Effects of Experience on Applying Entrepreneurial Decision Heuristics

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Abstract

The paper seeks to explore the role of experience in the use of decision heuristics by entrepreneurs. An exploratory mixed-methods study incorporating qualitative and quantitative data, and generating propositions to guide future research and practice. The findings suggest that expert entrepreneurs use heuristics frequently in relation to the evaluation of opportunities, but novice entrepreneurs use much less heuristics in their decision making. Being an exploratory study of a relatively small sample, the findings are tentative and not generalized to a wider population. However, the study implies that future researchers should explore these topics in greater depth. This study is one of the first studies to explore the complex role played by experience in the use of heuristics by entrepreneurs. The study also adopts an original approach by assuming that heuristics may be effective.

Index terms— The paper seeks to explore the role of experience in the use of decision heuristics by entrepreneurs. An exploratory mixed-methods study incorporating

1 INTRODUCTION

cholars have considered cognitive psychology to provide the psychological foundations for understanding the behavior of entrepreneurs. Entrepreneurship research that draws on the principles of cognitive psychology has become a significant subfield (Baron, 2004; **??**itchell et al., 2002). The term 'entrepreneurial cognition' has been introduced to describe the way in which entrepreneurs think and behave. Entrepreneurial cognition refers to "the knowledge structures that people use to make assessments, judgments, or decisions involving opportunity evaluation, venture creation and growth" **??**Mitchell et al., 2002). Deciding which opportunities to pursue and how to exploit them are important features of entrepreneurship (Shane and Venkataraman, 2000). However, entrepreneurs often encounter new opportunities in dynamic environments with limited resources and information.

2 II. DECISION HEURISTICS

Studies focusing upon entrepreneurial cognition emphasize the use of heuristics and biases by entrepreneurs. Heuristics refer to simplifying and time-saving strategies that individuals use to make decisions. Cognition scholars argue that entrepreneurs are particularly susceptible to the use of heuristics and biases in complex environments (Baron, 1998). From the naturalistic perspective, heuristics can be seen as natural and effective decision means that are not inherently associated with cognitive errors and extreme bias. Similarly, bounded rationality and limited cognitive capacity are viewed as natural features of human cognition and decision making, and not as imperfections relative to classical ideals (Beach and Connolly, 2005).

3 III.

4 EXPERIENCE

Sayeh et al **??**2004) express that experience is critical in the creation of tacit knowledge and use of intuitive decision-making skills. There is a growing stream of literature that provide evidence senior managers routinely make decisions based on tacit knowledge grounded in experience and that other experts use intuitive decision strategies almost exclusively under high stress conditions (Buzenits, 1997). In the context of decision-making in crisis, we argue that relevant experience is composed of education, training, and exposure to events similar to the current situation. Experience is linked to the manager's explicit knowledge about the event, cognitive schema, sense of efficacy, and emotional memory.

Experienced entrepreneurs were shown to base their judgments on surprisingly few pieces of information (Todd, 1999). It was found that people could trade off the effort involved in making a choice against the accuracy of that choice, and choose a simple decision strategy that would achieve the desired balance **??**Payne et al., 1988). And simple heuristics that use only a single piece of information to make a choice between two alternatives were discovered to rival the performance of much more complex and information-hungry methods such as multiple linear regression **??**Gigerenzer and Goldstein, 2002).

5 DECISION AND EXPERIENCE

Although use of heuristics is a natural cognitive behavior, its results can (and do) vary. Heuristics made by novices in a field are hardly much better than a guess, whereas heuristically based decisions made by experts are most often adequate **??**Hammond et al., 1987). This is because of this fact that in general, experts' and novices' information perception and information processing is different, with experts solving problems faster and with fewer errors (Gustafsson, 2009). In entrepreneurship research, this reasoning can be shown using studies by Sarasvathy (2008) and Baron (2006). Baron demonstrated that heuristically based decisions in opportunity idenification process (creation of meaningful patterns or mental modeling), while performed by expert entrepreneurs, were much more refined and adequate than those of novices.

It is now possible to make a tentative conclusion that no decision is good or bad per se, but can be either adequate or non-adequate. This depends on the decision maker's expertise in a field; an expert can depart from the strict norms of rational decision-making and nevertheless achieve adequate decisions (Gustafsson, 2009) But it is possible to claim that heuristically based decisions, especially if performed by experts, are superior to decisions based on any other cognition? Not entirely; well, in fact, not at all. First of all, heuristics are often frugal; even if the decisionmakers use the most salient decision cues (as experienced entrpreneurs do), significant part of the available information is ignored. This leads, to decisions that are usually good (adequate) but not optimal. For majority of real-life decision tasks satisfying decisions are adequate (Gustafsson, 2009).

