

MOpA[®]: A Multiple Opportunity Screening Heuristic for Entrepreneurs¹

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Abstract

Much of the opportunity assessment literature focuses on evaluating a single opportunity rather than multiple opportunities. However, discussions with entrepreneurs, as well as personal experience, suggests that many entrepreneurs have multiple opportunities that they are screening in parallel. As such, the challenge is to assess each opportunity for its viability individually *and* against other opportunities under review. A second challenge is retaining objectivity in the opportunity assessment process. More than one entrepreneur, including one of the authors, spoke of how particular opportunities resonated with them, even before any research had been conducted. If entrepreneurs have a means to evaluate multiple opportunities objectively, they will have a much more realistic view of which opportunities have the highest potential for success.

The authors explored how opportunities are analyzed, then modeled the process for multiple opportunities and developed a heuristic to assist entrepreneurs with the effort. The Multiple Opportunity Analysis Process (MOpA[®]) was pre-tested with students in undergraduate and postgraduate entrepreneurship courses, and with entrepreneurs. After making appropriate changes, a single case study was conducted in which one entrepreneur's multiple opportunities were assessed. The heuristic proved to be viable at narrowing the opportunities quickly to a much smaller set, as well as identifying the best alternative.

To the authors' knowledge, this heuristic is the only one of its type, and, with further testing, may hold significant value for the field.

Keywords: Opportunity evaluation, Opportunity analysis, Entrepreneurial heuristic

Conceptual Paper

1. Introduction

From long exposure to entrepreneurs, it is clear that many of them have more than one viable opportunity to evaluate, thus it becomes important to have the ability to discriminate between the potential opportunities by assessing them against each other. Yet the literature is silent on how to do this, focusing instead on single opportunities. In that literature, it is known that some entrepreneurs evaluate with gut feeling or by emotion, others use one or more heuristics, others use both (Bryant, 2006). However, if entrepreneurs have multiple opportunities, how are they to proceed? To address that issue, we sought to develop a heuristic that would help entrepreneurs identify the opportunity or opportunities with the highest potential for success. It is the *process* of evaluating *multiple opportunities*, to find the most rewarding venture, that many believe is at the heart of the entrepreneurial process and improves the probability of success of the venture (Hills, et al. 2004).

¹ This paper is based on the first author's senior thesis (Major Qualifying Project) at Worcester Polytechnic Institute in 2009.

It is understood among entrepreneurs and researchers that the ability to recognize and capitalize on a potential opportunity can only be exploited by a limited number of people; entrepreneurs who are able to see potential market needs and create customer value are those who will be the most successful (Park, 2005). This reinforces the importance of opportunity recognition and evaluation. Others have found that successful entrepreneurs use personal knowledge, previous experience, and market insight to see opportunities where others do not (Ucbasaran, et al., 2009).

Current research in the opportunity recognition/evaluation field focuses on three major topic areas. One area is how opportunities arise, such as opportunity discovery vs. creation, the psychological process of opportunity identification, and the influence of personal traits of entrepreneurs on the opportunity recognition process (OpR). A second area is the process of evaluating a single opportunity, which consists primarily of conceptual models and frameworks for determining how entrepreneurs determine the potential success of opportunities. The third area looks at how opportunities are transformed into business ventures through the use of a business plan. A common theme among the three areas is that the mitigation and reduction of risk in the opportunity increases the chance of success. (Keh, et al., 2002)

By its very nature, opportunity analysis (OpA) is an important area to study. Entrepreneurs spend years of their lives, tremendous effort, and often considerable personal funding, starting a new business. Clearly entrepreneurs would not purposely pursue a sub-optimal opportunity. However, the optimal opportunity is not easy to discern, thus the potential value of a heuristic to evaluate opportunities, especially multiple opportunities, is high.

This paper investigates how multiple opportunities are analyzed, compared, and ultimately narrowed down to one that is later pursued to launch a new business venture. This process will be referred to as the Multiple Opportunity Analysis Process (MOpA). In addition to reviewing the literature in the field of OpR and OpA, insights were sought from entrepreneurs, angel investors, and venture capitalists. A model was developed and a heuristic instrument was created based on the model. The heuristic was pre-tested with undergraduate and postgraduate students in entrepreneurship courses, as well as with entrepreneurs. One entrepreneur who was in the active search process applied the resulting heuristic to a set of 19 opportunities that he identified.

2. Literature Review

2.1 What is an Entrepreneurial Idea?

Entrepreneurial ideas, in their simplest form, are new ideas for a product or service, or a new way to create incremental improve for an existing product or service that has commercial viability. These ideas can come from many sources and can be created by almost any person. (Saks and Gaglio, 2002) At this stage ideas are only that - ideas; they are not yet business opportunities, or a new products or services.

Entrepreneurial ideas transition to opportunities when they have the ability to satisfy a market need and provide new customer value. Entrepreneurial opportunities exist when there is potential of generating revenue from the idea and certain commercial factors can be validated. Ideas can be transitioned to opportunities with a small number of tests. For example: Can you talk to some

potential customers? Do they think the idea satisfies a need they may have? Are they willing to pay to have that need satisfied?

If the answers to those questions are yes, the idea can be recognized as a potential opportunity. There are no indications of the potential outcome of the opportunity at this point. Furthermore there are also no indications of the magnitude of the opportunity. Just because some people might buy a product or service does not mean that enough people will buy it, or pay an appropriate price, to develop a profitable business. There are many more questions that must be answered. The following sections discuss how opportunities are realized, validated, and evaluated.

2.2 How Opportunities Arise

The research in the field of how opportunities arise consists of three main topics: articles discussing the differences between (1) opportunity discovery, (2) opportunity creation (Ardichvili, et al., 2000), and (3) how traits of entrepreneurs relate to their ability to identify and understand market need. (Puhakka) Despite the different ideas on how entrepreneurs realize opportunities, researchers agree that opportunities do not just appear. Through using a specific process or by sheer creativity, opportunity recognition takes a considerable amount of time and effort.

