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Investigating the Mediating Role of Reflective Identity in the Relationship Between Neuroeconomics and Entrepreneurial Decision-Making

Farshid Khajeh Mahmood[1] **Aleme Keikha[2]** **Mehdi Zivdar[3]**

[1.] M.A in Enterepreneurship, Department of Enterepreneurship, Faculty of Management and Economics, University of Sistan and Baluchestan, Zahedan, Iran. E-mail: farshid.khajehmahmood@gmail.com

[2.] Corresponding Author, Associate Professor, Department of Enterepreneurship, Faculty of Management and Economics, University of Sistan and Baluchestan, Zahedan, Iran. E-mail: aleme.keikha@entp.usb.ac.ir

[3.] Assistant Professor, Department of Enterepreneurship, Faculty of Management and Economics, University of Sistan and Baluchestan, Zahedan, Iran. E-mail: mehdizivdar@entp.usb.ac.ir.

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Abstract:

Objective: "The present study aims to investigate the mediating role of reflective identity in the relationship between neuroeconomics and entrepreneurial decision-making in entrepreneurs based in Zahedan Science and Technology Park.

Methods: The research method is applied in terms of purpose and descriptive survey based on structural equation modeling in terms of nature and procedure. A questionnaire was used to collect field data. The face and content validity of the questionnaire was confirmed by experts and the construct validity was calculated using confirmatory factor analysis. The reliability of the research tools was calculated using Cranach's alpha test and a composite reliability higher than 0.7 was achieved, which reveals the appropriate validity of the research tools. The statistical population of the research consists of 110 entrepreneurs based in the Science and Technology Park of Zahedan. Morgan's table was applied to determine the sample size, and 86 individuals were selected as the statistical sample by using simple randomization. For analyzing the research data and answering the research hypotheses, SPSS23 and SmartPLS software and the structural equation modeling test were used.

Results: The research findings indicated that reflective identity has a mediating role in the relationship between neuroeconomics and entrepreneurial decision-making of the entrepreneurs based in the

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Zahedan Science and Technology Park.
Conclusions: It should be mentioned that a better understanding of the issues pertaining to the upcoming choices for entrepreneurs will lead to better decisions. Therefore, this understanding of the neural basis of decision-making can lead to entrepreneurial decision-making in a special way, which often includes risky choices under conditions of uncertainty.

1. Introduction

Behavioral economics is a field of economics that resolves the anomalies caused by the integration of social, cognitive and emotional factors in understanding people's economic decisions because neuro-based economics, neuroeconomics, economic psychology, or in other words neuroscience-based economics is an interdisciplinary discipline that aims to explain human decision-making, the ability to process different alternatives and follow a course of activity. Neuro-based economics studies how economic behavior can be formed under the influence of brain mechanisms, and how neuroscience findings can justify economic models (Abbasian & Nasrindost, 2012). Neuro-based economics combines the research of neuroscience, behavioral and experimental economics, and cognitive and social psychology (Levallois & et al, 2012), so it can be said that neuroeconomics adds another layer by using neuroscientific methods in understanding the interaction between behavioral economics and neural mechanism. Some researchers claim that, by using various tools of these disciplines, neuro-based economics can be a more integrated way to understand decision-making and reception and perception of rewards by the brain during decision-making, because in these discussions, human behavior is evaluated based on risk classification and its effects (Kenning & Plassmann, 2005). According to the definition of Schumacher (1993), the entrepreneurial decision-making process consists of "willful choices with quick reactions in issues that basically affect the survival and nature of the organization". From the perspective of researchers such as Casson (1992), Bosnitz (1999) and Ivanova and Gikas (2003), the entrepreneurial decision-making process is based on a descriptive and qualitative approach, and the classical and neoclassical normative views of rational decision-making are contrary to the behavior of entrepreneurs. Therefore, it is very important to investigate the role of neuro-based economics in making entrepreneurial decisions. According to Gustafson (2009), since the entrepreneurial environment is an environment of uncertainty, entrepreneurs' thinking and decision-making occurs under conditions of uncertainty, and in such conditions, they are forced to choose among the available solutions and output options, considering the various actions or states resulting from it. Such an action is not possible based solely on rational approaches; therefore, entrepreneurs turn to qualitative, subjective and intuitive analyses based on the epistemological approach. On the other hand, the researchers' findings reveal that the success of

businesses is highly dependent on the decision-making techniques and processes of their managers (Gigcus & et al, 2010). In fact, the decisions made by business owners are the essence and heart of entrepreneurship in their businesses (De Kort & Vermeulen, 2010). According to researchers such as Gikas et al. (2010), Vermeulen and Corceau (2010) and Bosnitz (1999), business owners' decision-making follows entrepreneurial decision-making process. Because such decisions basically affect the survival and nature of the organization, they guide the organization towards the future and shape the path towards permanence in the market environment. Despite the importance of the entrepreneurial decision-making process, Corceau et al. (2010) have pointed out that most of the previous studies in this field is focused on explaining the rational decision-making processes and procedures of managers in large and multinational companies. Meanwhile, some researchers, including Gikas et al. (2010) and Bosnitz and Barney (1997), have concluded that entrepreneurs, unlike managers, do not follow rational and logical rules and principles in their decision-making process, and the entrepreneurial decision-making process in small businesses is different from managers' decisions so that the existing patterns and frameworks cannot describe these processes.

The researchers in the field of entrepreneurship have found normative models and theories unable to answer the questions pertaining to the decision-making process of entrepreneurs, and believe that entrepreneurs in the real world make decisions without information or with irrelevant information, and they have insufficient time for decision-making especially for analysis. Therefore, relying on traditional views in entrepreneurship destroys any kind of opportunity and situation that leads to the creativity of entrepreneurs and their confrontation with ambiguity or coordination with environmental changes, and the unusual and irrational decision-making of entrepreneurs cannot be the driving force of growth and development (Gustafson, 2009). In this regard, Iverson and Jorgensen (2008) also believe that entrepreneurs are often forced to make their decisions without access to historical trends, documentation and sufficient information about the market.

