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RESEARCH PAPER

Relationship among cognitive biases, risk perceptions and individual's decision to start a venture

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Abstract The study examines the relationship among the cognitive biases (viz., overconfidence, illusion of control, optimism and planning fallacy), risk perception and individual's decision to start a venture. To understand the relationship, this study developed and tested a model by partial least square—structural equation modelling. The study collected responses from 136 post graduate students after teaching discussion of a Harvard Business School case titled 'Optical Distortion, Inc (Clarke 1988)'.This study found that planning fallacy and illusion of control have direct as well as indirect influence on new venture formation. Conversely, overconfidence and optimism have influenced new venture formation through risk perception. The study also indicates the overall preparation of management graduates for being an entrepreneur. It would act as an indicator of entrepreneurial orientation. All these understandings would be used as a base for the teaching of business skills as well as increasing the understanding the potential Indian entrepreneur's minds towards the entrepreneurship and risk perception in particular.

Keywords Cognitive biases · Risk perception · New venture formation · Decision-making · Entrepreneurs

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Introduction

Entrepreneurship is a complex and multifaceted phenomenon, and it is gaining importance in many countries around the world. Despite the high risk involved in becoming an entrepreneur, many individuals decide to pursue entrepreneurship (Simon et al. 2000). This behaviour has prompted many researchers to explore why some individuals choose to become an entrepreneur while others do not. Researchers have tried to explore how an entrepreneur differs from others by exhibiting certain traits to a greater extent than others (for example, Das and Teng 1997) based on the trait approach. A number of psychological traits viz. need for achievement, locus of control and risk propensity has been studied in an attempt to differentiate entrepreneurs from non-entrepreneurs. Early efforts met modest success in identifying consistent differences between entrepreneurs and non-entrepreneurs (for

example, Shaver and Scott 1991; Hatten and Coulter 1997). Therefore, researchers have turned to studying how entrepreneur think and the role played by cognition in the process. (Nigel Wadeson 2008). The researchers believed that the entrepreneur would think in a different manner (Baron 1998). If the cognitive process of entrepreneurs is different from those of others, the manner of assessment of opportunities, process of information gathering and the perceptions of risks would also vary from others. Building on the cognitive theory, this study proposes that various cognitive mechanisms may be associated with identifying the opportunities and assessing the creation of a new venture.

As discussed above, risk is a central element in decisions to enter new ventures, whether by an established firm or an entrepreneur establishing a new firm (Mullins et al. 2002). As the creation of new venture or decision to start a venture involves risk, an individual who has a tendency to take risk would form a new venture as compared to someone who is averse to taking risk (Shaver and Scott 1991 and Kannadhasan and Nandagopal 2010a, b and Kannadhasan 2012). The extant literature suggests that risk propensity is a multifaceted personality trait. However, it fails to differentiate entrepreneurs from others (for example, Brockhaus, 1980). Even an individual who does not have high-risk propensity might unknowingly involve in risky ventures if he perceives less risk than others (Simon et al. 2000). This leads to a question, would this risk taking behaviour be different if all of them evaluate the same situation? The answer is no. Even when different individuals evaluate identical situations, some individuals may not perceive the situation very risky; others may perceive it very risky (Nutt 1993). If the perception influences risk taking behaviour of an individual, it is indispensable for us to understand what leads to variations in risk perception. This is due to the individual differences in knowledge management style or cognitive process. For example, an individual collects, organises and categorises the information that supports previously conceived ideas/experience. This selectivity process creates cognitive frameworks with regard to how individuals think and act in their domain. This is due to the different cognitive schemata and approaches towards information management (Baron and Markman 1999). Therefore, the actual understanding new venture formation would require examination of how various cognitive biases influence human perception towards risk and thereby their decision to form new ventures.