Major factors that contribute to the underlying ability to recognize opportunities are: understanding of the target market, the general industry, the technology, and the customers. Researchers believe that entrepreneurs who have a full understanding of those elements will have a better chance to recognize potentially successful opportunities. (Ardichvili, et al., 2000)

Opportunities can come from many different sources. Specific needs of customers or markets, major market shifts, regulatory changes, and new technologies can all spawn the potential for new entrepreneurial opportunities. (Hills and Shrader, 1999)

2.3 Opportunity Discovery vs. Creation

Researchers and practitioners believe that there are two different ways opportunities are recognized: opportunity discovery and opportunity creation.

Discovery is the process where entrepreneurs realize there is an opportunity to (D1) create customer value for an existing market need due to a change in market conditions, (D2) customer needs, (D3) technology, or (D4) social trends. In the case of opportunity discovery the entrepreneur uses his knowledge to make the non-obvious seem possible. (Gregorie and Shepherd) Opportunity discovery usually consists of a structured process, although not necessarily formal. Lumpkin and Lichtenstein (2005) suggest the process consists of three stages: Preparation, Incubation, and Insight. They believe that opportunities are not discovered during a single enlightening experience, but rather through a phased approach.

The preparation phase is heavily influenced by the entrepreneur's past experiences and knowledge. During this phase, understanding of the market, industry, and technology for a

potential opportunity give the entrepreneur insight into the potential success of the opportunity. (Lumpkin and Lichtenstein, 2005)

The incubation phase is where the entrepreneur is contemplating the inner workings of the opportunity. They look at the customer need, market readiness, and execution of bringing the opportunity to market. Many options are evaluated; the critical thinking and problem solving skills of the entrepreneur are tested. Due to the large amount of thinking or churning of the opportunity in the entrepreneur's head, this stage may take significant time. This is also the stage where the entrepreneur may talk with other entrepreneurs or potential customers to gather feedback on the value proposition of the opportunity. Key fundamental assumptions of the opportunity may change during this phase; the entire direction of the opportunity can also change. (Lumpkin and Lichtenstein, 2005)

The insight stage can be described as the point where the true identity of the opportunity becomes clear. The answers to the questions developed during the incubation phase may all be answered, seemingly at once. The entrepreneur experiences a convergence of all the things previously being considered. It is at this point the entrepreneur realizes the existence of a substantial business opportunity. The process indicates that the entrepreneur has a vast understanding of background information related to the opportunity. The entrepreneur deliberates over the opportunity, and through the process of thinking the problems are solved. An issue with this process is that it does not take into account creativity or intuition. These are two of the major factors in the opportunity creation process. (Lumpkin and Lichtenstein, 2005)

Opportunity creation is the process where an entrepreneur creates a new market opportunity that was not previously recognized. Sometimes these opportunities are characterized as very large paradigm shifts; one could argue that the invention of personal computers or the iPod were creation opportunities. Creation opportunities take an immense amount of knowledge by the entrepreneur in a certain field, so much that they are able to predict the next big market innovation. Ardichvili, Cardozo, and Ray (2000) suggest that five key factors are integral to the creative opportunity recognition and development process: (C1) Entrepreneurial alertness, (C2) information asymmetry and prior knowledge, (C3) social networks, (C4) personality traits including optimism, self-efficacy and creativity, and the (C5) type of opportunity itself.

With the creation method of opportunity recognition, the key concept of entrepreneurial alertness describes the creative and perceptive traits entrepreneurs leverage to recognize opportunities. This entrepreneurial alertness allows entrepreneurs to sense or perceive a new market need, and use their creativity to develop a fit between needs in the market and resources available. Finally, they are able to create a new business or commercial opportunity based on their prior knowledge. (Gaglio and Katz, 2001)

Ardichvili, Cardozo, and Ray (2000) summarize the creation ideology of opportunity recognition as "Creation involves redirecting or recombining resources in order to create and deliver value superior to that currently available. Concept creation may go well beyond adjustment of current matches of resources and needs and may even lead to dramatic restructuring of an existing business or radical innovation."

The concept of information asymmetry and prior knowledge describes the trend that individuals notice and understand things they already know. This is the idea that prior knowledge in a particular area triggers opportunity recognition. Any given entrepreneurial opportunity is not obvious to all potential entrepreneurs, the rationale being that all people do not possess the same information all the time. (Kirzner, 1997) Each person's idiosyncratic prior knowledge creates a knowledge corridor that allows the entrepreneur to recognize certain opportunities, but not others. Three major dimensions of prior knowledge are important to the process of entrepreneurial recognition through creation: prior knowledge of markets, prior knowledge of ways to serve markets, and prior knowledge of customer problems. (Ronstadt, 1988)

Social networks play an important role in the opportunity creation process; the ability to converse with many like-minded as well as non like-minded individuals can increase the potential for successfully recognizing opportunities. Hills et al., (1997) assert that entrepreneurs who have extended social networks identify significantly more opportunities than solo entrepreneurs. They also hypothesize that the quality of the social contacts can affect other characteristics, such as alertness and creativity. (Ardichvili, Cardozo, and Ray, 2000)

Personality traits, specifically creativity, are a major factor that allows entrepreneurs to recognize opportunities that others do not. While hard to quantify, creativity provides entrepreneurs the basis for innovation and allows them to solve problems that others believe have no solution.

Personality traits of the entrepreneur are related to the final factor in the opportunity creation process - the type of opportunity. Opportunities that are recognized through the creative process are usually of a specific type; as mentioned earlier, these opportunities are sometimes based upon totally new technologies or paradigm shifting ideas. Baseline knowledge and previous experience coupled with personality traits feeds into the entrepreneur's social network, leading to discussion, which becomes the basis for entrepreneurial alertness.

