurveyMonkey.com). With each correspondence, subjects will be informed of the study’s purpose, credentials of the investigators, ways in which confidentiality and privacy will be maintained, and the mechanics of the study. Surveys to obtain select demographic information on each participant will be sent two weeks later after the initial correspondence. If the individual does indeed respond, this will signify that the individual consents to participate in the study. For any non-respondent, follow-up e-mails will be sent at days two and four of the initial response window. Subjects will be asked to respond to this general survey instrument during each of the data collection points so that longitudinal data can be maintained.

In regards to the behavioral simulation, participants will either call the
investigator’s office or the researcher will visit the participant at their respective institutions. For the actual data collection process, subjects will be given each of the three scenarios just prior to any subject-investigator interaction. For participants utilizing the phone, these scenarios will be e-mailed just before the data collection session begins. Each of the three different types of scenarios will be randomly selected and ordered to reduce any potential learning effects that could occur over time. While the subject reads each scenario, they will be asked to express their thoughts aloud and the comments will be digitally recorded for future analysis. At the completion of the exercise, subjects will also be asked to further expand their position in the identification of new venture opportunities in each of the three different scenarios. Subjects will be given ten minutes to express these thoughts. The data from each of these sessions will be transcribed, coded as described by Gustafsson (2006), and analyzed using techniques discussed in the next section.

Statistical Analysis

*Multivariate Analysis of Covariance (MANCOVA)*

As an extension of the statistical technique of multivariate analysis of variance (MANOVA), this procedure has the ability to control for the effects of known extraneous variable that may influence the study’s findings (Hair et al., 2006; Tabachnick & Fidell, 2007). MANCOVA eliminates the influence of these covariates from explaining the possible variance in the study’s dependent variables by using statistical techniques such as regression. Although there may more, the investigation feels that the length of one’s graduate program and prior entrepreneurial experience are two significant extraneous variables that should be controlled in the analysis to minimize their influence on the study’s findings.

*Independent Variables*

- Cohort A -- Graduate Students in Entrepreneurial Programs
- Cohort B -- Graduate Students in Traditional MBA Programs
- Cohort C -- Graduate Students in Non-Business Programs

*Dependent Variables*
Task Identification -- The ability to identify venture opportunities in a particular scenario (This measure is binomial and values equal one for a subject having the capacity to identify a venture opportunity and zero for a subject not having the capacity to identify a venture opportunity).

Decision-Making Strategy -- The ability to use an appropriate decision-making strategy based on the level of uncertainty in a particular strategy (This measure is binomial and values equal one for a subject using the appropriate decision-making strategy and zero for a subject not using the appropriate decision-making strategy).

Cluster Analysis

Cluster analysis is a classification method that determines whether units of inquiry -- each of the individual cohorts -- are similar in some regard (Everitt, 1996; Gore Jr., 2000; Hair et al., 2006). This interdependence technique places “like” members into distinct groups based on a set of pre-determined parameters. For this study, the cluster variate will be comprised of the subject’s scores for each of the two dependent variables (See the above-mentioned section entitled Multivariate Analysis of Covariance) at each of the study’s data collection periods (i.e., t₀, t₉, and t₉+₁ -- See the section entitled The Study’s Timeline).

Multivariate Analysis of Variance with Repeated Measures (MANOVA)

The dependence technique of multivariate analysis of variance with repeated measures (MANOVA) (also known as a profile analysis or doubly-multivariate design) is a way to determine whether there are significant differences between groups over time (Tabachnick & Fidell, 2007). This type of procedure can also assess whether two or more groups display similar trends in changes in the dependent variables over this same time period. This is referred to as the degree of parallelism. Finally, the technique has the capacity to also confirm whether the treatment (i.e., graduate education) can elicit the same response in all groups upon administration of the treatment. The later is referred to as the degree of flatness (Tabachnick & Fidell, 2007).
Definition of Terms

The following terms are defined to assist one’s understanding of the material and establish how these terms will be framed throughout the investigation.