Cognitive biases, risk perceptions and new venture formation

Entrepreneurship is contributes to any nation's economic growth and wealth creation. For economies of developing countries, like India, entrepreneurship is seen as an engine of economic progress, job creation and social adjustment. Change is pertinent in today's world, and change creates opportunities for the entrepreneurial class. The exploding industry sector has opened up exciting opportunities in India. The increased prevalence of outsourcing by many business operations is creating new opportunities for entrepreneurs. The blurring of national borders, the encouragement to world trade and the increasing availability of information has opened up international opportunities to all sections of the society. It is believed that an entrepreneur is the person who discovers, creates and recognises opportunities, and translates these into added value to society (Baron and Markman 1999) by assuming the risk of starting a business (Hatten and Coulter 1997). Although risk propensity of an individual does not differ between entrepreneur and others, it differs in terms of how they think about the business situations in terms of strengths, opportunities and potential gain (Palich and Bagby 1995). It is evident that an individual's decision to start a venture depends on one's perception about the risk involved in a venture. Palich and Bagby (1995) and Simon et al. (2000) opined that individuals who perceive less risk than others will start a new venture. This line of thought is consistent with several studies (for example, Brockman et al. 2006; Keh et al. 2002; Forlani and Mullins, 2000; Simon et al. 2000; Chen and Dong 2007; Panzano and Billings 1997; Sitkin and Pablo, 1992). Therefore, it is expected that

H_1 Individuals who perceive less risk than others will start a new venture

Cognitive biases and risk perception

As discussed above, if different individuals think and perceive differently, then it is essential for us to understand the reasons for such difference in

behaviour. Cognition aspects differentiate entrepreneurs from non-entrepreneurs, which include their beliefs, values, cognitive styles and mental processes (Sánchez García et al. 2011). Cognitive literature speaks of different cognitive styles viz. knowledge structures that are used to make assessment, judgement and decisions; and what an entrepreneur thinks, says or does in acquiring, using and processing information. This study investigates the participants' responses in the second perspective i.e. entrepreneurs think differently and process information in a different way and such differences would help to differentiate between the entrepreneurs and non-entrepreneurs (Sánchez García et al. 2011). In particular, this study observes how cognitive biases affect individual's decision making under risky conditions (Laibson and Zeckhauser, 1998). This section discusses how cognitive process affects the new venture formation, mediated by risk perception. In this process, the study included four cognitive biases viz., over confidence ('a failure to recognise the limits of our knowledge') (Baron and Markman 1999), optimism (a tendency to believe things will turnout well), illusion of control (a tendency to believe that one can control outcomes over which in fact he/she has no control) and planning fallacy ('a tendency to assume that one can achieve more in a given period of time than that is warranted in reality') (Baron and Markman 1999) that are studied widely and relevant to entrepreneurship.

Overconfidence: Generally, entrepreneurs have higher level of self-confidence compared to others (Levander and Raccuia 2001). This leads to over self-esteem. A person with high self-esteem is highly prone to make decisions with uncalculated risks (Ivanova and Gibcus 2003). This study is not interested to know whether entrepreneurs are overconfident per se. It is, however, interested to know how well they know what they do not know (Baron and Markman 1999). This is because what they know about themselves (i.e. meta-knowledge and information) is very much important to the success or failure of their new venture formation (Baron and Markman, 2000). According to Baron and Markman (2000), the overconfidence bias refers to 'the tendency to underestimate our lack of knowledge or to think that we know more than we really do i.e., poor Meta-knowledge)'. Knowledge has been bifurcated into primary and secondary. Primary knowledge consists of facts and principles that one believes are true. On the other hand, the secondary knowledge refers to 'the extent our primary knowledge is reliable' (Russo and Schoemaker 1992). They also pointed out that this bias is the result of the availability heuristic, adjustment and anchoring heuristic, hindsight bias and confirmatory bias. Due to these biases, overconfident individuals attach higher probabilities to particular outcomes than are warranted by what they know (Zacharakis and Shepherd 2001) by remembering the evidence that supports their view and their knowledge instead of taking into account disconfirming evidence (Russo and Schoemaker, 1992). However, this reasoning may not improve the accuracy of the available information (Schwenk 1986). In addition, they fail to revise the initial estimation after receiving new information. As a result, there is a possibility that their estimates may be wrong (Tversky and Khaneman 1973). Moreover, they treat their assumptions as facts. This outlook results in inadequate information search (Zacharakis and Shepherd 2001). As a consequence, they do not consider the uncertainty closely associated with the decisions stemming from those assumptions. This bias leads them to conclude that the decision is not risky and hence enter risky ventures unknowingly (Tversky and Khaneman 1973). Though this bias is very common in unstructured decision situation like introduction of new product (Simon and Houghton 2003), the confidence level is not justified as the entrepreneurs will fail in the collection of relevant information thereby affecting the quality of their decisions (Sánchez García et al. 2011). The extant literature exhibits that this bias diminishes an individual's perception towards the level of risk associated with new venture formation (for example, Russo and Schoemaker 1992; Simon et al. 2000; Zacharakis and Shepherd 2001; Keh et al. 2002). Therefore, it is expected that