Despite the two different schools of thought on how opportunities are recognized (discovery vs. creation) recent research suggests that entrepreneurs that are able to incorporate both discovery and creativity opportunity recognition concepts are far more successful than individuals who practice one method or the other. (Park, 2005) Elements of the opportunity discovery method (D1 – D4), and the opportunity creation method (C1 – C5) can be seen interacting. After an opportunity is identified, more work is required to determine the potential of the opportunity. The need to evaluate opportunities has led to research frameworks and models to evaluate a single opportunity.

The models are broken into two categories: identifying opportunities and evaluating opportunities. Both models assess many of the factors that influence the potential successfulness of the opportunity. The models evaluate the market, the competition, the technology, the economics, the capital requirements, risks, and exit strategy.

At the highest level, the evaluation process consists of elaborating and evaluating on key elements of the opportunity. During this phase the entrepreneur is testing assumptions and investigating the direction of the opportunity. (Corbett, 2005)

Many models exist for evaluating a single opportunity. The Timmons and Spinelli (2004) model gives complete list of potential factors to evaluate. These factors are grouped into areas such as competitive, technological, economic, risks, and so forth.

The areas to evaluate in the market are: the customers, the value proposition, the market type, the market size, competitive forces, market growth/shrinking rate, pricing and perceived cost benefit. These areas provide an understanding of the overall market and customer needs. The following confluence of conditions indicates a potentially successful opportunity: large market, high value proposition, and customers who see the value of the product or service.

The competitive analysis consists of looking at the competitive forces, what competitive barriers can be erected against the competition (i.e., an intellectual property barrier), what strategies are in place to overcome the competition, and how much effort is required.

The technological analysis evaluates existing technologies that support the opportunity. If the technology does not exist it will take significant time and money to develop the technology and intellectual property. But if the technology can create IP barriers against the competition, the opportunity has a greater potential for success. Existing intellectual property must also be evaluated. If patents currently exist, research will need to determine if the proposed technology will infringe.

The economic analysis can determine if the product or service can be delivered at a price customers will pay, while being profitable for the business. Economic analysis will look at the cost of development, cost of manufacturing, cost of running the business, and cost of marketing and selling the product or service. All of these factors will determine the gross margin and potential return on investment (ROI) for the initial capital required to setup the business.

The opportunity analysis process focuses on the mitigation of risk, and the exit strategy of the opportunity. If the opportunity is low risk, and the exit strategy is such that it provides a large upside potential, the opportunity is generally viewed as favorable.

As previously stated, the Timmons and Spinelli (2004) list presents the most thorough list of factors. For each aspect of the opportunity they describe situations that indicate high potential and low potential for success of the opportunity. The factors can be found and are listed in Appendix A. One issue with this list, and current available research is the lack of documented correlations between specific factors that prove a successful opportunity exists.

2.4 A Gap in the Research

Thus far in the literature review, research has been presented on how opportunities are identified, discovered or created, and models have been presented on how to evaluate a single opportunity. An important element of the research that is sparsely discussed is how opportunities are evaluated against other opportunities. Entrepreneurs have more than one idea when they are screening new business ventures to launch. The process developed in this paper on Multiple Opportunity Analysis (MOpA) can increase the probability of the success of the entrepreneur.

Currently little is known about how entrepreneurs sift through, compare and choose the opportunity to follow into business. Some entrepreneurs seem to use rough comparison while others use a subjective process. A major problem that has been identified with entrepreneurs is that they are sometimes blinded by their assumptions early in the process. This leads them to pursue business ventures that may not have the highest potential for success.

To try to make sense of this, we created the graphic found in Appendix 1. Using that as the basis, we created a questionnaire as a heuristic device to guide entrepreneurs through an evaluation of multiple opportunities using a comprehensive set of criteria.

3. Overview of the Heuristic

In a perfect world entrepreneurs would have unlimited time to vet new opportunities. Unfortunately, that is not the case and it is often prudent to act on a new opportunity as quickly as possible. The purpose of this heuristic is to give entrepreneurs a systematic method of evaluating multiple opportunities while doing enough research to analyze them.

The Multiple Opportunity Analysis heuristic (MOpA) was developed through the evaluation of current academic research, knowledge of private sector practitioners obtained through interviews, and personal experience. The MOpA heuristic was improved and iterated several times, through testing on personal opportunities, opportunities from members of the WPI Venture Forum, and the introduction and experimentation of the heuristic in multiple formal classroom environments. Using the MOpA heuristic consists of three steps: Completing a Single Opportunity Questionnaire for each opportunity, reviewing the preliminary results, and if necessary, adjusting the control parameters to increase variation and identify the opportunities with the highest potential for success.

Before analyzing opportunities with the MOpA heuristic, two criteria must be true for each opportunity. The opportunity must truly be an entrepreneurial opportunity, not merely an idea, and basic data and analyses must be completed so that the questions in the Single Opportunity Questionnaire (SOQ), found in Appendix 2, can be answered as accurately as possible.

For the purpose of using this heuristic, entrepreneurial opportunities exist when they have the ability to satisfy a defined market need, provide new customer value, generate revenue, and commercialization aspects can be validated. It is important to understand the value proposition of the opportunity to the potential customers, and have some idea what the potential customers are willing to pay for that perceived value. If these aspects of the opportunity cannot be ascertained the opportunity may be only an idea. Retaining those ideas is also important, as is reviewing them periodically, as new market trends, market shifts or a different personal perspective may allow the idea to evolve into an opportunity.

The initial evaluation must be thorough enough to answer questions relating to the all of the eight main categories of the SOQ: market, competitive forces, technology, economics, sales and marketing, capital requirements, risks, and exit strategy.