On the other hand, identity has long been used as a term to understand entrepreneurial experiences, struggles, and meaning-making (Ha & Gimeno, 2015). Identity is one of the important concepts in the fields of psychology, sociology, philosophy and political sciences, which has gained special importance in recent decades, especially under the influence of globalization, and is comprised of a set of meanings that a person uses within a social role or position to express who he is (Rostamiyan & et al, 2018). In addition to its constituent elements, reflective identity also has various dimensions, including social, historical, geographical, political, religious, cultural, language, and literary dimensions. Each of these dimensions has its own importance in the formation

and identification of identity (Ghannadi & et al, 2018). Therefore, the term "identity work" was invented to show that identity is not just an internal state formed by an autonomous person, but is created through the regulatory dynamics of social structures and discourses (Ha & Gimeno, 2015). Also, with the introduction of identity theory in the field of entrepreneurship, the idea was raised that maybe certain people and not all people have an identity that creates entrepreneurial behaviors (Ghannadi & et al, 2018), because behaviors are influenced by human identities, and even according to McGall and Simon (1996), identities are the primary sources of motivation for human behavior. Also, many researchers believe that identity is the root of passion, and entrepreneurial passion and reflective entrepreneurial identity are linked together (Ghannadi & et al, 2018).

In general, with the introduction of identity theory in the field of entrepreneurship, the idea was raised that some people may have an entrepreneurial identity, which is responsible for motivating and stimulating people's behaviors (Murnieks & Mosakowski, 2007). Regarding reflective identity, it is worth considering that entrepreneurs have a strong sense of self and tend to consider themselves different from non-entrepreneurs. This point indicates that entrepreneurs distinguish between the entrepreneurial role and other social roles and have a deep understanding of themselves (Farmer & et al, 2007). This reflective identity can internalize external meanings related to the entrepreneurial role of people and turn them into self-concept. Therefore, this is where a person considers himself an entrepreneur (Murnieks & et al, 2014). Thus, entrepreneurial identity represents a powerful driving force that can help explain people's entrepreneurial activities, and research shows that it is related to a variety of new investment decisions. Although identity may imply some degree of temporal stability, personal factors and social interactions may change it (Belchior & Castro-Silva, 2023). Therefore, considering the important role of decision-making in entrepreneurship and the reflective entrepreneurial identity that an entrepreneur exhibits, the researchers in the present study seek to answer the question whether reflective identity plays a mediating role in the relationship between neuroeconomics and entrepreneurial decision-making or not.

2. Literature review

2.1 Neuroeconomics

Neuroscience techniques and knowledge was first used in economic analysis by Camerer & et al (Camerer, Loewenstein, & Prelec, 2004). Neuro-based economics studies the fact that different areas of the human brain play a role in different types of human decision-making, especially economic decisions, and the activity of those areas definitely reveals people's thoughts in economic issues, and can guide economic models (Konovalov, A., & Krajbich, 2019). Neuro-based economics combines neuroscience research, behavioral and experimental

economics, and cognitive and social psychology (Glimcher, 2013). Neuroeconomics studies decision-making by combining the tools of different disciplines to avoid the shortcomings of a single-perspective approach (Lytvyn & et al, 2023). Therefore, neuroeconomics has been proposed to further develop conventional theories in economics. For example, rational choice theory suggests that investors evaluate risks objectively and react to them with a rational approach (Weirich, 2020). However, this approach tends to minimize the role of the decision-maker and the complex process that takes place in the brain. In addition, neuroeconomics overcomes this limitation by introducing cases from psychology where people do not demonstrate economic rational choice theory or maximize utility. From this point of view, neuroeconomics aims to shed light on those neural patterns that occur in humans and explain decisions in economics and at the same time predict the future of economics. For example, how emotions influence decisions, or how the brain reacts to losses and gains (Prots et al., 2022). Therefore, neuroeconomics has emerged to resolve the anomalies created by the integration of social, cognitive and emotional factors in the understanding of economic decisions. So, it can be said that neuroeconomics has added another layer by using neuroscientific methods in understanding the interaction between behavioral economics and neural mechanism (Weirich, 2020). Some researchers also claim that neuroeconomics offers a more integrated way to understand decision-making. In these discussions, human behavior is evaluated under the banner of risk classification, the effectiveness and impact of actions, and how the brain receives and perceives rewards in decision-making (Raj, Priya, & Pathak, 2023).

Therefore, it can be said that the basis of neuroeconomics is the need to fill specific gaps in conventional economic theories. By studying the relationships between economic decisions and observable phenomena in the brain, neuroeconomics tries to gain awareness of the mechanisms that motivate people and can help better predict the future of the economy. Neuroeconomics provides insight into why humans may not consciously act to optimize profits and avoid financial problems. It is commonly believed that emotions deeply influence people's decision-making (Bashir & et al, 2023).

Also, neuroeconomics helps business management by examining the brain processes that underlie decision-making. For example, it is important for a business leader to understand why customers prefer one product over another. Furthermore, neuroscience can help explain why business leaders make certain decisions. Neuroscience can also help find answers too many questions related to business, such as "How can we make the best decisions?", "How can we identify the most productive parts of the brain?", and "How can we encourage the brain to be creative?" (Raj, Priya, & Pathak, 2023).

Finally, it can be said that neuroscience-based economics is introduced in order to understand the motivations and factors affecting the decision-making of economic agents. Therefore, the primary task of economics based on neuroscience is to collect information related to the behavior of a set of neurons and how they interact to create an economic decision (Dickhaut & Ructichini, 2008). Other goals can also be proposed for the economics based on neuroscience, such as an algorithmic description of the human mechanism of choice (Glimcher & et al, 2009), explaining how brain chooses, and understanding the decision-making processes that animals and humans use in order to choose actions that are exposed to reward and punishment (Niv & Montague, 2009). Finally, the broad picture that Smith (2003) depicts of economics based on neuroscience is that: "Economics based on neuroscience is about the study of the relationship between how the mental activity of the brain, the internal order of the brain, and behaviors in (1) personal decision-making, (2) social exchange, and (3) institutions such as the market (Bashir & et al, 2023).