**Entrepreneur:** Any individual or groups who identifies and exploits an opportunity to generate products or services that have value. In doing so, this entity pursues this course of action without regard to their initial resources that they control (Stevenson & Jarillo, 1990).

**Entrepreneurial Cognition:** The processes used by individuals to transform, store, and utilize sensory input from one’s environment to make assessments, judgments, and decisions involving venture opportunities, value creation, and organizational growth (Mitchell et al., 2002; Neisser, 1967).

**Venture Opportunity:** An idea that generates unique products, services, or processes with commercial appeal. In addition, this novel concept must have the ability create new value for the end-user and linked to a viable business model (Allen, 2009).

**Opportunity Creation (An Intuition-Inducing Task):** An environment where the level of uncertainty is high and the magnitude of supply and demand is unknown. As a result, this scenario presents an opportunity to generate new markets for the entrepreneur (Sarasvathy et al., 2003).

**Opportunity Discovery (A Quasi-Rationality-Inducing Task):** An environment where the level of uncertainty is moderate and only one side of the supply and demand curve exists (i.e., demands exists, but supply does not). As a result, this scenario presents an opportunity to explore existing or latent markets for the entrepreneur (Sarasvathy et al., 2003).

**Opportunity Recognition (An Analysis-Inducing Task):** An environment where the level of uncertainty is low and the magnitude of supply and demand is known or can easily be determined. As a result, this scenario presents an opportunity to
exploit existing markets for the entrepreneur (Sarasvathy et al., 2003).

The Correspondence-Accuracy Principle of Decision-Making (CAP): A paradigm that suggests that neither the use of an analytical or intuitive (also known as naturalistic) decision-making process can guarantee a quality outcome. The most accurate decisions are ones where the type of decision-making strategy corresponds to factors within the environment (i.e., level of uncertainty) (Hammond, 1988).

Analytical Decision-Making: A logical process where the individual identifies all of the possible alternatives in solving the particular problem, calculates the outcomes for each of these alternatives, selects the alternative that provides the great benefit to the individual, implements that alternative, and evaluates the results after the completion of the task. This model of decision-making follows a sequential order of steps with no variance (March & Simon, 1958).

Quasi-Rational Decision-Making (Also referred to as Bounded-Rationality): A process where individuals do not attempt to maximize potential outcomes, but satifice in the selection of the next best alternative to rectify a current problem (Simon, 1976). In addition, the individual is influenced by certain heuristics, biases, and framing effects in the identification of this alternative (Kahneman & Tversky, 1982).

Intuitive Decision-Making: In the absence of information or direct evidence, the way of assessing one’s environment will be based on the relationships and meanings of certain antecedents which are beyond the span of one’s conscious mind (Myers and McCaulley, 1985). As a result, the individual attempts to “make sense” of their world by imposing some type of order when identifying potential opportunities (Weick, 1983).
Appendix A

Note: All simulation scripts are adapted from Gustafsson (2006).

Simulation Script for the Opportunity Creation Scenario (Intuition-Inducing Tasks)

Dear Participant:

Please read the description of the situation below. Your task is to decide whether this scenario presents a potential business opportunity that one could exploit to one’s benefit. While reading the scenario, please state aloud your thoughts as you read these materials. Furthermore, please state aloud how you would proceed after you have come to the end of the readings.

At first glance, the apparatus appears to be the size, color, and shape a United States half dollar. When a button on the side of the apparatus is compressed, an image can be displayed on any vertical surface. This piece of equipment is named after the cartoon character Scooby Doo.

‘The idea just came to me,’ says Jim Laucher of Sunshine Electronics (the person who invented the apparatus). According to Laucher, ‘There was no particular issue I was trying to resolve.’

However, there are two unique features that this piece of equipment does address. Once the image is displayed on the vertical surface, one can easily manipulate the image using a tactile response. In addition, the image can be transmitted via any Internet carrier that provides Wi-Fi.

