

Personality, Cognitive Bias and Entrepreneur Decision-making

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ABSTRACT

When people talk about the necessary features of being a successful entrepreneur, one of the most important characteristics is the ability to make decisions with limited information. However, the decision-making process is easily influenced by many cognitive biases, especially for entrepreneurs, a group of people normally considered to have different personalities than others. The discussion about personalities has been one of the classical and early approaches to entrepreneurship for nearly a century. Although numerous studies have explored the personality impact on entrepreneurs' decision-making and discussion about cognitive biases are also frequently considered in entrepreneurial studies, there are not so many studies linking these factors together to entrepreneurship decision-making. An amount of entrepreneurial-related literature is used and reviewed in this paper, trying to provide a basic scope of impacts on personalities and cognitive biases to those people interested in entrepreneur decision-making studies. This study found that the influence of personality and cognitive bias on entrepreneurs' decision-making is not completely independent and irrelevant. On the contrary, the two factors are very similar and interdependent. The findings of this article highlight the significance of properly understanding the entrepreneur's personality and cognitive biases in the entrepreneurial decision-making process.

Keywords: *cognitive bias, decision-making, entrepreneurship, personality*

1. INTRODUCTION

Entrepreneurship is becoming the most pursued career choice in recent years [1]. On the one hand, it encourages many people to pursue their dreams of becoming successful entrepreneurs. On the other hand, more than half of startups are no longer operational after six years, and 75% of entrepreneurs exit with no equity. One of the most important reasons that can be attributed to the failures of entrepreneurship is that those entrepreneurs fail to make the decision [2].

And the personality study is one of the classical and early approaches to entrepreneurship. Many scholars believe that some specific personalities of those entrepreneurs are found to influence their decision making [3]. Moreover, increasing number of scientific research shows that people are rarely rational decision makers. Instead, there are many specific, basic and persistent biases when people make the decision, and these behaviours in decision-making process sometimes cannot be explained by those economic assumptions.

And behavioural economists recently adopted these cognitive traps to understand the decision-making process of entrepreneurship.

The relevant literature either discusses the relationship between entrepreneurs' personalities and decision making or the effect of behavioural economics biases in making the decision. However, fewer of them are trying to connect them. Therefore, this paper will discuss how personalities affect entrepreneurs' decision-making processes and apply psychology and behavioural economics to explain their decision-making behaviours. This paper used an amount of entrepreneurial relevant literature reviews to provide a basic understanding of decision-making in entrepreneurship regarding personality and cognitive biases.

The first part will discuss three specific personalities of entrepreneurs that are different from others, including self-efficacy, locus of control and risk inclination, to examine if personality traits can impart entrepreneurs' decisions. Then, this paper chooses three typical

cognitive biases, heuristics, confirmation biases and framing traps, by understanding these biases can help us avoid and adjust them to make better decisions.

2. PERSONALITY TRAITS

[4] believe "entrepreneurship research can be divided into three categories: how entrepreneurs act (i.e. what they do); what happens when entrepreneurs act (i.e. what the results of their actions); and why people choose entrepreneurship (i.e. what motivates them to become entrepreneurs)." The process by which entrepreneurs make decisions therefore falls into the first category: how entrepreneurs act when strategic decisions need to be made. This session will try to explore how entrepreneurs' personalities affect their decisions.

In new start-ups, entrepreneurs are required to make decisions frequently to tackle the daily challenges they meet in the business world, and these decisions are significantly influenced by their personality and knowledge. There are multitudes of research that have studied the relationship between entrepreneurial personality and decision making. The research also shows that individual personality traits would positively affect the quality of decision-makers' decisions and their confidence [5]. Therefore, it is essential to understand and consider how entrepreneur's personality would affect their decision-making and rely on rationality instead of self-reported knowledge driven by their personality traits.