2.2 Entrepreneurial decision-making

The word “entrepreneurial decision” is from the French root *entrepreneur*, which means undertaking a task (Ahmadpour & Moghimi, 2019). Over time, this word has undergone transformation and has found new concepts, along with the evolution of production methods and social values, and new theoretical concepts have been taken into consideration in the study of entrepreneurial processes and business entrepreneurship (An & et al, 2020). Therefore, the process of entrepreneurship and the activities of entrepreneurs need decision-making, and entrepreneurs need different behavioral methods in decision-making when faced with uncertainties in entrepreneurial processes and achieving goals (Reymen & et al, 2017). So, the process of entrepreneurial decision-making in organizations seems to be very necessary, due to the competitive environment of today's world, which forces organizations to try not to fall behind their competitors and to survive in the competition circle. Therefore, the entrepreneurial decision-making process helps the entrepreneur to make decisions with the help of tools such as knowledge, skills, abilities and communication networks, and this has an effect on controlling rather than predicting the future (Hauser & et al, 2020). Therefore, it can be said that entrepreneurial decision-making to create new businesses has a creative and effective nature, and the changes that follow can lead to the emergence of new goals, paths and tools. Also, in the process of entrepreneurial decision-making, the goals are not completely and precisely defined in advance, but emerge during the process (Sarasvathy & et al, 2013). Therefore, the assumption of complete and absolute knowledge or tacit knowledge about objective realities in predetermined paths to achieve certain goals does not exist, and it is the entrepreneur who, as designer of the future, creates new goals and paths with his effective decisions and actions (McMullen, 2015).

2.3 Reflective identity

Literally, identity means truth and nature of something. In other words, identity is the answer to the question of who to be and how to be (Mousavi, 2016). In another definition; identity is a set of basic social, cultural, psychological, biological and historical features and specifications that indicate the nature or essence of the group in the sense of the unity or similarity of its members with each other, and distinguish them distinctly and acceptably and knowingly from other groups and people belonging to them in a specific time and place. Therefore, personal identity is depicted as a personality characteristic of a person. Since people spend a significant part of their lives at work, unique individual characteristics related to work, group membership, and social roles can also create a work identity, such as an entrepreneurial reflective identity (Miscenko & Day, 2016).

Reflective identity also refers to people's experience and understanding of themselves, and the social and cultural connections related to different social groups. From the perspective of entrepreneurship, reflective identity also refers to matching and correspondence of businesses to the values, needs and expectations of the customers' community. In this point of view, the property or owner of entrepreneurship may be a business, brand, or businessman who tries to create a meaningful and suitable identity for its customers according to the reflective identity (Grimes, 2018).

Based on the definition of identity, the concept of reflective identity in entrepreneurship also has various elements. According to Huang and Gimno (2015), entrepreneurial identity refers to the set of values, beliefs, attitudes and behaviors that enable a person to play an entrepreneurial role. Wagenschwanz (2021) believes that the identity of entrepreneurs is "the identity content at the individual level and the individual structure that creates a new venture" (Wagenschwanz, 2021).

The dimensions of reflective identity in entrepreneurship can include matching with values and skills, interactions with customers, communication with cultural and social aspects of the target community, and even influencing the environment. Therefore, reflective identity in entrepreneurship shows the effort to create a meaningful match and connection with customers and the surrounding environment to establish a business. It can also be said that this focus on reflective identity is consistent with the theory of decision-making in entrepreneurship and contributes to it (Ferreira & et al, 2019). According to Farmer et al., an entrepreneur represents a powerful driving force that can explain why some people choose and continue entrepreneurial activity and why others do not." (Belchior & Castro-Silva, 2023).

Therefore, it can be said that entrepreneurial identity can explain entrepreneurial behaviors (Zuzul & Tripsas, 2020), new and important decisions, time

commitment (Murnieks et al., 2020), strategic responses and the ability to respond to adversity, opportunity evaluation, resource acquisition, motivations, behaviors, and related outcomes. Therefore, studying the issue of identity in entrepreneurship is important, because it allows us to better understand these people and the process of establishing a company (Belchior & Castro-Silva, 2023).

Regarding the background of the research, it should be mentioned that Valdes and Lopez (2023) in research entitled "Investigation of entrepreneurship competencies in undergraduate education with a focus on decision-making" concluded that the current decision-making interventions in educational systems are not consistent with the frameworks of entrepreneurship competencies. Therefore, focusing on knowledge, attitude and skills to deal with uncertainty, ambiguity and risk can be effective in the process of entrepreneurial decision-making and its learning in students.

Acharya and Barry (2023), in a study titled "Traits, Behaviors and Attitudes in Entrepreneurial Decision-making: Current Research and Future Directions" concluded that an entrepreneur is likely to use a personal cognitive framework that develops over time through the interaction of several contextual variables and psychological characteristics, including personal characteristics and attitudes, to make decisions. While past studies have shown the importance of these behaviors in new venture creation, they are far from providing a comprehensive model of the role of personal characteristics, behaviors, and attitudes in entrepreneurial decision-making.

Belchior and Castro-Silva (2023) in their research titled "Identity Cycle and Entrepreneurial Experience - A Longitudinal Analysis" concluded that past entrepreneurial identity ideals predict identity ideals 11 years later. Also, the results of their research showed that, while previous successful entrepreneurial experiences positively affect the current identity, unsuccessful experiences do not reduce them.

Wang et al. (2021) in their research entitled "Entrepreneurial decision-making and family social capital" in the context of Chinese family firms concluded that entrepreneurial decision-making in family firms is dependent on the intersection of cognition, emotions and social influence, which leads to deep understanding of the effect of family social capital on entrepreneurial decision-making.

In their research, Ma & et al. (2020) conducted a study titled "examination of entrepreneurial decision-making under risk". They examined how entrepreneurs can make different decisions compared to non-entrepreneurs with the same opportunities. The results indicated that entrepreneurs and non-entrepreneurs evaluate opportunities differently.