V.

6 DECISION AND SITUATIONS

Heuristics are not general cognitive strategies; they are situation-specific, moreover, designed for a special task (Todd and Gigerenzer, 2003). Some of the decision situations would need use of particular heuristics, but this is a skill which has to be learned over time and experience.

Most comprehensive treatment of the potential fit between the aspects of a decision task and required cognitions is presented by **??**ammond (1988) in the cognitive continuum theory (CCT). CCT introduces the concepts of task continuum, where tasks vary according to their uncertainty level (from very high to very low), and cognitive continuum, where cognitions range from intuition (one side) to quasirationality/heuristics to analysis (the other side).

According to this theory, every task within the task continuum would induce certain cognitive processes in order for the decision to be appropriate. Thus, highly uncertain tasks induce intuitive cognition, moderately uncertain tasks induce heuristics, and low uncertainty tasks induce analysis.

The notion that different types of decision situations would induce different decision techniques starts taking hold also in entrepreneurship research. For example, Sarasvathy (2001Sarasvathy (, 2008)) (Knight, 1921). ? Experienced entrepreneurs do recognize the nature of the decision task and are able, to a high extent, to match their decision-making techniques with the nature of the task. This means that the skill of entrepreneurial decision-making is expressed through the adaptable behavior of experts. ? Being a skill, the decision-making behavior in entrepreneurial tasks is different for expert and novice entrepreneurs. As mentioned above, the experts' behavior is adaptable and, in general, expert entrepreneurs would make use of different decision-making techniques: analysis, heuristics, and intuition and match their cognitions with the requirements of the task. Novices, however, are to a high extent prone to analytical decision-making regardless of the nature of the decision task.

VI.

7 RESEARCH METHOD, ANALYSIS AND RESULTS

We used a mixed methods approach including both qualitative and quantitative techniques. The qualitative component of the study consists of 2012 ebruary F semi-structured interviews with 28 entrepreneurs regarding

decision-making. The research population is high-tech entrepreneurs. The interview sample includes 18 expert entrepreneurs and 10 novice entrepreneurs. In addition, the study has a quantitative component in which a larger sample, 64 entrepreneurs incorporate in the study.

The 28 entrepreneurs have different ages, education levels and industry backgrounds, and four are women. Some of the sample members are startups and less than three years old, while a few are in expansion stage, over six years old. All are located in Iran.

8 a) Methods

The qualitative part tends to recognize heuristics that experienced and novice entrepreneurs apply in decision making while evaluating opportunities. In the quantitative part we used independent T-test for comparing means between the experienced sample and novice sample of entrepreneurs. This independent T-test, evaluate some hypothesis about difference between usage of heuristics among experienced and novice entrepreneurs. Mixed method studies of this kind have been recognized for some time (Creswell, 2003). They may explore relatively narrow research questions and may include relatively small samples that are purposefully selected to explore embedded processes.

The semi-structured interviews lasting approximately one hour each were used as data gathering tool and we considered the same interview guide throughout. The questions covered the following factors of decision making: time and information pressure; uncertainty and risk; emotion; switching decision styles; opportunity evaluation; self-evaluation and intuition. At the end of each interview, interviewees were invited to talk openly about any topic that came to mind.

Based on content analysis of 28 interviews, we developed a questionnaire. This questionnaire consists of seven major part, each includes some subquestions. These researcher-developed questions tend to measure importance of recognized decision heuristics.

9 b) Interview Results

We used theme methodology for content analysis. Transcription of the 28 recorded interviews resulted in approximately 140 pages of single-spaced text. Next, each interview was coded for recurrent themes. Iterative cross-case analysis was then conducted by comparing codes and themes, including frequency, intersection and proximity analysis. As a result, six common heuristics were identified in relation to decision making in evaluating opportunities:

(1) trusting the enterprise competencies.

(2) reliance on personal information.

(3) developing success and failure scenarios. (4) trusting one's intuition and feelings.

(5) trusting previous experiences. (6) using consultation meetings conclusion.