While the study of entrepreneurial personality traits took off in the mid-20th century, researchers have primarily gravitated to the Big-5 factor personality model over the last few decades [6]. However, except for the famous Big-5 factor model, some other personality traits of entrepreneurs have also been reported to affect decision-making significantly. Considering we study entrepreneurial personality traits of this specific population, amount of studies has compared the characteristics of entrepreneurs with those of employed or general workers in order to better understand and characterize entrepreneurs as a group. Therefore, after [6] consolidated relevant and academically rigorous articles from a research database, they compiled the results into a set of tables that counted personality traits studies. They found out in addition to the Big-5 factor personality. There are other specific qualities of entrepreneurs that may influence their decisions more than others, including self-efficacy, locus of control, and risk propensity, which are the most important personality dimensions of "personality" related to entrepreneurship [7]. Moreover, [8] asserted that these more specific characteristics are even more useful than the Big Five in predicting entrepreneurial performance because the "specific" characteristics rely on explicit descriptions of entrepreneurial activities.

2.1 Self-efficacy

The personal characteristics of entrepreneurs are considered to play a crucial role in environmental adaptation and personal achievement [9]. In an uncertain and competitive entrepreneurship environment, it is assumed that entrepreneurs rely on a strong sense of personal self-efficacy to achieve their vision, and their keen sense of innovation can help them identify new products and markets [6]. Self-efficacy is a powerful psychological mindset. It is "believing that have the ability to organize and implement the actions needed to deal with the future situation" [10]. In the same vein, self-efficacy means that people have beliefs in terms of whether they can achieve a particular goal [11].

The entrepreneur will meet plenty of challenges in the entrepreneurial process is full of challenges, requiring to have good psychological qualities. Self-efficacy is one of the distinctive entrepreneurs' traits and defines their confidence and attitude to overcome various difficulties and achieve success in their business. [12]. Therefore, when entrepreneurs make the decision, self-efficacy helps them believe they can make good decisions and judgments effectively. When problems arise, they are likely to persist and simultaneously look for opportunities to take action to alleviate the problem [13]. And these entrepreneurs are likely to exhibit a high degree of personal initiative [14]. Since they have stronger desires for success, they usually take a long-term perspective to consider the question and actively seek out information to help them make better decisions. [15].

2.2 Locus of control

The theory of "locus of control" was introduced by [16], which refers to a person's belief in controlling his or her own destiny and future. People with an internal locus of control think they can control results via their own abilities, efforts or talents, instead of controlling those results through external forces [6]. Many research found that comparing with other population, entrepreneurs usually have a stronger locus of control. [17] shows that self-employed people and entrepreneurs before starting their own firm showed a stronger locus of control than people employed by others.

Unlike self-efficacy, self-efficacy relates to how easy or difficult it is to perform a behaviour and how confident people can achieve it if they want to. On the other hand, the locus of control involves people's belief that they can control behaviour and that it is up to them to perform or not perform [18]. Furthermore, [19] believe that, in a globalizing society, organizations and companies face many diverse problems. Therefore, it is believed that a decision often implies contextual and environmental

correlates. In our case, entrepreneurs need to have leadership skills and deep understanding, adapt to the complexity of the field, think critically and creatively when making decisions, and be confident that they can control the outcome through their abilities, efforts, and talents. The extent to which they can perform specific behaviours and make the right decisions, that they have the essential resources, and that they are confident to overcome any obstacles they may face.[18].

Among the entrepreneurial population, higher internal locus of control is also correlated to some extent with perceived risk. A study conducted by [20] shows that people with a higher locus of control are more sensitive to risk because they are more perceptive to subtle, random cues. Studies have shown that they are better able to focus on relevant cues, ignore irrelevant signals, and experience an increase in risk perception [21].

2.3 Risk inclination

The third often mentioned entrepreneurial characteristic is the individual's risk inclination or propensity. The discussion of risk and entrepreneurship can be traced back to [22]. He argued that entrepreneurs distinguish themselves from others by their keen perception and action of opportunity despite uncertainty and risk. It is considered a probability constraint or the tendency of people to take risks [23]. Several researches have investigated the relationship between self-efficacy and risk propensity. For instance, in a survey sample of 265 MBA students, [24] found that the impact of risk inclination from entrepreneurial experience is completely mediated by individual self-efficacy. Similarly, [25] also considered whether the propensity to take risks could have side effects on high self-efficacy. After interviewing 49 entrepreneurs, the researchers concluded that high self-efficacy makes risk-taking easier to manage.