Zulu et al. (2021), in research titled "Entrepreneurial passion, orientation and behavior: the moderating role of linear and non-linear thinking styles", investigated the underlying mechanisms of entrepreneurs' passion, orientation

and behavior. The results of their research revealed that entrepreneurial passion is a very important factor involved in entrepreneurial orientation and in turn can affect strategic entrepreneurial behavior. In addition, the linear thinking style of entrepreneurs positively moderates the relationship between entrepreneurial passion and entrepreneurial behavior, but cannot predict the relationship between passion and entrepreneurial orientation. Also, non-linear thinking style positively moderates the relationship between entrepreneurs' passion and orientation, but does not moderate the relationship between orientation and strategic entrepreneurial behavior.

Krass and Panoquin (2011) investigated "Neuroeconomics, decision-making and rationality". They concluded that the tools of neuroscience allow us to approach the problem of decision-making and, in particular, they can illuminate the rationality of hedonic choices, be it consumption decisions, decisions in social interaction, intertemporal choices, decisions at risk, or decisions in uncertainty. Neuroscience actually makes it possible to distinguish between internal rationality and external rationality, so it seems that if choices are motivated by emotional considerations, especially the taste for reward as well as the aversion to pain or punishment or motivation, the decision often results from neural and psychological considerations.

Based on the theoretical foundations and review of literature, the research hypothesis of the present study is that "Reflective identity plays a mediating role in the relationship between neuroeconomics and entrepreneurial decision-making of entrepreneurs located in Zahedan Science and Technology Park" and the conceptual model of the research is presented in the form of Figure 1.

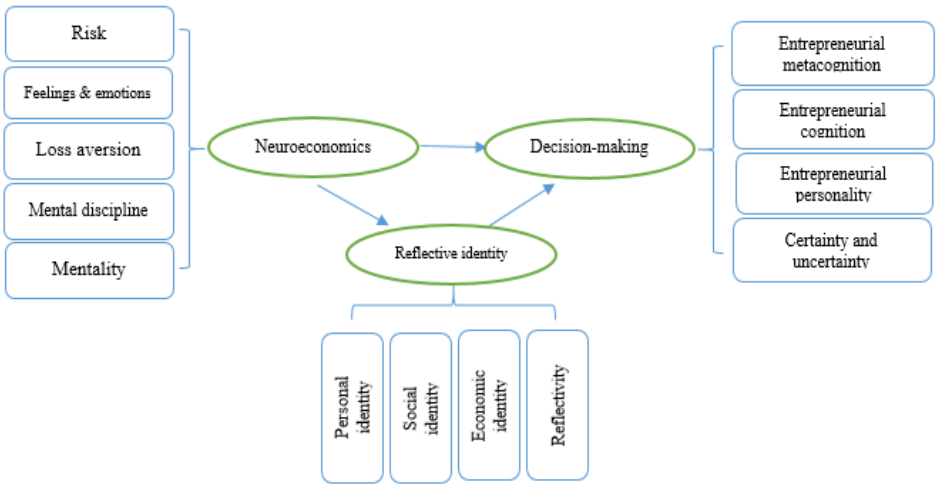


Figure 1. Conceptual model of the research

3. Research Methodology

The present research is practical in terms of purpose, and a descriptive-survey with structural equation modeling approach in terms of procedure. In terms of the time of data collection, it is survey and cross-sectional. In terms of research type, the present study is a library and field research because scientific articles and books have been used to collect information, and field surveys and questionnaires have been used to check the research hypothesis. Regarding the research statistical population, researchers used a meta-positivist philosophical premise that led them to a comparative reasoning approach. Using strategies such as describing conditions or testing phenomena, the researchers were obliged to follow the proposed theories governing the selection of the research population and sample (Sarstedt, Bengart, Shaltoni, & Lehmann, 2018) and to follow tactics that can in practice lead the researcher to the powerful generalization of the results from a representative sample to a wider population (Creswell & Creswell, 2018). A total number of 110 entrepreneurs based in the science and technology park of Zahedan City were selected as the target population. Using the Karjesi and Morgan table and the simple random sampling method, 86 people were selected as statistical sample.

In order to collect data at the level of library studies, the researcher reviewed books, related publications, research projects and electronic information sources, especially quality articles, as well as some university websites and other active and approved websites. At the field level, the questionnaires including neuroeconomics questionnaire with 20 items and components of "risk, feelings and emotions, loss aversion, mental discipline and mentality"; reflective identity questionnaire with 16 items and components of "personal identity, social identity, economic and business identity, and emotional reflexivity"; and the entrepreneurial decision questionnaire with 16 items and components of "entrepreneurial metacognition, entrepreneurial cognition, entrepreneurial personality and certainty and uncertainty" was used based on a five-point Likert scale. In order to prove the formal and content validity of the research tools (questionnaire writing style, clarity, difficulty level, length, etc.), the questionnaires were given to a number of experts, and the feedbacks received from the pre-test and the opinions of the experts yielded acceptable results and were used to determine the construct validity. Construct validity refers to the ability of the components of the scale to form a coherent whole (like a system) for measurement, and sometimes it is also called factor validity, which refers to the appropriate fit of the path model. This type of research validity was also confirmed.

Table 1. Results of factor analysis and validity of research tools

Factor	Factor analysis indicators	Acceptance level	Value
Neuroeconomics	KMO	>0.6	0.806
	Bartlet's Sig	<0.05	0.000
Entrepreneurial decision-making	KMO	>0.6	0.810
	Bartlet's Sig	<0.05	0.000
Reflective identity	KMO	>0.6	0.807
	Bartlet's Sig	<0.05	0.000

Table 2. Validity and reliability of research tools

Variable	Components	Cross-sectional construct validity	Convergent validity	Composite reliability	Average variance extracted
Neuroeconomics	Risk	0.08	0.641	0.709	0.544
	Feelings and emotions	0.07	0.899	0.731	0.567
	Loss aversion	0.117	0.940	0.711	0.588
	Mental discipline	0.233	0.986	0.763	0.705
	Mentality	0.111	0.811	0.745	0.645
Entrepreneurial decision-making	Entrepreneurial metacognition	0.054	0.829	0.768	0.628
	Entrepreneurial knowledge	0.109	0.771	0.793	0.786
	Entrepreneurial personality	0.07	0.712	0.719	0.602
	Certainty and uncertainty	0.05	0.931	0.752	0.587
Reflective identity	Personal identity	0.102	0.945	0.788	0.634
	Social Identity	0.154	0.988	0.783	0.720
	Economic identity	0.09	0.823	0.768	0.702
	Emotional reflexivity	0.047	0.802	0.800	0.699