H_2 Overconfidence decreases one's perception of the level of risk associated with new venture formation

Optimistic bias: The literature shows optimism as a stimulator of persistence and commitment to new venture creation (for example, Seligman & Schulman 1986). As entrepreneurs are likely to be optimistic, they frequently make judgements and decisions based on subjective factors (Cooper et al. 1988; McCarthy et al. 1993). Optimistic bias refers to the tendency in believing that things will turnout well. It has three forms namely over positive self-evaluation, over optimism about future plans and events and over optimism

due to the illusion of control bias (Taylor and Brown 1988). A study by Cooper et al. (1988) found that 81 % of entrepreneurs believed that their chances of success were at least 70 and 33 % claimed that they were certain of success. However, reality showed that only 25 % of new businesses survive for more than 5 years. The results require some attention. For instance, such positive statements partially reflect a need for self-justification and thereby reduce the perception of the level of risk. In addition, they have a normal predisposition to talk positively about their efforts with a view to encouraging others, such as financiers, employees and customers into believing that they will be successful. Further entrepreneurs operate by a unique set of cognitive process and thereby support their optimism (Palich and Bagby 1995). However, this kind of positive outlook about their future very often enables entrepreneurs to downplay on uncertainty and thereby decreases the risk perception about the new venture formation (Cheng and Dong 2007; Simon et al. 2000). Therefore, it is expected that

H_3 Optimism decreases one's perception of the level of risk associated with new venture formation

Illusion of control: Illusion of control refers to the tendency of the entrepreneurs to believe that they can control the outcomes over which they have no control actually or overemphasise the level of control that they do have (Nigel Wadeson 2008). This bias is the result of two factors viz. difficulty in distinguishing the relative importance of skill and chance elements, and motivation to control their environments. There is a difference between overconfidence and illusion of control. As discussed above, overconfidence refers to 'an overestimation of one's certainty regarding the current information', whereas illusion of control refers to 'an over-estimation of one's skills and consequently one's ability to cope with and predict future events' (Simon et al. 2000). Typically, the entrepreneurs overemphasise their skills that would increase the performance in situations where chance plays a larger role as a deciding factor (Langer 1975). This bias makes oneself to believe that she or he can control and predict the outcome of uncertain events precisely (Duhaime and Schwenk 1985; Shaver and Scott, 1991). This leads one to underestimate the risk associated with an event as they believe that their skills can overcome negative occurrences. This may generate overly optimistic estimates leading to risky decisions, such as acquiring poorly performing firms (Duhaime and Schwenk 1985). Not only this, but also it affects the decision to form a new venture (Boyd and Vozikis, 1994). However, this belief is based on perceptions of an individual (Shaver and Scott 1991) and decreases one's perception of the level of risk associated with a new venture formation (Simon et al. 2000 and Keh et al. 2002).Therefore, it is expected that

H_4 An illusion of control bias decreases one's perception of the level of risk associated with a new venture formation.

Planning fallacy: It refers to the tendency of most individuals to underestimate the amount of time that it will take to complete a task or overestimate the extent of accomplishment in a given period of time (Baron and Markman 2000). This bias is due to the fact that entrepreneurs have a relentless tendency to step into new experiences and they do not have adequate reference of how much resources or personal efforts are required for a new venture. (Kahneman and Lovallo 1993). In addition, they are failing to break down their multifaceted mental tasks into different components (Kruger and Evans 2004). If one is able to do so, the planning fallacy becomes reduced. Baron (1998) pointed out that 'the idea that entrepreneurs tend to be more susceptible to the planning fallacy than others, because they operate in a dynamic and uncertain environment, under the severe pressure of time and substantial amounts of information'. Therefore, they treat the current situation or decisions as unique and therefore are isolated from past experience (Kahneman and Lovallo 1993). Research indicates that this bias leads to underestimation of risks and overestimation of the success possibilities. As new venture formation is future oriented and highly uncertain, one may be more prone to planning fallacy and hence perceive less risk associated with a new venture (Keh et al. 2002). Therefore, it is expected that:

H_5 Planning fallacy decreases one's perception of the level of risk associated with a new venture formation.