Among two groups of experienced and novice entrepreneurs, we observed different usage of heuristics. For novice entrepreneurs, trusting the enterprise competences heuristic developing success and failure scenarios heuristic and last one (using consultation meetings conclusion) were not identified (table **??**). So we can conclude that novice entrepreneurs use heuristics less than experienced entrepreneurs when they decide in evaluating opportunities. The "trusting the enterprise competencies" heuristic was often used in relation to opportunity evaluation. It was typically used as a simple test to decide whether or not an opportunity was worth considering at all. Among 18 interviewed experienced entrepreneurs, 14 of them mentioned that they used this decision heuristic, but only three of novice entrepreneurs state that they used this heuristics in response to quick decision making. In previous researches about identifying decision heuristics, no study have not shown similar result to current article and trusting the enterprise competencies heuristic have not recognized before. ebruary F Heuristic 2 : reliance on personal information Second decision heuristic, "reliance on personal information", is stated by all 18 expert entrepreneurs and 9 novice ones. This frequency shows that this is an important decision heuristic for entrepreneurs. Most of these persons expressed, when facing situation with low information or time constraint, they refer to previous personal information about the opportunity. They said this information can be even not relevant to the opportunity they want to evaluate.

10 Experienced entrepreneurs

11 Novice entrepreneurs

12 Identified decision heuristic

Yes

From a neo-classical perspective, it could be argued that the "reliance on personal information" heuristic is evidence of representativeness bias and hence another source of potential cognitive error. That is, it could be argued that entrepreneurs exhibit representativeness bias when they assume that prior information is a basis for understanding the risks associated with new opportunities in the market (Busenitz and Barney, 1997;Simon and Houghton, 1999). Yet even if one concedes this point about potential bias, some scholars argue that the use of

such heuristics is a valuable and even necessary element of effective entrepreneurial decision making, given that they often select opportunities in new or illdefined markets **??**Sarasvathy, 2004).

13 Heuristic 3 : developing success and failure scenarios

The "developing success and failure Scenarios" heuristic is about assessing the risk of the pursuing new opportunities. 15 of expert entrepreneurs stated they develop and consider success and failure situations of the decision they are about to make. Most of expert entrepreneurs consider failure cases for evaluating any new opportunities, but develop success scenarios when the opportunity was somehow similar to previous experience. Novice entrepreneurs did not mention this heuristic in their statements, but a few of them said, they assess the worst case scenario for their decisions.

Peter Brynat (2006) argues that The "worst case" heuristic was least common and was primarily used to assess risk in opportunity evaluation. If the answer to the question "What's the worst that could happen?" suggested that the worst case was unacceptable, then the opportunity would be quickly rejected. Also, Gigerenzer et al (2002) found that this heuristic served as a simple rule to reject some opportunities quickly, or as a simple rule to stop further information search and risk analysis. In other hand, if the answer was more positive, and the worst case was acceptable, then the opportunity might be explored further **??**Brynat, 2006).

Heuristic 4: trusting one's intuition and feelings about the opportunity Use of the "trusting one's intuition and feelings about the opportunity" heuristic also appeared unrelated to different levels of experience. Both experienced and novice entrepreneurs consider their intuition and their feelings about the opportunity they should evaluate. 15 persons of experienced entrepreneurs stated that they trust their feeling about the case; if they have a strong feeling -no matter how bad or good it is-for the opportunity, they will trust that feeling and will base their decision on it. This heuristic often acts as the only factor for deciding whether or not pursuing the opportunity. Among 10 novice interviewed entrepreneurs, seven persons mentioned this heuristics, especially, when they have knowledge or expertise about the opportunity.

According to Brynat (2006), trusting intuition (gut, in his words) is one of the most important and applicable decision heuristics and it works together with other heuristics to reinforced each other.

14 Heuristic 5: trusting previous experiences

The fifth heuristic, "trusting previous experiences", is mentioned by both novice and experienced entrepreneurs. During evaluating an opportunity, entrepreneurs refer to their similar experiences for prior cases. Some of these entrepreneurs mentioned that they consider their competitors experiences too and sometimes study all relevant and irrelevant elements of previous cases before deciding about evaluating an opportunity.

From a neo-classical perspective, it could be argued that the "using consultation meetings conclusion" heuristic is evidence of belief in law of small number bias and hence another source of potential cognitive error. That is, it could be argued that entrepreneurs exhibit belief in law of small number bias when they base their judgment and decision making on their experience -law of small number- (Keh, Foo and Lim;. But, some scholars argue that the use of such heuristics is a valuable and even effective entrepreneurial decision making tools. Brynat (2006), assumes this heuristic as instances of gut feel that were often explained in terms of intuition based on prior experience and accumulated expertise. Krabunrat and Phelps (1998), also, consider previous experience as one of six heuristics in their study, so entrepreneurs in current research show this heuristic similar to Krabunrat and Phelps (1998).