However, risk influences how individuals think and make decisions under uncertainty, including entrepreneurial decisions [26]. The research of [27] showed that entrepreneurs tend to be more likely to perceive business ventures as opportunities rather than threats. Furthermore, [28] found that entrepreneurs rely heavily on their subjective judgments when making decisions and tend to show higher confidence in their success, which seems to be a pan-cultural phenomenon that partly explains why new ventures tend to have high failure rates. Subjective judgment always plays a central role in entrepreneurial decisions under conditions of uncertainty. However, when decisions need to be made, regardless of the value of the project at risk, experienced people tend to be more risk-averse as long as they lack confidence in ultimate success, especially under low probability conditions. [29].

3. BEHAVIORAL BIASES

Having concerned about how some specific personality traits would affect entrepreneurs' decision making, however, these traits are very abstract and aggregated constructs. They may not always be able to clearly and accurately predict and explain entrepreneur behaviour [30]. Therefore, this part will examine several behavioural biases that could potentially affect entrepreneurs' behaviours and decisions. The boundaries between economics and psychology have been widely discussed in recent years. Traditional economists postulate that human behavior and decisions are based solely on rational choice. For people with rational preferences, they always want to act independently to maximize the utility of outcomes based on adequate and relevant information, especially for entrepreneurs, a group of people who are typically considered very cautious and decisive to make the correct business decision[31]. Entrepreneurs are always involved in deciding when or where to launch their products, whether to expand or keep the status quo. However, many behavioural economics studies demonstrate humans are irrational and cannot always make the right decisions. In addition, there will always have specific, fundamental, and persistent biases in human decision making that those traditional economic assumptions will often fail to explain [32].

Therefore, behaviour economics may bring a proper explanation about those behavioural biases during decision making. And by understanding these biases, entrepreneurs may be able to adjust or adapt to them, thereby improving economic outcomes. It is not possible to review and discuss all cognitive biases and behavioural abnormalities in this paper, but several fundamental biases will be covered, including heuristics, confirmation biases and framing traps, which are very simple and alleviate the speed of problem solving and decision making, especially in highly complex cases [32].

3.1 Heuristics

The topic of the heuristic in entrepreneurship has been studied throughout the relevant literature in the last 30 years [33]. Compared with managers and other employed people, entrepreneurs rely more on heuristic methods in decision-making [34]. When making business decisions, entrepreneurs do not always and initially acknowledge that they use heuristics, even though it might be unconsciously. Therefore, understanding bias and heuristics helps explain why entrepreneurs sometimes make irrational decisions.

Entrepreneurs apply heuristics to decision making with varying degrees of maturity or comprehensiveness, showing both innate proficiency and inadequacy in areas where they excel and struggle [35]. According to [35],

entrepreneurs can develop heuristics through experience or learn heuristics from others. The heuristic is a conscious or unconscious decision-making strategy that deals with uncertainty and complexity with reduced complexity and simpler cognitive operations [36]. These heuristics and biases could, for sure, to some extent, affect the cognition and perceptions of entrepreneurs. The decisions based on heuristics may not always lead best outcomes. [37] argues that because heuristics are not always based on invalid or imperfect information, heuristic decisions are sometimes irrational. As we discussed previously, one of the characteristics of entrepreneurs is self-efficacy, a belief that they can perform tasks and roles to start a business in the end. However, sometimes, it can lead to overconfidence and reduced performance rather than promoting behaviour [38]. That is why sometimes entrepreneurs are often overconfident in their ability to exploit opportunities successfully while relying on very little information to make crucial decisions [39]. Typically, people with analytical cognitive styles are more likely to collect more information when evaluating opportunities, thus reducing the chance of representative bias. Conversely, those with intuitive cognition are more likely to be overconfident in their intuition and believe their decisions are correct. Especially for those nascent entrepreneurs who usually rely on heuristics to cope with the uncertainty and complexity in entrepreneurial process, they may experience failure due to the bias