Some preliminary questions asked before answering the SOQ and during the cursory evaluation are: How large is the market? What is the competitive landscape? Can the technology be

protected? Is it going to be expensive to develop? What is the cost to develop and produce the product/service vs. the price a customer will pay? Is there enough margin to sustain a business? How will it be marketed/sold? How much capital is required and when? What are the risks? and What is the exit strategy?

Once the opportunity is validated and the initial evaluation completed, the SOQ can be answered. Additional research may be required to answer some questions during the SOQ. The MOpA heuristic is designed to take the output of any number of SOQs and objectively analyze the opportunities to identify the opportunities with the greatest potential for success.

Once all SOQs are completed, the second step of the MOpA heuristic is the automated analysis and correlation of the SOQ answers to develop weighted scores for each question, the main categories, and the opportunity as a whole. This second step does not require any user input. The algorithms developed in this step are discussed in detail in the analysis model section of this paper. The final step allows the user to adjust the model control parameters to increase variability to identify the opportunities with the highest potential for success.

3.2 The Single Opportunity Questionnaire

The SOQ consists of 60 questions, most with multiple-choice answers. The questions fall into eight categories: market, competitive forces, technology, economics, sales and marketing, capital requirements, risks, and exit strategy. Fifty-four questions are quantifiable while six are open-ended. It was understood that the closed-ended nature of many of these questions could be a limitation, but that format was deemed most appropriate for making the questionnaires reasonably easy to use. Considerable effort was made to capture all possible answer scenarios. Each question has a comment field where the user can record assumptions or information used to determine the selected answer. These comments can be beneficial if the entrepreneur wants to revisit an opportunity through his or her SOQ results at a later date.

The SOQ questions were compiled from reviewing leading academic research, and interviews with successful entrepreneurs, venture capitalists and angel investors. During the interviews, the latter were asked to identify key areas and questions they used to evaluate new business opportunities. All of this information was incorporated during the development of the SOQ questions and answers.

The multiple-choice answers were designed to represent ranges, which allowed the SOQ to remain highly objective. Approximately 60 WPI students, six colleagues, and 15 members of the WPI Venture Forum, a member-based not-for-profit organization focused on helping nascent and seed-stage entrepreneurs evaluated the SOQ. They were asked to answer the questions with a potential opportunity in-mind, and provide feedback on the questions and answers. This exercise was repeated until no new feedback was received.

The number of answers for each question ranged from two answers (yes/no) to five answers (answers that were a set of ranges). Depending on the answer selected, each question is assigned a raw value of 0-10 (0 = less favorable, 10 = more favorable) based on two variables: the number of multiple choice answers in the question, and the answer profile. The first variable, the *number of multiple choice answers*, has four options: questions with 2, 3, 4, or 5 answers. The second

variable, the *answer profile* has for options: down, up, bell, reverse bell. The answer profile is used to determine how the 0-10 scale is distributed. Table 1 shows the number of answers in a question vs. the 0-10 value that gets assigned depending on the selected answer (A - E). The SOQ is designed so that first or last answer of any given question is not always the highest or lowest assigned raw score. This variability removes any potential for the user to select the more favorable answers.

Answer Profile	2 Answers		3 Answers			4 Answers				5 Answers				
	A	B	A	B	C	A	B	C	D	A	B	C	D	E
Down	1 0	0	10	5	0	1 0	6.6	3.3	0	10	7.5	5	2.5	0
Up	0	10	0	5	10	0	3.3	6.6	10	0	2.5	5	7.5	10
Bell			0	10	0	0	10	10	0	0	7.5	10	7.5	0
Reverse Bell			10	0	10	1 0	0	0	10	10	2.5	0	2.5	10

Table 1 - Multiple Choice Answer Scale Distribution

The SOQ output is a raw score for each of the 54 questions. These raw scores are then fed into the analysis model.

3.3 The Analysis Model

The analysis model consists of two components, a matrix analysis based on a set of weighted factors and a correlation analysis based on a set of specific answers present between different questions. The output of these two analysis components is a weighted score for each opportunity that is ultimately broken into: a total opportunity score (sum of all weighted scores), and a score in each of the eight SOQ question categories (sum of weighted scores for each question in each category).

3.3.1 The Matrix Analysis

The matrix analysis component generates weighted scores for each opportunity where they are all evaluated on the same set of factors. This provides the objectivity and a uniform foundation of analysis. Each raw score value, for each SOQ question from each opportunity, is entered automatically into a matrix similar to the one shown in Table 2; each opportunity - Opp(n) is placed along the top Y-axis, and each question of the SOQ is placed along the X-axis.

	Opp(1)	Opp(2)	Opp(3)	Opp(4)	Opp(n)
Question(1)	Raw Score	Raw Score	Raw Score	Raw Score	Raw Score
Question(2)	Raw Score	Raw Score	Raw Score	Raw Score	Raw Score
Question(3)	Raw Score	Raw Score	Raw Score	Raw Score	Raw Score
Question(4)	Raw Score	Raw Score	Raw Score	Raw Score	Raw Score
Question(n)	Raw Score	Raw Score	Raw Score	Raw Score	Raw Score

Table 2 - MOpA SOQ Answer Score Matrix

Existing research and interviews with practitioners identified that some aspects of an opportunity are more important than others (Timmons and Spinelli, 2004). This led to the development of multiplying the raw score by a weighting value. The weighted value was derived from identifying which SOQ question holds more importance. Each of the questions in the SOQ was given an importance factor ranging from one to three, with one having average importance and three having high importance. These factors would eventually act as a linear multiplier for that question's score in the analysis. This can be seen in Table 3.

For example, research has shown if an opportunity has an intellectual property advantage (i.e. Patent Protection) it will have a higher chance of success. Thus a question regarding the level of intellectual property is given a higher level of importance, than one regarding level of effort required to build a working prototype. The two questions are related but if the intellectual property cannot be protected, the amount of time to build a working prototype is less important. Also the question about intellectual property is more important to the potential success of the opportunity where as the question regarding the number of hours required to build a prototype speaks to the length of time needed to demonstrate a working product.