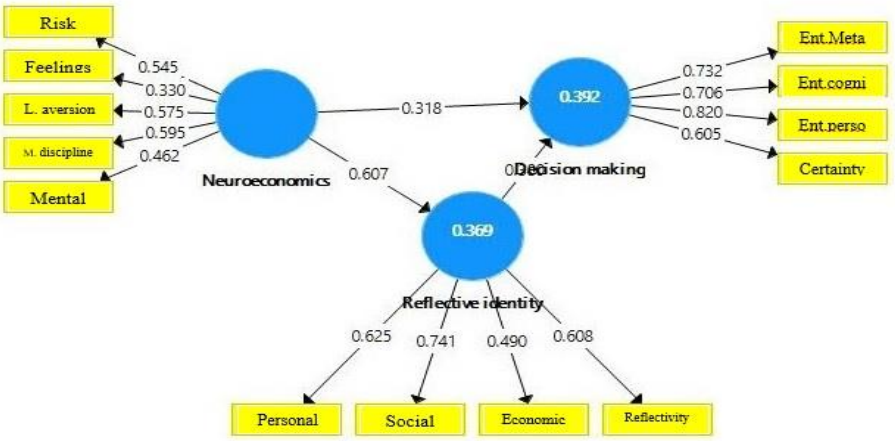


Figure 2. Standard coefficients of factor load

As seen in Tables 1 and 2 and Figure 2, the results of the research indicate that the factor analysis indicators in the research questionnaires are at an acceptable level; therefore, it can be concluded that the research questionnaires have good validity. Also, in order to calculate the reliability of the research tools, Cronbach's alpha test was used, and the Cronbach's alpha coefficient for the neuroeconomics questionnaire was estimated as 0.852, entrepreneurial decision-making as 0.791, and reflective identity as 0.821. These values indicate that the research questionnaires have very good reliability. The model is of good quality, because the cross-validity of the research variables is positive, Cronbach's alpha and composite reliability are more than 0.7, and the average variances extracted are more than 0.5. Therefore, reliability and convergent validity are acceptable. Finally, in order to analyze the research data and to determine the validity and reliability of the research tools, the confirmatory factor analysis test was used, and to answer the research hypothesis, structural equation modeling and Smart PLS3 and SPSS23 software were applied.

4. Model estimation and results

In order to check the research hypothesis, structural equation modeling and Smart PLS software were used. It should be noted that in order to use the structural equation modeling method, first of all, the accuracy of the relationships in the measurement models should be checked using reliability and validity criteria. Then, the existing relationships in the structural part are examined and interpreted and in the final stage, the overall fit of the research model is examined. It is important to mention that the relations of the structural part are meaningful and can be interpreted only if the relations and values of the measurement models are acceptable. Therefore, the results of "investigating the

mediating role of reflective identity in the relationship between neuroeconomics and entrepreneurial decision-making" are presented as follows

4.1 Structural model fit

To check the fit of the structural model, significant coefficients z (t-values); R Square measure; f2 effect size criterion, and Q2 criterion was used. It should be noted that the path coefficients must be significant at least at the confidence level of 0.5 (that is, greater than 1.96), which can be seen using the bootstrap technique on the model. If this value is greater than 1.96, it indicates the correctness of the relationship between the constructs and as a result, the research hypothesis is confirmed at the level of 0.95. Regarding the R2 criterion, it should be mentioned that this criterion measures the relationship between the explained variance of a hidden variable and the total variance. This criterion is used to check the fit of the structural model in research. Regarding the Q2 criterion, it should be mentioned that if the relationships between the constructs are defined correctly in a model, the constructs will have a sufficient impact on each other's' indicators, and in this way, the hypotheses will be correctly verified. The value of Q2 should be calculated for all the endogenous constructs of the model and its result should be given in the interpretation section of the model. If the value of Q2 becomes zero or less than zero in the case of an endogenous construct, it indicates that the relationships among other constructs in the model and the endogenous construct are not well explained, and as a result, the model needs to be modified.

Table 3. Criterion Q2

Variable	Q2
Neuroeconomics	-
Reflective identity	0.36
Entrepreneurial decision-making	0.39

As can be seen in Table 3, the values of Q2 for the endogenous variables are in the average range, so the values of the structural model of the research are confirmed in terms of the prediction and explanation of the dependent constructs.

Redundancy criterion; this criterion is obtained from the multiplication of common values (common values related to each indicator are obtained through the average of the second order of the relationship between that indicator and the related construct, which are the factor loadings of the constructs by their corresponding R2 values. It shows the amount of variability of the indicators of an endogenous construct that is affected by one or more exogenous constructs.

Communality (shared values): This value is obtained from the average of the squared factor loadings of each variable.

Redundancy: It is obtained from the multiplication of dependent variables of R Square model and Communality. As can be seen, for example, the reflective identity variable is affected by 0.24 of the exogenous variables of the model.