15 Heuristic 6: using consultation meetings conclusion

Applying "using consultation meetings conclusion" heuristic is different between expert and novice entrepreneurs. Just three of experienced entrepreneurs did not state this heuristic in their answer to interview questions. In spite of broad usage of last identified heuristic by expert entrepreneurs, only 2012 ebruary F one of novice entrepreneurs expressed that he uses consultation or advises of others.

Like the "trusting previous experience", Krabunrat and Phelps (1998), identified this heuristic under their cooperation category. Cooperation was defined as pooling knowledge and sharing risk with competitors and customers. They mentioned within each category, specific heuristics relevant to the firm and environment are generated and used in decision making and using previous experience is a specific heuristic.

16 c) Independent T-Test Results

We used independent T-test between those two groups for comparing means of two populations about some specific features or characteristics. In this study, experience is the factor that distinguishes two groups of entrepreneurs from each other. These two groups are expert entrepreneurs and novice ones.

As shown in The sig. value of t-test for equality of means column in table 2, for "trusting the enterprise competencies heuristic", "developing success and failure scenarios decision heuristic" and "using consultation meetings conclusion" one are less than 0.05. As shown in table 1, these three decision heuristics do not derive from interview with novice entrepreneurs, and we can support this difference by the results of comparing means of two groups of entrepreneurs in quantitative part. Furthermore, the sig. value of second heuristic, reliance on

personal information is less than 0.05 too. According to inherent hypothesis of independent t-test, it means there is difference between means of novice and expert entrepreneurs. This is true; based on original t-test

17 IMPLICATIONS

The findings suggest that experienced entrepreneurs use decision heuristics more than novice entrepreneurs. Analysis of quantitative data shows that there is difference between experienced and novice entrepreneurs using decision heuristics. Number of decision heuristics for expert entrepreneurs is six while novice ones implement three heuristics when deciding about an opportunity. Both groups use "reliance on personal information", "trusting one's intuition and feelings" and "trusting previous experiences" heuristics commonly.

18 a) Implications For Future Research

The aim of this study was exploring the role of experience in using decision heuristics. By dividing sample of qualitative part of methodology of this study, to experienced and novice entrepreneurs, we could separate decision heuristics for these two groups from each other. Based on this objective we would suggest followings:

High-tech entrepreneurs, Because of their business changing environment, it can be a difference between these entrepreneurs heuristics with other industries. Studying other areas of activity for identifying decision heuristics and comparing it with the findings of current study, can lead researchers to know entrepreneurs' decision making better.

This study support the role of experience in applying decision heuristics when evaluating opportunities, but the sample is limited and consists of a few entrepreneurs; so this study should take place in a larger sample.

And since opportunities should be exploited so a business or a product come to reality, identifying decision heuristics when exploiting opportunities can help to improve entrepreneurial decision making and lead to more successful businesses or products. ebruary F However, there is still an under-researched issue which is worth attention; namely the correlation between performance and entrepreneurial cognition and heuristics as a part of entrepreneurial cognition. Heuristically based decisions, made by experienced entrepreneurs, are supposed to be adequate, because they are matched to the cognitive requirements of the entrepreneurial task and are, therefore, ecologically rational. Yet this is a theoretical inference. Gustafsson (2009) argues that no research has been yet made, in real life, on connections between entrepreneurial cognitions, decision heuristics and the entrepreneur's performance.

There are some evidence that support the impact of cognitive processes on decision making but there are little studies about the relationship between psychological characteristics of novice and expert decision makers and the decision. This topic can be a very useful area for future researches. Keh, Lim and Foo (2002) found that heuristics have an influence on perception of risk and perception of risk influence on opportunity evaluation. Decision heuristics such as overconfidence, representativeness and illusion of control affect risk perception. Barskey (2010) studied the relationship between decision heuristics with risk perception and risk perception with starting a new business for different entrepreneurs. In his study, the result for both relationships were not clear and the questions remain. Studying these relationships for novice and expert entrepreneurs may help to answer the ambiguity of the results.