	Importance					
	Factor	Opp(1)	Opp(2)	Opp(3)	Opp(4)	Opp(n)
Question(1)	3	Raw Score*3	Raw Score*3	Raw Score*3	Raw Score*3	Raw Score*3
Question(2)	1	Raw Score*1	Raw Score*1	Raw Score*1	Raw Score*1	Raw Score*1
Question(3)	2	Raw Score*2	Raw Score*2	Raw Score*2	Raw Score*2	Raw Score*2
Question(4)	1	Raw Score*1	Raw Score*1	Raw Score*1	Raw Score*1	Raw Score*1
Question(n)	3	Raw Score*3	Raw Score*3	Raw Score*3	Raw Score*3	Raw Score*3

Table 3 - MOpA SOQ Answer Score with Importance Factor Matrix

After the multiplication of the importance factor shown in Table 3, the matrix now contains the opportunities with weighted scores for each question. These weighted scores, as shown in Table 4, are summed by each of the eight categories as well as an overall opportunity score.

	Opp(1)	Opp(n)
Category(1)		
Question(1)	Weighted Score	Weighted Score
Question(2)	Weighted Score	Weighted Score
Question(n)	Weighted Score	Weighted Score
Sum of Category(1)	Sum for Category(1)	Sum for Category(1)
Category(2)		
Question(3)	Weighted Score	Weighted Score

Question(4)	Weighted Score	Weighted Score
Question(n)	Weighted Score	Weighted Score
Sum of Category(2)	Sum for Category(2)	Sum for Category(2)
.	.	.
.	.	.
.	.	.
Sum of Category(8)	Sum for Category(8)	Sum for Category(8)
Total Opportunity Score	Sum of All Weighted Scores	Sum of All Weighted Scores

Table 4 - Summarized SOQ Weighted Score and Overall Score

3.3.2The Correlation Analysis

Important correlations between how specific questions were answered appeared in the research as well as during interviews of practitioners. These correlations can be divided into positive and negative correlations. In the model these correlations were defined as if/then statements. These are if (some conditions exist) then (some output; positive or negative exists) type statements.

For example, one positive correlation could be an opportunity that has an intellectual property advantage and a rapidly expanding market. A negative correlation is an opportunity that has a very small market with a few well-defined competitors, or a market that is shrinking and large competitive barriers to entry.

Approximately 20 correlations were defined and built into the analysis model. After computing the weighted score for each opportunity, the analysis model evaluates a set of rules and determines if any of these correlations exist for each question in the SOQ. If any of the correlations exist, that opportunity is given an additional correlation score, either positive or negative. The total weighted opportunity score is the multiplied by the total sum of correlation scores, yielding a final score for each opportunity.

Multiplying the weighted score with the correlation score acts as a non-linear effect to the final score of each opportunity. Each opportunity is then compared and evaluated based on this final score. This final score, for each opportunity, takes into account all aspects of the opportunity, the raw score data, the weighted score data based on question importance, and the correlations between questions.

At this point a preliminary output is available. The model predicts the opportunities with the greatest potential for success. All of the opportunities are compared on a bar chart, and the opportunities with the highest potential have the highest overall score. A comparison by weighted score in each of the eight category areas is also provided.

At this point opportunities with a higher potential for success have been identified based on the importance factors and correlations from research and speaking with practitioners. To help entrepreneurs understand and evaluate the output of the initial analysis, a set of variables, or adjustable control parameters, were defined to fine tune the model to different circumstances.

3.3 Analysis Model Adjustable Control Parameters

The final step in the analysis is varying the adjustable heuristic parameters. There are two areas of adjustable parameters: selecting driving SOQ categories, and defining specific SOQ category thresholds.

By selecting one or more driving categories from the eight SOQ categories, the model will place higher importance on scores generated by questions in the selected category or categories. This is important because an entrepreneur may be looking for an opportunity with a strength in any one of the SOQ category areas. For example, perhaps one is looking for a lifestyle business vs. a business that would be sold or where technology licensed. Selecting a driving category allows the output to be tailored to these different situations. It also allows the user to identify the strengths and weaknesses of each opportunity, while adjusting the parameters and comparing the output results.

The second area consists of the ability to set thresholds in the heuristic that are used to differentiate further the opportunities. These thresholds define a cut-off point where, if the opportunity does not meet the cut-off point, the entire opportunity is deemed potentially unsuccessful (given a final score of 0). This feature of the model can be turned on and off, and was designed as a normalizing factor across multiple executions of the MOpA heuristic with distinct sets of opportunities.

3.4 MOpA Output

The final outcome of the MOpA heuristic, combining the SOQ, the analysis model and any adjustable parameters, is two graphs. One graph shows the final score of each opportunity, while the other graph shows each opportunity broken into the SOQ category areas.

Figure 1 displays the MOpA heuristic overall output for 19 personal opportunities of the first author. Opportunities 8, 16, and 18 have been clearly identified as opportunities with a high potential for success.