The mediating role of risk perception

Sitkin and Pablo (1992) and Sitkin and Weingart (1995) tested the proposition that risk perception mediated the relationship between determinants and

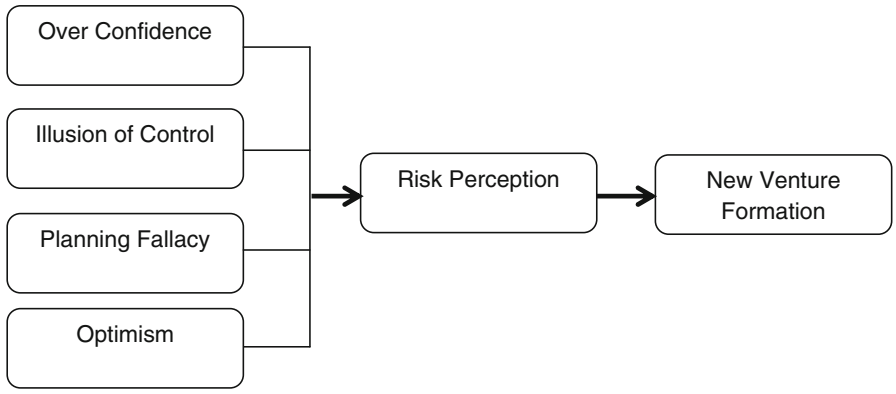


Fig. 1 Research model

risky behaviour. Similarly, the extant literature shows that risk perception mediated the relationship between cognitive biases and new venture formation (Simon et al 2000) and opportunity evaluation (Keh et al. 2002). In addition, the proposed hypotheses (1–5) show that cognitive biases directly influence risk perception which, in turn, influences new venture formation (Keh et al. 2002). Thus, cognitive biases indirectly influence the new venture formation decision. The above discussion leads to the following hypothesis and the model (refer Fig. 1):

H_6 The relationship between cognitive biases and new venture formation is mediated by risk perception.

Methodology

Procedure

The purpose of the study was to explore the decision making process of individuals to start a new venture. As suggested by Krueger and Brazeal (1994) and others, this study avoided asking an existing entrepreneur looking backwards to explore how they decided to start a venture. Instead, this study has explored the decision making process of individuals who have not started the business yet. This, in turn, would not influence the individuals' decisions relating to the demands of running a new venture (Busenitz and Barney 1997a, b).The study has collected the responses from the students after teaching a Harvard Business School case titled 'Optical Distortion, Inc(Clarke 1988)'. The survey instrument was used to capture the students' cognitive biases, risk perception and decision to start the venture after a week from the date of discussing the case. This method is in consistent with the method used in past research conducted by Mark Simon et al. (2000). This method ensured that all the participants analysed the same venture. It also minimises the variances among the participants in terms of types of ventures being studied, demand of running the venture, risk assessment and environmental differences in relation to new venture formation (Krueger and Brazeal 1994).

Sample

142 out of 168 students of Post Graduate students at a reputed B-School volunteered to participate in this research. The survey yielded a response rate of 84.50 %. Therefore, all analyses were conducted with a sample size of 142. Since the researcher is working in the same institute, it was informed to the participants that the responses would not to be used for evaluation. The mean age of the participant was 24.53 years (SD = 2.02) and average experience of the participant was 27.18 months (17.41). Eighty-two per cent of responses were from males and the rest were from females.