Table 4. Redundancy criterion

Indicator	Entrepreneurial decision-making	Reflexive identity	Neuroeconomics
Q2	0.39	0.36	-
Communality	0.603	0.0641	0.055
Redundancy	0.29	0.24	0.35

4.2 Test of relationships among variables

In order to examine the research hypothesis, the variance-based structural equation modeling approach was used, and the independent and dependent variables of the research were entered into the structural equation model as latent variables and in the form of first-order factor models. The estimates related to the general evaluation indicators of the structural equation model and the main parameters of the model (direct and indirect effects of neuroeconomic variables on entrepreneurial decision-making with the mediating role of reflective identity) is reported in the following figures and tables:

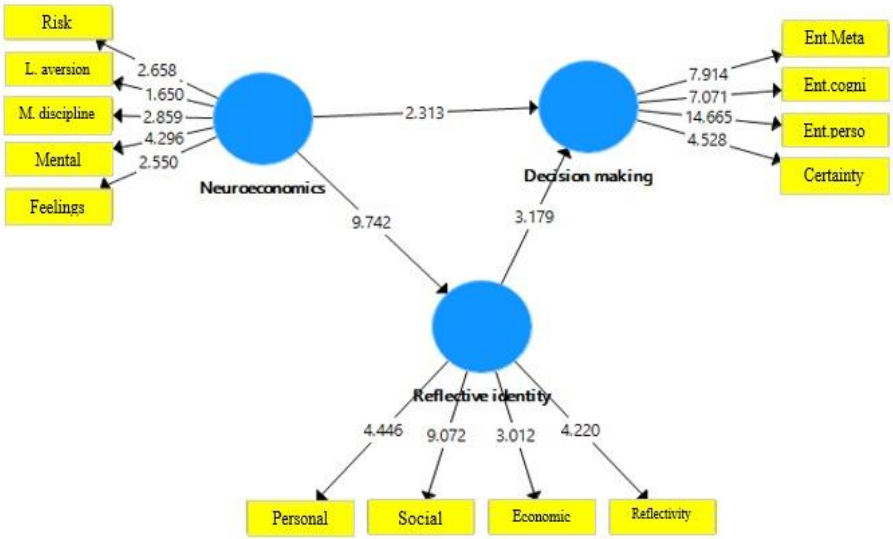


Figure 3. The structural model of the research in the case of significant coefficients

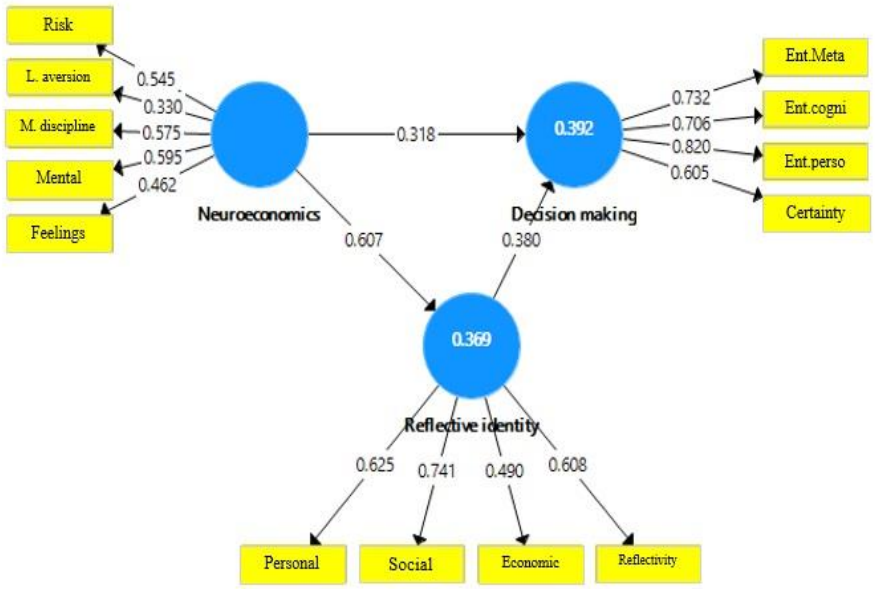


Figure 4. The structural model of the research in the case of standard coefficients

The results obtained from Figures 3 and 4 show that the value of the T statistic and the standard coefficients obtained from the relationship between the variables are higher than 1.96, which confirm the main hypothesis of the research.

Table 5. Evaluation indicators of the generality of the structural equation model

Indicator	NFI[3]	SRMR[2]	GOF[1]
Value	0.901	0.052	0.46

Based on the results of the above table, the overall evaluation indicators of the structural equation model show that the data supports the theoretical model of the research. In other words, the fit of the data to the model is confirmed and all the indicators show the desirability of the structural equation model.

[1] Regarding the GOF indicator, values less than 0.10 indicate poor fit, 0.25 mean fit, and values more than 0.36 indicate good fit.
[2] - The value of this indicator should be less than 0.10.
[3] - The optimal value for this indicator is higher than 0.90.

Table 6. Estimation of total, direct and indirect effects of research variables

Independent variable	Mediating variable	Dependent variable	Coefficient of determination	Estimation					
				Total		Direct		Indirect	
				Effect	P	Effect	P	Effect	P
Neuroeconomics	Reflective identity	Entrepreneurial decision-making	0.369	0.837	0.001	0.607	0.001	0.230	0.001
Reflective identity	-			0.318	0.001	0.318	0.001	-	-

According to the estimated values in table 6, it can be concluded that the variables of neuroeconomics and reflective identity explain 36.9% of the variance of the entrepreneurial decision-making variable. Based on the values of effect size, the coefficient of determination of this value is estimated as medium; As a result, it can be said that neuroeconomics and reflective identity can explain the variance of the entrepreneurial decision-making.

The indirect effect of neuroeconomics on entrepreneurial decision-making is statistically significant ($p < 0.05$). Therefore, it can be concluded that reflective identity plays a mediating role in the relationship between neuroeconomics and entrepreneurial decision-making, considering that the direct effect of the neuroeconomics on entrepreneurial decision-making is also statistically significant as a result of mediation. Reflective identity is estimated as a partial mediator, and finally, considering the value of the indirect effect coefficient of neuroeconomics on entrepreneurial decision-making, this direct effect is estimated at medium level.

Regarding the research hypothesis that "neuroeconomics has an effect on the entrepreneurial decision-making of entrepreneurs located in Zahedan Science and Technology Park", the estimates related to the evaluation indicators of the model's generality and the main parameters of this model (the effect of neuroeconomics on entrepreneurial decision-making) are as described below.