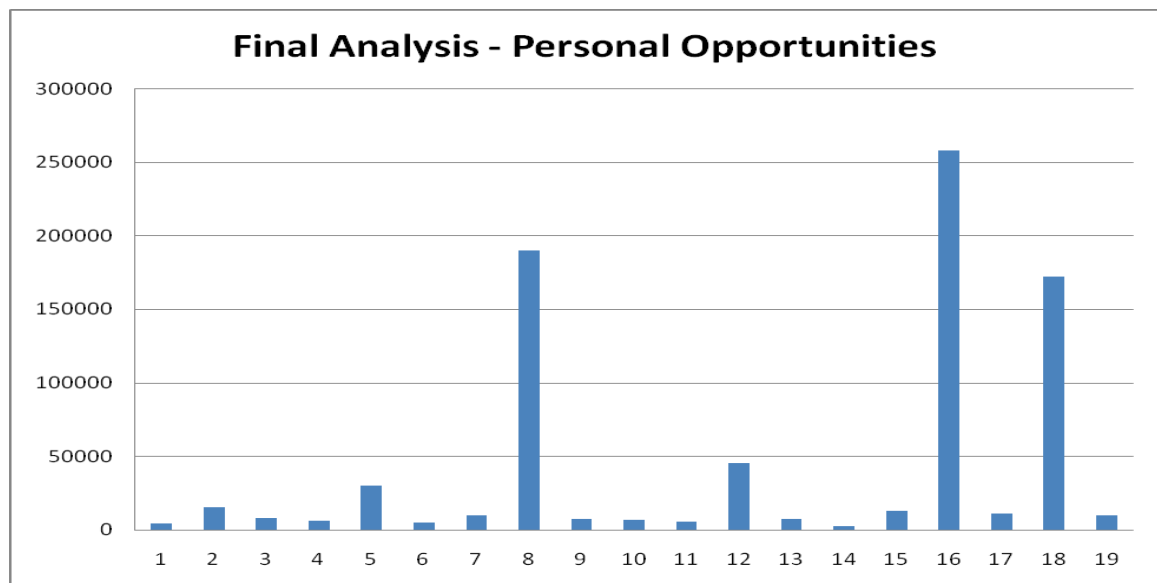


Figure 0 - Final MOpA Output for Personal Opportunities of author Thomas J. Lynch IV

Figure 2 contains the final output of the top five opportunities broken down by the SOQ categories. In this all opportunities had the same exit strategy so that is not displayed. This graph gives the entrepreneur a good understanding of strengths and weaknesses of each opportunity.

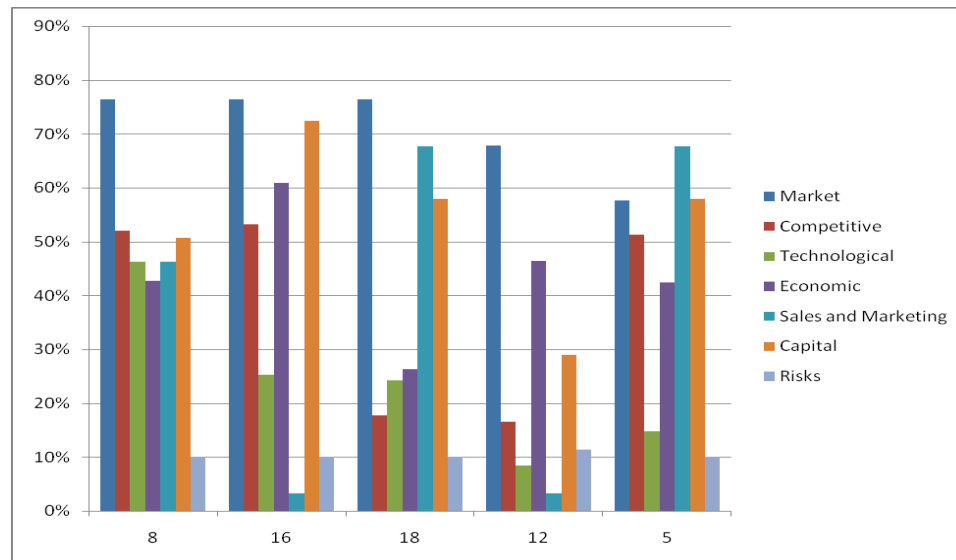


Figure 0 - Final MOpA Output for Personal Opportunities of T.J. Lynch IV by SOQ Category

4. Conclusions

The MOpA heuristic is important because many entrepreneurs have biased methods of evaluating opportunities. Entrepreneurs can be too emotionally connected to their opportunities to evaluate the chance of success objectively. The MOpA heuristic is an attempt to develop a unified, non-biased process for objectively evaluating multiple opportunities.

It is important to realize that the MOpA heuristic should be only used on validated entrepreneurial opportunities as opposed to ideas, and that adequate initial research of potential opportunities must be completed before attempting to answer the SOQ.

Failing to complete these two steps will lead to inaccurate opportunity analysis results. The initial research will allow the entrepreneur to have enough background knowledge about the opportunity to answer the SOQ questions as accurately as possible. It was demonstrated during initial testing at the undergraduate level that if the MOpA heuristic is used on ideas, or opportunities where the SOQ was not answered accurately, the resulting analysis could not be validated.

These tests indicate that the heuristic is only as good as the data in the SOQ; inaccuracies in the SOQ answers translate to inaccurate analysis. This is intuitive; the output is only as good as the input. After running the heuristic multiple times on various sets of opportunities, it is interesting to note that the opportunities entrepreneurs thought would come out on top were not always

identified as top opportunities. Such a result should then be used to adjust how the entrepreneur thinks about the opportunity, many times identifying strengths or weaknesses not initially seen. That was a key take-away for those testing the heuristic.

Despite finding the undergraduate classroom experiment less than desirable in terms of opportunities vs. ideas, it was found that the heuristic stimulated discussion about the various SOQ items and various opportunities. That, too, was a good outcome, even though it was not the one sought.

In our model, after the MOpA heuristic identified one or two opportunities as having a high potential for success, the entrepreneur would begin the in-depth research required to write a business plan. At this point, as more research is conducted, the entrepreneur is encouraged to validate the answers of those opportunities on the SOQ. This will ensure that the data in the SOQ are as accurate as possible. The way the model is built, if an answer to a question on a specific opportunity's SOQ changed, the output and analysis would update as well.