Measurement

In order to measure the risk perception, new venture formation, illusion of control and optimism, the study used the scales which were developed by Simon et al. (2000). Overconfidence and planning fallacy were measured using the scales developed by Henry Friedman (2007) and Keh et al. (2002), respectively. In order to verify the properties of the measurement scales, this study tested reliability, convergent validity and discriminant validity of the scales. New venture

Table 1 Quality review of the latent variables

Variable	Alpha	Composite reliability	AVE
New venture formation (NVF)	0.926	0.964	0.930
Risk perception (RP)	0.807	0.851	0.430
Overconfidence (OC)	0.907	0.942	0.844
Planning fallacy (PF)	0.789	0.902	0.822
Illusion of control (IC)	0.800	0.878	0.706
Optimism (Opt)	0.884	0.928	0.811

formation and planning fallacy were measured with a 2-item scale and have a reliability of 0.926 and 0.789, respectively. Overconfidence, illusion of control and optimism were measured with a 3-item scale and have a reliability of 0.907, 0.800 and 0.884, respectively. Risk perception was measured with an 8-item scale and has a reliability of 0.807. The reliability of the constructs is above the minimum threshold level for a construct (Nunnally 1978) and hence all the constructs have good reliability (see Table 1). Note that all the items in the constructs have a minimum loading of 0.503 which is greater than the threshold level of 0.40 (Hulland 1999).

After verifying the reliability, it is important to examine the convergent and discriminant validity of the constructs. All the variables have convergent validity (see Table 1) which was tested by calculating 'Average Variance Extracted (AVE)' value. The AVE value describes the amount of shared variances among the indicators for a construct (Cohen 2001). Generally, constructs which have AVE $>$ 0.50 (Hair et al. 2006) or have AVE close enough to 0.50 are considered to have a good convergent validity (Cohen 2001). The discriminant validity was tested by examining the squared root of the AVE that exceeds the intercorrelation of the construct with the other constructs or squared correlation between the constructs which should be less than the AVE (see Fornell and Larcker 1981; Hair et al. 2006). Table 2 shows that all the constructs have good discriminant validity. Therefore, the measurement model was considered satisfactory with the evidence of adequate reliability and validity and could be used for testing hypotheses and proving the research model.

Power analysis

Power analysis test was used to examine the stability of the model's parameters with the sample size used in the analysis (Chin 1998). The effect size was computed using R^2 (Cohen et al. 2003). All inputs were entered in G*Power software and output is shown in Fig. 2 (Faul et al. 2009). Figure 2 indicates that power of the overall model increases as number of sample increases and is achieved 100 % with sample size of 75. The sample size of this study is 136 which is adequate for achieving substantial explanatory power of the model.

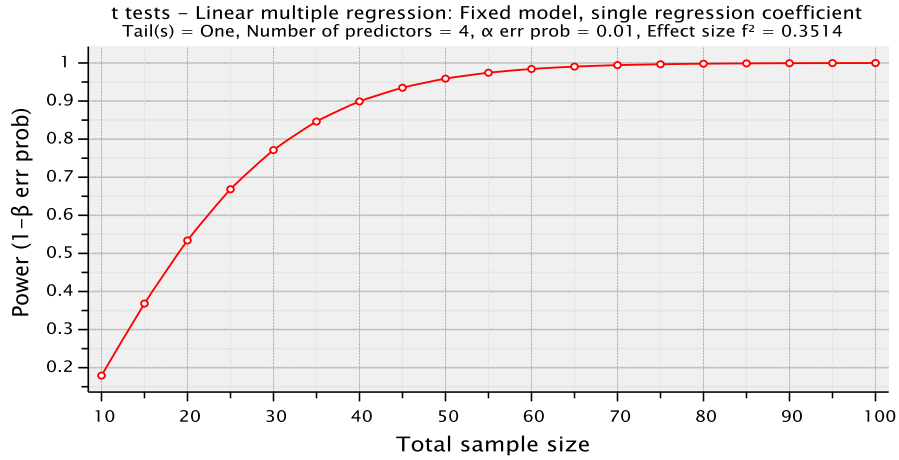
Structural model results

The study used Partial Least Squares approach to structural equation modelling (PLS-SEM) which is a variance-based approach to assess their interrelations of all the constructs simultaneously (Chin 1998). The PLS model estimation was carried out using Smart PLS 2.0- M3 software. Fig. 3 shows PLS with its path coefficient value of the measurement model. The cognitive biases are negatively associated with risk perception. Further, Paths (i.e. cognitive biases) linking to risk perception were significant at 1 per cent level (refer Table 3). This result reveals that cognitive biases decrease one's perception level of risk associated with