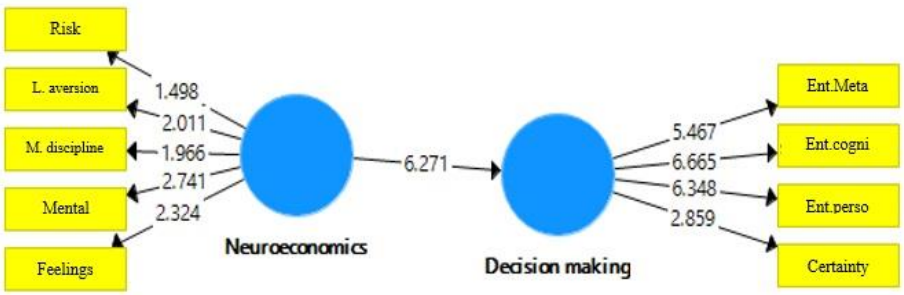


Figure 5. Structural equation model of the effect of neuroeconomics on Entrepreneurial decision-making in a meaningful state

The results obtained from Figure 5 show that the value of T statistic obtained from the relationship between neuroeconomics and entrepreneurial decision-making is equal to 6.21 and because this value is greater than 1.96, therefore the relationship between the two variables is significant.

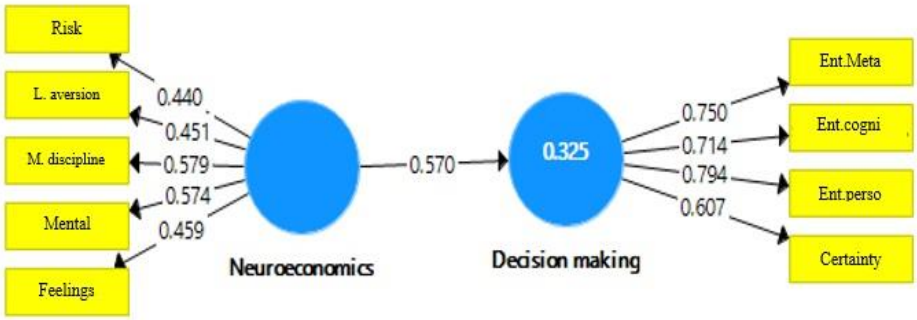


Figure 6. Structural equation model of the effect of neuroeconomics On entrepreneurial decision-making in the case of standard coefficients

Table 7. Evaluation indicators of the generality of the structural equation model

Indicator	NFI	SRMR	GOF
Value	0.93	0.056	0.50

The overall evaluation indicators of the structural equation model regarding the effect of neuroeconomics on entrepreneurial decision-making reveal that the data supports the theoretical model of the research. In other words, the fit of the data to the model is confirmed and the indicators show the desirability of the structural equation model.

Table 8. Estimating the effect of neuroeconomic components on entrepreneurial decision-making

Independent variable	Path	Dependent variable	Coefficient of determination	Effect size	T value	Significance level
Neuroeconomics	……>	Entrepreneurial decision-making	0.325	0.570	6.21	0.001

Regarding the results of table 8, we can conclude that: 1) neuroeconomics explains a total of 32.5% of the variance of entrepreneurial decision-making. According to the effect size values, the coefficient of determination of this value is estimated at the medium level. In other words, neuroeconomics can explain the

variance of entrepreneurial decision-making at medium level. 2) The effect of neuroeconomics on the entrepreneurial decision-making is statistically significant ($p \geq 0.05$). Therefore, the hypothesis of the research that neuroeconomics has an effect on the entrepreneurial decision-making of entrepreneurs located in Zahedan Science and Technology Park is confirmed. By considering the value of the coefficient related to the effect of neuroeconomics on entrepreneurial decision-making, it can be said that this effect is direct and moderate. This is to say that neural and behavioral economics can lead to the strengthening or increase of entrepreneurial decision-making and, on the contrary, weakening of the neuroeconomics can lead to the reduction or weakening of entrepreneurial decision-making.

5. Conclusion and Recommendations

The main motive for conducting the current research and the main concern of the researchers was to answer the question whether neuro-based economics can help in making better models of economic decision-making? Does the reflective identity formed by entrepreneurs play a role in this process? The results of the research showed that the context of decision-making is mainly related to the process by which people choose one option among many options. These processes are generally assumed to be carried out in a logical manner, such that the decision itself is largely context-independent. Different options are first translated into a common currency and then compared with each other and the option with the highest total utility value is selected. While this economic view of decision-making is supported, there are also situations where the optimal decision hypothesis seems to be violated. Neuroeconomics is the result of this discrepancy. By determining which brain regions are active in which types of decision-making processes, neuroeconomics scientists hope to better understand the nature of what seems irrational and immoral; Therefore, in the present study, the researchers investigated the impact of neuroeconomics on entrepreneurial decision-making processes with the mediating role of reflective identity, and based on the results of the research hypothesis, it was revealed that neuroeconomics and reflective identity explain 36.9% of the variance of the entrepreneurial decision-making. As a result, neuroeconomics and reflective identity can explain the variance of the entrepreneurial decision-making. Also, the indirect effect of neuroeconomics on entrepreneurial decision-making was statistically significant ($p < 0.05$). Therefore, it can be said that reflective identity plays a mediating role in the relationship between the neuroeconomics and entrepreneurial decision-making, considering that the direct effect of neuroeconomics on entrepreneurial decision-making is also statistically significant as a result of the mediation of reflective identity which was estimated as partial mediation. Finally, by considering the coefficient value of the indirect effect of neuroeconomics on entrepreneurial decision-making, this effect was

direct and moderate. Also, the results of the research indicated that neuroeconomics explains a total of 32.5% of the variance of entrepreneurial decision-making. Based on the effect size values, the coefficient of determination of the value was estimated at the medium level. In other words, neuroeconomics could explain the variance of entrepreneurial decision-making at a moderate to high level, and considering the coefficient value of the effect of neuroeconomics on entrepreneurial decision-making, it can be said that this effect is direct and at a medium to high level.