In a perfect world the level of research needed to write a business plan would be conducted on every opportunity. But the immense level of effort required to do so would circumvent the entrepreneurial process and by the time the entrepreneur had determined the best opportunity, that opportunity could have been realized by another party. The MOpA heuristic attempts to balance in-depth research with action needed to evaluate personal entrepreneurial business opportunities.

We recognize that what we have presented here is new. Considerable additional research on the heuristic will strengthen it. For example, further validation of the correlations between factors in the MOpA heuristic is warranted. Additionally, we could test how entrepreneurs perceive their ideas before using the heuristic, then compare the heuristic results. Further research into successful companies started by entrepreneurs and how they perceived their opportunity, at the time of inception, could be completed using the MOpA heuristic to validate and strengthen the algorithms used to determine potentially successful opportunities. The ultimate validation of the MOpA heuristic will be a longitudinal study that will compare heuristic results to the ventures launched based on them years following their formation.

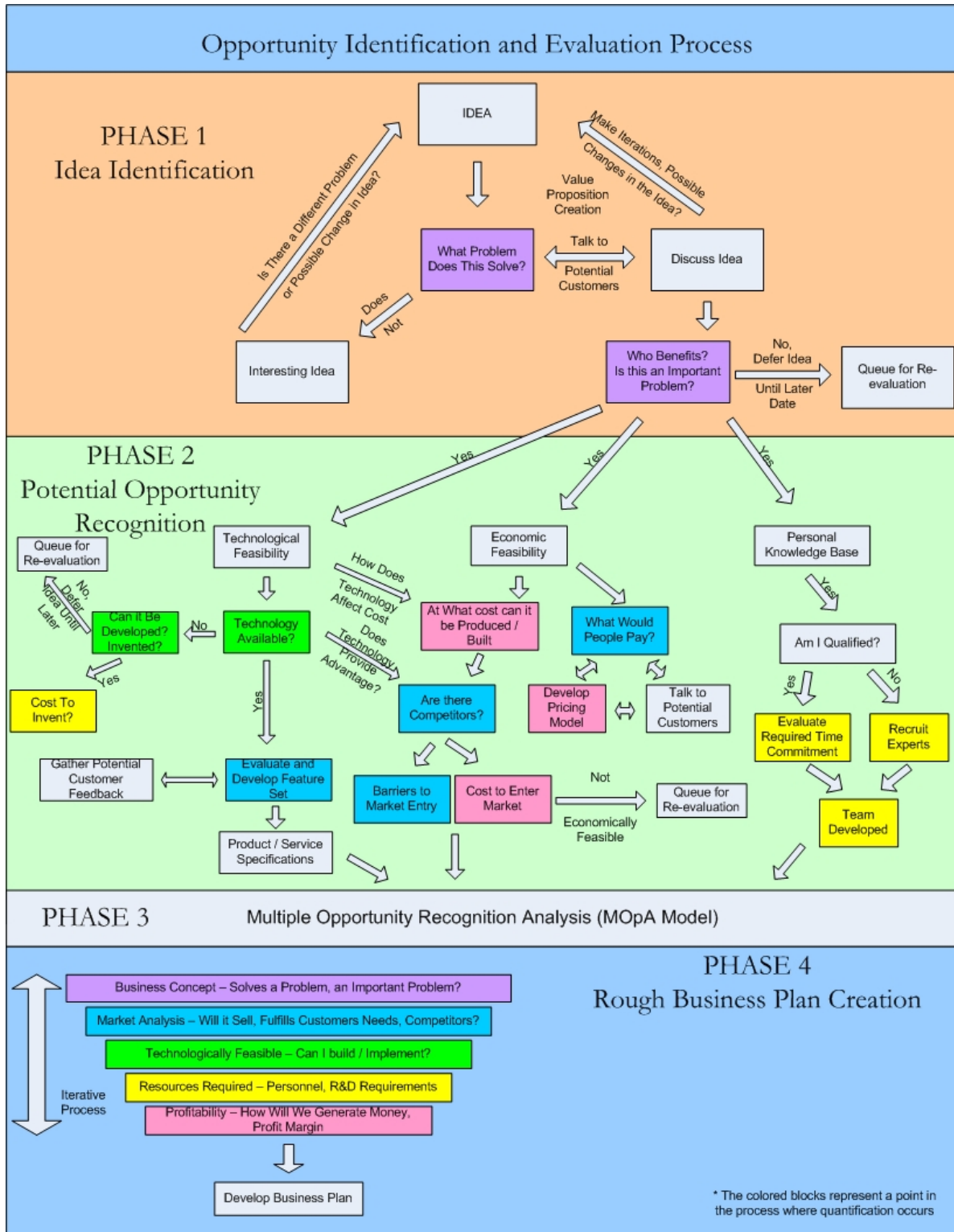
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Appendix 1: The Model



Appendix 2: Heuristic Instrument

Market Analysis:

1. How would you rate the perceived customer value of this product or service?
A. Strong B. Average C. Weak
2. Can you identify a specific need or problem that your product or service solves?
A. Yes B. No
3. For whom is this an important problem?
A. Everyone in the World B. Only Potential Customers C. Not Very Important to Most People
4. Who are the potential customers?
A. Every Person B. The Average Person C. A Select Specific Group D. Very Few
5. What would the customers be willing to pay for this product or service?
(Use a range if unsure of exact amount) Enter Amount:
6. How large is the market for this product or service, in dollars?
A. 1 Billion or More B. 100 Million – 1 Billion C. 1 Million – 100 Million
D. 100 Thousand – 1 Million E. Less than 100 Thousand
7. What is the market's current direction?
A. Growing B. Stable C. Shrinking
8. What is the type of market for this opportunity?
A. Niche Market B. General Market C. Large Broad Market
9. What is your product's lifespan?
A. Multiple Years B. Months C. One-Time Use D. Not Applicable
10. Does your service allow for repeat business with the same customer?
A. Yes B. No C. Not Applicable
11. Is there an opportunity for a family of products or services around the initial concept?
A. Yes B. No
12. Are there currently any similar products or services available in this market?
A. Yes B. No
13. For potential customers, what is the alternative to using your product or service?
A. No Alternative B. Using Inferior Product or Service C. Similar Product