Table 2 Latent variable correlations

Variable	NVF	RP	OC	PF	IC	Opt	$\sqrt{}$AVE
New Venture Formation (NVF)	1.000						**0.964**
Risk Perception (RP)	−0.268	1.00					**0.656**
Overconfidence (OC)	0.075	−0.386	1.00				**0.919**
Planning Fallacy (PF)	0.180	−0.362	0.318	1.00			**0.907**
Illusion of Control (IC)	0.053	−0.349	0.336	0.443	1.00		**0.840**
Optimism (Opt)	0.080	−0.418	0.518	0.411	0.416	1.00	**0.901**

Fig. 2 Power analysis



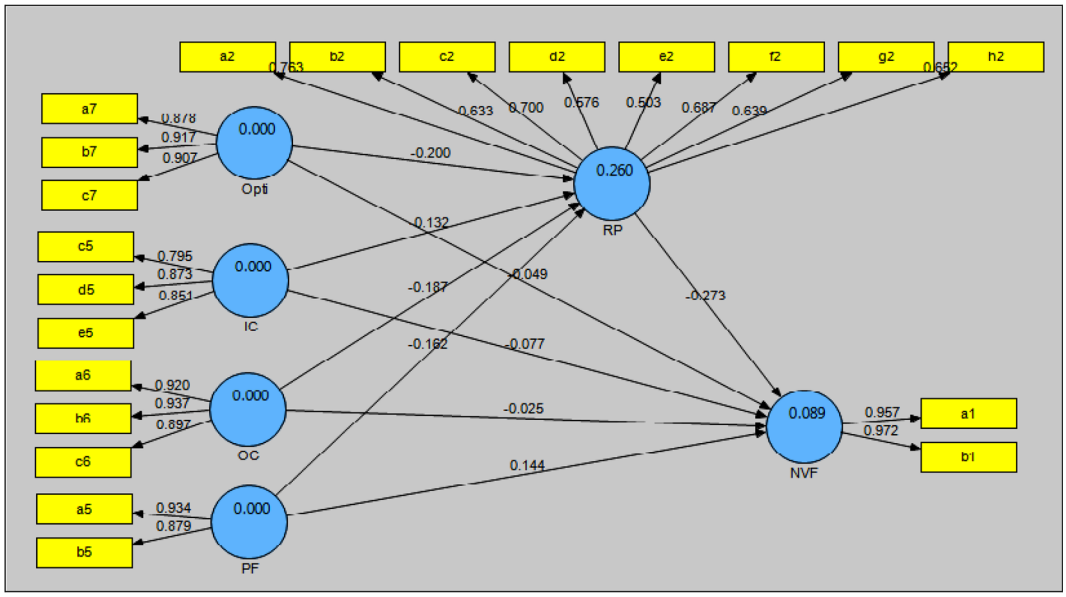


Fig. 3 Measurement model

Table 3 Bootstrap summary of research model and hypotheses results

Hypothesis	Path	Path coefficients	Standard error	T-statistic	Results
1	RP - > NVF	−0.273255	0.031850	8.579475	Significant
2	IC - > RP	−0.131663	0.035558	3.702749	Significant
3	OC - > RP	−0.186587	0.036787	5.072029	Significant
4	Opti - > RP	−0.200004	0.046622	4.289885	Significant
5	PF - > RP	−0.162307	0.032869	4.937948	Significant

Table 4 The results of indirect effect

Hypothesis	Path	Sobel's Z-value	Results
6	**IC - > RP- > NVF**	4.26	Significant
	OC - > RP- > NVF	4.34	Significant
	Opti - > RP- > NVF	3.82	Significant
	PF - > RP- > NVF	3.38	Significant

a new venture formation. Therefore, this study concludes that hypotheses 2–5 were accepted. In addition, hypothesis 1 is also accepted (refer Table 3). It indicates that perceiving a lower level of risk is associated with the new venture decision.