However, there are also some positive effects of heuristics. For example, a study conducted by [40] demonstrates that the smaller the entrepreneur's information sample, the lower the perceived risk of finding risky opportunities in the heuristic treatment; they then explain that it is because this sample tends to contain confirming information instead of negative information. One of the characteristics of entrepreneurship is uncertainty since the decisions always need to be made timely without any benefits from past experience. So heuristic will be a successful decision-making strategy with high function in an uncertain environment [41]. Heuristics can help entrepreneurs piece together limited information in order to make quick decisions in situations that get out of hand, considering entrepreneurs usually operate under conditions of uncertainty and complexity.

As one of the most critical stages in entrepreneurship, those nascent entrepreneurs need to evaluate entrepreneurial opportunities carefully to increase business survival possibilities. According to [42], entrepreneurs use heuristics to conduct effective entrepreneurial evaluations for rational analysis when evaluating entrepreneurial opportunities. [43] also claim that heuristics is an exclusive tool in situations where entrepreneurial expertise is high and ambiguity is low. The research shows that when entrepreneurs are trying to evaluate new entrepreneurial opportunities, the more

heuristics are used, the faster information can be processed and the potential for a new business can be positively assessed [44]. When there is a new start-up opportunity, they evaluate it based on little information and representative heuristics, such as recent revenue or other financial data [45], resulting in obtaining confirming evidence, increasing the entrepreneur's self-efficacy, reducing their perceived risk, and speeding up opportunity assessment [46].

3.2 Confirmation bias

As discussed before, people's behaviour is easily influenced by biases derived from past experiences, perceptions, and emotions, rather than rationality and objectivity backed up by data. Sometimes, though, our brains can simplify information processing and positively impact decision-making because they can support entrepreneurs to make judgments without wasting too much energy and cognitive resources [47]. Nevertheless, since people's decisions are not rational and discount available information, cognitive biases may also lead to mistakes. And entrepreneurs are particularly susceptible to cognitive biases. One of the explanations is that entrepreneurship attracts personality types that are more inclined to act on hunches. Confirmation bias explains why people always tend to see what they want to see, also described as "believing is seeing" [47]. People confirm what they have already believed while seeking opinions and information. And they may unconsciously and consciously avoid, ignore or overlook new information that is inconsistent with their preconceptions and what they already believe.

Confirmation bias may associate with the locus of control, as discussed in the previous part. It occurs because people want to convince themselves the story or belief is only possible to explain and organize reality. People can control their own stories and the stories they tell themselves, but they often don't believe it, which dovetails with the locus of control. Confirmation bias supports the concept of locus of control. If people believe they control their destiny, they will keep telling themselves that they control everything. Confirmation bias and locus of control may not be that obvious when everything is going well. However, both can lead to conflict initiation and continue when there is a confrontation or competition. And it may appear to be pervasive throughout many areas. For example, instead of collecting and considering all current information in finance, when investors need to make investment decisions, they are more likely to gather and believe hard evidence.

As a result of confirmation bias, entrepreneurs may overestimate the belief systems of others, decline to question the heart of the problem and neglect to look for unexpected outcomes [48]. Moreover, as a group of very optimistic people, entrepreneurs are highly motivated

and focused on their goals. So they are particularly vulnerable to the damaging effects of confirmation bias and believe that events will end with positive results, leading to relevant and negative information may be ignored, thus intensifying confirmation bias [49]. For example, identifying and analyzing the competition for their business, understanding the company's current situation and potential customers, and estimating the firm's resources needs to meet set objectives [47].