In explaining the results of the present research, it can be said that neuroeconomics has the potential to provide entrepreneurs with valuable insights into decision-making processes. Based on the scientific foundations of neuro-based economics, it can be said that neuroscience-based economics is the introduction to understanding people's decision-making or how they behave, knowing how the brain reacts to information in uncertain conditions. The study of Pellet and Yotel (2018) in this area show that the nerves in the cingulate layer of the anterior cortex play a key role when making decisions in risk situations. This area is activated when there is ambiguity and uncertainty about the time or amount of reward. In some studies, the main role of the anterior cortex layer in decision-making in complex and risky situations has been pointed out, therefore, conducting various experiments and examining the states created in different brain areas can be a useful guide in theorizing about behavior in risky and ambiguous situations.

It should also be mentioned that a better understanding of the issues pertaining to the upcoming choices for entrepreneurs will lead to better decisions. Therefore, this understanding of the neural basis of decision-making can lead to entrepreneurial decision-making in a special way, which often includes risky choices under conditions of uncertainty. Also, reflective identity can play a prominent and obvious role in this process, because identity as an independent factor shows that the reflective identity of an entrepreneur and his perception of himself as an independent decision-maker can affect the relationship between his neural economic insights and actual entrepreneurial decisions. As a result, the integration of neuroeconomics and reflective identity can provide a more comprehensive understanding of entrepreneurial decision-making because by understanding the neural processes underlying entrepreneurial decisions and how an entrepreneur's perception affects these processes, researchers and practitioners can potentially develop more effective strategies to support and nurture successful entrepreneurs. Results of the present study are in line with the results of Davies (2010) who reported a significant relationship between the neuro-based economy and identity; Hijab (1401) who found a significant relationship between the uncertainty variable and the logic of decision-making, as well as the entrepreneurial outcomes (the relationship between uncertainty and

entrepreneurial outcomes was indirect); Hadavinia et al. (1400), who stated that economics plays a fundamental role in determining the place of beliefs in the micro-foundations of a person's decision-making; Abbaspour et al. (2019) who examined the role of entrepreneurial decision-making factors in creating new businesses and concluded that the common cognitive characteristics related to entrepreneurs' thinking play a role in entrepreneurs' decisions; Ma et al. (2020) who examined entrepreneurial decision-making under risk and concluded that entrepreneurs and non-entrepreneurs evaluate opportunities differently and that the subjective value model and probability weighting model have an effect on entrepreneurs' decision-making; Zulu, Riakti, Theron and Siapi (2020) who concluded that entrepreneurs can strengthen their entrepreneurial passion by trusting their non-linear thinking style (emotion, feelings and intuition), but in the direction of entrepreneurship, they should rely on their linear thinking style (rationality and consult) to increase the effect of their entrepreneurial orientation on strategic entrepreneurial behavior; and finally the research of Travis and Tani (2020) who concluded that there is a relationship among entrepreneurial characteristics, entrepreneurial motivations and entrepreneurial behaviors.

Therefore, based on the results of this research, it is suggested that entrepreneurs take advantage of psychological and behavioral counseling. This allows them to better understand their individual traits, mentality and identity, so they can make better decisions and minimize possible risks; Also, entrepreneurs should be aware that in order to promote entrepreneurial decision-making in the organization, there should be a coherent structure or framework in the organization, and the organization should never be indifferent to threats, and it should consider a way to deal with threats in its plan. It is suggested that in order to maintain their focus, entrepreneurs should continuously pay attention to the strategic plan, and if they realize that the results are not as expected during the implementation of a new idea, they should carefully check their risk and not consider unexpected conditions as a threat. They should look at risks as a new opportunity and practice precautionary plans so that they can be applied more usefully if necessary. Entrepreneurs should give employees the opportunity to personally decide how to achieve their goals and actually form an entrepreneurial team to create a common vision and understanding between managers and employees; It is also suggested to use the summary and analysis of the records as basic assumptions of the strategic plans as soon as there is a problem in the company's plans and consider the consequences before finalizing a decision. Entrepreneurs should honor the employees whose creative ideas lead to positive results in the organization; also, future researchers can examine the impact of the brain's decision-making and reward systems on the reflective identity of entrepreneurs and its role in their investment-related choices. Also, the correlation of risk-taking, opportunity identification and entrepreneurial decision-making with the mediating role of self-feeling and entrepreneurs' identity needs to be investigated.

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بررسی نقش میانجی هویت بازتابی در رابطه بین اقتصاد عصبی و تصمیم گیری کارآفرینانه

چکیده

هدف پژوهش حاضر، بررسی نقش میانجی هویت بازتابی در رابطه بین اقتصاد عصبی و تصمیم‌گیری کارآفرینانه در کارآفرینان مستقر در پارک علم و فناوری شهر زاهدان بود. روش پژوهش از بعد هدف کاربردی و از بعد ماهیت و روش اجرا، توصیفی پیمایشی با رویکرد مدل سازی معادلات ساختاری بود. جهت گردآوری داده‌های پژوهش در سطح میدانی از ابزار پرسشنامه استفاده گردید که روایی صوری و محتوایی پرسشنامه‌ها توسط خبرگان تایید و روایی سازه با استفاده از تحلیل عاملی محاسبه و تایید گردید، پایایی ابزارهای پژوهش نیز با استفاده از آزمون آلفای کرونباخ و پایایی ترکیبی بالاتر از 0.7 محاسبه گردید که حاکی از اعتبار مناسب ابزارهای پژوهش بود. جامعه آماری پژوهش نیز کارآفرینان مستقر در پارک علم و فناوری شهر زاهدان به تعداد 110 نفر بودند که جهت تعیین حجم نمونه از جدول مورگان استفاده شد و تعداد 86 نفر به روش تصادفی ساده به عنوان نمونه آماری انتخاب گردیدند. جهت تجزیه و تحلیل داده‌های پژوهش و پاسخ به فرضیه‌های پژوهش نیز از نرم افزارهای spss23 و Smart PLS و آزمون مدل سازی معادلات ساختاری استفاده گردید و نتایج پژوهش حاکی از آن بود که هویت بازتابی در رابطه بین اقتصاد عصبی و تصمیم‌گیری کارآفرینانه کارآفرینان مستقر در پارک علم و فناوری شهر زاهدان نقش میانجی دارد.

کلمات کلیدی: هویت بازتابی، اقتصاد عصبی، تصمیم گیری کارآفرینانه، کارآفرینان.