To understand the mediating effect of risk perception between cognitive biases and new venture formation, this study applied Iacobucci and Duhachek (2003) simultaneous assessment of mediation effect, which ensures superior results to those given by other existing methods (Helm et al. 2010). To apply this method, the analysis has to meet the criteria for mediation analysis viz. predictors have significant influence on the mediator, mediator has significant influence on criterion variable and predictor has significant influence on the criterion variable. Even though, paths (overconfidence and optimism) linking to new venture formation are not significant, the path coefficient is different from zero. Therefore, in order to test the significance of indirect effect (a*b) of cognitive biases on new venture formation through risk perception, the Z-test (Sobel 1982) is applied. If the Z-value exceeds 2.58 at 1 % significance level, there is an indirect effect. Table 4 shows that there is an indirect effect at 1 % significant level. Therefore, planning fallacy and illusion of control biases have direct effect as well as indirect effect through risk perception on new venture formation. However, overconfidence and optimism have only indirect effect through risk perception on new venture formation.

The study also conducted Global Fit Index (GoF) for path modelling (Tenenhaus et al. 2005) as it may serve as a cut-off value for global validation (Wetzels et al. 2009). GoF is defined as the geometric mean of the AVE and average R^2. The GoF value of this study is 0.3635 i.e. 36.35 % for the complete model that exceeds the cut-off value. As compared to the base line values of power, this model has exceeded the required level (i.e. GoF = 0.36). Therefore, this study concludes that the model has adequate support to validate the PLS model globally (Wetzels et al. 2009).

Discussion and implications

Nowadays, all businesses face an unstable business environment with high levels of uncertainty. This uncertainty makes decision-making more complex than ever before. In a rapidly changing environment, it is a challenging task to use available opportunities and make decisions by utilising all available information for being a rational decision maker. By the time decisions are made, there is a possibility that the opportunity would not exist. In such complex circumstances, cognitive biases play an important role in decision making (Kannadhasan and Nandagopal 2010a, b). This study has extended a cognitive theory in the context of new venture formation by capturing the students' perceptions regarding their overconfidence, illusion of control, optimism, planning fallacy, risk perception and decision to start a new venture. The study developed and tested a model with the help of PLS-SEM using Smart PLS software. The tested model of this study contributes empirical support to the studies by Simon et al. (2000) and Keh et al. (2002) in the Indian context. Although this study could not find any surprising results, it supports the existing literature.

Obviously, the perception towards risk associated with new venture plays an important role in decision making. If one perceives higher level of risk associated with a new venture formation, she or he does not start the venture. The study found that there is a significant negative relationship between risk perception and new venture formation. This finding is similar to the findings of Keh et al. (2002); Simon et al. (2000); Forlani and Mullins (2000); Sitkin and Weingart (1995) and Sitkin and Pablo (1992). Further, individuals do not need a greater risk propensity to start a venture as long as they perceive less risk associated with a new venture. The study also found differences among the individuals in starting the venture even though they evaluated the same venture. It is due to the influence of cognitive biases on risk perception as well as new venture formation. Out of the four biases, planning fallacy and illusion of control have direct effect as well indirect effect on new venture formation.

On the other hand, overconfidence and optimism have indirect effect through risk perception.

As discussed above, respondents perceive that they are able to control the outcomes of the venture, over which actually they have no control. The reasons might be that they fail to consider the competitors' response or they may think that competitors are beyond their control (Kerin et al. 1992). Moreover, their cognitive biases lead to the belief that competitors' responses will not affect their chances of success. With regard to planning fallacy, respondents think that they are able to break down their tasks in their mind into their different parts and thereby they can complete their task on time. This belief leads them to underestimate the level of risk. This perception, in turn, influences their decision to start the venture. These findings are similar to those of Simon et al. (2000) and contrast to those of Keh et al. (2002). The contrasting result is due to the differences in study groups. The present researchers and Simon et al. (2000) studied a group of MBA students, whereas Keh et al. 2002 studied actual entrepreneurs from Singapore. Another reason could be the key difference in the way in which entrepreneurs collect and process information from others (Baron 1998). Entrepreneurs are more realistic in terms of viability of new venture formation rather than students (Keh et al. 2002). Overconfidence influences new venture formation indirectly. Overconfident individuals have a greater faith in the correctness of their assumptions. These assumptions may lead to two directions: estimates either being too pessimistic or too optimistic depending on how their estimates are positively or negatively biased (Sánchez García et al. 2011). These assumptions may lead to optimistic conclusions. Therefore, they may be certain regarding their assumptions which lead them to perceive the level of risk associated with the venture to be low and start the venture. This finding is in contrast with those of Simon et al. (2000) and Keh et al. (2002). Also, optimism does not influence venture formation directly. In addition to the above stated reasons, the survey was done in a specific context rather than more generally.