The apparatus does have one limitation. Due to its size, the displayed image is only monochrome in nature. The user can select the tint of the image from one of the eight primary colors.
The Scooby Doo contains 100 small mirrors -- 20 fixed and 80 moving. The moving mirrors are synchronized when producing the image. When the image changes, the mirrors move respectively to generate the new image. Due to the fact that the image is able to fill only a portion of most surfaces, the user is able to see the surroundings and image at the same time.

Jim Laucher has worked on this invention since 2001. Today, there exist only two demonstration devices that are housed at Sunshine Electronics.

Simulation Script for the Opportunity Discovery Scenario (Quasi-Rationality-Inducing Tasks)

Dear Participant:

Please read the description of the situation below. Your task is to decide whether this scenario presents a potential business opportunity that one could exploit to one’s benefit. While reading the scenario, please state aloud your thoughts as you read these materials. Furthermore, please state aloud how you would proceed after you have come to the end of the readings.

According to a recent research report, computer gaming has become a hypercompetitive industry that generates several billions in US dollars each year. The industry’s total market worth in 2005 was $1.3 billion dollars (within in the United States) and is expected to grow linearly over the next decade. During each day, every third computer user plays a computer game. Another report establishes that computer games are now becoming a new vehicle for media delivery.

Mostly people between the ages of 15-24 play computer games, but according to the report, older age groups are now utilizing game playing during their leisure time. Men play computer games two to three time
more than women, but there are nearly as many women who have played a computer game at least once in their life.

According this same report, more and more computer games have become available for Smartphones such as the iPhone, Blackberry, and Palm Pre. In addition, using a broadband connection, we now have the availability to enable on-line playing to proved better function and attract a broader audience.

Founders of a company called Sunshine Electronics have decided to create software that allows users of Smartphones to interact with each other as they participate in computer gaming. Therefore, individuals not only can competent against the computer, but also can compete against others that have this specific software. At this point in time, Sunshine Electronics has tried to find potential investors due to the fact that the majority of their capital is tied to other projects. The profit breakdown of the computer gaming industry is as follows:
Dear Participant:

Please read the description of the situation below. Your task is to decide whether this scenario presents a potential business opportunity that one could exploit to one’s benefit. While reading the scenario, please state aloud your thoughts as you read these materials. Furthermore, please state aloud how you would proceed after you have come to the end of the readings.

At an Internet café in a midwestern college town in the United States, you stop to surf the web and grab a bite to eat. There are quite a number of people at this establishment that is across the street from a major university. Waiting in line to purchase an ice tea and muffin, you discover that the café is for sale. You get curious and while your order is being completed, and start talking with the individual behind the counter. She is the store’s manager, she is from this town, and has worked at the café for ten years. During this time, she has thoroughly enjoyed her work. However, she now has the chance to continue her education at the university and will be leaving the store in a couple of weeks.

The café offers a well assortment of beverages and pastries, and has plenty of seating for approximately 50 patrons. In addition, there is a kitchen that is utilized at lunch and dinner to make sandwiches and soups each day. Ten people work at the café (employees work as teams in select shifts) and the store operates from 7:00 am until 10:00 pm Sunday through Saturday.

You give in to your curiosity and ask the manager to give you the contact information of the individual who can provide you with the financial
performance data for the store. Some of these financial numbers are as follows:

**Revenues and Expenses for the Internet Café**

<table>
<thead>
<tr>
<th><strong>Revenues</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Food and Beverage Sales</td>
<td>941,913</td>
</tr>
<tr>
<td>Other Sales</td>
<td>253,223</td>
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<tr>
<td>Total Sales</td>
<td>1,195,136</td>
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<table>
<thead>
<tr>
<th><strong>Expenses</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Food and Beverage Items</td>
<td>623,762</td>
</tr>
<tr>
<td>Wages</td>
<td>112,865</td>
</tr>
<tr>
<td>Other</td>
<td>295,621</td>
</tr>
<tr>
<td>Total Costs</td>
<td>1,032,248</td>
</tr>
</tbody>
</table>

**Net Profit (Before Taxes and Interest)** | 162,888 |

All financial measures are in US dollars
LIST OF REFERENCES