14. If there is an alternative, does your product or service have a distinct advantage?

A. Yes B. No C. Not Applicable

15. How long will the window of opportunity be open to capitalize on this product or service?

A. Multiple Years B. 6 Months – 1 Year C. 1 Month – 6 Months D. Days

Competitive Analysis:

16. Can you identify the competitive forces on your product or service?

A. Yes B. No

17. What size companies are the competitors? (Choose any that apply)

A. Large Established Companies B. Medium Sized Companies C. Small Companies
D. Other Start-ups E. Not Applicable

18. What type of competitive advantage does the competition have?

A. Large Advantage B. Medium Advantage C. Small Advantage D. Not Applicable

19. Do you have a strategy to overcome their competitive advantage?

A. Yes B. No C. Not Applicable

20. How hard is it to overcome their competitive advantage?

A. Hard B. Moderate C. Easy D. Not Applicable

21. How big is your competitive advantage?

A. Large B. Medium C. Small D. Not Applicable

22. What is your lead time to market over the competition, or potential competition, for your specific product or service?

A. Years B. 6-12 Months C. 1-6 Months D. None

23. Can you create competitive barriers?

A. Yes B. No

Technological Analysis:

24. Does this product or service involve the use of technology?

A. Yes B. No

25. Is the technology readily available to implement the product or service?

A. Yes B. No C. Not Applicable

26. How mature is the technology for the product or service? (Choose any that Apply)

A. Underdeveloped or Research Stage B. New and Emerging C. Stable
D. End of Life E. Not Applicable

27. Is there an intellectual property advantage?

A. Yes B. No

28. What is the source of the technology? (Choose any that Apply)
A. In-House Developed B. Licensed C. Outsourced D. Answers A, B, and C
E. Not Applicable

29. If developed in-house, is the technology patentable?
A. Yes B. No C. Not Applicable

30. What is the level of effort required to build a working prototype?
A. Large (500+ Hours) B. Medium (100+ Hours) C. Small (<100 Hours)

31. What is the estimated development investment required to reach prototype stage?
Enter Dollar Amount:

32. Can the technology be licensed to others?
A. Yes B. No C. Not Applicable

33. Can the technology be used in a totally different non-obvious market?
A. Yes B. No C. Not Applicable

Economic Analysis:

34. What is the estimated range of production cost per unit of product or service?
A. High Cost (>\$1000) B. Medium Cost (\$100 – \$1000) C. Low Cost (<\$100)

35. What is the exact per unit production cost?
Enter Dollar Amount:

36. How complicated is the business process for making money?
A. Complicated Process B. Average Process C. Simple Process

37. What is the revenue model? (Choose any that Apply)
A. One Time Use B. Service Revenue Only C. Reoccurring
D. One Time + Service Revenue E. Reoccurring + Service Revenue

38. Is there a potential for re-occurring revenue?
A. Yes, from physical products and services B. Yes, from services only
C. Yes, from physical products only D. No

39. What is the gross margin?
A. High Margin (>%75) B. Medium Margin (%50 - %75) C. Low Margin (<%50)

40. What is the first year revenue projection?
A. Above 10 Million B. 1 – 10 Million C. 100k – 1 Million D. Under 100k

41. What is the three year revenue projection?

- A. Above 100 Million B. 50 – 100 Million C. 20 – 50 Million
D. 1 – 20 Million E. Under 1 Million

Sales and Marketing Analysis:

42. What is the business presence?

- A. Brick and Mortar Store B. Brick and Mortar w/ Online Store
C. Online D. Warehouse and Distribution

43. How is the product or service sold? (Choose any that Apply)

- A. Direct Sales B. Channel Sales C. Use of Sales Force in the Field D. Tele-Sales

44. What is the sales timeline, how long does it take to make a sale?

- A. Long (Multi-Year) B. Medium (6 – 12 Months) C. Short (1 - 6 Months) D. Immediate

45. What is the estimated cost of marketing?

- A. High Cost (\$100,000 +) B. Medium Cost (\$10k – \$100k) C. Small Cost (Under \$10K)

46. How many barriers to market entry exist?

- A. Many Barriers B. 1-3 Barriers C. None

Capital Requirements:

47. How much investment is required in the first year?

- A. Large Investment (\$10+ Million) B. Average (\$1 – \$10 Million)
C. Small (\$100,000 – \$1 Million) D. Extremely Small (< \$100,000)

48. How long will it take to become profitable?

- A. 3+ Years B. 1 – 3 Years C. Less than a Year

49. What percentage of initial capital required is going to be used for sales and marketing?

Enter Percentage:

50. What percentage of initial capital required is going to be used for research and development?

Enter Percentage:

51. What percentage of initial capital required is going to be used for general business administration?

Enter Percentage:

Risks:

52. Does your product or service require regulatory compliance?

- A. Yes B. No

53. Do you have a strategy to overcome the compliance risks?

- A. Yes B. No C. Not Applicable

54. Is your product or service at the risk of “acts of god”?

A. Yes B. No

55. Do you have a strategy to mitigate risk factors substantially out of your control?

A. Yes B. No

56. Is there a risk of aging consumers?

A. Yes B. No

57. Do you have a strategy to address a shrinking market?

A. Yes B. No C. Not Applicable

58. Does your product or service depend on a highly volatile resource?

A. Yes B. No

59. Do you have a strategy to control costs?

A. Yes B. No

Exit Strategy:

60. What is the exit strategy of this business?

A. Sell Business B. License Business C. Run Business as Lifestyle Business