Although this study could not produce any conclusive results towards individual's cognitive aspects, the study attempted to understand the influences of cognitive biases on decision making process and focused on four variables in a specific context. The results of this study suggest that cognitive biases would produce superior results when the information and time is limited for decision making (Gigerenzer and Todd 2000). However, one should minimise his or her biases, because the incomprehensive decisions will reduce the performance of the ventures (Smith et al. 1988). If individuals are too optimistic in their estimates, it leads to incorrect estimates of risk that they have to face in their venture. Sometimes it may lead to lower performance or failure in their venture. To minimise or avoid biases in decisions, one needs to do systematic research. For instance, they may collect the information like success rate, industry position, range of profits, size of industry, strength of existing products and so on. Moreover, it will still be extremely difficult for individuals to minimise biases in their decision processes, because they are often unaware that they exhibit biases (Hogart 1980). This study also indicates that it is essential to include risk perception as a mediator when analysing the influences of cognitive biases on risky decisions (Sitkin and Weingart 1995) and distinguish between risk perception and risk propensity (Sitkin and Pablo 1992). The reason for emphasising about the risk perception is that it promotes entrepreneurship as entrepreneurs perceive less risk in the venture.

Another understanding from the study is that the quality and process of decision making is also an important determinant of the success of the venture. As noted above, less comprehensive decision-making lowers a venture's performance (Smith et al. 1988). For example, those who exhibit a greater level of biases when deciding to start a venture may not cope with the risks while venture is in progress. This, in turn, decreases the performance of the venture. It also demotivates individuals who wish to start the new venture. As pointed out by Simon et al. (2000), a further study could explore the relationship among cognitive biases, risk perception and venture performance with the objective of exploring why many start-ups fall short of the entrepreneurs' expectations. Most individuals perceive less risk while comparing the opportunity costs of alternative employment. It is due to their education and their past successes (Keh et al. 2002). To overcome this kind of issues, in addition to the systematic research, one has to seek views and advice from the experts in the respective field. In addition, one may take group decisions instead of taking decisions on his or her own (Russo and Schoemaker 1992). Else, they have also to prepare

themselves to face risk that may arise from uncontrollable external factors and remember those experiences while making next decisions. Even though current scenario is considered a knowledge era, one should pay more attention and care to the reliability and validity of any information before making important decisions based on such information. Schwenk (1986) and Busenitz and Barney 1997a, b) suggested that cognitive biases should not be minimised, since they are the motivational factors to start a venture. However, if they are not minimised, one may enter a risky venture unknowingly. Therefore, it is suggested that one should pay careful attention to cognitive biases and their level of influences on one's decision for successful decision making.

Directions for future research

As stated above, this study investigated only four cognitive biases in a specific context. The authors believe that the findings of this study can be complemented by further investigation on the following areas: Research could be taken up on entrepreneurs and also by adding some more variables like self-efficacy, affect infusion, escalation of commitment, attributional styles, self-esteem and belief in the law of small numbers. This study could explore decision environment as a mediator or moderator of the relationship between cognitive biases and new venture formation. This study could also examine the influence of counterfactual thinking on new venture formation and when and why entrepreneurs think differently than others as done by Baron (1998). A study could be undertaken on opportunity evaluation under risky condition as done by Keh et al. (2002), continuation of a project as done by Keil et al. (2000), and introduction of new products as done by Simon and Houghton (2003). The results of the above studies could be compared with the results of studies on managers by Mullins et al. (2002) and Busenitz and Barney (1997a, b). It is a known fact that India as a country has a rich tradition and different cultures. This study could focus on how the cultural differences (Boris Urban, 2004), prior experience (Zhai, 2007), social capital (Carolis and Saparito 2006; Carolis et al 2009), alertness and social networks (Singh et al. 1999), impact on entrepreneurial intentions and decision making process. The area is very vast. The present research adds value to the existing literature and taken an initial step towards the understanding the research topic in the Indian context. The unexplored area motivates us to do more research on this area.

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