People describe the essence of entrepreneurship as the action. These entrepreneurs are susceptible to confirmation bias, in which they eagerly seek out and analyze information to have reasonable explanations. For example, underestimating competitors' abilities because stronger competitors make it harder for a start-up business, believing satisfying customers' needs will lead the company to a weaker position in the marketplace, possessing fewer resources can make raising money easier. These misapprehensions reduce their psychological disharmony by misunderstanding the relationship between the enterprise and the market, minimizing the gap between reality based on real information and their own perception based on collected and analyzed discounting information. Therefore, entrepreneurs need to recognize the confirmation bias and realize its damaging results so they can find ways to reduce negative outcomes.

3.3 Framing trap

There are so many definitions of 'entrepreneur'. For example, some people consider entrepreneurs are risk-takers, innovators, arbitrageurs and uncertainty bearers [50]. [51] defines entrepreneurs as a group of decision-makers whose main task are making decisions. And decision making process is always associated with so many risks. As discussed before, entrepreneurs are more risk-seeking than others, meaning they may face a lot of ambiguity and failures. As one of the main characteristics of entrepreneurship, there are many discussions about risk with a rich historical background and always being the popular topic in the entrepreneurship literature [52].

Moreover, the process of starting a business has also been influenced by many cognitive biases. These cognitive biases will distort entrepreneurs' decision-making, and it is almost impossible to avoid them and easily make mistakes and fall into the trap due to our limited rationality [53]. And one application of cognitive bias has been mentioned in recent research to explain entrepreneurs' risk perception [54].

In the process of starting a new business, entrepreneurs need to make decisions all the time, and the first step in making decisions is to frame questions, which is also the riskiest step since how the problem is framed can profoundly affect choice [55]. And there is a well-known decision-making theory called the Prospect

Theory, which was proposed several years ago and emphasizes the importance of framing. [56] explain how a framed problem can play a crucial role in making decisions. For example, people behave differently when they frame a situation in terms of a potential gain with frame in a potential loss. And it can lead to more risks when framing a question in terms of loss than gain.

Therefore, it is essential to understand loss and gain might influence risk-averse and risk-taking. In terms of risk perception, [54] argues that most of the research support people are, to some extent broadly consistent, either risk-averse or risk-taking due to their personality. However, [54] emphasises that it is necessary to know frames are only models, meaning they are not always correct since they are out of reality and fail to help us to understand the challenges and complexity in real life. And previous studies have shown the impact of framework bias on managers' and entrepreneurs' risk-taking behaviour.

For example, [57] conducted an experiment showing there are framing traps when related to available information in new ventures to some extent influence and manipulate entrepreneurs' risk perception and how framing affects final entrepreneurial decisions. Moreover, entrepreneurs with more experience typically have more moderate risk-taking attitudes, while others who are nascent and with less experience are more inclined to avoid losses [58]. He also suggests as long as we can notice its oversimplification, it can be helpful and useful in decision-making by dealing with complexity and ambiguity.

4. CONCLUSION

The process of creating a start-up is called entrepreneurship, and entrepreneurs refers to a group of people who start new businesses. Therefore, psychological studies are essential for entrepreneurs to understand their minds and behaviour when making decisions. Such as examination of opportunities to entry into entrepreneurship, projection of growth and success of business and assessment of challenges and risks of the company. Entrepreneurs are very diverse, so studying their personalities is valuable to understand how their decisions might be affected. Behavioural economics, on the other hand, is a new discipline that offers a different perspective on how people make decisions than classical economic theory, and not many studies have applied it to entrepreneurship.

From the discussions, it seems like there are some connections between some specific personalities and cognitive biases in the decision-making process for entrepreneurs, and considering both topics belong to psychological study and economic psychology only emerged from the 20th century, the boundaries between these two areas are not very distinguished and may very

similar in some ways. For those who are new to this field and are attempting to investigate the links between two psychological topics, this article only provides a basic introduction to how personality and behavioral biases may affect entrepreneurs' decisions. In terms of specific relationships regarding how personality and cognitive biases interact, and how they are expected to influence entrepreneurs' decisions, this may require some empirical analysis and modelling in further relative studies.

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