19 b) Implications For Practice

It is already known that experience performs an important role in using decision heuristics (Gustafsson, 2009). Heuristics made by novices in a field are hardly much better than a guess, whereas heuristically based decisions made by experienced entrepreneurs are most often adequate **??**Hammond et al., 1987). Some role playing practices could be incorporated into the training and education of entrepreneurs, thereby improving their use of heuristics in decision making about opportunity evaluation based on experiences they achieved through practicing real situations. Secondly, as the study has shown, when facing with uncertainty or time constraint or lack of relevant information, entrepreneurs use heuristics as decision shortcuts and substitute for systematic approaches of decision making. This information could be used by entrepreneurs, investors and consultants to evaluate nascent and practicing entrepreneurs in terms of their heuristic decision making skills.

The decision-making behavior in entrepreneurial tasks is different for experienced and novice entrepreneurs. As has been mentioned by Gustafsson (2009), the experienced entrepreneurs' behavior is adaptable and, in general expert entrepreneurs would make use of the ample array of decision-making techniques: analysis, heuristics, and intuition and match their cognitions with the requirements of the task. Novices, however, are to a high extent prone to analytical decision-making regardless of the nature of the decision task. This is especially true as far as students of business administration are concerned (they participated in the study as novice or aspiring entrepreneurs); we can, then, make a tentative conclusion that modern business education seems to be highly conditioning toward analysis and do not support decision heuristics.

20 VIII.

CONCLUSION Decision-making is not a simple and straightforward matter as it might seem. First of all, decision tasks do differ in their cognitive nature. In some situations information is readily available (or can be collected at a low cost and during ample time, available for this collection) and salient cues are neither redundant

normissing; means and variables are independent (Todd and Gigerenzer, 2003). Under such conditions analytical (rational) decision-making is not only possible but indeed would provide the optimal results. An example in the entrepreneurial setting would mean that if both supply and demand are known (e.g., while introducing an incremental innovation to a mature market), entrepreneurs would do best, i.e., make an adequate decision by performing market, financial, etc., analysis.

Yet in the real world, such situations are far from forming a majority of decision environments. On the contrary, that time decision-makers are faced with either lack or redundancy of cues; insufficient time to make decision (and especially to run an analysis); and correlations between means and variances, so that they can be seen as cues to infer each other (Einhorn and Hogarth, 1981). Under such conditions rational theories of choice cannot lead to optimal results; at times the costs of collecting data would make use of such theories prohibitive. The rational theories, as we have already discussed, are not commonly applied in the real-life decision-making. When information is scarce and costly to come by, when time is a pressing issue, decision-makers would fall back to using "fast and frugal" heuristics -cognitive techniques that are based on simple procedures, few information cues, and avoid complex computations.

Experts in general and entrepreneurs in particular do possess a variety of cognitive techniques (a "cognitive toolbox," in terms of Baron and Ward (2004)) and are quite capable to match cognitive requirements of the task and appropriate decision 2012 ebruary F making techniques, as Gustafsson found out in her earlier study (Gustafsson, 2006).

To study what successful entrepreneurs have done is important, but an even more important and interesting question is what could be done right now, before somebody else pre-empts an opportunity that is open at this very moment. Entrepreneurship scholars should be able to answer this question and be able to translate the answer into normative recommendations for practitioners, and this is another implication of the present study. And, finally, but not the least important, entrepreneurship educators could emphasize developing such skills among their students.

Experienced entrepreneurs can produce adequate decisions under uncertainty; according to Hammond (1988) these decisions, though not entirely faultless, nevertheless produce more small mistakes with less severe consequences for each, compared with analytical decisions. On the other hand, novices do not yet possess this skill, and their decisions are hardly better than guesses. As such, level of expertise pose as a powerful moderator.

Development of expertise requires a lot of time (no less than 7-10 years (Ericsson and Smith, 1991)), substantial efforts, and a lot of mistakes in order for cognitive schema to be developed. It is enough to mention that well-developed and numerous cognitive schemata (such as experienced entrepreneurs possess) provide them with a possibility to make quick and adequate decisions across a variety of entrepreneurial settings. Barskey (2010) studied the role of experience in applying decision heuristics and found that, there is no meaningful relationship between these two factors, but this study shows such a significant relationship and emphasize the role of experience is considerable. Furthermore, two heuristics, " trusting the enterprise competencies" and " reliance on personal information" were not recognized in other decision heuristic related studies. [1]

Figure 1:

[1]

Identified heuristics		Leven's test for equality of variances	t-test for equality of means
trusting competencies	the enterprise	0.690	0.039
reliance on personal information	0.725		0.025
developing success and failure scenarios		0.042	0.009
trusting one's intuition and feelings		0.193	0.307
trusting previous experiences		0.136	0.455
using consultation meetings		0.005	0.034

conclusion

Table : 2 independent T-test results

VII.

Figure 2:

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